



# Income and Factor Markets under the 2003 CAP Reform – Workshop Proceedings

Editors: Adriana CRISTOIU, Jarmila CURTISS



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## ■ Executive Summary

The European Commission is currently evaluating the functioning of the 2003 reform of the Common Agricultural Policy (CAP), a process known as the 'health check'. Due to the analytical complexity of the policy evaluation and the need for both theoretical analysis and solid empirical work, the contribution of the research community to the policy debate are seen as essential (see Bascou and Münch in this report).

As part of the long-term co-operation between the Directorate-General for Agriculture and Rural Development and the Joint Research Centre, the Institute for Prospective Technological Studies organised an expert workshop in June 2007 entitled "Income and Factor Markets under the 2003 CAP Reform". The aim of the workshop was to provide a framework in which members of the academia could report and discuss the latest research findings relating to the 'health check' and in which policymakers could point out their needs for further research, particularly linked with the functioning of the current CAP. The workshop was organised around two broad topics: (a) the 2003 CAP reform (Pillar 1) effect on the income distribution among farm types (in terms of size and production orientation) and regions, and (b) the effect of decoupling direct payments on agricultural factor markets. This publication is a collection of short papers provided by the speakers as a background to their oral presentations.

Most of the research indicated that there were important variations of the 2003 CAP reform impact on farm income, depending on the implementation scheme of direct payments (e.g. following historical or regional references) and the degree of the decoupling applied (full or partial). Implementation of the single payment scheme, following the historical model, maintains the distribution of the first pillar budget fund among farmers unchanged, owing to the influence of previously received higher support in the reference period. The move from partial to full decoupling of direct payments brings positive income effects, removing

the distortions to competition in some sectors (e.g. beef sector within the EU). An overview of the results reported in several modelling exercises (e.g. CAPRI, AROPAj, FARMIS) suggests an overall positive income effect of implementing the 2003 CAP reform. Factors such as model specification, aggregation level, and target year and/or scenario assumption influence the absolute values reported by each modelling approach.

The workshop also offered grounds for presenting and discussing the decoupled policy support effects on land markets. Particularly, the possible capitalisation of the single payment into land prices and the land rent price increases came into the forefront of the policy debate. These could have an effect on the wealth distribution, adjustment capacity of the sector, and entry into and exit from the sector. Studies discussed in the workshop generally confirmed the land price effect of the SPS and pointed out differences depending, for example, on the SPS implementation chosen, on land market institutions, or linkages between the agricultural and other sectors all varying among MSs. Analyses presented based on simulation models showed that in countries where land markets are not constrained by regulations or institutions, the SPS leads to increasing rental land prices, especially for grassland, and therefore income transmission in favour of owners. The effect of the 'regional' SPS was shown larger than the effect of implementing the 'historical' SPS. The SPS activation constraint<sup>1</sup> linking the payment entitlements to land use was considered to be the main reason for the land/land rent prices effect of the single payment scheme. Higher land rent prices for operating farmers decrease the wealth effect of the reform and increase the net effect of off-farm labour. However, empirical studies illustrated that even in countries where the implementation of the SPS is more likely to stimulate structural changes and farmers are planning to exit earlier than they would have done under Agenda 2000, very little land is likely

<sup>1</sup> To receive the payment, the farmer is obliged to maintain land in agricultural use while the number of hectares has to be at least equal to the number of entitlements she/he holds.

to be abandoned as the demand for land for farm growth persists after the policy change.

Few empirical evidence exist to date regarding the 2003 CAP reform effects on the labour market, particularly on pluri-active farms and waged labour. Given that the reform is a combination of income payment and price decrease, theoretical expectations regarding these aspects depend, among others, on the relationship between leisure and farm work, and the separability of production and labour allocation decisions (e.g. in case of farmers engaged in off-farm work, if the two decisions are separable — and farm prices do not change — the introduction of decoupled payments will decrease their off-farm work). The overall effect of the CAP reform on waged labour is difficult to grasp as it depends on whether the decrease in total farm work (depending on the substitution effect between family and waged labour) is larger or smaller than the decrease in the farmer's on-farm work (depending on wealth effects of the reform). Owing to the modest empirical estimates reported so far, dramatic effects of the 2003 CAP reform on wage labour use and pluri-active farms are not to be expected. However, in the absence of clear-cut theoretical expectations, the analysis of the effects of the reform on the labour market would greatly benefit from additional empirical evidences.

The last topic covered during the workshop concerned the 2003 CAP reform effect on farm investment. The results of the studies presented implied that the ex-ante analysis of the reform effect on farm investment is a highly challenging task. Previous CAP reforms did not show as having a significant impact on aggregate investments. The same effect was expected for the 2003 CAP reform; nevertheless, farm-level investment differences and regional effects on farm investment were suggested as possibly occurring. Decoupled payments and a reduction of intervention prices were discussed to likely call for adjustments in the structure of farm production capacity, and thus for a change in the investment use of additional funds. However, these adjustments were only expected to take place slowly, as changes in production structures are linked to high sunk costs resulting from high agricultural assets specificity. At the same time, discussion results suggested that non-specific farm investments (i.e. in land) or off-farm investments will become more attractive. Furthermore, changes in intervention prices are expected

to introduce price volatility reducing investment incentives, while some Pillar 2 measures, such as interest rate reduction or subsidies to specific investments, can be expected to have a positive effect on on-farm investments.

Nevertheless, empirical studies suggested that reactions to the policy changes significantly vary among farms. This is based on results from surveys conducted in Italy, Germany, Poland, Spain, Greece, the Netherlands, France, and Hungary. Results indicated that operators of more efficient and expansion-oriented farms perceived decoupling as an opportunity for investment, while small, poorer performing farms viewed the introduction of the single farm payment scheme rather as an aid allowing production extensification. Based on evidence from the Czech Republic, investment behaviour significantly varied with farm characteristics such as farm ownership. Therefore, it was suggested that in new Member States with high ownership structure heterogeneity, the significant inflow of policy transfers after EU accession will have marked consequences for farm structural development.

Empirical studies of selected EU countries and regions that were brought to the attention in the workshop highlighted a marked heterogeneity of local conditions influencing the policy reform impacts. This marked heterogeneity called for caution when using the empirical results for drawing EU-wide level conclusions. Also results from ex-ante policy impact analyses suggested careful interpretation of quantified changes as presentations revealed a notable degree of variability in results among model specifications and/or levels of aggregation. Workshop participants identified a high need of (i) additional empirical work to contribute to the understanding of national/regional contexts and allow the build up of longer time series of observations, (ii) refinement of theoretical models, and (iii) extensions of analytical modelling tools to facilitate analyses of medium- and long-term effects of the CAP reforms on income, factor markets as well as other aspects of agriculture and development of EU rural areas.

## ■ Income and Factor Markets under the 2003 CAP Reform – The Policy Context

PIERRE BASCOU\* AND WOLFGANG MÜNCH\*

The Common Agricultural Policy (CAP) embarked on a wave of reform that started in 1992. This reform process was then strengthened in 1999 with the Agenda 2000 and deepened in 2003 with the start of a new process of fundamental reform. This reform process, which is now almost complete with the latest reform of the banana and fruit and vegetables common market organisations, aims at promoting the European Model of Agriculture, i.e. an agricultural sector which is competitive, sustainable, market-oriented, harmoniously integrated in rural areas and which meets society's concerns. The most important element of the reform is the introduction of the single payment scheme (SPS) and the decoupling of the vast majority of direct payments.

The medium-term policy framework can be expected to be shaped by the “health check”, i.e. a review of the implementation of the CAP reform in order to ensure that the CAP is working as it should and by the “review clause” of all aspects of EU spending, including the CAP, that is likely to address more long-term issues.

The “health check” includes a set of reporting obligations and review clauses over the 2006-2010 period (with a view to evaluate, correct, adapt and simplify where appropriate). They concern market measures (such as dried fodder, dairy, cotton, energy crops) as well as cross-compliance and farm advisory systems. The “health check” should also cover a review of the implementation of the SPS (degree of decoupling, decoupling model etc.), of policy instruments for market support as well as issues related to risk management. Finally, financial issues such as capping, modulation and degressivity could also be raised.

In this context, many policy issues will have to be addressed, including:

- The competitiveness of the farm sector (in relation to market and trade developments; farm income and profitability);
- Structural adjustment (capitalisation of support in the prices of production factors; value of agricultural assets; the role of rural development policy in facilitating structural changes);
- Transfer efficiency of farm support;
- Provision of public goods.

An examination of income developments and distribution over the last 25 years shows that the income gap between the agricultural and the non-farm sectors remains. Whether assessed in terms of disposable household income or of income generation, the farm sector clearly underperforms the other economic/household sectors. The income gap has further deteriorated with the recent successive enlargements. In this context, the contribution of direct payments to income as well as their distribution across producers should be reviewed.

As far as the income and labour markets are concerned, many policy issues need to be addressed, including:

- Farm household income (in terms of diversification and household behaviour);
- Income transfer efficiency;
- Targeting vs. equity issue;
- Functioning of the labour markets (which may condition policy adjustment of the sector).

With the introduction of the SPS, the functioning and efficiency of land markets have come at the forefront of the policy debate. Besides its economic importance and the imperfections of its markets, land as a production factor consti-

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tutes a key factor in determining the relative competitiveness (within agriculture and outside the farm sector and the EU) of the agricultural sector in relation with the institutional (legal and socio-economic) framework. However, land constitutes not only a production factor but also collateral for access to capital and an insurance/wealth factor for producers.

The impact of the CAP reform process (notably the SPS) on the land markets represents a critical policy issue and may significantly influence the degree of policy (income) efficiency. The current systems of implementation of the SPS in the various regions of the EU (in particular their link to land, the presence of “naked land” and the degree of decoupling) should entail differing degree of capitalisation of support in the cost of land.

Land price formation is a complex issue owing to the regional diversity, the link with other

economic sectors and the role of public support (and the various systems of SPS). Furthermore, it strongly depends on national/regional legal frameworks (contrary to output markets) and socio-economic conditions (with highly diverging perspectives for EU regions).

Developments on land markets should have a critical influence on the adjustment capacity of the sector and the entry into and exit from the sector. Depending on the regions, land prices would condition the adjustment capacity of producers to adapt to changing economic environment.

Addressing the numerous policy issues related to the study of the impact of the CAP reform process on the land and labour markets represents significant analytical challenges. Beyond theoretical examination, it requires solid empirical work. In this framework, the contribution of the research community to the policy debate will be essential.

# ■ Agricultural Incomes in the EU and Public Policies

VINCENT CHATELLIER\*, HERVÉ GUYOMARD†, LAURE LATRUFFE†, AND FABRICE LEVERT†

## Introduction

The paper first discusses the issue of measuring agricultural incomes (section 1). It then describes the evolution of EU agricultural income support policies since 1992 and raises the issue of capitalisation of income support in farm assets, notably land value (section 2). The French case is used to illustrate how incomes from agricultural activity vary in function of output choice and farm size (section 3). This example also shows the increasing dependence of farm incomes on direct aids. Hence, the last section analyses the income effects of various scenarios involving the level and the allocation rules of first and second pillar direct aids.

## Measuring incomes in agriculture - income from agricultural activity versus overall income of agricultural households

Traditional indicators of agricultural incomes adopt a producer point of view. As they relate solely to the income generated by agricultural activity, they do not include incomes from other sources (non-agricultural activities, salaries, social benefits and income from property). The standard indicator (*IA*) is the net value added at factor cost.<sup>1</sup> Data in real terms are obtained by deflating nominal values by the implicit price index of Gross Domestic Product (GDP) at market prices. Real agricultural incomes per worker are then defined by dividing real farm incomes by agricultural labour measured in Annual Working Units (AWUs) to take account of part-time farming and seasonal work (one AWU corresponds to the input of one person engaged in

agricultural activity in an agricultural unit on a full-time basis over an entire year). This first indicator *IA* measures the remuneration of primary inputs, i.e., capital, land and labour (plus production rights). By subtracting from *IA* the compensation of employees, one defines the net operating surplus which measures the yield from capital, land and unpaid labour (indicator *IB*). By subtracting from the net operating surplus interest payments, land rents and farm rents, one defines the net entrepreneurial income which remunerates unpaid labour as well as capital and land belonging to production units (indicator *IC*). From these three definitions, one immediately sees that many factors determine the level and the development of agricultural activity incomes: production levels and prices, input quantities and costs, subsidies and taxes, etc. These factors are not independent. They are themselves influenced by exogenous parameters (climatic conditions), market conditions (notably the balance between supply and demand) and policy changes.

Income from agricultural activity does not measure overall income of agricultural households which also includes incomes generated by non-agricultural activities of household members. Measuring overall income of agricultural households raises two practical problems. First, Farm Accountancy Data Network (FADN) databases do not provide information on incomes from non-agricultural activities. In some countries, this first problem is (at least partially) addressed by developing specific surveys and methods for collecting information on incomes from non-agricultural sources. However, information registered through this way differs from one country to another making inter-country comparison difficult. In France three matching exercises

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<sup>1</sup> The net value at factor cost is defined by subtracting from the value of agricultural output at basic prices (prices received by producers net of subsidies and taxes on products) plus other subsidies on production (product specific and non-product specific subsidies), the value of intermediate consumption, the consumption of fixed capital and other taxes on production.

were performed in 1991, 1997 and 2003 using the tax revenue register and the FADN database to compare incomes from agricultural activity and overall incomes of agricultural households. By construction, the comparison is restricted to professional farms, that is, farms with more than 0.75 AWUs and/or a Standard Gross Margin (SGM) greater than 8 Economic Size Units (ESUs). In 2003 incomes from non-agricultural sources accounted for 40 % of overall incomes of French professional agricultural households. The corresponding percentage was 25 % in 1997. However, for 51 % of French professional agricultural households, incomes from non-agricultural sources were equal to zero in 2003. On average, part-time agricultural households were largely better off than full-time units in terms of both SGM and income.

### EU farm income support policy: some questions raised by the Single Payment Scheme

Income support is still an essential objective of the CAP. It is now well admitted that market price support policies are inappropriate devices for supporting farm incomes in so far as there exist other instruments that are simultaneously more efficient and less trade distorting. In that perspective, one achievement of the CAP reform process is clearly to increase the transfer efficiency in favour of agricultural producers through the continuous shift from market price support to direct aids progressively more and more decoupled from production and factor use. But efficiency and equity are two different concepts. One drawback of the June 2003 CAP reform is that it does not address the question of the uneven distribution of agricultural aids across countries, regions and farmers. The CAP as it now applies still benefits proportionally more to North-European countries and larger farms. There are distributional issues not only within the agricultural sphere but also with other economic sectors. On this point, critics are clearly summarised in the so-called Sapir Report (Sapir et al., 2003). According to this report, the CAP has

moved from an allocative policy enhancing competitiveness towards a distributive policy targeted on a particular group of citizens. The report considers this as a “systemic anomaly” and recommends addressing this issue at Member State level.

Some agricultural economists argue that the 2003 CAP reform does not go far enough to capture all the benefits of decoupling. Of primary concern is the potential capitalisation of the Single Farm Payment (SFP) into land prices. Of course, production is no longer required to get the payment attached to entitlements.<sup>2</sup> But the scheme maintains a very specific link between payments and land use through the so-called activation constraint, i.e., the obligation for the farmer to maintain in agricultural use a number of hectares at least equal to the number of entitlements she (he) holds to get the payment attached to the latter. This constraint is likely to maintain the capitalisation of support into farm land prices, in favour of landowners and to the detriment of farmers. The greater the number of entitlements relative to the number of admissible hectares, the higher the capitalisation of the SFP into farm land prices (Guyomard et al., 2007).<sup>3</sup>

### Incomes from agricultural activity in France

At the national level, real farm incomes per worker exhibit a contrasted pattern of evolution over the last 15 years that is a continuous increase from 1994 to 1998 followed by a continuous decrease from 1999 to 2005. Real incomes per worker increased over the 1994-1998 period despite the 1992 CAP reform which reduced institutional prices for cereals and beef meat. However, these price cuts were fully compensated by direct aids and labour productivity gains were rather high over the years 1994 to 1998. By contrast, price cut compensation was only partial following the Agenda 2000 CAP reform of 1999 and labour productivity gains were much lower over the years 1999 to 2005 (Butault, 2006). This contrasted evolution has brought the indicator *IA* to a level of around 17,000 Euros in 2005 that is a level only

<sup>2</sup> The SFP is broken down into a certain number of entitlements which in practice correspond to unit amounts of direct aids per hectare in so far as each entitlement has to be accompanied by an eligible hectare in order to give right to the payment of the amount fixed by the payment entitlement.

<sup>3</sup> The lower the supply price elasticity of land and the fewer substitution possibilities between inputs, the higher the capitalisation of support into farm land prices, *ceteris paribus* (Latruffe and Le Mouél, 2006).

slightly greater than the 1993 level. Figures for 2006 suggest a significant increase in real incomes per worker, essentially thanks to positive output price effects.

In “2005” (average of the years 2001 to 2005), real agricultural incomes per family worker of French professional farms were equal to 20,200 Euros.<sup>4</sup> This average figure masks substantial disparities among units classified according to their product choice and their economic dimension. On average, farms of the highest economic dimension (more than 100 ESUs) had an income per family worker three times higher than farms of the lowest economic dimension (less than 30 ESUs), respectively 32,400 and 11,700 Euros. The ratio of incomes on the value of production plus direct aids was equal to 20 %. The higher the economic dimension, the lower the ratio of incomes on the value of production plus direct aids (from 25 % for the farms of the lowest economic dimension to 18 % for the farms of the highest economic dimension). On average, direct aids represented 87 % of incomes. The dependence of incomes on direct aids was largely greater than 100 % for beef farms (148 %), sheep and goat farms (140 %), as well as for producers of cereals and oilseeds (127 %). It was equal to 87 % for dairy farms. It was very low for farms specialised in pork and poultry (29 %), horticulture and permanent crops (24 %), as well as wine production (8 %). The dependence of incomes upon direct aids will very likely increase in the next years, *ceteris paribus*, because of an increasing number of products included in the CAP reform process (olive oil, tobacco, sugar, fruits and vegetables, wine). Interestingly, the ratio of direct aids on incomes is equally important for all classes of economic dimension.

## Impacts of domestic support reforms on agricultural activity incomes in France

### The baseline: impacts of the Single Payment Scheme on French agricultural incomes

The 2003 Single Payment Scheme (SPS) mitigates into a SFP most of per-hectare and per-head

direct aids. France chose to implement the SPS using the historical model which, by construction, maintains unchanged the distribution of first pillar budget funds among farms, *ceteris paribus*. France maintained coupled 25 % of direct aids for arable crops, 100 % of sucker cow premiums, 100 % of calf slaughter premiums, 40 % of adult cattle slaughter premiums and 50 % of sheep and goat premiums. France has thus fully exploited the possibility offered by the European legislation of maintaining coupled some of direct aids that were formerly granted on a per-hectare or per-head basis. The baseline situation includes the dairy and sugar reforms. It assumes that 70 % of land under mandatory set aside is used for production of bio-fuels and it incorporates a 5 % mandatory modulation rate. Prices and quantities are assumed unchanged at “2005” levels.

Under these baseline assumptions (H1), the single payment (57 % of total direct aids) amounts to 16,500 Euros per farm and 234 Euros per hectare. Single payment amounts per farm and per hectare vary considerably according to farm orientation. For example, the single payment per farm is three times higher for a wheat grower (29,500 Euros) than for a specialised beef producer (11,500 Euros). By definition of the historical model, the single payment per farm is higher for units previously oriented towards highly supported productions (arable crops, milk and beef). It is lower for beef farms (14,900 Euros per farm) than for dairy farms (23,000 Euros per farm) or farms specialised in arable crops (26,200 Euros per farm) because of a higher degree of re-coupling in beef relative to milk and arable crops. The higher the size of the farm (expressed in hectares) the higher the single payment per farm, *ceteris paribus*. The ratio of the SFP on total direct aids varies significantly in function of farm orientation/specialisation. This ratio is lower for extensive dairy, beef and sheep farms because these units are also supported through second pillar measures which are not included in the SFP. This is the case in particular for extensive dairy, beef and sheep farms in mountainous areas. The single payment per hectare (on average 234 Euros) varies from 125 Euros (sheep and goat farms) to 349 Euros (specialised dairy farms with a surface in fodder maize greater than 30 %

<sup>4</sup> The indicator considered here is the net operating surplus defined per family worker (expressed in AWUs) and in real terms (in Euros of the year 2005).

of total forage area). It is significantly lower for beef farms (167 Euros) than for dairy farms (270 Euros) and farms specialised in arable crops (290 Euros).

### Scenario S1: impacts of total decoupling

Under the assumption of total decoupling (scenario S1), the single payment (80 % of total direct aids) amounts to 23,100 Euros per farm and 327 Euros per hectare (an increase by 40 % relative to the assumption of partial re-coupling). The increase per farm and/or per hectare is logically more marked for beef farms (the single payment per beef farm increases from 14,900 Euros in the baseline to 28,600 Euros in this scenario S1, that is a rise of 92 %) than for dairy farms (the single payment per dairy farms increases from 23,000 under H1 to 27,800 Euros under S1, that is a rise of 21 %). The single payment per farm and per hectare of arable crop producers increases by about 25 % due to the inclusion into the SFP of the 25 % of direct aids that were previously maintained coupled. Even under the assumption of total decoupling, considerable differences remain in amounts of decoupled aids per farm and/or per hectare. The single payment per hectare is equal to 177 Euros for specialised dairy farms with a fodder maize surface lower than 10 % of total forage area, but to 415 Euros for specialised dairy farms with a fodder maize surface greater than 30 % of total forage area. On average, the single payment per hectare is equal to 321 Euros for beef farms, 327 Euros for dairy farms and 368 Euros for arable crop farms.

### Scenario S2: impacts of a 20 % mandatory modulation

The second scenario S2 assumes a mandatory modulation of all first pillar direct aids at a rate of 20 %, all the funds saved through this mechanism being reallocated on existing measures of the second pillar.<sup>5</sup> By construction of the scenario, its impact on the average income of French professional farms is null. However, some types of farms loose while other types gain. Units which suffer the most are those which, under H1, received large amounts of first pillar direct aids and small amounts of second pillar subsidies. This is the case,

for example, of arable crop producers who record an income loss of 19 % and intensive dairy farmers who suffer from an income decrease of 14 %. By contrast, extensive livestock farms, notably those located in mountain areas, register significant gains: incomes increase by 48 % for sheep and goat farms, 45 % for grass-based dairy farms and 25 % for specialised beef farms. This modulation scenario would favour smaller size units relative to large size units. In other words, the distribution of direct aids would be slightly less unequal in this scenario S1 relative to the baseline H1.

Regarding output price changes that would be needed to neutralise the positive or negative effect on incomes of this 20 % modulation scenario, one notes first that a very small increase (1 %) would be sufficient so that incomes of dairy farms are the same in the baseline H1 and in this scenario S1. In the same way, a relatively small increase (5 %) in prices of cereals and oilseeds would be sufficient to neutralise the negative impact on incomes of arable crop producers of this 20 % modulation scenario. These average figures mask significant disparities among farms according to their product choice and/or economic dimension. The case of dairy farms illustrates this diversity. Farm-gate milk prices should increase by 3 % to maintain unchanged incomes of fodder maize based dairy farms but they should decrease by 14 % to maintain unchanged incomes of grass-based dairy farms.

### Scenario S3: impacts of a 35 % cut in First Pillar direct aids

The third scenario S3 assumes full decoupling. The SPS is applied using the regionalised model. Unit values of entitlements are thus identical for two farmers located in the same region. These unit values are cut by 35 %. But contrary to S2, funds saved thanks to this mechanism are not used to increase second pillar subsidies.

On average, incomes of French professional farms decrease by 28 % (8,100 Euros) because of the decrease by 35 % in first pillar decoupled direct aids. Income losses are particularly important for arable crop growers (-50 %) and beef produc-

<sup>5</sup> Of course, the redistributive effects of any modulation scenario critically depend on the way funds are reallocated on the second pillar.

ers (-45 %). Dairy farms also suffer from a substantial income decrease (-32 %) with important differences according to farm characteristics. While fodder maize based large units record an income loss of 42 %, grass-based small to medium units obtain an income gain. However, output price changes needed to neutralize these huge income losses would be rather “modest”. Farm-gate milk prices should increase by 7 %, beef prices by 14 % and arable crop prices by 11 %.

### Concluding comments

Given the weight of direct aids in agricultural incomes, any reduction in first pillar direct aids and/or any redistribution of funds from the first to the second pillar will significantly impact most types of farms. Accordingly, it would be economically (and politically) dangerous to implement too drastic and rapid cuts in first pillar direct aids. In other words, cuts should be spread over several years to allow farmers to adapt. The dependence of farm incomes on direct aids also highlights the risk of a domestic support reform strategy excessively based on a mechanism of “communicating vessels” (cuts in first pillar aids to increase budget support of the second pillar). Clearly, a better strategy would be: first to define policy objectives, be they of the first or second pillar; second to define efficient instruments and resources needed to achieve these objectives. In that respect, it is clear that the 2003 CAP reform does not address the question of small and poor farmers, very often located in marginal zones where agriculture is still a major economic activity and employment alternatives are seldom. In the same way, it does not address the question of agricultural price and income instability. Income support expenditure could and should be significantly reduced and funds saved by this way used to finance price and income stabilisation programmes as well as remunerate positive environmental and territorial public goods.

### References

- Butault, J.-P., 2006. La baisse des revenus et l’essoufflement de la productivité dans l’agriculture française depuis 1998. INRA Sciences Sociales 2, 4 pages.
- Guyomard, H., Le Bris, K., 2003. The Fischler’s Proposals for the Common Agricultural Policy: Paving the Way for the Future. INRA SAE2 Rennes, Working Paper.
- Guyomard, H., Chatellier, V., Courleux, F., Levert, F., 2007. La politique de soutien des revenus agricoles dans l’Union européenne: Quel avenir pour les droits à paiement unique ? INRA SAE2 Rennes, Rapport pour le Conseil d’Analyse Economique (CAE), Paris.
- Latruffe, L., Le Mouél, C., 2006. How and to What Extent Support to Agriculture Affects Farmland Markets and Prices: A Literature Review. INRA SAE2 Rennes, Report for the OECD, Paris.
- Sapir, A., Aghion, P., Bertola, G., Hellwig, M., Pisani-Ferry, J., Rosati, D., Vinals, J., Wallace, H., 2003. An Agenda for a Growing Europe: Making the EU Economic System Deliver. Report to the EC, Brussels.



# ■ Income Effects of 2003 CAP Reform – Review of Modelling Approaches and Recommendations

WERNER KLEINHANSS\*

## Introduction

Income effects of policy changes play an important role in the decision-making process. Market and income effects were at the centre of studies regarding the 2003 Common Agricultural Policy (CAP) reform, especially dealing with decoupling of direct payments and its implementation in the Member States (MS). I will give an overview on modelling approaches and predicted income effects and give some recommendations on probable income effects of policy changes discussed with regard to the “health check”.

### Modelling approaches

Quantitative models can contribute to ex-ante analysis of policy changes. Furthermore they are suitable to quantify the partial effects of single political measures or the combined effects with others. On this basis, valuable information can be drawn with regard to the impacts of single measures or an optimal policy mix.

Considerable efforts were realised in the development and application of mathematical programming models for policy analysis. EU-wide models and models specified for some Member States are used for the analysis of CAP reform. They differ in the model type (LP/MIP; NLP/PMP), process differentiation, periodicity, model calibration, income indicators and data base (EU- or national FADN). Scenario analysis is done with regard to base or target years. In most farm (group) models, price changes are handled exogenously based on market models. The integration of a supply and market model in CAPRI allows simultaneous optimisations to reach market equilibrium.

Exemplarily for the construction and working steps of mathematical programming models, a brief overview is given with regard to the farm group model FARMIS. Formerly developed for the German agricultural sector, the model has been

extended to other EU MS. The model work proceeds in the following steps:

- Selection of farm groups on the basis of individual farms, constant samples, multi-year averages, flexible selection of farm groups depending on location, type, size, etc.
- Application of an improved aggregation scheme allowing consistent sectoral aggregation with regard to standard income, land use and livestock.
- Generation of activity specific I/O coefficients: support points for entropy estimation based on management handbooks or expert knowledge. Complex balancing of feed use by means of entropy method.
- Model generation and model calibration: Calibration related to base year by means of PMP allowing exact base year projection. However, supply reaction is influenced by standardisation of the revenue function by means of elasticities. Problems exist primarily with regard to the implementation of normative components, i.e., new activities (mulching, biomass, different intensities).
- Scenario analysis with regard to target years (2013, ... 2015), related to the underlying full cost approach, as well as the final step of policy measures (Regional Model) after stepwise implementation.
- Optimisation of each farm group, aggregation of the results using weighting factors. Recursive or simultaneous optimisation over all farm groups in defined regions with regard to assessments of rental land market, milk quota trade and structural change.
- Income indicators: Farm Net Value Added (FNVA) serves for the remuneration of fixed factors of production, whether external or family owned, being calculated on the basis of output and input levels and prices. The

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nonlinear object function, however, includes costs for fixed factors (based on market prices or opportunity costs). A partial cost approach with regard to a shorter planning period is possible. It has turned out that the supply reactions induced by the nonlinear object function do not always converge with the income effects expressed in FNVA, especially with regard to options of land and quota transfer as well as structural changes. Due to this problem, net income (according to profit) or other income indicators are used complementarily.

### Income effects of 2003 CAP reform (and further reforms)

Before going into detail, I would mention that the modelling outcome indicates main tendencies although the absolute values differ. Income effects are sometimes influenced by different modelling approaches, model specifications, aggregation levels, target years as well as scenario assumptions.

#### EU-wide effects

EU wide effects are available from analyses of CAPRI and AROPAj. Results of CAPRI, referring to the probably national implementations in 2009, show positive income effects for all regions but one. They are relatively high in the north-west of the UK and northern Finland. It might be induced by adjustments in the beef and sheep sector and probably positive price effects. Relatively low (positive) income effects are calculated for the Mediterranean region, which might be determined by income losses in the durum wheat sector.

In a further project, CAPRI has been extended with a farm type module and to the EU 25 (27). Each region is represented by a number of representative farm types. Referring to Agenda 2000, the CAP reform induces positive income effects for farm types 'specialised arable crops, specialised livestock and mixed cropping livestock'. Slightly negative income effects are calculated for permanent crops and specialised granivores farms. Full decoupling induces further positive income effects of 0.5 to 3.4 % points.

Aggregated results for EU-15 MS are also available based on the LP farm group model AROPAj re-

alised within the GENEDEC project. The model excludes permanent cropping farms (and horticulture) and therefore represents roughly three quarters of UAA. Further, it doesn't take modulation into account. Price scenarios are based on ESIM (realised within IDEMA), which for sheep seems to be exceptionally favourable. Income effects (expressed in Gross Margins) under the scenario 'National Implementation' vary between -4 % for the Netherlands and 22 % for Spain. They might be even higher under full decoupling; however the latter might be overestimated as no compulsory set-aside has been assumed for this scenario.

### Income effects in some Member States based on GENEDEC

More detailed results are available for four MS based on models developed by GENEDEC partners. Price projections are based on ESIM. Although efforts in harmonization the models vary by type (LP: Ireland, others PMP), income indicators (Gross Margin, FNVA) and comparative scenario analysis with regard to the base or target years. In addition, the FAL included the sugar market reform using ad hoc price estimates for sugar beet.

Aggregate changes of Gross Margins for regions of Spain show income losses in only one region. The other quarters of the regions shows increasing incomes up to 5 %, 10 %, or more. Full decoupling leads to slightly higher incomes.

The model used for Ireland (full decoupling, historical reference) is an LP model which has been run for all FADN farms. The spread of Gross Margins is derived from the results expelled for different farms types and sizes. On average, positive income effects can be deduced for dairy farms; this is also true for larger beef farms. Sheep farms show income increases between 5 and 25 %. There is no high variation of income effects in arable farms.

An analysis at the University of Parma shows positive income effects (Gross Margin) in the North of Italy, which is ascribed to the milk market reform (milk premia greater than price-induced revenue reductions). Income losses of 10 and 5 % have to be expected in the regions Centre and South which mainly result from the arable crop sector (particularly Durum wheat).

The analyses for Germany were carried out with FARMIS. They include the sugar market reform which induces less favourable income effects. Under the scenario National Implementation with full transformation into the Regional Model, entitlement levels are unified for all eligible UAA, but differentiated by Laender.

On average, an increase of FNVA by 1 % arises. Grazing livestock, arable cropping and mixed farms will have income losses up to 4 %, while income increases by 8 % in pig and poultry farms. Redistributions of direct payments are expressed by the income effects of dairy farms: farms with up to 25 cows show 6 % higher incomes which can be explained by increases of direct payments and higher beef prices. In larger dairy farms, however, negative income effects can be recorded. Partial decoupling of headage premia and/or for arable crops induces less favourable income effects.

For the analysis of redistribution effects of the German dynamic hybrid model we have to go back to simulations based on the whole sample of FADN farms. The initial phase (static hybrid model) induces only minor changes, as the main part of beef premia, milk and sugar premia are paid as farm individual top-ups. After complete transformation in a Regional Model, a strong redistribution of direct payments appear. Farms specialised in bull fattening or dairy have to expect strong reduction of direct payments. Before implementation of the sugar market reform, specialised sugar beet producer gained by premium redistribution. With sugar market reform income losses are induced; they would be only half if entitlements were based on historical references instead of applying the Regional Model.

In addition, it has to be mentioned that (based on our analysis) the regional model leads to increasing rental land prices especially for grassland and therefore income transmission in favour of land owners.

Finally, some results for other countries:

- France: small income increases in Arable Crop farms;
- AgriPolis (IDEMA): Results for select regions in France, Germany and Sweden also show positive income effects of the CAP reform;
- Model analyses for Poland prove income increases by 50 % mainly due to the increase of direct payments level in 2013;

- The income projections of the Commission show income increases in NMS (10) of approximately 25 %.

## Conclusions with regard to the Health Check

Assuming that the health check will not be a far-reaching reform as the Mid-Term Review (MTR) and no additional direct payments will be paid:

### Market policy

- Abolition of the cereal intervention or arrangement as a safety net: No negative income effects have to be expected at the present price level and price expectations.
- A reduction in the base price for beef (safety net) could become necessary with regard to the reduction of import duties. This would lead to income losses; it is, however, only relevant in connection with WTO decisions.
- Abolition of compulsory set-aside: Removes restrictions in connection with coupled arable crop premia. Positive income effects expected. Application of the measure only to full decoupling would create incentives in phasing-out partial decoupling in the arable crop sector.
- Milk quota system: Phasing-out via quota increase, reduction of intervention price and reduction of super levy, leading to price induced income losses in the medium term.

### Direct payments

- From partial towards full decoupling: positive income effects, removing the distortions of competition in the beef sector within the EU.
- Historical versus regional references: Regional model, less favourable income effects than the historic SFP, redistribution of direct payments in favour of 'other land user', increase of land rental prices.

Further development of the SFP as a static hybrid model seems to be worthwhile (different entitlement level for arable and grassland, regional differentiation, individual top-ups for the main part of headage and milk premiums).

### Modulation proposals: further increase (10 %), upper limit of DP per farm

- Income losses for farms with DP > 5000 Euros, small income effects via Pillar 2 payments,
- Capping would induce drastic income losses especially in large farms in Eastern Germany.

Recommendation: Digressive modulation with respect to volume of DP and / or DP per AWU.

### Final considerations

Income effects are caused by several influencing factors of which CAP is important. Due to step-wise implementation of 2003 CAP reform and time lags in statistical and FADN data, income effects can only be assessed based on model analyses (at the moment). Results are partly influenced by model type, aggregation level and scenario assumptions. Decoupling induces positive income effects (full decoupling > partial decoupling; historical reference > Regional Model).

### Conclusions with regard to modelling and scenarios

- FADN to be completed by national FADN LAs (if national data are more detailed in I/O, regional scale) and expertise of national experts.
- Harmonised modelling:
  - Network of (national) models.
  - EU-wide model (i.e., CAPRI), modelling centralised but connected with a network of national experts.
- Scenarios: FAPRI-like market and price predictions and specification of baseline (and policy) scenarios (i.e., managed by IPTS or other centres). Standard baselines should be used for the test and validation of (national) models.

# ■ Historical Distributions of Direct Payments in the EU-15 and Modelled Consequences of Alternative Implementations of the Single Farm Payment

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## Introduction

Until 1992, market price support and supply control policies were the major tools of the Common Agricultural Policy (CAP). The weaknesses of this policy conception to reach allocative and distributive policy objectives have been extensively criticised by economists during the last decades. A proposed solution was ‘decoupling’, which started with the MacSharry reform in 1992 and gained full momentum with the 2003 CAP reform. Today, direct payments paid according to individual entitlements obtained during the reference period 2000-2002 are the most important agricultural policy tool. From a financial perspective, these “single farm payments” are either fully or at least partially decoupled and thus avoid many of the negative characteristics of both market price policy and the payments based on historical areas and heads of livestock after 1992 (OECD 2006a and 2006b).

Fully decoupled payments are deemed to have minimal or no allocative effects and hence can be considered as pure income support. Thus, these payments are elements of a distributive policy. Such policies aim at correcting market outcomes according to politically determined objectives, usually through transferring money from richer to poorer households. If these CAP payments can be considered as a distributive policy tool in its very meaning, similar redistributive outcomes should be observable as well.

This short paper summarises two working papers from Schmid et al. (2006) and Schmid and Sinabell (2006) and is therefore structured accordingly. In the first part, we compare the distribution of direct payments for farm holdings across EU Member States using Gini-coefficients and Lorenz curves. For Austria we show in detail how market

incomes, social transfers, direct payments and other CAP transfers are contributing to farm household incomes. Using micro-data of Austrian farm households we show the consequences of direct payments on the distribution of market income and incomes of other sources. In the second part, we focus on the alternative implementations of the Single Farm Payments (SFP) as introduced in 2005 using these and other data and FAMOS (Farm Optimisation System). Comparing a base-run in 2003 with the actual ‘partial decoupling historic model’ and two alternatives in 2008 (full decoupling and historic model and full decoupling and the flat-rate regional model) we show the distributional implications of alternative policy choices. The paper finishes with conclusions and policy recommendations.

## Data and methods

Established information systems for instance the *farm accountancy data network* (FADN), the *economic accounts for agriculture* (EAA), or the *income of the agricultural households sectors* (IAHS) to measuring the effects of CAP on farm incomes are hardly adequate for analyzing distributional outcomes, as recently maintained by the Court of Auditors (2004). In preparing the 2003 CAP reform, EU Commissioner Franz Fischler infringed a hitherto off-limits information barrier. He released fairly detailed data about the distribution of direct payments to foster a political climate to limit the size of high-end CAP payments and thus to reduce the regressive nature of the CAP regime with the 2003 reform. A similar strategy is followed by the European Commission in starting the “European Transparency Initiative” in 2005, which aims to “increase openness and accessibility of EU institutions, raise awareness over the use of the EU

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budget and make the institutions of the EU more accountable to the public” (CEC, 2006). Indicative figures on the distribution of aid according to Reg. (EC) No 1259/1999 for EU-25 Member States are available for the year 2005. For EU-15 Member States data are available from 2000 to 2004 (for Greece there are missing data).

For our quantitative analysis we use the dataset for 2001 which includes 14 EU Member States. Based on these Eurostat data on the allocation of direct payments among farms in different classes, we have derived estimates on two measures of inequality: Lorenz curves and Concentration Ratios (CR). CR range between zero (absolute equality) and one (absolute inequality) of transfers and we express them as percentages.

Direct payments are only one source of income for farm households and therefore an overall assessment of the distributional consequences of these instruments must include the other sources of income as well. To measure the distributional effects of various income sources, we use MAD (mean absolute difference), a measure which is robust even if negative incomes are involved. This measure is invariant to equal absolute changes in all incomes. For instance, if all farms have got the same amount of payments (flat-payment per farm) then they receive the same level of support regardless of their current resource endowments (e.g. land, labour), production decisions, or income situation. Such a transfer would not change the MAD measure and may be judged as distributionally neutral, because it has no effect on absolute inequality. For this analysis we use the Austrian bookkeeping farm records from 2000 to 2002. In this analysis, average figures for 2,572 bookkeeping farms are calculated from the three-year panel record to offset annual anomalies. The bookkeeping data do not exclude incomes from other sources than agriculture, as is the case in many other countries which collect FADN data. Therefore, a large share of total income of the farm household – including social transfers and pension and non-farm activities – are recorded.

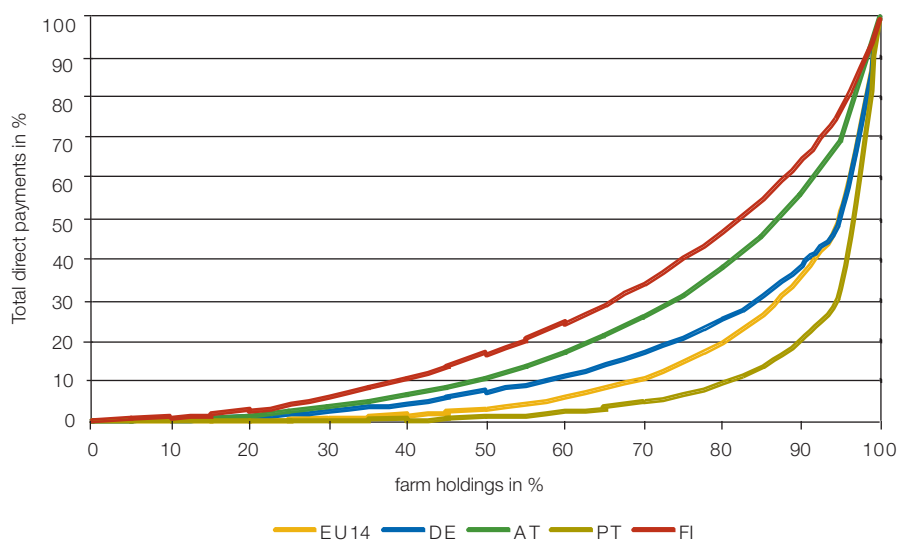
For the analysis of alternative SFP implementations we use FAMOS (Farm Optimisation System; Schmid, 2004), which is a data-modelling system that simulates the decision making process of about 6,800 typical farms on the basis of historical and alternative production and income possibilities

for typical farms in Austria. Alternative production and income possibilities include agricultural and forestry production, secondary and off-farm income activities, subsidy and transfer payments. All instruments of CAP and measures of the programme for rural development, in particular the agri-environmental programme and less favoured area payments, are modelled. FAMOS aims to find the optimal combination of production and income activities, which are contingent on quality and quantity of resource endowments (e.g. land, capital and labour) and available production technologies. Endowments and production and income activities of individual farm models are primarily based on observed data. The data pool is based on micro data of the IACS (Integrated Administration and Control System) from 1999 to 2005. Various agricultural censuses (from 1990, 1995 and 1999) provide farm level information on historic land and livestock endowments. Data of the EAA (Economic Accounts for Agriculture) from 1988 to 2004 are used to guarantee consistency with national accounts at the sector level. Data analysis of the Austrian bookkeeping farms and standard gross margins from 2000 to 2003 provide estimates on farm specific production technologies. We make the assumption that relative price wedges observed between conventional and organic commodity will remain constant until 2008. The commodity price projections for 2008 are based on OECD forecasts. Each of the modelled farms is a special case of only one *general* farm model implemented in GAMS (General Algebraic Modelling System).

## Major results

The distribution of direct payments has varied significantly across EU-15 countries. The inequality measures show that some countries (among them Finland [CR = 49.5], Luxembourg [CR = 49.8], The Netherlands [CR = 57.7], Denmark [CR = 58.2]) have comparable low levels of concentration, while Portugal (CR = 87.1), United Kingdom (CR = 75.5), Spain (CR = 75.3) and Germany (CR = 71.2) have very high ones. On average of 14 EU members, 20 % of farm holdings received 80 % of direct payments in 2001. The Lorenz Curves of some selected EU Member States are shown in Figure 1.

■ Figure 1: Lorenz curves for direct payments and farm holdings in selected EU Member States and in EU-14 in 2001



Source: Eurostat (2005); own calculations.

The analysis of Austrian bookkeeping farmers on distributional consequences by income source reveals that the average agricultural market income per farm (defined as revenues of agricultural commodities net of expenses and depreciation) is 10.8 thousand Euros of the whole sample. Agricultural market income was negative in the first quintile of farms. Without any additional sources of income, these farms would go out of business. The MAD of the agricultural market income is 20.5 thousand Euros which is used as a benchmark. When we add direct payments according to Reg. (EC) No 1259/1999 to the agricultural market income (6.7 thousand Euros on average per farm) the MAD increases from 20.5 to 22.2 thousand Euros. A higher MAD indicates that the direct payments favour those farmers more that have higher agricultural market incomes in the first place. When all other CAP transfers are taken into consideration (the sum of direct payments, less favoured areas payments and agri-environmental payments) the MAD increases further, reaching 24.9 thousand Euros. Thus CAP payments taken all together and direct payments in particular, increase the level of income inequality in the sample of Austrian bookkeeping farms. Other sources of income (most notably social transfers and pensions) neither contribute to inequality nor do they make incomes more equal, the MAD remains at the level of agricultural market income plus CAP transfers which is 24.9 thousand Euros.

The comparative static policy analysis of alternative SFP implementations has included a base-run scenario (observed situation in 2003), the Austrian implementation in 2008 (historic model with partially decoupled premiums) and two alternative implementations of full decoupling scenarios in 2008. The FAMOS model results show that farm net-returns are lowest with the Austrian partial implementation of the single farm payments in place compared to the alternatives (full decoupling historic model and regional flat rate model). Austrian policy makers obviously put more emphasis on maintaining certain production activities (e.g. suckler cows) in distinct regions compared on gaining higher average farm net-returns. The 'full decoupling with the flat-rate regional model' would have lead to more egalitarian outcomes: farms in mountainous regions, smaller and organically producing ones would have benefited from such an implementation in Austria.

## Conclusions

We use the evidence on the distribution of direct payment of the CAP to draw three major conclusions concerning 'single farm payments' which have been introduced in 2005 based on the level of transfers during the reference period 2000-2002:

- 'single farm payments' are constructed in a manner to minimise production incentives,

the most important instrument of the CAP (from a financial perspective) has therefore (almost) no allocative effects;

- in EU-15 Member States, the largest share of ‘single farm payments’ reaches a small number of holdings; in some of them, the number of privileged units is very small;
- evidence from Austria suggests that direct payments (and most likely ‘single farm payments’) are not contributing to more equal farm household incomes.

We use measures of inequality in this analysis but we do not advocate that direct payments (or the ‘single farm payment’) should be equally distributed among farmers who qualified for them through historical coincidence at a given date. Such a claim would neither contribute to the objectives of the CAP, nor would an equal distribution be more socially acceptable than the observed ones. However, our findings shall contribute to a discussion on the long term perspectives of the EU common agricultural policy which seriously takes into consideration distributive consequences of CAP payments. Such a discussion will prevail in the EU because the peculiar distributive consequences of CAP payments have attracted concerns among non-agricultural economics researchers (e.g. Sapir et al., 2003) and the general public (see e.g. Baldwin, 2005).

A couple of suggestions have been discussed how to mitigate this situation. One suggestion concentrates on the size of holdings in curtailing direct payments for larger ones. This suggestion has already found its way into practical policy making in the EU (this regulation is called ‘modulation’). Yet, the obvious weakness of such an approach is that farmers are able to respond quite easily, e.g. by formally dividing a farm into different legal entities. From an economic perspective, such an approach is likely to have negative allocative effects by influencing the performance of farms according to their size. So, at best, this approach can be seen as a temporary solution.

Another suggestion, which tries to overcome some of the drawbacks of the modulation approach focuses on the labour input of farms. The basic intention is that transfers in farming in the end should support people, not products or owners of land. But also in that case, direct payments related to labour input will induce reactions in the

form of incentives to artificially increase officially counted farm labour. Farmers could include family members, but also by engaging employees for service activities which then can be sold to non-agricultural firms. One solution could be to replace actual labour inputs by a transparently calculated representative values. This, however, would be seen as a direct link between production and support and may thus cause problems with respect to the WTO green box status of such payments.

Single farm payments (the substitutes of direct payments from 2005 on) are only paid if farmers abide by a set of production standards (‘cross compliance’). These rules have been tied with environmental, food safety and animal welfare standards. Thereby, such payments overcome the status of a simple income transfer and thus get fortified in political discussions. Yet, scientific evidence points out that this way of securing public goods is highly inefficient and should be replaced by better profiled specific programs within the “second pillar” of CAP. Choices on the decoupling strategy (partial or full decoupling) have effects that go beyond the agricultural sector. Coupled direct payments have the following consequences: more resources (land, labour and operating inputs) are used for the particular activity and outputs are slightly higher (in Austria beef production). Upstream and downstream industries as well as regional labour markets are therefore affected in different ways depending on how the CAP reform is actually implemented. From such an angle it looks that agricultural ministers in EU Member States made deliberate choices concerning the consequences for their rural economies.

From an economic point of view, the key question is whether and under what circumstances the EU should continue such a specific, sectoral income policy in the long-run. The general opinion among (agricultural) economists is that direct payments which originate in compensations for historic price cuts etc. should be granted only temporarily. Direct payments, which focus on the provision of public goods or address externalities, should become elements of the “second pillar” and should be subject to strict monitoring and evaluation procedures.

## References

- Baldwin, R. E., 2005. *Who finances the Queen's CAP payments? The CAP as a dooH niboR scheme*. Available at: [http://hei.unige.ch/~baldwin/PapersBooks/WhoPaysTheQueensCAP\\_Baldwin6Dec05.pdf](http://hei.unige.ch/~baldwin/PapersBooks/WhoPaysTheQueensCAP_Baldwin6Dec05.pdf) (retrieved 23-Dec-2005).
- CEC (Commission of the European Communities), 2006. *Green Paper on the European Transparency Initiative*. Available at: [http://ec.europa.eu/commission\\_barroso/kallas/doc/com2006\\_0194\\_4\\_en.pdf](http://ec.europa.eu/commission_barroso/kallas/doc/com2006_0194_4_en.pdf) (retrieved 05-Oct-2006).
- Court of Auditors, 2004. *Special Report No 14/2003*, Official Journal of the European Union, C 45/1, 20.2.2004.
- Eurostat-Database, 2006. [http://epp.eurostat.ec.europa.eu/pls/portal/url/page/PGP\\_QUEEN/PGE\\_QUEEN\\_TREE?screen=welcomeref&open=/&product=EU\\_MAIN\\_TREE&depth=1](http://epp.eurostat.ec.europa.eu/pls/portal/url/page/PGP_QUEEN/PGE_QUEEN_TREE?screen=welcomeref&open=/&product=EU_MAIN_TREE&depth=1); data retrieved during February – June 2006.
- OECD, 2006a. *Decoupling – Policy Implications*. OECD Publication, Paris.
- OECD, 2006b. *Special Issue on Decoupling Agricultural Support*. OECD Paper Volume 5, No. 11. OECD, Paris.
- OECD, 2004. *Agricultural Outlook 2004-2013*. OECD, Paris.
- OECD, 2005. *Agricultural Outlook 2006-2015*. OECD, Paris.
- Sapir, A., Aghion, P., Bertola, G., Hellwig, M., Pisani-Ferry, J., Rosati, D., Viñals, J., Wallace, H., 2003. *An Agenda for a Growing Europe – Making the EU Economic System Deliver*, <http://www.euractiv.com/ndbtext/innovation/sapirreport.pdf> (retrieved 20-Dec-2005).
- Schmid, E., 2004. *Das Betriebsoptimierungssystem - FAMOS*. Discussion Paper Nr. DP-09-2004 of the Institute for Sustainable Economic Development, University of Natural Resources and Applied Life Sciences Vienna. [http://www.boku.ac.at/wpr/papers/d\\_papers/dp\\_cont.html](http://www.boku.ac.at/wpr/papers/d_papers/dp_cont.html).
- Schmid, E., Sinabell, F., 2006. *Alternative Implications of the Single Farm Payment – Distributional Consequences for Austria*. Discussion Paper Nr. DP-17-2006 of the Institute for Sustainable Economic Development, University of Natural Resources and Applied Life Sciences Vienna. [http://www.boku.ac.at/wpr/papers/d\\_papers/dp\\_cont.html](http://www.boku.ac.at/wpr/papers/d_papers/dp_cont.html).
- Schmid, E., Sinabell, F., Hofreither, M. F., 2006. *Direct payments of the CAP – distribution across farm holdings in the EU and effects on farm household incomes in Austria*. Discussion Paper Nr. DP-19-2006 of the Institute for Sustainable Economic Development, University of Natural Resources and Applied Life Sciences Vienna. [http://www.boku.ac.at/wpr/papers/d\\_papers/dp\\_cont.html](http://www.boku.ac.at/wpr/papers/d_papers/dp_cont.html).



# ■ Using the OECD PEM to Investigate Land Market Changes Resulting from the Introduction of the SFP

ROGER MARTINI\*

## Introduction

The OECD Policy Evaluation Model (PEM) is a tool designed to connect the information in the OECD Producer Support Estimate (PSE) database to economic outcomes such as production, trade and welfare. The PEM considers the different ways that agricultural policies may be implemented, as characterised by the PSE classification system and reflects those differences in a simple economic model containing commodity and factor markets as well as world trade. In this way, it is making use of the information contained in the PSE classification system in order to characterise the effects of different policy types.

The market for land as an input into the production process is of particular interest. This is for two reasons. First, many modern agricultural policies are directed at and have their first incidence in the land market. Second, agricultural policies may be expected to become capitalised in land markets to varying degrees depending on their implementation, making land market changes a key vehicle through which the effects of agricultural policy play out.

In using the PEM to investigate the impacts of the new Single Payment Scheme (SPS) in the European Union, a first consideration must be the basis upon which this payment is made. The SPS is implemented differently in different member states; either based on historical payment levels received by a farmer, or a fixed amount per-hectare for an entire region, or a hybrid approach mixing the two. In any case, once the amount of a payment entitle-

ment is established (entitlements must be activated by being connected with land) it does not vary with respect to the production choice of the farmer. In this way, the different approaches to implementing the SPS affect the distribution of payments, but not their impact on production choice.<sup>1</sup>

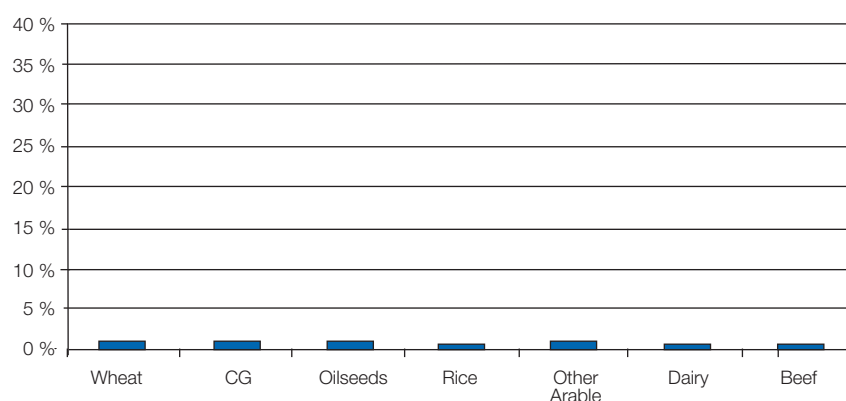
The SP is connected to land and so finds its first incidence in the model in the land market. Since the SP does not directly influence production choice, it must not directly alter relative prices for land used for the production of different commodities. Thus, for the list of allowed commodities (some production exceptions apply to land connected to an SP entitlement), the payment must cause a uniform inflation of land values. The amount of this inflation is chosen so the total expenditure on the SPS equals the total change in land values. Thus, the SP affects relative prices between included and excluded commodities, but not across the set of permitted uses of the land. This approach focuses on the economic impacts of the SP at the margin and not its distributional aspects.

Taken alone, the impact of introducing the SPS on land markets in the model is modest as the payment is broadly based, excepting only fruit and vegetable production and the net supply elasticity of all land is very small as a result (Figure 2). In the PEM, total land area in agriculture is fixed; that is it has an elasticity of zero. The larger a sub-group of total land that is affected by a policy, the smaller will be the net elasticity and the resulting supply response.

\* Organisation for Economic Cooperation and Development (OECD), 2 rue Andre Pascal, 75775 Paris Cedex 16, France. E-mail: roger.martini@oecd.org. The views expressed in this paper are those of the author and do not represent those of the OECD or its member countries. The OECD produced a report in 2004 titled "Analysis of the 2003 CAP reform" which is available at <http://www.oecd.org/dataoecd/62/42/32039793.pdf> The analysis in this study is based on a different approach designed to illustrate the effect of different policy packages in the model.

<sup>1</sup> Some claim that under imperfect capital markets, the increased liquidity provided by the SPS will influence the production choices of farmers. In this case, the different implementations of the SPS would be relevant, and the impact of the SPS greater than otherwise.

■ *Figure 2: Effect of SPS on land area*

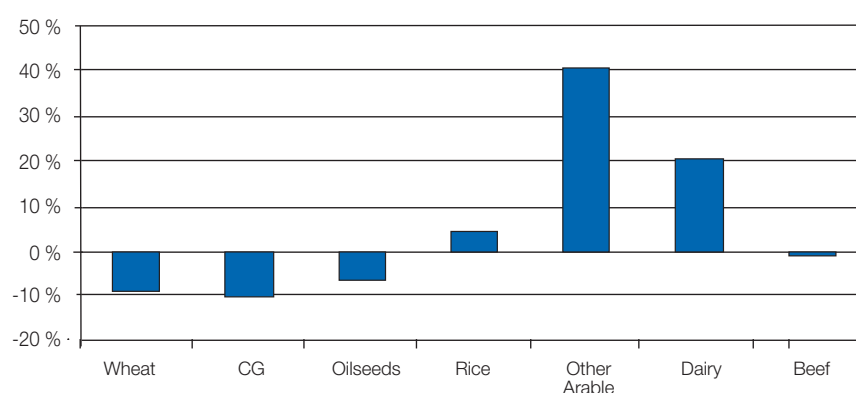


Source: OECD PEM.

The total effect of the CAP reform on land use must also take into consideration the impact of removing the payments that were replaced by the SPS. For the interest of simplicity, rather than representing all the different options chosen by the member countries in implementing the CAP, a simple scenario is used where the maximum decoupling option is applied to the EU-15 as a whole. This sce-

nario implies a reduction in area payments that applied only to crop land used for certain commodities and has a somewhat less even distribution than that assumed for the SPS. The result is that land use changes relatively significantly when these payments are removed. Producers shift away from using their land for crops eligible for the area payments to other arable crops and pasture uses (Figure 3).

■ *Figure 3: Land use changes after elimination of Area Payments*

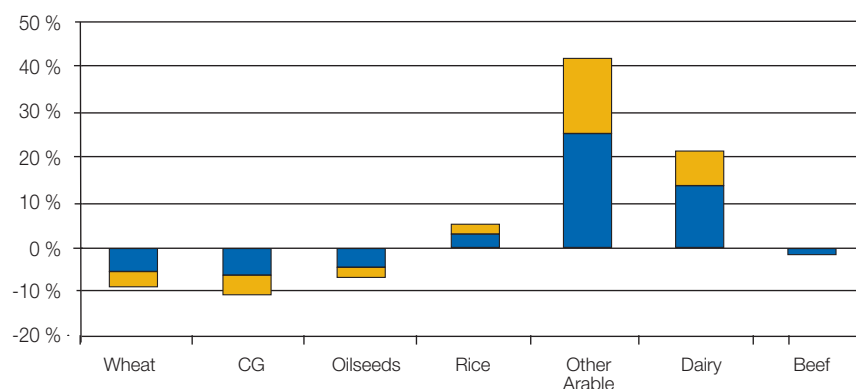


Source: OECD PEM.

Consider the combined effect of the removal of pre-existing area payments (and payments based on animal numbers) and the introduction of the SPS; that is, a full CAP reform scenario. The effect

of this policy package on land area is significantly moderated compared with the removal of area payments alone (Figure 4).

■ Figure 4: CAP reform impact on land use by commodity type



Source: OECD PEM.

In Figure three, the taller burgundy-coloured bars recapitulate the results shown in Figure 2. The smaller light bars overlaid on top of these show the effects of the full CAP reform scenario; the visible dark area represents the difference between the two. The shift from Cereals Oilseeds and Protein (COP) crops to other uses is nearly half the amount in percentage terms in the full CAP scenario compared with removing area payments only. The difference between the two is that the CAP scenario includes the SPS payment. But we saw earlier that the Single Payment had only a small impact on land use and one with a very different pattern of effect than shown in Figure 3. What explains this difference? There are two main axes of effect of these policies—between different land uses (land substitution) and between land and other inputs (relative factor intensity). The older area payments influence both of these axes: relative land prices are altered and land is made relatively cheap compared to other factors. The single payment influences only the relative cost of land with respect to other factors but not between land uses. The increase in the relative price of land compared with other factors of production when area payments are removed is largely reversed by the introduction of the single payment. This leaves the relative land price effect of the area payments as the dominant factor in the results. So, the decoupled payment reduces the effect of removing the area payment.

Payments such as the SPS in the European Union are typically considered more decoupled from production by virtue of their historical basis and lack of major constraints on production choice. Indeed, OECD estimates of the impacts of these policies indicate that they are minimally distorting of production choice. However, the impact of these policies when introduced as part of a larger policy package such as the reform of the CAP that was introduced in 2003, can be much different as a result of the interactions between policies. In this case, it was observed that the SPS acted to moderate the impact on land use of the removal of payments based on area. The result is a much smaller predicted re-alignment of agricultural production in the EU-15 in response to CAP reform than one may anticipate when considering the effects of these policies separately.



## ■ Land Market Issues — The Czech Experience

TOMÁŠ DOUCHA\*

### Introduction

The briefing focuses on the Czech experience with regard to:

- Land market development in the EU new Member States (NMS) after 1989 as one of the basic conditions for transformation and restructuring in the agricultural sector;
- Links between agricultural policy support and farm structure development and land prices, particularly after EU accession;
- Needs for future research in these fields.

### Land market development after 1989

Land market development in the NMS reflects the two starting dates: 1989 as the year when the basic socio-economic transformation started and 2004 as the year when the NMS joined the EU.

Owing to the relatively short period after 1989, land market development has been influenced by historical consequences, termed path dependencies, which are country-specific. These dependencies have negative impacts on land market development, as usual. From a policy standpoint the dependencies can be classified as “unchangeable” (meaning very rigid and only changeable — if at all — in the very long term) and “changeable” by adequate policy measures. The problem is that — as a rule — there are more policy failures hindering land market development whether after 1989 or after 2004. The path dependencies together with policy failures have led to relatively very high transaction costs and imperfect competition on the land market.

### Path dependencies

Examples of negative path dependencies can be given based on the Czech experience:

- The difference between land ownership registration and land use registration. The elementary ownership units are represented by individual parcels (plots); the elementary land use units are represented (after EU accession as the units eligible for EU direct payments) by land blocks. The physical boundaries of the parcels and the blocks do not correspond. The sum of all parcels amounts to about 4.3 million ha of agricultural land and represents the Agricultural Land Fund (ALF). The sum of all land blocks amounts to about 3.5–3.6 million ha and represents the Utilised Agricultural Area (UAA). The difference, 0.7–0.8 million ha, is mainly caused by the disagreement between land registered in cadasters and the land registered as utilised agricultural land (in the register for processing applications for agricultural subsidies). This dependency can be classified as “unchangeable”, being partly solved by land consolidations (see below).
- The private ownership of land, except for land expropriated after 1948 to large farms, was not abolished during the communist regime, but ownership registration was interrupted (after 1964). Subsequently, rights of use almost totally overwhelmed property rights. A special situation exists in the Czech border regions, with about 10% of parcels still without ownership identification (as a consequence of the expulsion of Germans after World War II). These dependencies — except for ownership identification in the border regions — are “changeable” in principle, being solved by restitution of property rights and property titles just after 1989.
- The extreme ownership fragmentation as a consequence of the two land reforms after 1918: there are about 3 million land owners

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(compared with a high concentration in land use). This is a typical “unchangeable” dependency.

- About 20% of the ALF remained in state ownership (administered by the Czech Land Fund), being gradually privatised after 2000 (“changeable” dependency).
- Physical barriers: there are extremely large fields consisting of several parcels, but with almost totally abolished physical baulks and physical access to plots. This is a “changeable” dependency, being solved by consolidation (re-parcelling) of individual holdings. However, these procedures are very costly.

## Policy failures

Institutional capacity building related to land market development under the new regime started just after 1989. The land market has been influenced particularly by the following legislation and institutions:

- The Land Law (1991) aimed at the restitution of land-use rights and property rights (titles). Policy failure: the restitution of property rights has still not been completed in physical terms (financial or physical compensations for built-up land, unidentified ownership of land in the border regions).
- The establishment of the Czech Land Fund (1991) for the administration of the state land and non-land assets to be privatised. Policy failure: the privatisation of non-land assets was largely realised in 1994–1995; the privatisation of land started according to a special law (with only Czech natural persons eligible) in 2000, creating uncertainty in farm investments.
- The Land Consolidation Law (1991). Main policy failure: very slow progress (in spite of many policy statements, only limited public finance has been devoted to these procedures and only about 650 property registers out of a total number of about 13 000 have completed their complex land consolidation during the last 16 years).
- The Civil and Business Code applied to transfers of private land, for which real estate agencies have only begun to develop.

- Grants by the Support and Guarantee Farm and Forestry Fund (SGFFF) for purchases of private land by farms after 2000 (with only limited significance for land market development).
- The Foreign Exchange Law (1991, 2004, proposals for amendments 2007): limited eligibility for foreigners to buy Czech land.
- The Tax Law: taxes on agricultural land.
- Environmental laws, especially the Land Protection Law and the Nature Protection Law, creating at national or regional level various agri-environmental conditions for farming.

In general, the Czech land market (related to the ALF) is still undeveloped and imperfect, generating high transaction costs. The bulk of these costs can be attributed to extreme ownership fragmentation in combination with slow progress in land consolidation.

## Segments of the land market and land prices

The Czech land market currently consists of several segments. Each segment has its own institutional background and regulations:

### A) Lease market (about 85–88% of the UAA)

- a) Lease of private land
- b) Lease of state land

### B) Sale market

- a) Sale market with state interference
  - Privatisation of state land (supply: about 70 000 ha per year since 2004); temporarily the main factor on the land market influencing land prices
  - Sale market based on restitution claims (primary and secondary holders of entitlements to financial compensation, involved in the privatisation of state land)
  - Buy-backs (“expropriation”) of land for public interests
- b) Sale market for private land (ranging from 0.1–0.2% to 1.7% of the UAA per year)

The development of the land market together with other factors stems from the present specific

Czech land use/ownership structure. The structure is characterised by the following main features:

- The strongly dual structure in land use (80% of the UAA is occupied by about 6% of farms): extreme land use concentration is in contradiction with extreme ownership fragmentation (millions of small land owners). The information asymmetry (owners vs. users of land) is typical.
- The lease market is largely predominant (about 85–88% of the UAA is leased to farms), still not much influenced by policy support (e.g. through the SGFF), but more influenced by land market imperfections. The consequence: informal suppression of property rights to the benefit of rights of use, much higher rents for competitors (especially individual farms competing for land with collective farms).
- The high share of lease land has four negative impacts:
  - barriers created to farm restructuring (e.g. the conversion of arable land into grassland and the utilisation of agri-environmental schemes);
  - impossibility to use the land as collateral, particularly for mortgage loans to farms;
  - leakage of public support from farms to land owners, largely living in towns;
  - reduced “internalisation” of negative externalities (e.g. maintenance of soil for future generations).
- Family farms occupy only 13% of the UAA. Larger individual farms (including partnerships and limited liability companies) are developing (occupying almost 50% of the UAA), generated from family farms on the one hand and competing for land with collective farms and with newcomers under the land privatisation programme on the other hand.
- This phenomenon can be recognised also in Poland with the growing share of subsistence farms (not in the Czech Republic) on the one hand and larger farms on the other.
- Collective farms (coops and joint stock companies) occupy about 40% of the UAA, with a growing share of “managerial farms” (collective farms where the power of man-

agers prevails over that of the owners).

- Altogether, about 66% of the UAA is occupied by farms with a “profit/business orientation”; about 33% of the UAA is occupied by farms with an “income/self-employment orientation”.
- According to informal information, the highest demand for land is in the regions with lower soil quality, but with LFA payments and payments for agri-environmental activities. Farming in those regions generates the highest net value added per AWU.
- The prices of land (only for farming) on the sale market are strongly (but only temporarily) influenced by the privatisation of land. For this reason, average land prices on the market have even fallen after EU accession, in spite of the huge increase (by about 50–60%) of direct (partly decoupled) payments. This is quite the opposite of the situation in Poland. Rents on the lease market have been growing slightly after EU accession on average, but reaching a maximum of only about 20–25% of direct payments per hectare.

## Needs for future research

Given the real situation on the land market, particularly in the NMS, and the expected changes in agricultural policy, future research is needed especially on the following topics:

- Impacts of different models of decoupling on land market development;
- Impacts of non-agricultural farm activities (including production of public goods) on land market development;
- Interactions between the land market and the capital (credit) markets.



## ■ Statement on Farmers' Behaviour and Capital Markets

EWA RABINOWICZ<sup>†</sup>

This statement builds on the presentations made during the workshop session related to farmers' behaviour and capital markets that I have chaired.

The major element of the 2003 Reform was decoupling of the support from production. Agricultural support, including decoupled payments, affects production in a number of ways such as markets effects, risk effects (including risk and insurance) and dynamic effects: investment and expectations. The session on capital markets relates mainly to the last mentioned but also risk effects since risk considerations are important determinants of investment behaviour.

I am going to organise my comments into reflections on past policy changes and some forward-looking thoughts related to the health check and beyond. My comments will mostly connect to EU-15. In the case of EU-15, the issue is of the impact on investment of a change to a less coupled support whereas in the case of NMS the dominating effect is due to the accession and an introduction of new payments.

A gradual decoupling of support from production has been going on since 1992. It could be expected that this policy change should have produced some impact on the level of investments but as shown by Martin Odening and Silke Huttel not much can be seen looking at the aggregate level of investment. However, a lack of any discernible effects is probably not as surprising as it may appear at the first sight. The 1992 reform moved the support from production (output) to the land input, keeping the total level of support unchanged. An impact on investment could be expected if land could be substituted for other inputs such as machinery. Otherwise, a low degree of substitutability between land and capital may well result in a lack of an impact on investment. With a Leontief or almost a Leontief type of technology it

does not matter what is subsidised. The effect on production and input use will be the same. With an unchanged level of support no substantial impacts of any kind can be expected.

The impact of 2003 reform on investment is not easy to assess due to many elements involved and opposing effects that can be expected from different components. Let me start to add to the expected effects by looking at production. Werner Kleinhanss has presented an overview of model results of anticipated changes in production. By and large, production will decline but not very much. However, the impact is believed to vary according to commodity. Two implications follow: if we believe that production changes will be limited and substitutability of production factors is low then we should also expect that investment should not change much. However, if the composition of the output changes, one of the main components of the reform was that the payments are not longer linked to specific commodities in order to achieve a greater market orientation, there may be an impact on investment due to differences in capital/output ratio between different commodities.

Statements such as "we do not know for sure" and "more research is needed" were consistently repeated during the workshop but are especially relevant when it comes to investment behaviour. A review of literature was presented by Martin Odening including both studies of stated preferences, in other words plans and expectations and of revealed preferences: econometric studies and models that are, however, normative in nature. In addition, we had a presentation of a study done commissioned by IPTS (Viaggi and Gomez y Paloma). As we could see the number of studies is low, so not much knowledge has been accumulated so far. Moreover, each category of studies has its particular limitations, which has to be kept in

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mind while interpreting the results. Econometric analyses, which at end of the day should constitute the most reliable way of establishing the effects suffer often from limited variability of the key explanatory variables. Models are based on assumed behaviour and the empirical underpinnings of those assumptions are, especially in the case of investments, often weak. In case of stated preferences, we all know that farmers not always do what they say they will do. The answers obtained from surveys suffer, moreover, from various types of bias such as strategic behaviour. A combination of different approaches, as in the IPTS study, which relied on both modelling and surveys seems therefore promising. Nevertheless, it can only be repeated, much more analyses on the subject of investment are needed.

Now some perhaps more speculative comments, related to the “health check”. What will be the actual outcome of the process it is not known yet but some issues have been raised. Let me focus on two of them: modulation and capping of the support. So far modulation rate is insignificant, only 5%, but up to 20% has been mentioned in the political discussions. A modulation of this size may have profound implications for investment ac-

tivities but it is difficult to project the direction. The modulated money will be transferred to the Pillar 2 of the CAP. Pillar 2 contains a large number of different measures organised along three axes. The first one includes *inter alia* investment support and support to young farmers. Both measures could be expected to boost investment activities. Measures in the second axis on the other hand, tend to favour extensification and, accordingly, less investment since the objective is to promote environmentally friendly production and production of public goods related to environment. Even more difficult is to speculate in possible effects on the funds which would end in the third axis since some of them may be allocated to diversification activities outside agriculture.

Capping, if decided, will reduce payments to the largest recipients, who presumably invest most, which may affect their investment behaviour especially if capital markets are imperfect.

To sum up, investment behaviour of farmers is an under researched subject and the future changes of the policy will only increase the knowledge gap.

## ■ Impacts of the 2003 CAP Reform on Pluriactivity and on Labour Markets

ALESSANDRO CORSI\*

### Introduction

The goal of this paper is to provide some theoretical insights on the effects of the 2003 CAP Reform on pluriactivity and on agricultural labour markets.

The rather scarce existing literature dealing with the effects of agricultural policy reform on labour use is generally focussed on decoupling *per se*. In this paper, I will take the approach of analysing the effects on labour use of the overall common agricultural policy (CAP) reform. The CAP reform is quite articulated and many details should be considered in empirical research to evaluate their impact. Nevertheless, a theoretical analysis cannot go into all details and needs to identify the most important features of the policy change. From this point of view, the approach I will take is considering the spirit of the 2003 CAP Reform as a trade off of a coupled support with direct payments. This is clearly the “philosophy” of the Reform itself and it is quite explicit in the norms prescribing that the budget allocated to coupled support should shift to Single Farm Payments (SFP). While coupled payments can take many forms, from intervention prices to direct payments per tonne produced to payments per area or animal head, the view that will be taken here is that their reduction is theoretically equivalent to a decrease in the average revenue received by farmers, i.e., is equivalent to a price decrease. Even when the payments are area-based, for a given yield their reduction or abolition is the same as decreasing the received price. Of course, since following the reform the crop mix and the factor use can be changed, the “price decrease” is not the same for all farmers, which makes this effect different from an actual price change that would be the same for all farmers. Nevertheless, it is convenient to analyse the effects of the reduction or abolition of the coupled payments as a price decrease. The

overall impact of the CAP reform will be therefore analysed as the introduction of a) direct payments, compensating for b) the price decrease (equivalent to the abolition or reduction of coupled payments). Both aspects are to be taken into account.

### Theoretical model

To begin, it is convenient to assume a perfectly competitive market, where farmers can freely allocate their family labour to farm and off-farm work and all adjustments can happen smoothly. Market imperfections will be examined below. It will also be assumed that farmers have no preference for farm rather than for off-farm work and for simplicity the joint decision-making within farm households among operators, spouses and other household members will be ignored. In other words, the reference model is a separable model of a single farmer. The model is static and, more importantly, the analysis does not take into account the price changes stemming from the CAP reform. According to the model (Singh et al. 1986; Huffmann, 1991) the farmer is assumed to maximise utility over consumption and leisure, under income and time constraint. The income constraint comprises farm income, off-farm wages and non-labour income. The model is as follows:

$$\text{Max } U = U(C, L; H, Z_H) \quad (1)$$

*S.t.:*

$$T = F + M + L$$

$$L > 0$$

$$F, M \geq 0,$$

$$Q = f(F, X; H, Z_F)$$

$$(p + s)Q - RX + \sum WM + V = C$$

where  $C$  is consumption (or, equivalently under the assumption of a composite good, income);  $L$  is leisure;  $H$  is a vector of personal vari-

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ables;  $Z_H$  a vector of characteristics of the household;  $T$  is total available time;  $F$  and  $M$  are time spent working on the farm and off the farm, respectively;  $Q$  is the quantity of the good produced by the farm;  $p$  its price;  $s$  the coupled payment per unit of output;  $X$  is the vector of hired inputs and  $R$  the vector of their relevant prices;  $Z_F$  the vector of farm characteristics;  $W$  is off-farm market wage;  $V$  is non-labour income. The utility function and the production function are assumed to be well-behaved.

The Kuhn-Tucker maximisation conditions yield the following on-farm and off-farm participation conditions and the condition for input use:

$$\delta(p+s)Q / \delta F \leq \mu / \lambda \quad (2)$$

$$W \leq \mu / \lambda \quad (3)$$

$$\delta(p+s)Q / \delta X = R \quad (4)$$

where  $\mu$  and  $\lambda$  are the marginal utilities of leisure and income, respectively. The first condition states that participation in farm work (an internal solution) occurs if the marginal value product of farm work is equal to the leisure-income marginal rate of substitution (MRS). The second states that participation in off-farm work occurs if the wage is equal to the leisure-income MRS. The third is the textbook condition for input use, i.e. the marginal value product of the input is equal to its price.

## Impacts of the CAP reform on pluri-active farms

In a pluriactive farm, equations (2) and (3) hold as equalities:

$$\delta(p+s)Q / \delta F = W \quad (5)$$

$$W = \mu / \lambda \quad (6)$$

That is, the marginal value product of farm labour is equal to the market wage and to the leisure-income MRS. Using this model, the impact of a direct payment has long been established: a decoupled direct payment is tantamount to an increase in non-labour income. Hence, assuming leisure is a

normal good, a clear a priori prediction is that a decoupled payment will increase the time allocated to leisure and, hence, decrease total time allocated to work (El-Osta *et al.*, 2004). This is because increased income will decrease its marginal utility and therefore increase the MRS. Nevertheless, if production decisions are separable from labour allocation decisions and no change is introduced in farm prices, total labour allocated to farm work does not change, since the optimality condition of equality between the wage rate and the marginal value product of farm labour is not affected. Hence, for a farmer participating in off-farm work, a decoupled direct payment will decrease off-farm work.

While direct payments only have a wealth effect, a decrease in coupled support (i.e., a decrease in the price of the agricultural output) has both a wealth and a substitution effect. The decrease in income decreases the MRS, so that the farmer consumes less leisure. At the same time, the decrease in the marginal value product of family farm labour induces a reduction of on-farm work. Hence, the overall result is an increase in off-farm work.

As the CAP reform is a combination of an income payment and of a price decrease, the two effects operate in opposite directions. One has to add additional hypotheses about the amount of decoupled payments relative to the price decrease following the abolition of the coupled payments. The most sensible one, in the spirit of the reform, is that at the farm level the decoupled subsidy exactly compensates for the pre-reform farm income, i.e., that:

$$(p+s)Q_I - RX = pQ_I - RX + SFP \quad (7)$$

where  $Q_I$  is the pre-reform output and SFP is the decoupled payment. But even under this assumption, no theoretical prediction on off-farm work is possible. While on-farm work is unambiguously reduced, the new income possibility curve lies above the original one in the relevant portion of off-farm work. Therefore, the farmer consumes more leisure and total work is reduced. The overall effect on off-farm work depends on whether the decrease of farm work (depending on the substitution effect) is larger or smaller than the decrease in total work (due to the wealth effect)<sup>1</sup>.

<sup>1</sup> This consideration makes the important point that if the decoupled payment exactly compensates the price decrease at the pre-reform equilibrium, a welfare gain is accrued to the farmer.

There are nevertheless indirect effects of the CAP reform on total off-farm labour supply. They stem from adjustments of the production mix following the abolition of the coupled support. Farmers will shift from the production of formerly subsidised output to non-subsidised crops, due to the elimination of price distortions. Supply of other crops is therefore likely to grow, which, *ceteris paribus*, implies a price drop. Therefore, farmers non receiving decoupled payments will suffer a price decrease, with the resulting trend to increasing off-farm labour supply and/or to decreasing use of waged labour. The magnitude of the indirect effects obviously depends, in addition to the wealth and substitution effects in these industries, on the price changes induced by the adjustments.

## Impacts of the CAP Reform on waged labour

To analyse the effects of the CAP reform on waged labour, a preliminary distinction needs to be made, depending on whether waged labour is a perfect substitute of family labour in farm production or not. The former applies if  $\delta(p+s)Q/\delta F = a \delta(p+s)Q/\delta F^w$ , where  $a$  is a constant and  $F^w$  is waged work. Substitutability of waged for family work in farm production depends on many factors including, among others, the type of farming (more “professional” types of farming, e.g. wine growing, require high skills in many operations, that waged work rarely have) and the type of work (seasonal vs. permanent).

If waged labour is not a perfect substitute of family labour, then waged work can be considered as any other input of vector  $X$ . If this is the case, then the effects of the CAP reform are unambiguously a decrease of waged labour. The decoupled payment accruing to farmers has no wealth effect on hired labour and the price decrease lowers the marginal value product of hired labour, so that its use is decreased (see eqn. 4).

When hired labour is a perfect substitute of family labour, family and waged labour can be expressed in equivalent terms. If  $\delta(p+s)Q/\delta F = a \delta(p+s)Q/\delta F^w$ , and  $W^w = b W$ , where  $W^w$  is the wage paid to hired workers, then the optimality condition for total labour use on the farm is  $\delta(p+s)Q/\delta F = W = a/b \delta(p+s)Q/\delta F^w$ . The optimal quantity of family labour contributed by the farmer corre-

sponds to the condition  $W = \mu/\lambda$ , the complement to total farm labour is provided by hired workers.

For a farmer hiring waged work, a decrease in the output price entails a decrease in total labour use on the farm, due to lower marginal value productivity of labour. At the same time, since income drops, the farmer consumes less leisure and increases his/her on-farm work time. It follows that hired work time unambiguously decreases as a result of a price decrease.

By contrast, a decoupled payment has no effect on total farm work time, since the marginal value productivity of labour is not affected. But, due to the positive wealth effect, a decrease in family work time is predicted. As a result, a decoupled payment unambiguously increases hired work time.

The overall effect of the CAP reform on waged work is the result of two components pushing in opposite directions. Again, assuming a full monetary compensation of the price decrease through the decoupled payment at the pre-reform level, no theoretical prediction on waged work is possible. Total farm work is unambiguously reduced, but the decoupled payment raises the income possibility curve of the farmer and his/her on-farm work is reduced. The overall effect on waged work depends on whether the decrease in total farm work (depending on the substitution effect) is larger or smaller than the decrease in the farmer’s farm work (due to the wealth effect).

## Empirical literature

Overall, the above analysis shows that there are very few theoretical predictions, if any, on the effects of the CAP reform on pluriactivity and on agricultural labour markets. Therefore, empirical analyses are required to assess the effects of the reform. So far, empirical analysis on this issue has been very scarce. Within the EU, Ooms and Hall (2005) simulate the effects of CAP reform for a sample of Dutch dairy farms, finding that its impact both on on-farm (positive) and on off-farm labour supply (negative) are weak. The result of the increase in on-farm work is inconsistent with the theory, but the simulation also included a milk quota increase, which could explain this result. More research has been produced on the effects of decoupled subsidies in the USA (El-

Hosta, Mishra, Ahearn, 2004; Ahearn, El-Hosta, Dewbre 2006; Dewbre, Mishra, 2002; Serra, Goodwin and Featherstone, 2005; Goodwin and Mishra, 2004). These analyses are generally based on a comparison between pre-1996 FAIR Act and the following period. The results are mixed. Some are consistent with the theoretical predictions, like the result that both coupled and decoupled payments decrease off-farm work hours or that coupled payments have a positive effect of on on-farm work, while the coefficients are not significant for decoupled payments (El-Hosta, Mishra, Ahearn, 2004). Some results are puzzling, like the finding by Ahearn, El-Hosta, Dewbre (2006) that there was no significant difference in the impact of different payment types on off-farm labour participation, which is negative for both. In general, the magnitude of the estimated effects is rather small, especially for total work, which suggests that the wealth effect on total work is indeed small.

### Other factors at play and directions for further analyses

Of course, factors other than the ones considered in the above theoretical framework may be at play, preventing or curbing farmers' response to the policy change. Among them, non-pecuniary returns from living a farming lifestyle have been indicated (Ahearn, El-Hosta, Dewbre, 2006; Key and Roberts, 2007). Decoupled payments increase farmers' wealth and may reduce their risk aversion and hence their propensity to take on an off-farm job (Serra, Goodwin and Featherstone, 2005). Expectations that future payments will also be tied to past yields and production choices (El-Hosta, Mishra, Ahearn, 2004) are a possible explanation for some theoretically puzzling results in the US, a factor that though is not likely to play a role in the EU, where the commitment of the EU to the policy change is very clear. A further point is that an appreciable share of government payments is passed through to landowners, to a greater extent in the case of decoupled payments (Goodwin et al., 2003; Kirwan, 2003; Lence and Mishra, 2003; Roberts et al., 2003), thus decreasing the wealth effect of the reform for operating farmers and rendering a net effect of increased off-farm labour and decreased waged labour more likely. Farmers that own their land directly benefit of the payments and for them the wealth effect is at work. In many Eu-

ropean countries, nevertheless, rents are heavily regulated and rent contracts are on a long-term basis. In these countries appropriation of the decoupled payments by landowners is therefore likely to be a slow process.

All the factors indicated above are important issues for research on this topic. I will indicate some more factors that could be considered.

A major difficulty with the empirical analyses is that a crucial point in establishing the effects of the policy change on labour is to what extent decoupled payments substitute coupled payments, since their effects are opposite. The higher the decoupled subsidy the larger the wealth effect, which implies a decrease in off-farm work and an increase in waged work. The larger the decrease in prices, the larger the substitution effect and, hence, an increase in off-farm work and decrease in waged work are more likely. It is therefore crucial to assess whether the CAP reform led to an "over-compensation" or an "under-compensation", relative to the pre-reform situation. If the decoupled subsidy more than compensates the decrease in prices, the former outcome is more likely to prevail; the reverse in case of under-compensation.

Several points are worth noting in this respect. The most obvious is the measure of the SFP at the area and farm level. For many products, the CAP reform dictates that the previous budget allocated to coupled payments be reallocated to SFP. This implies that at the macro level there is exact "compensation". This might not be the case at the farm and area level. Comparisons of the pre-reform coupled payments with SFP levels might add information on this point.

Second, all the above theoretical analysis implicitly assumed a single output. As a reaction to policy change and much in the spirit of the reform itself, farmers can change their output mix. There are efficiency gains in quitting or reducing products previously enjoying coupled support. As a result, the average price decrease after this change is less severe than if no change in the output mix was undertaken. This reinforces the wealth effects relative to the substitution effects.

Third, in most old member states the SFP is set according to historical entitlements and price variations in the following period may cause "over- or under-compensation". There is a wide variation of

price trends since the reference period for SFP calculation, which, if crops are not perfectly substitutable, creates “winners” and “losers”, i.e., farmers that over- and under-compensate. “Winners” are more likely to decrease off-farm work and to hire more waged labour; the reverse is true for “losers”.

A following point worth investigating is the effects of the policy change in relation to the distribution of CAP support. CAP support was traditionally biased in favour of wealthier farms. The CAP reform apparently is not going to change dramatically this pattern and inequality might even increase under the CAP reform (Schmid *et al.*, 2006; von Witzke and Noleppa, 2007). If this is really the case, the result is that small farms will be less “compensated” on the average than large farms and the effects in terms of increase of off-farm labour are more likely to prevail. A relevant connected question is whether small farms are more sensitive to non-labour income changes or to farm labour productivity changes, relative to large farms. This is also an open question worth investigating.

A final relevant issue concerns market imperfections. All the theoretical analysis was based on the assumption of perfect markets, which is obviously almost never the case in real world. The most relevant market imperfections for this issue are off-farm labour rigidities and job availability.

Off-farm work is usually more time constrained than on-farm independent work. Except for overtime, there are seldom open options on how many hours, or days, to work, especially in case of waged jobs. Laws, regulations and agreement between employers and trade unions on working time are quite frequent in European countries. If off-farm work is assumed to be totally inelastic (e.g., 8 hours or none), pluriactive farmers cannot perform a fine tuning of their work time by adjusting off-farm work and small adjustments of total work are only possible on farm work. In such a situation, the signs of the effects are obviously the same as in an unconstrained situation, but the effects are discontinuous<sup>2</sup>. A decoupled payment, if large enough, can trigger quitting the off-farm job and a price decrease, if severe enough, can lead to taking on an off-farm job and even to dis-

continuing farm operation. Again, “over-compensation” or “under-compensation” from the CAP reform is crucial. But on the average the responsiveness to policy changes is lower than in an unconstrained situation.

Job availability, both on the supply and on the demand side, is another important related issue. If no off-farm job opportunities are available to a farmer, obviously no adjustment to changing economic conditions is possible through off-farm work. Labour allocation decisions and farm production choices are not separable. The decoupled payment has a pure wealth effect, pushing to more leisure and hence less on-farm work. The decrease in prices has both a substitution and a wealth effect, with opposite directions. If the decoupled payment exactly compensates the income loss stemming from the price decrease at the pre-reform equilibrium, the two wealth effects vanish, only the substitution effect is at work and the net effect is a reduction of farm work. This negative net effect of farm work is likely to dominate in marginal areas where few job opportunities are available and among older farmers, for which finding an off-farm job is problematic. But rationing and transaction costs to participate in off-farm activities are widespread also in rich areas (Woldehanna *et al.*, 2000).

Shortage of waged labour is another possibility. Until one or two decades ago, waged labour was difficult to find in some areas, especially in south Europe. If waged labour is not available, output is lower and farmers’ farm work is greater, than when hired work is available. If the situation of hired labour shortage had persisted, the CAP reform would have further reduced output and farmers’ work. But in the last decade many immigrant workers entered the EU, thus alleviating the problem. This trend has been reinforced by the EU enlargement and many workers from new member countries now work in agriculture in old member countries. This obviously act in the opposite direction as to farm output and farmers’ on-farm work, so that in an empirical analysis it will presumably be very difficult to disentangle the effects of the CAP reform from those of the larger availability of waged workers. More so, because many immigrant workers, especially in southern Europe, work illegally and are not recorded in official data.

<sup>2</sup> This is probably the reason why almost invariably models of off-farm labour participation usually perform statistically better than models of off-farm labour supply.

## Conclusions

The main message of this paper is that unfortunately there are no clear-cut theoretical predictions on the effects of the CAP reform on pluriactivity and agricultural labour markets. Its effects in this respect are therefore to be evaluated empirically. Nevertheless, it is quite dubious that the CAP reform will have dramatic effects on pluriactivity and on waged labour use. The reason is not only because there are opposite effects of the reform that are offsetting each other, but also because the effects of both coupled and decoupled payments, as estimated by the empirical research so far, are quite modest. Though, the estimates concern almost only the US and the coefficients concerning EU farmers might be different. Regardless, the investigation on the way farmers respond or do not respond to policy changes in allocating their work time is important, both regards to changes in agricultural production and in a rural development perspective.

## References

- Ahearn, M. C., El-Osta, H. S., Dewbre, J., 2006. The Impact of Coupled and Decoupled Government Subsidies on Off-Farm Labor Participation of U.S. Farm Operators, *American Journal of Agricultural Economics*, 88: 393-404.
- Burfisher, M. E., Hopkins, J., (eds.), 2004. Decoupled Payments in a Changing Policy Setting, USDA Agricultural Economics Report No. 838, November.
- Dewbre, J., Mishra, A. K., 2002. Farm Household Incomes and US Government Program Payments, paper presented at the Annual Meeting of the AAEA, Long Beach, California, July 28-31.
- El-Osta, H. S., Mishra, A. K., Ahearn, M. C., 2004. Labor Supply by Farm Operators Under "Decoupled" Farm Program Payments, *Review of Economics of the Household*, 2: 367-385.
- Goodwin, B. K., Mishra, A. K., Ortalo-Magne, F. N., 2003. What's Wrong with Our Models for Agricultural Land Values?, *American Journal of Agricultural Economics*, 85: 744-752
- Goodwin, B.K., Mishra A.K. (2004) Farming Efficiency and the Determinants of Multiple Job Holding by Farm Operators, *American Journal of Agricultural Economics*, 86: 722-729
- Huffman, W. E., 1991. Agricultural Household Models: Survey and Critique, in M.C. Hallberg, J.L. Findeis and D.A. Lass, eds. *Multiple job holding among farm families*. Ames: Iowa State University Press, 79-111.
- Key, N., Roberts, M. J., 2007. Nonpecuniary Benefits to Farming and Decoupled Payments, Paper prepared for presentation at the Annual Meeting of the AAEA, Portland, Oregon, July 29-August 1.
- Lence, S. H., Mishra, A. K., 2003. The Impacts of Different Farm Programs on Cash Rents, *American Journal of Agricultural Economics* 83: 753-61.
- Ooms, D. L., Hall, A. R., 2005. On- and Off-farm Labour Supply of Dutch Dairy Farmers: Estimation and Policy Simulations, Paper presented at the 11<sup>th</sup> Congress of the EAAE, Copenhagen, August 24-27.
- Roberts, M. J., Kirwan, B., Hopkins, J., 2003. The Incidence of Government Program Payments on Agricultural Land Rents: The Challenges of Identification, *American Journal of Agricultural Economics*, 83: 762-69.
- Schmid, E., Sinabel, F., Hofreither, M. F., 2006. Direct payments of the CAP – distribution across holdings in the EU and effects on farm household incomes in Austria, Diskussionspapier DP-19-2006, Institut für nachhaltige Wirtschaftsentwicklung, Oktober.
- Serra, T., Goodwin, B. K., Featherstone, A. M., 2005. Agricultural Policy Reform and Off-farm Labour Decisions, *Journal of Agricultural Economics*, 56: 271-285.
- Singh, I., Squire, L., Strauss, J., (eds.), 1986. *Agricultural household models: extensions, applications and policy*. Baltimore: John Hopkins University Press.
- von Witzke, H., Noleppa, S., 2007. Agricultural and Trade Policy Reform and Inequality: The Distributive Effects of Direct Payments to German Farmers under the EU's New Common Agricultural Policy, Working Paper Nr. 79/2007, Humboldt Universität Berlin, Wirtschafts- und Sozialwissenschaften an der Landwirtschaftlich – Gärtnerischen Fakultät.
- Woldehanna, T., Lansink, A.O., Peerlings, J., 2000. Off-farm work decisions on Dutch cash crop farms and the 1992 and Agenda 2000 CAP reforms, *Agricultural Economics*, 22: 163-171.

# ■ Investment Behaviour and Capital Markets under the 2003 CAP Reform - Some General Considerations

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## Relevance of investment behaviour

The understanding of investment behaviour is important for an economic and policy analysis in agriculture for several reasons. Firstly, investments change the farm size which has an impact on profitability and competitiveness due to economies of size. Secondly, the adoption of new technologies is frequently realized through investments. This may shift the production frontier of the farm and its efficiency. Thirdly, investments and disinvestments are the main driving forces of structural change in agriculture. This becomes obvious if one considers farm foundations, market entries, the conversion of conventional into organic farms, the termination of production activities or even the retirement from agriculture as special investment and disinvestment activities. In general, investments have, once being realized, a long lasting effect on the economic orientation of the farm.

## Determinants of investment behaviour

Economic theory asserts that investments (disinvestments) are triggered off, if the investment returns exceed (falls below) a particular hurdle rate. The following factors determine the investment returns and the investment (disinvestment) trigger of farms in the context of the CAP:

*Investment costs:* Several measures within the second pillar have a direct impact on the investment cost, for example interest rate reductions, state bails or subsidies to investment finance of environmental or animal friendly production systems. In contrast, investment costs may increase due to bureaucratic regulations inducing transaction costs, for instance, building permissions for investments in intensive livestock production. Indirect effects may arise if policy instruments affect the price for investment goods, for example land.

*Gross margins of production activities:* Changes in intervention prices are expected to induce declining producer prices with a higher volatility and will therefore change the absolute value of the gross margins of agricultural products as well as their comparative advantage. Moreover, quotas restrict production quantities and hinder optimal output. Further impact from policy measures on the investment cash flow may arise from production requirements, e.g., cross compliance.

*Direct payments:* Direct payments are only relevant for the investment decision if they are coupled with the production activity which is carried out by means of the investment. In general, fully decoupled payments do not contribute to the marginal cash flow of an investment. However, within the option of regionalised decoupling the value of land is expected to increase and thus, indirectly affects the marginal cash flow.

*Salvage values:* Agricultural investments are usually very specific and cannot be sold on liquid markets once they have been purchased, i.e. high sunk costs accrue. This drives a wedge between investment and disinvestment triggers. Sunk costs of specific assets constitute a major reason for path dependence and slow adjustment processes in agriculture.

*Risk:* Investment decisions rest upon expectations of future cash flows, which are more or less uncertain whereby intervention prices and other market regulations in the past reduced producer price risk. Thus, production branches which have not been affected by market regulation have been more risky. Otherwise, products with reduced market support within the CAP reform (2003) will become more risky. Since one can reasonably assume that farmers are risk averse, they will require risk premia when investing in uncertain production activities. In fact, Hinrichs et al. (2007)

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and Pietola and Myers (2000) report a considerable investment reluctance of hog producers which is caused by risk.

This itemisation of investment determinants shows that it is almost impossible to forecast the direct impact of a complex policy reform like the 2003 CAP reform, since several factors coexist and interfere. Hence, the following hypotheses should be considered with some prudence.

### **Hypotheses on the impact of the 2003 CAP Reform on investment behaviour**

Long run historic data show that the aggregate investment volume in EU agriculture is rather stable (Eurostat 2007). Former changes in the CAP as the MacSharry reform (1992) or the Agenda 2000 do not seem to have a significant impact on aggregate investments and there is no apparent reason why this should be the case for the 2003 CAP reform. However, this does not mean that this reform is irrelevant for investment decisions at the farm level or at a regional level.

### **Impact of the CAP Reform on the (relative) cash flow of important production activities**

The reduction /abandonment of intervention prices linked with decoupled payments changes the structure of incremental investment cash flows. Within the MacSharry reform financial support has already been decoupled from production intensity even though some level of production was still required to claim area or headage payments. Accordingly, specific investments were necessary to realize and maintain production. If under the 2003 reform payments are completely (not partially) decoupled from production, many investments (e.g., livestock barns, machinery) are no longer necessary to continue production and thus to activate premia. Besides, adjustments of production capacities will happen slowly due to sunk costs. As long as production revenues cover the variable production cost, farmers will continue to produce. Disinvestments are realized through depreciation and defaulted reinvestment. This process may last several years depending on the age of the assets. Hence, the effects of the reform on disinvestments will be measurable with a time lag. Notwithstanding, in medium term it can be expected that invest-

ments in dairy farming and in beef production will decline due to decreasing gross margins (Kuepker et al. 2006; Lethonen, 2004). In contrast, unspecific farm investments (land) or off-farm investments become more attractive (Peerlings and Ooms, 2005). However, these tendencies hold for an average farm. According to a recent survey of UK milk producers younger farmers, tenant farmers, farmers producing over 1 million litres of milk per year and specialized dairy farms plan to increase milk production over the next years (Milk Development Council UK, 2006). It seems likely that divergence between efficient expanding farms and less efficient contracting dairy farms can be observed. The extension of the milk quota and the expected decline in quota prices as a consequence of decoupling will accelerate this process.

Another potential impact of the 2003 CAP reform on the investment behaviour comes from changes of the farmers' risk exposition. The reduction of intervention prices will not only decrease expected producer prices but also increase the price volatility, since the price distribution is truncated at a lower level. Hence, the downside risk increases and farmers require higher risk premia before they invest. Schokai and Moro (2005), for example, estimate a decline of the capital stock of Italian crop farms about 25 percent due to an "insurance effect".

It should be noted that the predicted price effects of the 2003 CAP reform may be superposed by external market developments. For example, OECD (2004 p. 43) conjectures a decline in the producer prices for cereals and a clear movement from crop land to pasture. Such an extensification would also reduce the necessary machinery capacity. However, in Germany, this development could not be observed until now, since markets for renewable energy boomed in the last two years and prevented grain prices from falling.

Moreover, the principal impacts of the CAP reform on investment behaviour and adjustment processes may be diluted, because farmers do not behave completely rational. SWINBANK et al. (2004) point out that decoupled payments provide farms with an additional income that delays cash problems in inefficient farms. Farmers not bothering about marginal cost and revenues might continue producing longer than optimal.

## Speed of structural change

As stated above, agricultural structures are characterized by a high degree of inertia. A major reason is the asset specificity and the low fungibility of many production factors in agriculture. Decoupling of payments may affect this fungibility and thereby influence the decision to give up production or even to retire from agriculture. Additionally, a flexible transfer of premium rights without specific production obligations will probably increase the market value of durable assets and thereby increase the incentive to leave the sector. Actually, Jongeneel (2006) shows by means of a simulation model that the exit rates of dairy farms in the Netherlands and West Germany are higher under the conditions of the Luxembourg reform compared to a continuation of the Agenda 2000.

In any case farmers' reluctance to invest or disinvest does not necessarily express ignorance of profit opportunities or market frictions. It rather is compatible with dynamically optimal behaviour. Hence, a slow capacity adjustment per se provides little justification for state intervention. Such measures should for instance be justified by environmental or regional policy targets. If, on the other hand, it is desirable to speed up adjustment processes and structural changes in intensive livestock production for whatever reasons, the considerable inertia which can be attributed to this sector, has to be taken into account.

## Capital markets and access to debt capital

One might conjecture that an indirect effect of the 2003 CAP reform occurs via the cost of capital and the access to debt capital. If agricultural assets lose value due to the reform, land in particular for those Member States that opted for the farm individual decoupling by the single farm payment, farmers can provide less collateral when applying for loans. Moreover, credit rating systems, in principle, are sensitive to the economic situation of the industry in which the credit applicant is embedded. That means if the profitability of agricultural production is deteriorated by unfavourable political or economic circumstances the access to debt capital worsens. This would be an important issue for growing farms showing a rather low equity share. However, it is unlikely that such effects

will be pronounced, at least on average. Firstly, the design of financial support has changed with the 2003 CAP reform, but not its total level. Hence, there is no withdrawal of subsidies from the whole sector. Moreover, it is not clear if the value of land as important collateral will actually fall. Finally, according to the new Basle accord (Basle II) banks should put less emphasis to the existence of collateral when assessing the credit worthiness of their clients. Compared with other industries the probability of credit default is low in agriculture.

## References

- Eurostat, 2007.  
[http://epp.eurostat.ec.europa.eu/extraction/evaluation/EVALight.jsp?A=1&language=de&root=/theme5/aact/aact\\_eaa01](http://epp.eurostat.ec.europa.eu/extraction/evaluation/EVALight.jsp?A=1&language=de&root=/theme5/aact/aact_eaa01).
- Hennessy, T., Rehman, T., 2006. Modelling the Impact of Decoupling on Structural Change in the Farming Sector: Integrating Econometric and Optimisation Models. In: Mann, S. (ed): *Causes and Impacts of Agricultural Structures*. Nova Science, New York: 101-120.
- Hinrichs, J., Mußhoff, O., Odening, M., 2007. Economic Hysteresis in Hog Production. *Applied Economics* (in press).
- Jongeneel, R., 2006. *Dairy farm size distribution of East and West: Evolution and Sensitivity to structural and policy variables: case studies for the Netherlands, Germany, Poland and Hungary*. European Dairy Industry Model (EDIM) SSPE-CT-2004-502111 D07.04 report on complementary tools Annex 3.1.
- Küpker, B., Hüttel, S., Kleinhanß, W., Offermann, F., 2006. Assessing impacts of CAP reform in France and Germany. *Agrarwirtschaft* 55(5): 227-237.
- Lethonen, H., 2004. Impact of De-coupling Agricultural Support on Dairy Investment and Milk Production Volume in Finland. *Acta Agriculturae Scandinavica*, Section C – Economy 1(1):46-62.
- OECD 2004. Analysis of the 2003 CAP Reform. <http://www.oecd.org/dataoecd/62/42/32039793.pdf>
- Perlings, J., Ooms, D., 2005. Effects of the 2003 CAP Reform on Investments of Dutch Dairy

Farms. Simulations with a Household Production Model. In: Arfini (ed): *Modelling Agricultural Policies: State of the Art and New Challenges*. Monte Università Parma.

Pietola, K. S., Myers, R. J., 2000. Investment under Uncertainty and Dynamic Adjustment in the Finnish Pork Industry. *American Journal of Agricultural Economics* 82 (4): 956-967

Milk Development Council UK, 2006. *Farmer Intentions Survey*.  
<http://www.mdcdatum.org.uk/PDF/MDC-FISurveyfinal.pdf>

Schokai, P., Moro, D., 2005. Modelling the Impact of the CAP Reform on Farm Investments. Paper prepared for the XI Congress of the EAAE “*The Future of Rural Europe in the Global Agri-Food System*”. Copenhagen, Denmark.

Swinbank, A., Tranter, R., Daniels, J., Wolldridge, M., 2004. *An examination of various theoretical concepts behind decoupling and review of hypothetical and actual de-coupled support schemes in some OECD countries*.  
[http://www.grignon.inra.fr/economie-publique/genedec/publi/deliv/GENEDEC\\_D1\\_1.pdf](http://www.grignon.inra.fr/economie-publique/genedec/publi/deliv/GENEDEC_D1_1.pdf)

## ■ Intended Farmers Responses to Decoupled CAP Payments in Selected EU-15 and New Member States: what Policy Lessons?

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This briefing emphasises some of the findings of a study of the impact of decoupled payment system on farmers' intentions in five EU Member States carried out within the FP6 IDEMA project (Impact of Decoupling and Modulation on the Enlarged EU). The analysis draws on primary survey data and farm accounting records. IDEMA project collected a unique dataset of farmers' intentions regarding their planned activities in the post-accession/single payment system era in five EU Member States (England, France, Lithuania, Slovakia and Sweden). For full details about the survey data, their analysis and interpretation of results see FP6 IDEMA, Deliverable 14, June 2007.

The choice of countries incorporates a mixture of EU-15 and NMS. Primary data were collected on intentions to exit from/stay within agriculture; change the amount of land farmed and production mix. Data were also collected about farmers' objectives, values and opinions concerning policy support. Primary data collection was linked to FADN records to enhance the understanding of the impact of farms' structural characteristics and past performance on future intentions and reduce the amount of data which had to be collected during interviews. To understand the specific effects of the switch in policy, farmers were asked to state their intentions under three main policy scenarios:

- a) Continuation of policies under Agenda 2000 in EU-15 / pre-accession policies in NMS. This provides the baseline scenario of what farmers would have done under continuation of the previous policy environment.
- b) Intentions under the 2003 CAP reform as implemented in each country: the single

farm payment (SFP) in the EU-15 and the single area payment (SAP) plus national top-ups in the NMS.

- c) Intentions under full decoupling in ex-ante sense – flat regionalised payments in the EU-15 and SAP without coupled top-ups in the NMS.

The strategic decisions to exit from or stay in agriculture and to increase farm area have been analysed for individual countries. Data on farmers' values and objectives across all five countries have been studied through cluster analysis in order to identify groups of farmers with similarly held beliefs and objectives and understand their characteristics. The main policy relevant conclusions are first summarised country by country and then on a cross-country basis.

According to farmers' intentions, the introduction of decoupled payments will have little direct effect on structural change in England. Few farmers plan to modify their exit or growth decisions under SFP arrangements compared to what they would have done if they faced a continuation of the Agenda 2000 policy environment. The more pronounced adjustment concerns production choices (even though the majority of the respondents are not planning to change their output mix, some intend to decrease their cattle production) and to a certain extent diversification to off-farm activities. Therefore, this early empirical research suggests that in England the adjustments to the 2003 CAP reform are likely to be subtle and to concern mainly production activity choices and diversification.

A direct comparison between England and France would be illuminating due to the differ-

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ences in the implementation of decoupling and different regulations concerning trade of entitlements in the two states. Unfortunately, due to the difficulties with data collection in France, direct comparisons are difficult to draw. The French sample is restricted in its geographical coverage and mountainous regions were not covered. Additionally, the regions surveyed are relatively homogeneous and the farmers interviewed in general rely only partially on their on-farm income and are younger than the national average. Nevertheless, the French results are similar to the findings from England in that few farmers intend to alter their plans to exit or grow as a result of the introduction of the SFP. Intentions are little affected by the switch to SFP in France, which may be expected given the conservative manner in which France has chosen to implement the SFP.

In contrast to England and France, in Sweden the implementation of SFP is more likely to stimulate the structural change as some farmers are planning to exit earlier than they would have done under Agenda 2000. Very little land is however likely to be abandoned as the demand for land for farm growth persists after the change in policy.

Summarising the results for the three studied EU-15 Member States, it appears that farmers plan to apply a *minimal adjustment strategy* in response to changes in agricultural policy, at least in France and England. There is no strong evidence that farmers intend to drastically change their strategic decisions to exit agriculture. Few farmers are interested in merely keeping land in good agricultural and environmental condition (GAEC) and not producing.

In the NMS (Lithuania and Slovakia), the implementation of the 2003 CAP reform has a different meaning. The implementation of the SAP in the NMS means a significant increase in the degree of protection afforded to farmers in the form of both higher and more predictable payments. Therefore, it is not surprising that in Lithuania the main impact of the payments is evidenced in a greater willingness to operate larger farms. As the returns to agricultural activities are expected to rise, farmers are less interested in diversification and have no wish to leave land uncultivated under GAEC. This comparable pattern is repeated in Slovakia: the switch from pre-accession policy to the SAPS induces a significant rise in the numbers who wish to

stay in agriculture. However, in Lithuania and Slovakia, the characteristics of those seeking to stay or expand do vary. In Slovakia, likelihood of expansion of farm area is related to managerial experience and farm location. In Lithuania expansion plans are linked to lifecycle variables (age and succession status).

In analysing the differences between the EU-15 and NMS, it should be noted, however, that what has been studied in the NMS is not so much the effect of a switch from coupled to decoupled payments but the effect of the introduction of the CAP payments as a result of EU accession. From this point of view, the differences in responses between the EU-15 and NMS are justified as the farmers respond to different policy changes.

The comparative cross-country analysis generates several important insights for policy, stemming from the analysis of farmers' attitudes across the pooled sample of five states. First, most farmers still possess a productionist mindset and do not accept the idea that they could survive or be competitive without policy support. The sampled farmers strongly disagree with statements advocating the removal of policy support and, at the same time, express preferences for the full utilisation of agricultural land for agricultural production and concentration on farming. More than one-third of the respondents strongly disagree with the notion that good farming skills are sufficient to run a profitable business whatever the design of European policies. At the same time, a half of the respondents think that the CAP system of support imposes restrictions on their future farming plans. So, it appears that farmers rely on policy support although a large proportion of them realise that this support might be conditional on some restrictions on their farming activities. The only farmers who endorse policy liberalisation are those who are largely based in sectors that traditionally receive little CAP support (pigs and poultry).

Second, the often advocated strategy of diversification and development of multiple income sources still creates difficulties for a substantial proportion of European farmers. This is due to a mixture of beliefs that farmers should focus on the production of food and fibre and a lack of appropriate skills and off-farm opportunities. More than 40 % of the respondents do not think they can easily find a job off-farm or increase the number of

hours devoted to off-farm work. This emphasises once again the limitations of rural development policies that are focused solely on the farming community. Farmers are unlikely to create a significant number of new jobs through the pursuit of enterprise diversification, which is an infeasible option for many and their own future prosperity depends on the availability of work in the non-farm rural economy. Pessimism surrounding the opportunities for diversification is not confined to the relatively poorer NMS. In fact, upland grassland farmers in England are the most pessimistic about their ability to adapt.

Third, although the overwhelming majority advocate protection, farmers are more flexible in terms of the instruments through which policy support might be delivered. One of the positive messages emerging from this research is that the majority of respondents agree with the need for farmers to produce attractive landscapes and positive environmental externalities and be paid for this. The non-pecuniary benefits of farming also feature prominently. The latter are crucial for understanding why farmers' responses to policy reforms have been rather modest or at least more modest than expected.

Finally, the strongest opposition to policy liberalisation comes from farmers in the NMS. Newcomers to farming in the NMS strongly reject policy liberalisation and endorse notions that farmers should concentrate on agriculture which corroborates with the previously mentioned intentions to stay longer in agriculture or grow more. For them diversification seems to be associated with liberalisation tendencies. These views are likely to have important implications for the decision-making processes surrounding agricultural policy reform in the EU. The new entrants to the Union are expected to strengthen the political opposition to agricultural policy reform and undermine attempts to extend the reform measures, including the capping and further modulation of the Single Farm Payment.



# ■ Effect of CAP and Market Scenarios on Farm Income and Investment Behaviour - Case Studies from Selected EU Countries

SERGIO GOMEZ Y PALOMA\* AND DAVIDE VIAGGI†

## Introduction

This paper reports some preliminary results of the study “Investment behaviour in conventional and emerging farming systems under different policy scenarios” coordinated by the IPTS, Seville.<sup>‡</sup>

The objectives of the study were:

- to perform an ex-ante analysis of investment behaviour among farming systems clustered by the use of conventional and emerging production practices;
- to assess the impact of the 2003 CAP reform - with special focus on the Single Farm Payment (SFP) - on producers’ investment behaviour using scenario analysis (8-12 years horizon);
- to evaluate the consequences of investment behaviour with respect to the sustainability of farming systems and to make appropriate policy recommendations.

## Background and literature

The review of the literature on farm investment behaviour focuses on: a) the determinants of investment behaviour; b) the effects of policy on investment behaviour; c) the classification of quantitative tools for analysing farm investment behaviour; and d) the choice of methodology for the empirical analysis of farm investment behaviour.

Contributions on this issue have been relatively less numerous than for other fields of agricultural economics research, despite its evident importance for the representation of farm behaviour. The analysis of investment at firm level be-

came an important issue in the general economic literature during the 1950s and 1960s and burgeoned in the agricultural economic literature during the 1990s. Early approaches, based on the neoclassical theory of the firm, were subsequently discussed and improved.

During the last two decades the literature focused on a number of investment-related topics such as asset fixity and adjustment costs, uncertainty and information, risk and other objectives, household characteristics, on-farm vs. off-farm investment, investment and labour allocation, investment and farm structure, investment and technical change, investment and contracts and investment and credit constraints.

Despite the variety of themes and approaches, the present understanding of farm investment behaviour is considered to be, to a large extent, unsatisfactory. The main research gaps include the need for: a) more adequate instruments for ex-ante analysis; b) model adaptation to incorporate empirical information about farm preferences and expectations; c) closer attention to the connection between investment, technical change and learning; and d) a more empirically relevant treatment of the decision maker’s (farm household’s, firm’s) objectives.

The amount of literature and the state of the art appear particularly unsatisfactory as far as policy analysis is concerned and particularly for ex-ante policy evaluation. Although a few recent studies tackled this issue, focusing to a large extent on decoupling, the analysis of policy impact on investment behaviour still appears to be a particularly challenging task. This may be attributed to the fact that policy scenarios interact with all

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‡ The study was carried out by a network of researchers coordinated by Vittorio Gallerani and Davide Viaggi (Bologna University) and, from the JRC IPTS side, by Sergio Gomez y Paloma.

other (numerous) determinants, particularly whole household/firm management, risk perception, asset liquidity and output prices.

## Methodology

The methodology adopted in this study is based on the integration of empirical primary information collected through a survey of about 250 farm households with a modelling exercise of the individual farms surveyed. Case studies were developed for Italy, Germany, Poland, Spain, Greece, The Netherlands, France and Hungary.

The first part of the methodology is based on the analysis of data collected through the survey and about the reaction of farmers to decoupling.

The second part is based on the simulation of scenarios using multi-criteria dynamic programming models of farm households, built for 80 individual farms selected from the sample of 250. The model is calibrated on primary data from the survey of single farms through a questionnaire.

Selected scenarios implemented in the model are:

- 1) Baseline 1: Agenda 2000 + current prices
- 2.1) Decoupling 1: 2003 reform + current prices
- 2.2) Decoupling 2: 2003 reform + lower prices (WTO scenario) (-20 %)
- 3.1) Payment cut 1: 2003 reform (up to 2013) + no payment after 2013 + current prices
- 3.2) Payment cut 2: 2003 reform (up to 2013) + gradual reduction of payments after 2013 + current prices
- 3.3) Payment cut 3: 2003 reform (up to 2013) + gradual reduction of payments after 2013 + lower prices (-20 %)

## Main results

Most farmers use the CAP support to cover farm current expenditure. Main uses of CAP revenues are:

- On farm current expenditure = 66 %
- On farm investment = 19 %
- Off farm productive investment = 9 %
- Off farm consumption = 6 %

In the majority of cases, farmers stated they were indifferent to decoupling (55 %). Among the others, the impact of decoupling was highly differentiated; major reactions stated are:

- Increase on farm investment = 24 %
- Decrease on farm investment = 7 %
- Change in crop mix = 7 %
- Increase off farm investment = 4 %
- Decrease off farm investment = 3 %

Differences in reaction are better explained by different individual household/farm characteristics rather than by association with a specific agricultural system. In the more efficient and expansion-oriented farms, decoupling is perceived as an opportunity for investment, while in small, poorer performing farms the introduction of the SFP is viewed rather as an opportunity for extensification.

Scenario analysis showed that CAP as a whole is very important for the sustainability of farming systems. However, prices (in the range simulated) appeared to be more important than policy and adaptation of farm activities more important than investment as a reaction to both policy and prices.

Average farm income variation of each scenario - compared to Agenda 2000 (A2000) - are reported in Table 1, while Table 2 reports the effects on investments.

■ **Table 1: Average farm income variation**

Scenario	2006-2013	2014-2021
2.1 – 2003 Reform	2 % (2 %)	4 % (4 %)
2.2 – 2003 Reform + Low Prices (LP)	-32 % (-23 %)	-33 % (-23 %)
3.1 – 2003 Reform + Payments (Pym.) Cut 2013	0 % (2 %)	-18 % (-14 %)
3.2 – 2003 Reform + Gradual Pym. Reduction (GPymR) 2013	1 % (2 %)	-11 % (-8 %)
3.3 – 2003 Reform + GPymR2013+ LP	-32 % (-22 %)	-43 % (-31 %)

Note: Numbers in the table indicate a percentage share of A2000; numbers in brackets indicate household income.

■ **Table 2: Average investment variation**

Scenario	2006-2013	2014-2021
2.1 – 2003 Reform	-60 %	-11 %
2.2 – 2003 Reform + LP	-38 %	-36 %
3.1 – 2003 Reform + Pym. cut 2013	-216 %	-34 %
3.2 – 2003 Reform + GPymR2013	-76 %	-77 %
3.3 – 2003 Reform + GPymR2013+ LP	-153 %	-50 %

Note: Numbers in the table indicate a percentage share of A2000.

Decoupling in itself does not cause major changes in income, while important impacts may be expected by the scenarios of price and payment reduction. The impact on investments is consistently negative across scenarios. However, the average presented is characterised by a strong variability within each scenario and each case study area. This reinforces the hypothesis of a strong effect of individual (structural and personal characteristics) in determining the results of the reaction to policy and market scenarios.

## Discussion

From the perspective of the farms-households interviewed, post-decoupling CAP appeared to be very much a ‘policy in search of objectives’ that takes on very different roles depending on the context in which it is cast.

However, results hint at the fact that a number of wider issues should be addressed in order to understand farm household behaviour with respect to policies. In particular, demographic trends, job and land use opportunities and technological options seem to be major drivers of a farm household’s reaction to CAP.

The results confirm the need for better empirical information in this field, contextualized within the present stage of EU agriculture and policy. They also highlight the importance of combining information about intentional behaviour and expectations with modelling outcomes. Future studies will be needed, focusing on *ex-ante* policy analysis and design, taking into account emerging technologies and market scenarios, as well as future farming/rural agents (households, firms with legal attributes and their networks) as the most appropriate decision-making units. The interplay between individual attitudes, technology adoption, investment and structural change could be a priority field of research, particularly in view of reinforcing competitiveness strategies of EU agriculture.



# ■ Role of Ownership in Investment Behaviour of Corporate Farms — Evidence from Czech Agriculture

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## Introduction

Investment is a business activity that is necessary for securing adoption of new technologies, achieving economies of scale and scope, or facilitating other competitive strategies. It is therefore one of the most important preconditions for the economic viability of a business. This paper starts with a general discussion analysing farm investment activity particularly in new Member States (NMS) of the European Union (EU), investment divergences related to farm structures and possible investment impacts of agricultural policies. The second part of the paper illustrates the role of the internal characteristics of farms in shaping their investment behaviour using an empirical study of the relationship between corporate ownership and investment activity in the Czech Republic.

## Investment, policy and farm structure — general discussion

### Importance of agricultural investment in new Member States

Within the agricultural sectors of the EU, investment activity plays a particularly vital role for farms in the NMS. Studies analysing the agricultural sectors in these countries at the beginning of transition identified them as undercapitalised (e.g. Janda, Sklenková and Vigner, 1997), pointing to a major

need for farm investment. A farm survey carried out in the Czech Republic in 2004<sup>1</sup> showed that farms were able to improve their investment activity only slowly. Individual farmers as well as managers of corporate farms mostly rated farm investment activity over the transition period until 2003 as unsatisfactory. This was particularly the case of corporate farms — 25% of respondents rated their investment activity as lower than necessary for simple asset replacement and 39% as just covering the level of simple asset replacement. These shares are lower for individual farms — 20% and 27% respectively. Nevertheless, the investment activity of both groups of farms increased over the period analysed. This increase was accompanied by changes in investment structure, especially in individual farms, and varied according to the production specialisations of farms. In 2003, a significant share of farms<sup>2</sup> still regarded the technical standard of their buildings, machinery and equipment as requiring substantial investments. As a related fact, more than 50% of farm operations/plants in that year did not satisfy EU standard requirements. The Czech example demonstrates the investment insufficiencies with which the NMS entered the competitive EU agricultural market.

### External determinants of investment activity — role for policy

Farm investment development at the beginning of transition was hindered by limited access

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<sup>1</sup> This survey was carried out jointly by the Leibniz Institute of Agricultural Development in Central and Eastern Europe (IAMO), Halle (Saale) and the Research Institute of Agricultural Economics in Prague (VÚZE). It was financed by IAMO, the Marie Curie Fellowship (HPMD-CT-2001-00063) hosted by IAMO, and the Czech National Agency for Science and Research (QF3269). The sample consisted of 167 corporate farms and 110 individual farms. The sample is random but not statistically representative. Individual private farms are represented by on average larger farms than given by the national average. The production structure of both types of farms does not on average closely copy the national production structure. For the full survey documentation and results presentation, see Curtissová et al. (2005).

<sup>2</sup> This share varies among farm types and production specialisation and equals 61% of corporate farms in livestock production and 42% of corporate farms in crop production, and 30% of individual farms in livestock production and 45% of individual farms in crop production.

to modern technologies (Lotze, 1998), political and economic uncertainties and institutional incompleteness. Generally, one of the most important external determinants of optimal firm/farm investment was the functioning of capital and credit markets and related institutions (Mueller and Peev, 2007). As agriculture makes limited use of capital market instruments, the capital market plays a relatively minor role in the investment and technological development of the agricultural sector. However, the credit market could be assumed to play a more important role. A study by Bezemer (2003) indicated that credit constraints represented significant investment constraints in the Czech Republic, discriminating against certain groups of farms, specifically individual private farms. More recent empirical studies suggest that credit institutions in the Czech Republic, even if still restricting the amounts loaned, allocate credit on the basis of standardised criteria for economic valuation of borrowers (see e.g. Medonos, 2007; Latruffe, Davidova and Ratering, 2005; Latruffe and Davidova, 2007) and thus no longer represent highly relevant financial constraints. It is predominantly the income level and firm value that determine the access to credit and the overall investment possibilities of the firm. Farm income support can therefore represent a means by which policy transfers can significantly alter farms' financial possibilities and investment activity<sup>3</sup>.

### Investment as the accelerating factor of the effect of uneven direct aid distribution on farm structural changes

The overall positive effect of policy support on investment in a low income sector such as agriculture can become disturbing in the case of uneven distribution across regions and farms by having an incongruous impact on structural changes. The uneven distribution of direct aid based on the EU's common agricultural policy (CAP) has indeed attracted some criticism (see e.g. Sapir et al., 2003). The structural effect of uneven aid distribution can be an issue especially since the share of direct pay-

ments in net farm income (NFI)<sup>4</sup> is substantial. In the Czech Republic, this share was 65.3% in 2005<sup>5</sup>. Also there, uneven distribution of direct support has been reported: 71% of the total number of farms, small and predominantly individual farms, received less than 5% of the direct payments allocated to the sector (State Agricultural and Intervention Fund 2007). However, this has not been related to information such as how many shareholders have assets in, how much labour is employed in, and how many land owners rent their land to the large-scale farms which received the remaining 95% of direct payments. The notion of uneven distribution stems only from the fact that individual farms, which represent 87% of all farms, cultivate 28% of the agricultural land but receive less than 22% of direct payments allocated to the sector in 2005. A relevant fact is that the bulk of direct payments is allocated to large-scale farms which are characterised by either (a) a highly dispersed ownership structure, in which owners have limited but more or less equal rights over the use of the direct payments, or (b) marked tendencies to ownership concentration (see Curtiss et al., 2006), under which direct payments benefit only a narrower group of owners. As corporate governance literature suggests, both ownership configurations could significantly differ in their investment behaviour and thus in the use of the direct support for investment purposes.

### Farm ownership and investment — empirical study of Czech corporate farms

The aim of the empirical study which will be briefly presented below was to shed light on the behavioural pattern related to the investment and ownership relationship in Czech corporate farms. Two data sources were combined for this analysis: an unbalanced seven-year panel from FADN and survey data for 74 farms. For the full paper, see Curtiss et al. (2007).

<sup>3</sup> Considering the differences between the effects of coupled or decoupled income support, see the paper by Odening and Hüttel in this publication. In general they argue that payment decoupling decreases incentives to invest in previously supported productions and increases incentives to reallocate funds to a new allocatively more efficient production structure. This is, however, burdened by asset specificity and high sunk costs. Nevertheless, decoupled payments still represent additional income which can improve the farms' bank valuation and generate internal funds for smaller investments.

<sup>4</sup> NFI is taken from the Economic Accounts for Agriculture and calculated according to the Eurostat methodology.

<sup>5</sup> The share of all support for farms in NFI was 76.1%.

## Theoretical background

The relationship between the ownership structure and investment activity of the farm is well captured by the corporate governance literature. Related issues such as firm ownership and performance relationship are the subject of agency, property rights or transaction cost theories. Corporate governance represents the rules for the exercise of ownership rights and decision-making or, in other words, contracts, organisational designs and legislation securing/motivating efficient management. These rules/contracts are important for dealing with the problems of ownership and management separation and thus the level of agency cost. The corporate governance design determines the scope for managerial discretion as managers have greater expertise and more information relating to the firm's performance than owners. The owners, particularly when shares are only limitedly tradable, are interested in maximising profit that generates dividends, while managers prefer strategies of growth and tend towards overinvestment. This tendency can be reduced, if managers buy out significant shares leading to managerial ownership. There can also be another group of owners, namely employees who got their shares from restitution or invested in farm's shares. Their business interests are connected with job security. They are therefore more risk averse and prefer lower investments.

Ownership configurations capturing different degrees of external ownership, employee ownership and managerial ownership as well as the overall effect of corporate governance of joint stock companies and cooperatives (compared to the simpler organisational form of limited liability companies) provide the main focus of the empirical analysis presented below.

## Specifics of corporate ownership in transition countries

For interpreting the results, a number of corporate ownership characteristics specific to transition countries had to be taken into account, namely:

- The different evolution of corporate ownership compared to mature market economies. Farms in transition have not developed from small to large, but were large and have remained large after privatisation. It has been mostly the interest of the managers to follow

the large-scale strategy, and many of the restitution claimants/owners had no alternative options.

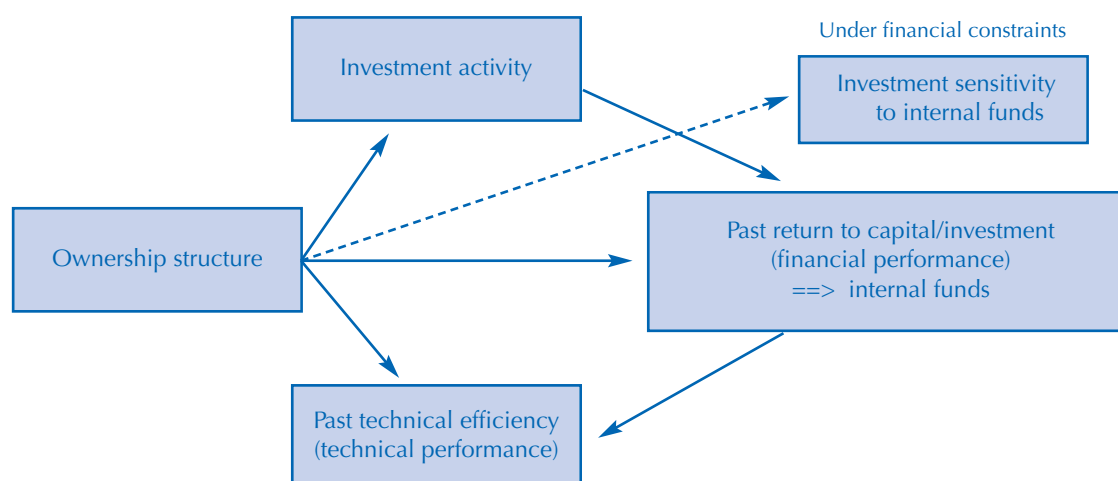
- The ownership is highly dispersed and the shareholders have only limited experience in management monitoring. This characteristic provides greater scope for managerial discretion.
- The interests of restituted external owners (shareholders) are often different from business interests. The external owners are frequently pensioners and urban residents waiting for settlement of their restitution titles to cash them afterwards.
- Many Czech farms developed into the legal form of a joint stock company; however, the stocks are not openly tradable.
- There is a low level of legal protection of shareholders' interests provided by underdeveloped institutions for corporate governance and a high level of legal uncertainty concerning the property rights (see Mueller and Peev, 2007).

## Modelling framework

As the theoretical discussion indicated, there are possible reasons for the ownership structure having an impact on investment activity. To construct an econometric model, other determinants of investment activity also have to be incorporated. We considered investment opportunities, past technical and financial performance of the farm and human capital characteristics. The resulting modelling framework is summarised in Figure 2.

The three arrows leading from the ownership structure indicate the above discussed effects of ownership on investment activity and the ownership effect on technical and financial performance. Technical performance can be replaced by TE and financial performance by returns to capital (CF/K). Under this definition, technical performance influences financial performance. Returns to capital represent internal funds, which especially under financial constraints represent an important determinant of investment activity. Also the question to what extent internal funds should be used can be dealt with differently under different ownership configurations (effect of ownership on the investment sensitivity to internal funds).

■ Figure 2: Conceptual framework for modelling the ownership-investment relationship



This framework is reflected in the econometric model, which consists of a three-equation system. The first equation represents the investment accelerator model with financial constraint, defined as a function of investment potential and internal funds (return to capital), to which we added ownership variables. The second equation defines the returns to capital as a function of ownership structure and technical efficiency; the third equation specifies technical efficiency as dependent on ownership variables and human capital variables.

## Empirical results

The estimated results confirmed the main logic of the conceptual model. Increasing technical efficiency increases the level of internal funds, and internal funds together with investment opportunities positively influence investment activity. The significant positive relationship between internal funds and investment activity indicates that financial constraints still exist.

Corporate governance<sup>6</sup> was found to negatively influence farm technical performance as it is related to higher complexity of the organisational structure, labour supervision and monitoring, as well as to lower managerial incentives linked to the managers-owners separation. Furthermore, increasing the number of owners worsens the financial performance of the corporate farm. The effect of corporate ownership on investment

activity was expected to be positive as managers theoretically tend towards over-investment. The estimates revealed that this is not the case in Czech corporate farms. If we assume that the group of large-scale farms not affected by corporate governance (mostly limited liability companies) is investing closer to the optimum, the corporate farms as defined in the study actually under-invest. This result does not change with the number of owners, and implies either (a) that corporate ownership in transition discourages or even limits management in realising investment projects as the shareholders are risk- and investment-averse, or (b) that management lacks investment incentives because of uncertainty related to the future withdrawal of shares/assets of those whose property rights are currently violated/unsettled. The management reserved investment approach is found to be significantly stronger if managers own higher than average capital shares, an outcome that supports the argument of uncertainties related to property rights settlement.

Another ownership variable represented the average size of share per owner, a proxy for ownership concentration. It was hypothesised that a larger average share reflects the owners' greater willingness to invest in the agricultural business, therefore the owners' lower risk aversion and higher interest in the efficient running of the company. Hence, it should improve technical efficiency, financial performance and the efficiency of

<sup>6</sup> The corporate governance variable was defined as a dummy variable: 1 represented firms with more than 20 owners and 0 firms with 10 and less owners, mostly limited liability companies. There were no farms in the sample with an intermediate number of owners.

controlling managers' investment activities. These effects were empirically confirmed at the 1% significance level. The sign of the effect of the average share size on investment activity shows that increasing ownership share size<sup>7</sup> improves problems with under-investment related to corporate ownership. This result therefore indicates larger owners' lower risk aversion and their higher interest in the farm's long-run performance. The results also revealed that companies with larger shareholders are more open to credit financing than small shareholders.

## Conclusions

Based on the empirical results we can conclude that the structure of corporate ownership has a significant negative impact on farm economic performance as well as investment activity. The investment activity of corporate farms is still significantly affected by the failures of the privatisation process, which retained as persons eligible for property shares shareholders with low interest in farming business and high risk aversion to investment and credit financing in the sector. Corporate farms with higher average ownership shares perform significantly better and show significantly higher investment activity, while farms with high ownership dispersion invest less and depend in this activity significantly more on internal funds including agricultural subsidies. The high level of policy transfers could, therefore, help the latter farms to remain in the agricultural business without speedy ownership changes. Nevertheless, ownership concentration can be expected to represent the long-run trend in structural changes in Czech agriculture.

## References

- Bezemer, D., 2003. Credit Allocation and Farm Structures in the Czech Republic, 1993-1997. *Comparative Economic Studies* 45 (1): 25-43.
- Curtiss, J., Ratering, T., Medonos, T., 2006. Less Discussed Dynamics in the Czech Farm Structure Development. Contributed paper presented at the International Association of Agricultural Economists Conference, Gold Coast, Australia, August 12-18, 2006.  
[http://agecon.lib.umn.edu/cgi-bin/pdf\\_view.pl?paperid=22509&ftype=.pdf](http://agecon.lib.umn.edu/cgi-bin/pdf_view.pl?paperid=22509&ftype=.pdf).
- Curtiss, J., Latruffe, L., Medonos, T., Ratering, T., 2007. Investment Activity and Ownership Structure of Czech Corporate Farms. Paper prepared for presentation at the joint IAAE - 104th EAAE Seminar 'Agricultural Economics and Transition: "What Was Expected, What We Observed, the Lessons Learned."' Budapest, Hungary. September 6-8, 2007.  
<http://web.uni-corvinus.hu/agrar/Pages/Contributed/CURTISS-LATRUFFE-MEDONOS-RATERING.pdf>.
- Curtissová, J., Bavorová, M., Jelínek, L., Medonos, T., Kubát, J., 2006. *Struktura, řízení a sociálně-ekonomické vztahy podnik v českém zemědělství. Výsledky dotazníkového šetření v roce 2004* (Farm Structure, Management and Socio-economic relationships in Czech Agriculture. Results of the 2004 Survey, in Czech). Die Deutsche Bibliothek.
- Janda, K., Sklenková, H., Vigner, J., 1997. Financování českého zemědělství — ekonometrická evidence. (The Financing of the Czech Agriculture — Econometric Evidence, in Czech). *Politická ekonomie* 5(45): 708–718.
- Medonos, T., 2007. *Investiční aktivita a finanční omezení českých zemědělských podniků právnických osob* (Investment Activity and Financial Constraints of the Czech Agricultural Firms, in Czech). PhD thesis, Czech Agricultural University, Prague.
- Mueller, D., C., Peev, E., 2007. Corporate Governance and Investment in Central and Eastern Europe. *Journal of Comparative Economics* (forthcoming).
- Latruffe L., Davidova S., 2007. Relationship between Technical Efficiency and Financial Management for Czech Republic Farms. *Journal of Agricultural Economics* 58 (2): 269-288.
- Latruffe L., Davidova S., Ratering, T., 2005. Technical Efficiency, Reform Debts and Financial Management of Individual and Corporate Farms in Transition Countries: The Experience of the

<sup>7</sup> Increasing the average ownership shares is mostly done in practice by settling transformation ownership claims to smaller shareholders by financial redemption.

Czech Republic. 94th EAAE Seminar, 'From Households to Firms with Independent Legal Status: The Spectrum of Institutional Units in the Development of European Agriculture'. Imperial College London, Wye Campus, United Kingdom. 9-10 April.

Lotze, H., 1998. *Integration and Transition on European Agricultural and Food Markets: Policy Reform, European Union Enlargement, and Foreign Direct Investment - Four Essays in Applied Partial and General Equilibrium Modelling*, Dissertation.

<http://edoc.hu-berlin.de/dissertationen/agrar/lotze-hermann/HTML/lotze.html>.

Sapir, A., Aghion, P., Bertola, G., Hellwig, M., Pisani-Ferry, J., Rosati, D., Vinals, J., Wallace, H., 2003. *An Agenda for a Growing Europe: Making the EU Economic System Deliver*. Report to the EC, Brussels.

State Agricultural and Intervention Fund, 2007. *Seznam příjemců hlavních dotací z fondu EU a ze státního rozpočtu ČR pro zemědělství administrace SZIF* (List of beneficiaries of main CAP payments and payments from state budget of Czech Republic administrated by SAIF). Database for year 2005.

<http://www.szif.cz/irj/portal/anonymous/podatelna~spd>.





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**Abstract**

The European Council in December 2005 invited the European Commission (EC) to report in 2008-2009 on the European Union budgetary spending including that on the common agricultural policy (CAP). In relation to this call, EC initiated a "health check" of the 2003 CAP reform aiming at the assessment of its impacts. This political interest and ongoing political debates stress on the high topical relevance of the farm- and regional-level as well as market effects of the CAP.

A workshop that reunited researchers and policymakers was organised in June 2007 in Seville with the aim to examine and to discuss recent research results and available empirical evidence related to the potential effects of implementing the 2003 CAP reform on the agricultural income and factor markets in the EU Member States.

This report reunites several papers provided as additional support to the presentations given during the workshop. The topics of the papers in this report relate to the effects of the Pillar 1 instruments on the income distribution among regions and/or farming systems, and the effects of decoupling direct payments on agricultural factor markets. Potential changes of farmers' behaviour under the new policy context are also considered.

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# Income and Factor Markets under the 2003 CAP Reform – Workshop Proceedings

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