

# **PACIOLI 12**

## **Income issues in Farm Households and the Role of the FADN**

Krijn J. Poppe (ed.)

Project code 30266

August 2004

Report 8.04.03

Agricultural Economics Research Institute (LEI), The Hague

The Agricultural Economics Research Institute (LEI) is active in a wide array of research which can be classified into various domains. This report reflects research within the following domain:

- Statutory and service tasks
- Business development and competitive position
- Natural resources and the environment
- Land and economics
- Chains
- Policy
- Institutions, people and perceptions
- Models and data

PACIOLI 12; Income Issues in Farm Households and the Role of the FADN  
Poppe, Krijn J.  
The Hague, LEI, 2004  
Report 8.04.03; ISBN 90-5242-924-3; Price € 24,- (including 6% VAT)  
99 p., fig., tab., app.

The Pacioli network explores the need for and feasibility of innovation in farm accounting and its consequences for data gathering for policy analysis in Farm Accountancy Data Networks (FADNs). PACIOLI-12 was held in Paris (France), in April 2004. This workshop report presents the papers. Pacioli-12 was a one day workshop in combination with a meeting for policy makers at the OECD. Special attention was given to issues of non-farm income as well as CAP reform.

Orders:

Phone: 31.70.3358330  
Fax: 31.70.3615624  
E-mail: [publicatie.lei@wur.nl](mailto:publicatie.lei@wur.nl)

Information:

Phone: 31.70.3358330  
Fax: 31.70-3615624  
E-mail: [informatie.lei@wur.nl](mailto:informatie.lei@wur.nl)

© LEI, 2004

Reproduction of contents, either whole or in part:

- permitted with due reference to the source
- not permitted



The General Conditions of the Agricultural Research Department apply to all our research commission. These were registered in the Central Gelderland Chamber of Commerce in Arnhem.



# Contents

	Page
<b>Preface</b>	7
<b>1. Introduction</b>	9
1.1 The Pacioli-network	9
1.2 The theme of PACIOLI-12	9
1.3 Programme PACIOLI-12	10
<b>2. Collection of farm income data in Sweden (by Ann-Marie Karlsson)</b>	12
<b>3. Classification and economic results of part time and full time farms using taxation data (by Maija Puurunen and Risto A. Seppälä)</b>	17
3.1 Introduction	17
3.2 Farmers' income development in different farm groups	17
3.3 Farmers' income development compared with other population groups	19
3.4 Analysis of the income structure and labour input of Finnish farmers	21
3.4.1 All farms owned by private persons	21
3.4.2 Farms owned by young farmers	24
3.5 Income studies and the FADN	26
<b>4. Developments in the organisation of the farm and their policy implications (by Krijn Poppe et al.)</b>	28
4.1 Introduction	29
4.2 The role of references	29
4.3 Modelling references	30
4.4 The modern farm	32
4.5 Some data from the Netherlands	36
4.6 Discussion	41
4.7 Conclusion	42
<b>5. The impact of enlargement and CAP reform to Latvian farmers (by Valda Bratka)</b>	44
5.1 Introduction	44
5.2 Materials and methods	45
5.3 Results obtained	49
5.4 Conclusions	56

	Page
<b>6. Use of micro data in policy analysis - the case of the 'mid-term review' of CAP (by Werner Kleinhanß)</b>	58
6.1 Introduction	58
6.2 Distribution of income in farm households	58
6.3 Distribution of subsidies respectively direct payments	61
6.4 Policy impacts of MTR and its national implementation on farm income and income distribution	64
6.5 Conclusions	72
<b>7. Farmers income distribution and subsidies: product discrimination in direct payment policies for continental and mediterranean agriculture (by Ricardo Mora and Carlos San Juan)</b>	74
7.1 Introduction	74
7.2 Egalitarian direct payments policies	77
7.3 Measuring direct payment policy bias	78
7.4 Presentation of Data and Results	80
7.4.1 Data set and variables	80
7.4.2 Results	81
7.5 Some thoughts as concluding remarks	87
<b>8. A short history of the FADN and other activities than agriculture (by Keyo Hyvönen)</b>	90
<i>Workgroupssession Typology</i>	95
<b>Appendix</b>	
1. List of participants	97

## Preface

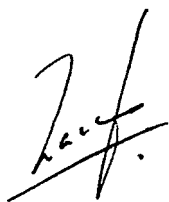
The European agricultural sector is experiencing severe adjustments. Accession to EU, CAP-Reform and the effects of food safety crises are just some of the drivers of these adjustments. For Farm Accountancy Data Networks (FADNs) this implies new challenges to innovate and come up with relevant data.

To exchange experiences in this domain the PACIOLI group yearly organises a workshop. In 2004 we choose not for the normal 3-day workshop with one of the FADNs, but accepted the invitation of the OECD in Paris to co-operate in a policy seminar with in addition a one day workshop for the PACIOLI group itself. These events were held on April 28, 29 and 30 respectively. This report contains the presentations from the PACIOLI 1-day workshop on April 28. The papers of the policy seminar will be separately published by the OECD.

We are indebted to the OECD, and in particular to Catherine Morredu, Carmen Cahil and Marina Giacalone for the support in organising the meetings. This included the provision of the meeting room with accompanying services for the PACIOLI meeting. Corrie de Zwijger helped to prepare the workshop from the Netherlands and once again Helga van der Kooij took care of the creation of the publication.

We are happy that our Norwegian colleagues invited us for the PACIOLI-13 meeting to be held on June 6-8, 2005 in the west of Norway. Check our website [www.pacioli.org](http://www.pacioli.org) for upcoming details.

The managing director



Prof. Dr. L.C. Zachariasse  
Director General LEI B.V.





# 1. Introduction

## 1.1 The Pacioli-network

Innovative ideas face many hurdles to become successful implementations. This is also true in farm accounting and in Farm Accountancy Data Networks (FADNs). Therefore it makes sense to bring together the 'change agents', the persons that have a personal drive to change the content of their work and their organisations. For farm accounting and policy supporting FADNs it is appropriate to do this in an international context: this creates possibilities to learn from each other. By bringing FADN managers and data users in micro economic research together, feedback is fostered.

It is with this background that the Pacioli-network organises a workshop every year. This small but open network has become a breeding place for ideas on innovations and projects.

Pacioli was originally a Concerted Action in the EU's Third Framework Programme for Research and Technical Development (AIR3-CT94-2456). After completion of the contract with the PACIOLI-4 workshop, the partners decided to keep the network alive at their own costs.

## 1.2 The theme of PACIOLI-12

FADNs are excellent tools to monitor income development at the micro level. With the reform of the Common Agriculture Policy (CAP) in the enlarged European Union, FADNs face an important task to make the agricultural policy more efficient and relevant. Next years many farmers will receive direct payments, decoupled from production. This will lead to more freedom in production decisions, probably more heterogeneity in farm systems and sources of household income, and to decisions to cap payments for the largest farms. It is also likely that policy makers and the society at large will more often question the efficiency of this policy: why should large farms get large amounts of money, why do they benefit from an extra safety net? It is most likely that FADN data will play a vital role in such discussions. We expect that these discussions will quickly raise questions on household and personal income (and even wealth), and in comparison to other persons in the economy. That will lead to a request for new data (on non-farm and household income for example) and new indicators.

These topics were already discussed in PACIOLI-11, in 2003 in Poland. For the 2004 workshop in Paris a number of contributors extended the discussion. Papers from Sweden, Finland and the Netherlands looked into new data or new ways to extract data from e.g. tax sources to see which income farmers make from other sources than agriculture and if this helps them to cope with the changing environment in agriculture. The RICA unit of the European Commission contributed with an overview of the information available in the

European FADN. What was also new in PACIOLI-12 was the discussion on how the CAP Reform as well as these non-agricultural activities should and could influence farm typology. The results of a brainstorming in a working group session on that issue are reported.

On the analysis with micro data from the FADN of effects of the CAP on farm income papers from Germany and Spain showed new results. These papers show the usefulness of the micro data and help FADN managers to think on demands for new types of data.

### **1.3 Programme PACIOLI-12**

Location: Monaco Conference Room, 2, Rue du Conseiller Collignon, 75016 Paris close to the metro La Muette


*Wednesday, 28 April 2004*

- 09:30 Welcome, Agenda and Introduction participants
- 09:45 The use of administrative registers in the collection of farm income data and the effects on definitions on farms and farm households  
Ann-Marie Karlsson (Statistics, Sweden)
- 10.15 Classification and economic results of part time and full time farms using tax data  
Maija Puurunen (MTT, Finland)
- 10.45 Break
- 11.15 Developments in the organization of the farm and their policy implications  
Krijn Poppe (LEI, The Netherlands)
- 11.45 Workgroup Session I
- 12.30 Lunch
- 14.00 Impact of enlargement and CAP reform to Latvian farmers  
Valda Bratka (Latvian State Institute of Agrarian Economics, Latvia)
- 14.30 Use of micro data (FADN) in policy analysis - the case of the MTR  
Werner Kleinhanss (FAL, Germany)
- 15.00 Break

- 15.30 The poverty of Farmers and the Wealth of Landlords - Farm Income Distribution and direct support equity under CAP  
Carlos San Juan (Carlos III University, Spain)
- 16.00 Workgroup Session II
- 17.00 Open slot for a last moment presentation
- 17.30 Questions and Answers/Closing

## 2. Collection of farm income data in Sweden


Ann-Marie Karlsson <sup>1</sup>



**Collection of Farm-income data in Sweden**

Merge of registers based on natural persons:

- Farm-register
  - All Swedish farmers threshold 2 ha of arable land
  - Swedish and EU-typology,
  - Region (parish)
- Extended income register
  - Incomes from business, capital and employment
  - Positive and negative transfers



Statistiska centralbyrån Statistics Sweden

---

<sup>1</sup> Statistics Sweden, Örebro.



Statistiska centralbyrån  
Statistics Sweden

## Forming of households

---

Included in the household

- Maximum two generations who live at the same real estate
- Who are related through
  - Mariage
  - Parents/ children



Statistiska centralbyrån  
Statistics Sweden

## Number of persons the year 2000

---

All farmers

(IAHS broad defintion)

- 75 281 households
- 194 223 household members

IAHS narrow definition

- 18 613 households
- 48 221 household members





Statistiska centralbyrån Statistics Sweden

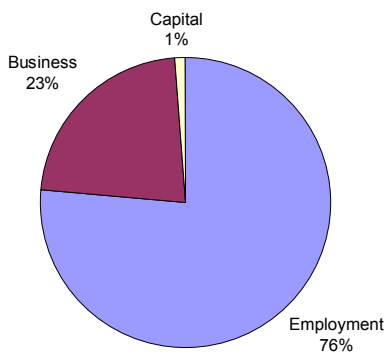
## Incomes 1999-2001

	Average per household SEI		
	2001	2000	1999
Income from employment	235 200	226 400	215 300
Income from business	51 200	45 900	40 600
Income from capital	22 900	29 000	30 400
<i>of which interest adjustment</i>	<i>(19 700)</i>	<i>(18 600)</i>	<i>(16 300)</i>
<b>Summary incomes</b>	<b>309 300</b>	<b>301 300</b>	<b>286 300</b>
General deductions	4 300	4 200	3 600
Change in expansion funds	-1 200	-1 700	-600
<b>Summary others</b>	<b>3 100</b>	<b>2 500</b>	<b>3 000</b>
Positive taxfree transfers	11 400	10 700	9 500
Negative transfers	-101 600	-104 000	-102 400
<b>Summary transfers</b>	<b>-90 200</b>	<b>-93 300</b>	<b>-92 900</b>
<b>Income after transfers</b>	<b>216 000</b>	<b>205 500</b>	<b>190 400</b>



Statistiska centralbyrån Statistics Sweden

## Share of incomes 2001





## Incomes 2001

	Incomes			
	Employment	Business	Capital	Summary
<b>Regions</b>				
RO 1	223 073	65 512	26 372	314 957
RO 2	239 686	40 856	21 509	302 051
RO 3	256 065	38 801	17 256	312 122
<b>Arabel land ha</b>				
2,1- 5,0	292 809	7 335	4 491	304 635
5,1- 10,0	281 723	9 537	9 391	300 651
10,1- 20,0	255 275	21 717	16 053	293 045
20,1- 30,0	226 042	45 515	25 500	297 057
30,1- 50,0	190 360	81 371	36 172	307 903
50,1-100,0	160 088	129 634	43 922	333 644
100,1-200,0	156 232	158 436	54 041	368 709
200,1-	146 376	192 391	66 775	405 542



## Incomes 2001

	Incomes			
	Employment	Business	Capital	Summary
<b>Type of farming</b>				
Field crops	251 175	49 005	27 089	327 269
Horticultural plants	211 863	72 119	20 778	304 760
Field crops+ horticultural plants	184 720	94 356	31 323	310 399
Dairy cows	119 020	138 148	40 189	297 357
Beefcattle	238 774	34 056	24 154	296 984
Cattle	131 090	109 320	41 002	281 412
Other animals	267 501	41 406	16 259	325 166
Mixt farming mostly field crops	217 768	63 740	32 329	313 837
Mixed farming mostly animals	215 254	57 334	28 047	300 635
<b>Farmers age</b>				
30-39 år	220 471	56 074	5 732	282 277
40-49 år	253 322	68 579	16 279	338 180
50-64 år	258 086	58 456	27 164	343 706
65- år	174 128	9 739	37 705	221 572

## Advantages / Disadvantages

---

### Advantages

- Inexpensive
- All population
- Consistent material

### Disadvantages

- Biased because of another purpose
- No control of changes
- Definitions not useful



## TAPAS-project

---

### Merge

- FADN (1000 holdings)
- Income variables

Additional questions of business - activities (complementary activities)

To achieve...

- Overview of household incomes for FADN-holdings
- Test possibilities for collecting additional data
- Improve quality on FADN-data





### 3. Classification and economic results of part time and full time farms using taxation data

*Maija Puurunen and Risto A. Seppälä*<sup>1</sup>

#### 3.1 Introduction

Classification of farms and farmers based on the line of business can be problematic, because farmers often engage in many kinds of non-farming work. The ratio between farm and non-farm business varies a great deal, ranging from occasional contract work for a neighbour to full-time paid employment outside the farm. This paper is focused on analysing the differences between farms in income structure and labour input. Such differences can be revealed by grouping farms in quite a traditional way, using a certain income structure to indicate the farm's type. In order to get a more sophisticated picture of farm groupings, multivariate methods, i.e. factor and cluster analyses, are used to classify the farms.

Empirical data of the study was obtained by combining data from large databases containing financial data and farm structure data from the year 2000. Statistics Finland collected financial data from taxation by means of a large sample of farms. The combined data consists of data from farm taxation (the Enterprise and Income Statistics of Agriculture and Forestry MYTT) and from personal taxation of the same sample. Farm structure and labour input data were based on the Agricultural Census and other sources maintained by the Information Centre of the Ministry of Agriculture and Forestry (Tike). The combined data comprised over 7,900 farms, which had two or more field hectares and were owned by private persons. Farms owned by joint owners, corporations, communities, etc. were excluded from the study. In 2000 the total number of Finnish farms over two hectares was 78,200 (in 2003 72,700), of which about 88% were owned by private persons.

#### 3.2 Farmers' income development in different farm groups

In Finland, during last fifteen years the real value of agricultural income of an average farm has not changed, although the farm size has nearly doubled (figure 3.1). Statistics Finland has traditionally classified part-time and full-time farms to four classes according to the share of agriculture and farm forestry in total income (shares are roughly 0-25%, 25-50%, 50-75% and 75-100%). This farm grouping has been used also in the income studies made at the MTT Economic Research (Puurunen 1990, Väre 2000, 2003, Hirvi 2004, Seppälä 2004). On so called free-time-farms the share of agricultural and forestry income is under 25% of the total income of farmer and spouse, on part time farms 25-50%, on subsidiary farms 50-75% and on full-time farms over 75%. In 2001 group of the free-time

---

<sup>1</sup> MTT Economic Research, Finland.

farms was about one third and full-time farms 40% of the farms. Groups of the part-time and subsidiary farms were about same size, both about 16% of farms. Earlier the share of the full-time farms was essentially bigger (figure 3.2-3.3).

The level of total income of farm families (here farmer and spouse) has increased mainly by means of salary income. In 1990s free-time farmers as well as part-time farmers were able to rise their total income by means of wages and salaries, but the income level of subsidiary farms and full-time farms has varied from year to year without any clear direction according to the production conditions (figure 3.4). Changes in the support system of agriculture and rise of costs will threaten especially the income development of subsidiary



Figure 3.1 Gross return of agriculture divided into farm income and costs in 1986-2001, real values in 1995 level

Source: Väre 2000, 2004.

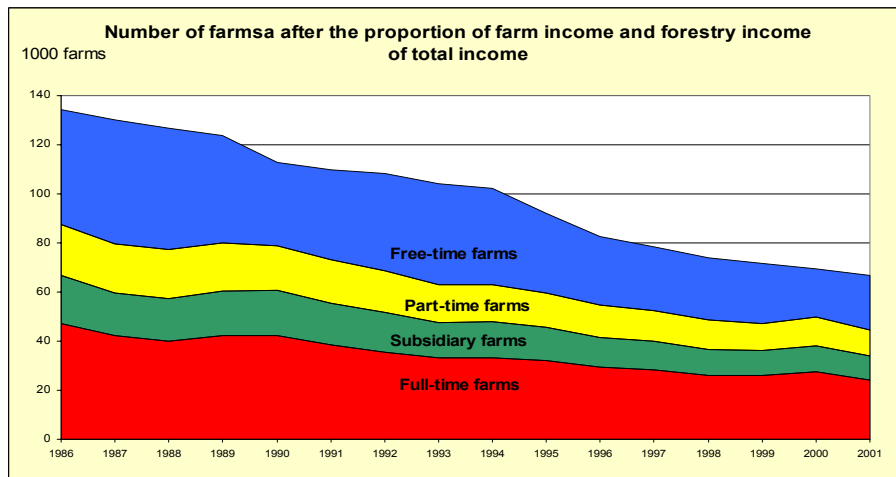


Figure 3.2 Number of farms according to the share of agricultural and forestry income form total income of farmer and spouse in 1986-2001

Source: Väre 2000, 2004.

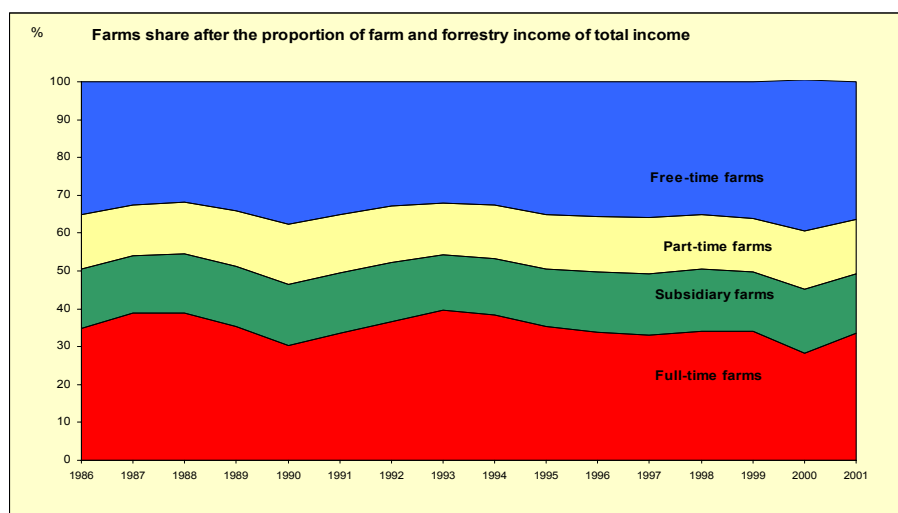


Figure 3.3 Farm grouping according to the share of agricultural and forestry income, percent of all farms  
Source: Väre 2000, 2004.

farms and full-time farms. Most of them are animal husbandry farms, whose income development is mainly dependent on agricultural income. Many of them have invested heavily to their production, and although they have got some support for the investments, they have to keep care of the mortgages.

In 2000 the depths for agricultural production of full-time farms were about three times the farm income plus depreciations and 1.8 times the total net income of farmer and spouse plus depreciations. On part-time farms agricultural depths were correspondingly 1.7 times the farm income and 0.7 times the total net income. From the year 1995 quantity of the depths compared to the total net income has decreased on the part-time farms, but due to the investments and stagnated income development it has increased on the full-time farms. On the full-time farms amortisation of debts can only be done from the agricultural income or from the forestry income.

### 3.3 Farmers' income development compared with other population groups

When the agricultural income of an average full-time farmer and spouse per head is compared to the salary income of a full-time industrial worker, in the middle of 1980s to the middle of 1990s the comparison figures varied between 65-80%. After that development of the salary income of industrial workers has continued its rise steadily and farmers' income has hampered on its low level. In 2001 the agricultural income of full-time farmers was 61% and primary income (i.e. entrepreneurial income total and wages) 73% of the wage income of industrial workers (figure 3.5). The comparison includes the whole agricultural income, although it is compensation not only for the agricultural work of farmer and spouse but also for the capital of agricultural production (Väre 2000, 2004).

In addition to the industrial workers, the income development of farmers has been compared to that of other entrepreneurs. The comparison included also incomes other than the agricultural and wage income as well as the size of the household. The Income Distribution Statistics (Statistics Finland) contain data on the incomes of different population groups and their changes, structure and distribution. Population in the statistics consists of private households. In 2001 the number of these was about 2.38 million. The number of all farmer households was about 83,200, and that of farmer households, where the socio-economic position of the reference person is self-employed in agriculture (i.e. the main sector comprising agriculture, game, forestry and fisheries), was 46,700. Part-time farmers are included in other population groups in terms of their socio-economic position.

In the Income Distribution Statistics the main key figure is *disposable income*. This is obtained by summing up the wage income, entrepreneurial income (agriculture, forestry, business, occupation and coalition) and property income (rent, interest, dividends) and income transfers (pensions and other social benefits) and deducting the paid income transfers from these (taxes, social security payments, other payments).

Because farmer households are somewhat larger than other households, the comparison based on households does not take into account the size of households. Thus incomes are compared according to consumer units (cu). In the method applied by the OECD, the first adult corresponds to 1 cu, the other adults to 0.7 cu and children under 18 years to 0.5 cu. In 2000 there were 2.5 cu in farmer households, 2.1 cu in other entrepreneurs' households and 1.9 cu in the households of industrial workers. The disposable income of farmer households per person and consumer unit has been about the same as in the households of industrial workers but clearly smaller than in other entrepreneurs' households (figure 3.6) (Väre 2003, 2004).

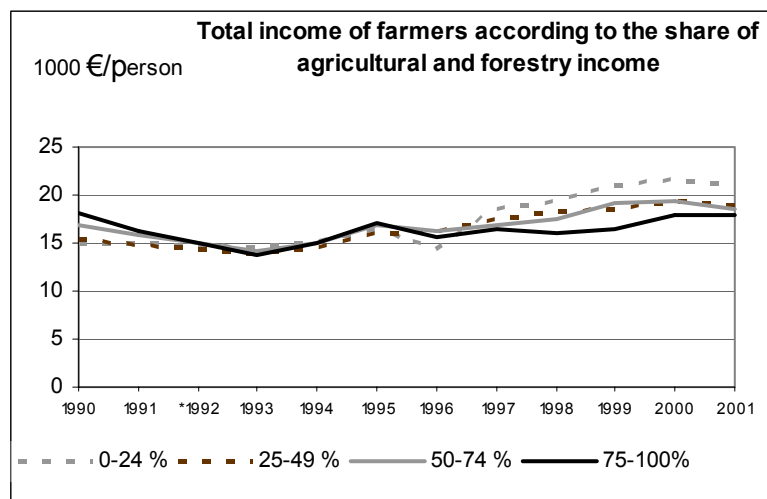


Figure 3.4 Total income of farmer and spouse (euros/person) in the farm groups based on the share of agricultural and forestry income of the total income in 1990-2001

Source: Väre 2004.

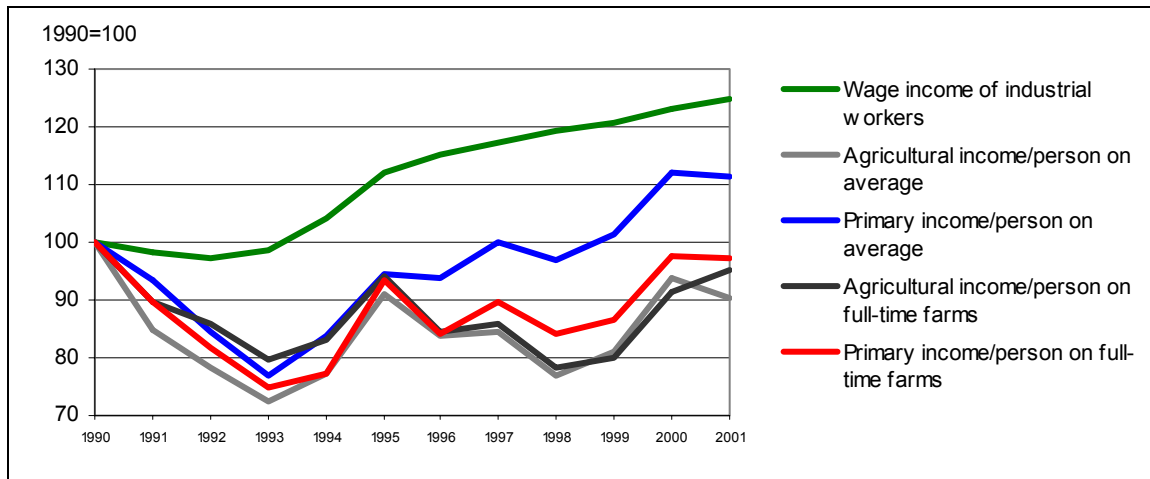


Figure 3.5 Income development of farmers and industrial workers in 1990-2001  
Source: Väre 2004.

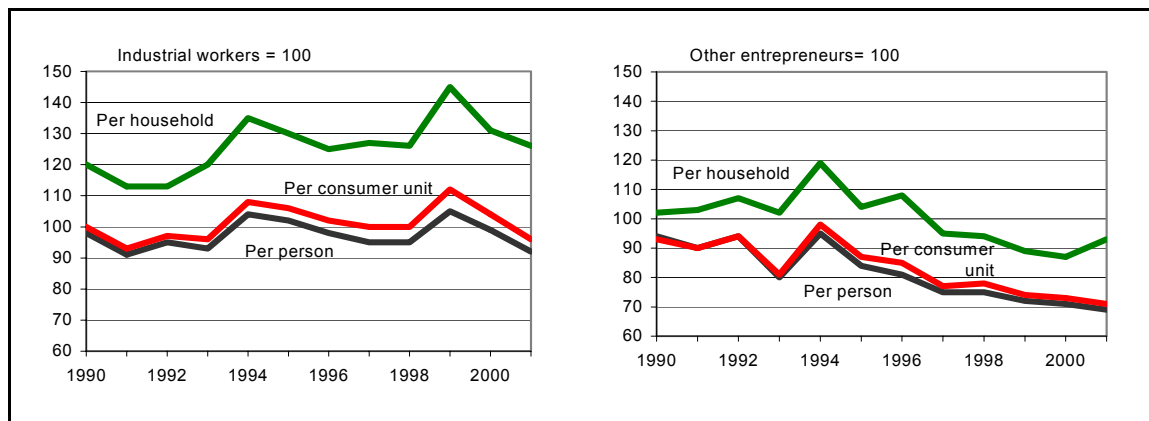


Figure 3.6 Disposable income of farmer households compared with industrial workers and entrepreneurs, income per household, person and consumer unit in 1990-2001  
Source: Väre 2004.

### 3.4 Analysis of the income structure and labour input of Finnish farmers

#### 3.4.1 All farms owned by private persons

When the share of agricultural income increases, the growth of total income becomes more moderate and yearly variation is greater. The variation of agricultural income from one year to another complicated the grouping of part-time and full-time farms according to income data alone. To exclude the effect of yearly variation of agricultural income, the income data of Statistics Finland was combined with the labour input data of the Agricultural Census of Tike (Seppälä 2004). Multivariate methods were applied to the data of the year 2000 for grouping the farms and finding out the different farm types. According to the results, the type of each major income source formed a farm cluster of its own. A total of

22 farm groups were chosen for further analysis. The main features of the farm groups are presented in the table 3.1. Some of the smallest farm groups are brought together. The income structure of farm groups is presented in the figure 3.7.

Table 3.1 Structural information of the farm clusters

	% of farms	Animals LU	Arable area	Forest area
Other farms	30.2	5.0	19	33
Salary earners	23.9	1.4	15	26
Farm forest 1 and 2	5.4	7.9	31	153
Pluriactive farms 1 and 2	1.3	9.3	33	56
Vegetables	0.6	4.5	37	37
Sugar beet 1, 2 and 3	2.6	11.2	47	43
Potato 1 and 2	1.6	5.0	42	43
Grain	5.8	4.4	79	46
Poultry	0.2	215.3	55	40
Pig 3 and 4	0.7	163.2	64	49
Pig 1 and 2	2.1	68.1	45	41
Beef 1 and 2	2.8	39.1	47	60
Milk 2	5.0	44.4	57	57
Milk 1	16.4	23.6	31	53

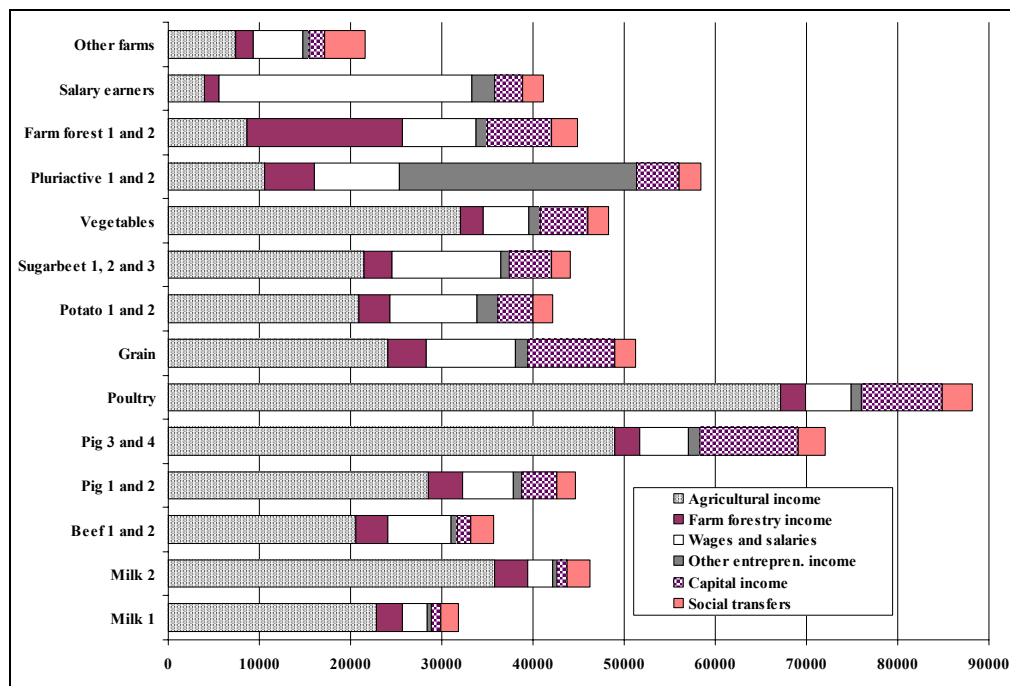


Figure 3.7 Structure of the total income of farmer and spouse in the farm clusters in 2000

The multivariate methods used in the study produced a farm grouping where the income structure with production line had a major role. The group of salary earners' farms was nearly one quarter of all farms, milk farms were one fifth and unspecialised other farms with low total income 30% of the farms. Number of livestock units was biggest in the poultry and pig farms and number of field hectares was biggest in the grain farms. Although nearly all the farms have some forest, forestry was a sorting factor in two of the chosen farm groups, which together were about 5% of the farms. Total income was lowest in the group of unspecialised farms. Also milk and beef farms had lower total income than in other farm groups (table 3.1 and figure 3.7). Inspect of the low income level the average labour input of agriculture was very high in the milk farms. Also most of the unspecialised other farms with low total income had very high labour input in agriculture (figure 3.8).

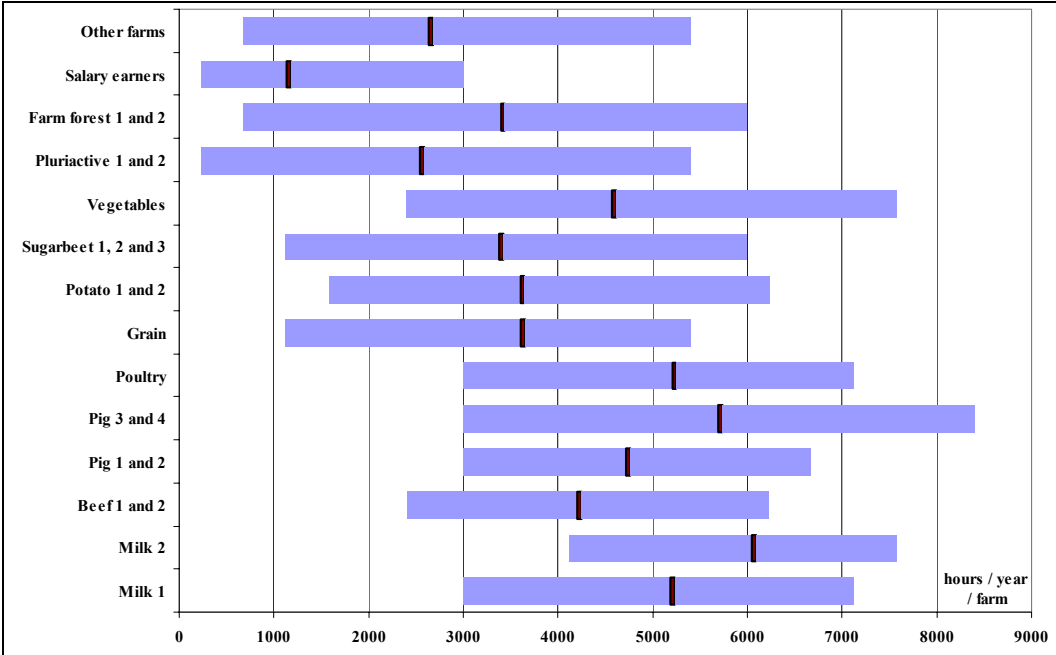


Figure 3.8 Labour input in agriculture in average and 80% of variation in the farm clusters

Farmer's and spouse's participating in agriculture was studied separately in respect of income structure and labour input use in agriculture. The year 2000 was quite a normal year, which is why the average labour input in the clusters was well in line with the income structure. Here the farm grouping was based merely on the share of agricultural income from total income of farmer and spouse. Farmer and spouse got scores from one to four for the agricultural income share and for the labour input in agriculture. Results were combined on farm level as a full-time index. In the index the scores from the share of income were stressed by one third and the scores from the share of labour input by two third. The share of income and labour input in the classification of farms was tested by the bookkeeping data of FADN-farms in an exceptional bad year 1998 and in a fairly good year 2000.

When the share of income was about 30% and thus the share of labour input about 70% in the index, the classification was most stable and only few farms changed their position between the part time farm groups and the full time farm groups.

The full time farm index of the farmer got the values over 90% on the animal husbandry farm groups and on some bigger plant growing farm groups. For spouses the full time index got values over 60% in most animal husbandry farm groups. In the other farm groups the index was mostly over 60% for farmers but less for spouses. For the whole farm the full time index was an average of the full time indexes of farmer and spouse (figure 3.9).

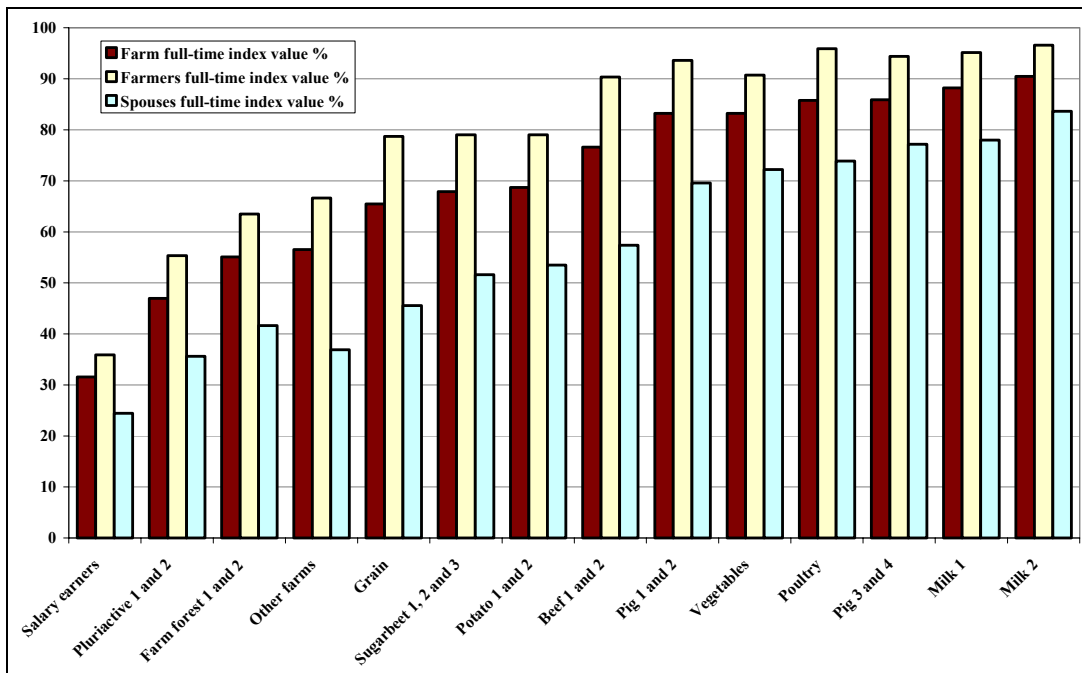


Figure 3.9 Full-time index of farms, farmer and spouse in the farm clusters

### 3.4.2 Farms owned by young farmers

The young farmers' farms were analyzed also by means of multivariate methods (Hirvi, 2004). In the young farmers' study the clustering was made separately in the milk farms, pig farms and grain farms. In 2000 there were 2,055 farms owned by natural persons under 40 years of age in the MYTT. In 2000 the total number of Finnish farmers under 40 years of age was 18,300, i.e. under one quarter of farmers. On dairy, pig and cereal farms the average arable area of young farmers was larger than that of older farmers. Young farmers were more heavily indebted than older farmers, especially in milk and pig production (figure 3.10).



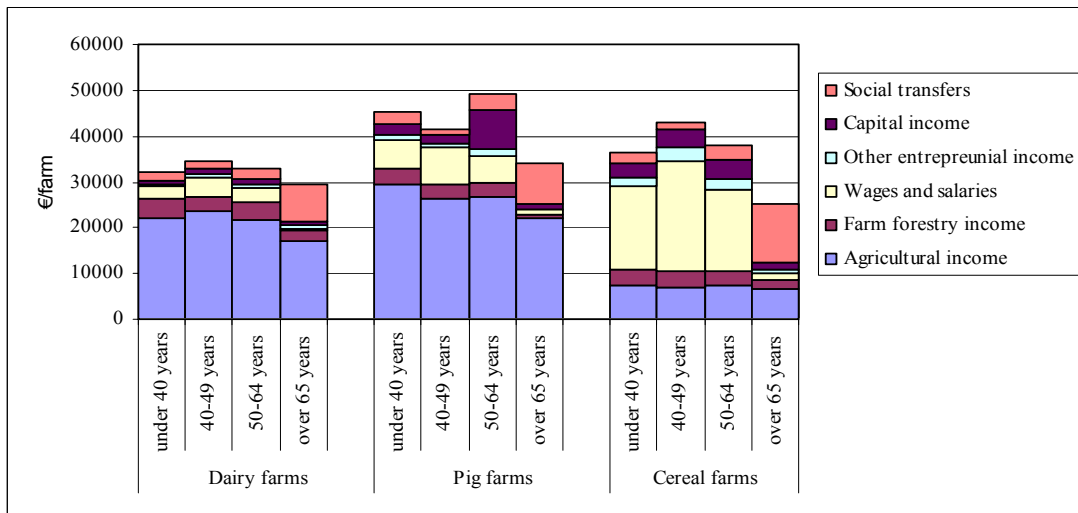


Figure 3.10 Income structure of farms according to farmer's age in 2000  
Source: Hirvi 2004.

According to the clustering of young farmers' farms, there were six dairy farm groups which gained over 75% of their total income from agriculture and farm forestry and two groups which gained 50-75% of their total income from agriculture and farm forestry. Two groups of pig farms gained over 75% and two groups 50-75% of their total income from agriculture and farm forestry. One group of cereal farms had below 25%, two groups 25-50% and one group 50-75% of their total income from agriculture and farm forestry (figure 3.11). The farms with the income share of over 50% were the most heavily dependent on agricultural income as well as agricultural policy and aids. They were also the most indebted because of the transfer of the farm to the next generation, investments and other development measures undertaken on the farm.

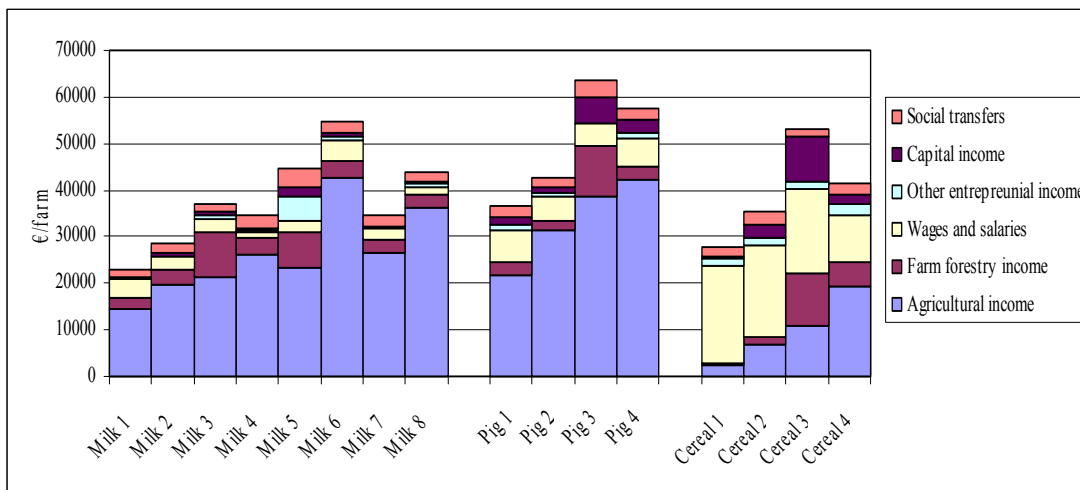


Figure 3.11 Income structure in the farm clusters in milk, pig and cereal farms of young farmers  
Source: Hirvi 2004.

### 3.5 Income studies and the FADN

Many goals of the Common Agricultural Policy refer to such income development of farmers which is comparable and somehow in line with the income development of other population. As for the CAP, most attention is paid to the agricultural income, but e.g. in the evaluation of the effects of rural development programmes the Commission has stated indicators which require comparisons of total income between farm families and other rural population. As for the rural development it is important to examine the whole income formation of farmer population, for especially on the smaller farms the livelihood of farm family is collected from many sources. The income comparisons presuppose reliable statistics and data concerning income level and structure of different population groups. Also unify income concepts are necessary for the comparisons.

The FADN-system is the most detailed and best possible statistics for studying the level of farm income and its development in different EU-countries. Profitability concepts of agriculture depend on how well the labour input and value of agricultural property are determined in the data source. In the FADN the full-time farming is partly determined by means of the minimum demand for the farm size. In Finland the data of bookkeeping farms has included the concept of total income of farm family. However, during last years data collection of the Finnish bookkeeping farms was reduced concerning salary income and private consumption of farm family. Although the Finnish bookkeeping includes the data of entrepreneurial income from three different branch of industry on the farm, the farms cannot be grouped according to the part-time/full-time dimension. Finally, the question is about the needs and possibilities to use the FADN-data only for the implementation of agricultural policy, or, on the other hand, to expand the FADN to cover the concept of total income of farm families for the research of different income sources and other needs of rural policy.

#### *References*

Hirvi, T., *Income structure and labour input of young farmers*. Agrifood Research Finland, Economic Research. MTT Working papers 65. Helsinki. 66 p., 8 app., 2004.

Maatalouslaskenta 2000, *Farm census 2000*. Information Centre of the Ministry of Agriculture and forestry. Tike. Helsinki, 2000, 275 p.

Maatilatalouden tulo- ja verotilasto 2001, *Income and Tax Statistics of Agriculture*. SVT. Maa-, metsä- ja kalatalous 2003:59. Statistics Finland. Helsinki, 2001, 87 p.

Maatilatalouden yritys- ja tulotilasto 2000, *Enterprise and Income Statistics of Agriculture*. SVT. Maa-, metsä- ja kalatalous 2003:51. Statistics Finland. Helsinki, 2000, 69 p., 1 app.

Puurunen, M., *A comparative study on farmers' income*. Agricultural Economics Research Institute. Research publications 62. Helsinki, 1990, 114 p.

Seppälä, R.A., *An analysis of the income structure and labour input of Finnish farms*. (Manuscript). MTT Economic Research, 2004.

Tulonjakotilasto, *Income Distribution Statistics*. Tulot ja kulutus 2003:13. SVT. Statistics Finland, Helsinki, 2001, 79 p.

Väre, M. 2000. Viljelijöiden tulotasovertailu, *Abstract: Farmers' income comparison*. Agricultural Economics Research Institute. Research reports 242, Helsinki, 2000, 168 p.

Väre, M. 2003, *Farmers lag behind the other population groups in income development. Finnish Agriculture and Rural Industries 2003*. (Figures of the article were updated in 2004). Agrifood Research Finland, Economic Research (MTTL). Research publications 95a:76-77, Helsinki, 2004.

## 4. Developments in the organisation of the farm and their policy implications

*Krijn J. Poppe, Hennie van der Veen, Karel van Bommel and Walter van Everdingen*<sup>1</sup>

### *Abstract*

Decisions are influenced by reference concepts, which have a risk that decision makers fix too much on such anchors that are by now outdated. This could also be the case with the implicit ideas policy makers have on the characteristic of a farm and the relation with the farm family.

The traditional reference on e.g. a dairy farm in Western-Europe is one farm family with the spouse working part-time on the farm, part-time in the farm family household. They joined the farm of their parents directly after their school years and the farmer took it over after a number of years, when his father retired.

Especially many dairy farms still fit into this classical reference of the family farm. However a lot of other farms do not. Many farming operations, at least in the Netherlands, are now much more complicated. Some have moved into other enterprises than traditional farm activities (including nature management, health care, tourism). Some have more than one location for their operation, or as some would say: own two farms. In plant production there are several farms that rent land in or out at a seasonal basis, to be able to specialize and reach efficiencies of scale in one crop. Many farms have now two or three farm operators/entrepreneurs. These are often father-son or spouses combinations, be it for fiscal or emancipation reasons. This can involve only one, sometimes two or even more households. This can involve situations in which for fiscal or other legal purposes the farm-as-you-see-it is split up in two or three 'companies'. Farmers and their spouses are also more integrated in the regional labour market, having an off-farm income source, in the capital market and receive social security transfers. And last but not least, the 'modern farms' are not only more complicated, but also much more dynamic over time than often thought.

This paper describes the difference between the old and the new reference concept of the farm, and the relationship with the farm families and the households by using entity-relationship data diagrams. This clearly shows how much more complicated farms are organised today, compared with the reference model used in current agricultural statistics (like the Farm Structure Survey and the FADN/RICA).

Based on these models, we provide - as far as possible with current statistics - data on the Netherlands that shows how important the aspects discussed above are. We end with discussing the policy implications of this. Three major ones stand out. First of all for some types of agricultural policy there are no implications. For veterinary policy for instance the size and organisation of the activity is not relevant. The stamping out methods used in classical swine fever, food and mouth disease or avian influenza imply that every animal in a

---

<sup>1</sup> LEI, The Hague (corresponding author: krijn.poppe@wur.nl).

region should be killed or vaccinated, including hobby animals with non-agricultural families. For such policies it seems correct to call everybody a farmer that owns a sheep or grow some vegetables, even if they are not sold in the market. Secondly there are policies that are very much touched by having a correct reference of the modern farm. The Common Agricultural Policy with its objective to support the income of farmers is an important example. Here the implications range from having a good definition of a farm that is eligible for a (modulated) direct payment, to the (transfer) efficiency of the policy for farms and farmers that are much more complex and dynamically organised. Thirdly policy makers and researchers should have their public monitoring instruments (data sets, farm typologies) reframed to the new reference concept, to take into account the new reality of modern farming.

## **4.1 Introduction**

This paper argues that it is time to update our reference of what a farm is. In section 4.2 we start from a behavioural economics perspective, that explains why references can become outdated. In section three we introduce data modelling, a technique from computer science to show the difference between the classic view of a farm and the more complicated concept of today's farm. This is worked out in more detail in section 4.4, where we start with the current trends that shape the farm organisation. Section 4.5 provides some new data from the Netherlands that illustrates our model. We end with a discussion and conclusions.

## **4.2 The role of references**

References play an important role in thinking and communication. Behavioural economics, as developed for instance by Nobel laureate Daniel Kahneman and others, learns us that decision makers make a number of systematic and predictable mistakes. Two of them are relevant here: the effect of self-experience and the anchor effect.

People put a lot of emphasis on things they have seen and experienced themselves, which may not be the best guide to decision making. In finance this leads to the 'home bias': the tendency of most investors to buy shares only in companies from the country they live in, even if they are aware of the advantages of diversification. In agricultural policy it might lead to imagine a farm as it was at the time that researchers and policy makers lived on or close to the farm of their relatives themselves.

This brings in the anchor effect. First encounters tend to be decisive, not only in making new contacts but also in contracts. Once a figure has been mentioned, e.g. a price quoted in a sale, it casts its shadows on new figures entered into the issue.

To improve decision making it is therefore not a bad thing to explicit our references from time to time. With regard to the (family) farm, this is nothing new. In an analysis of the concept of 'family farm' in the United States, Reinhardt and Barlett (1989) found that this concept was revised implicitly over time when new developments occurred. Originally the concept was used to describe a farm where all the inputs of labour and capital were provided by the farm's owning family: the land should be owned, as well as the other capi-

tal, labour was provided by the family and no contractors were used. Over time these assumptions were relaxed, as 'family farms' were renting land, using bank loans and hiring personnel and contractors to make efficient use of machinery.

### 4.3 Modelling references

A reference can be described in pictures or words. The traditional reference of a dairy farm in North-western Europe would be something like this:

*a number of farm buildings, often old and including a farmhouse and a more recently build cow shed for 40 cows. Five plots of land, in total 30 ha, surround the buildings. There is one farm family with the spouse working part-time on the farm, part-time in the farm family household. They joined the farm of their parents directly after their school years and the farmer took it over after a number of years, when his father retired.*

In information science techniques are available to describe such a reference in a data model, that can be used to create a database (e.g. Chen, 1976). A data model, in the form of an entity-relationship diagram, that could describe the example above, is given in figure 4.1. It shows to so-called Entity Types, that are things about which we would like to know something (that is record data): the farm & household, and the family members connected to the farm. One farm household has one or more family members, and family members are related to each other.

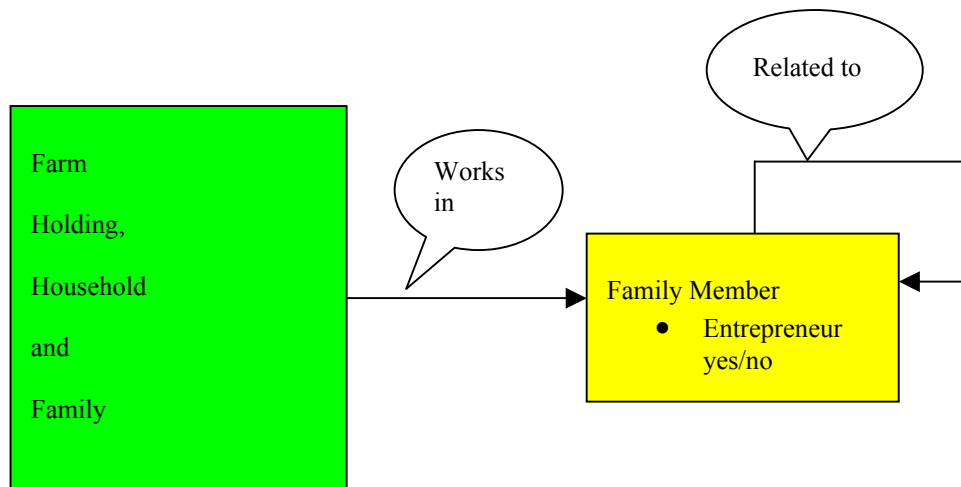


Figure 4.1 Data model to describe traditional NW European dairy farms

Compared to the reference data model in figure 4.1, those used in agricultural statistics to inform policy makers and researchers are already a bit more complex. The FADN/RICA has a more elaborated data model than the Farm Structure Survey (FSS). Relevant parts are given in figure 4.2.

The data model in figure 4.2 shows that in this reference a farm is always located in one geographical location (village), that is located in one altitude-zone. It has one legal structure. The holding has one or more assets and liabilities and one or more activities, that are also used to classify the farm. For each holding data are gathered on a number of unpaid (that is: family) workers that are connected to the farm. From these labourers a number of data elements (attributes) are collected. It also implies that some persons that work on the farm also have not only a 'working' relationship with the farm, but have also an 'ownership relation'.

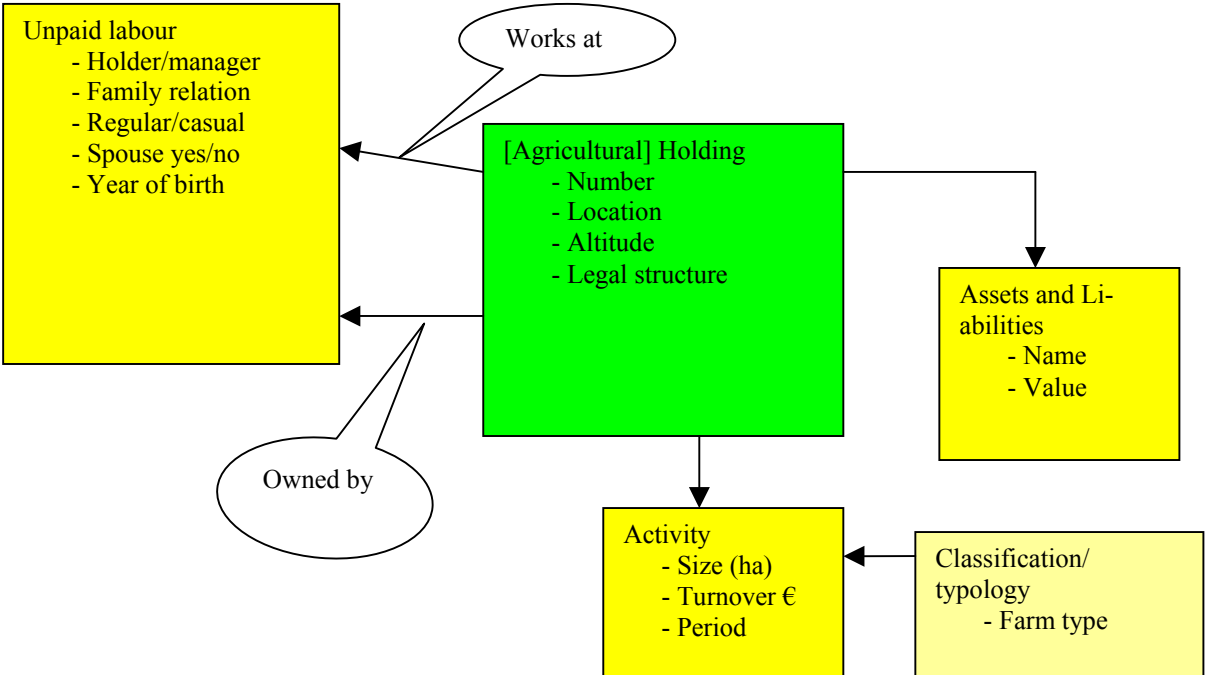


Figure 4.2 Data model of FADN Farm Return (as far as relevant to describe the organisation of the family farm)

A comparison between figure 4.1 and 4.2 learns us that the FADN describes a large number of issues relevant to the characteristics and organisation of the farm. The traditional view on the family farm is well supported. However some aspects, like households and off-farm activities have not been thought relevant in the past for agricultural policy making and research. Nor has been thought about more complex cases, like holdings that have operations at two locations, or have a complex legal structure. Or at least these have not been seen that relevant that obstacles in data gathering should be overcome.

#### 4.4 The modern farm

Farm organisation, and the relation between the farm family (families) and the farm has changed in the last years. Many interviews with farmers in the trade journals, as well as research on multi-functionality (Huylbroeck, 2003) show different aspects of this modernisation, and there are economic phenomena that explain these trends:

- efficiency of scale: technological progress, be it in larger machines or information technology, helps to increase labour productivity and goes on to increase the optimal size of the farm. Some farmers have not only enlarged their farm by buying their neighbours' land, but bought a second or third holding elsewhere, sometimes even abroad. Two leading Dutch agricultural politicians are reported to have not only farms in the Netherlands but also elsewhere;
- forward or backward integration: some farmers buy a second farm to integrate forward or backward in the production column, to cut out transaction costs. Examples are in pig breeding/fattening or in plant nursery. For technical/veterinary reasons this second farm is often at a different location (sometimes even in Kenya in the case of horticulture);
- diversification in agricultural niche markets: some farmers choose the strategy not to enlarge their current operation (only), but to take on new business activities related to the farm. Examples are in food processing and retail, nature management, agri-tourism, agri-health care etc.;
- diversification into an off-farming job. In farms that are no longer able to compete in the treadmill of lower margins per unit of production and larger production units, it can be attractive to join the labour market and take a part-time job. Some agricultural activities can be combined rather easily with another activity in a part-time approach (e.g. poultry fattening or cereal growing) as they are not necessarily a day- or year round activity. In case of the farmers' spouse, it can be attractive not to join farm work at all, but to stay in her own profession, to reap the benefits of the investment (sunk cost) in human capital;
- diversification of investment outside agriculture: if it becomes clear that the farm probably has no successor, or if no attractive investment opportunities are available, it is attractive to invest cash flows generated by the farm outside the farm. Besides capital this also can include unused buildings for non-agricultural use (e.g. renting them out to store caravans or to house a car repair shop);
- some of the new developments are the result of a combination of these trends (e.g. investing ones money and time in an on-farm tourism activity).

All these developments relate to the central problem of economic organisations: adaptation. Williamson (2003) reminds us that these adaptations can be reflected in either autonomous adaptations in which individual parties respond to market opportunities as signalled by changes in relative prices (as an economist like Hayek would do), or can be seen as cooperative adaptations accomplished through administration within the firm (as the organisational theorist Barnard would do). Williamson states that a high performance economic system will display adaptive capacities of both kinds. Thus an understanding and



appreciation of both markets and hierarchies (in our case: farm-household complexes) are needed.

Many of the developments discussed above, are not totally new. The treadmill of the cost squeeze and the fact that the structure of the farm industry lags the optimal farm size, is an old characteristic of the sector. Part-time farming has been around in some regions like Bavaria for several generations. On farm cheese making and other forms of food processing and retail are also old.

New about this pluriformity is probably that the CAP now provides more incentives and need for entrepreneurship - as the support for standardized bulk products and production processes slowly disappears. Farmers and their families are now also more integrated into society. Transport and communication costs have come down. Where farmers 50 years ago dominated rural societies, they then formed for a long time a group large enough to club together in local associations and at parties. In many European regions villages and cities are now so close, that farmers just have another profession, and are integrated in the society at large. Which makes economic integration easier.

This raises the question: what is nowadays a farm? Is a dairy farm that realises 51% of its income from agri-tourism still a dairy farm, or even a farm at all? At least in national accounts it would not be a farm but a tourist business. If a Dutch pig breeder buys a second farm for pig fattening in a village at 50 km distance, does he then have one or two farms? And if the second operation is in Belgium? Is a 75 year old farmer that earns 80% of his income from a pension, still a farmer? And if he is 40 and earns 80% from a job in the village? Or even 110% and spends 10% as a loss making operation on the farm as it gives him the right to live in the country side and brings entitlements to social security?

Of course we could try to make new definitions of a farm, a farmer and a family farm. No science without proper definitions, to build common references for our communication.

However it is at the moment more attractive to find out more in detail what is happening on the farm with respect to farm organisations. This can be done by updating the data model and use it for an inventory.

To support this fact finding we developed and propose a new reference data model (figure 4.3). It describes the farm - farm household complex. The model is based on earlier discussions in the PACIOLI-group (Poppe, 2004) and the data model implemented in the new software for the Dutch FADN (Poppe, 2001). The proposed data definitions are given in figure 4.4.

Central in this data model is the agricultural holding as our unit of interest. However, as economists, we propose to give the farm an economic definition. That implies that an agricultural holding, like any other business, can have more than one location. As long as decision making on a location of the farm is influenced by developments on another location (e.g. by sharing capital or labour, or by integrated production), it is one holding. There are only two farms or holdings in those cases where operations at different locations do not share resources, and are only linked because they have the same owner (and his capital is not an extremely scarce resource). Thus, holdings can have more than one location. And some locations (if not defined too narrowly) can host more than one holding (e.g. a business like a consultancy that is run by the spouse of the farmer that is not in any way integrated with the farm).

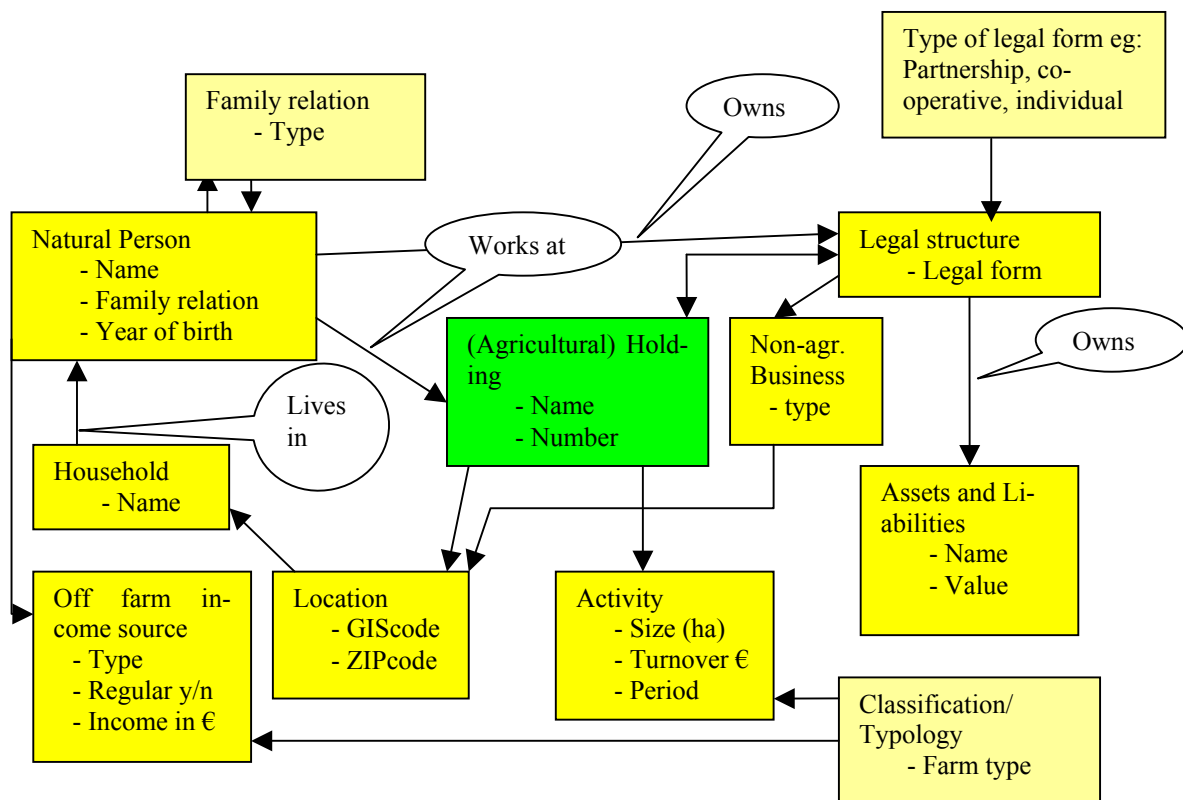


Figure 4.3 Reference data model for the modern farm - farm household complex (changes over time not explicitly modelled in)

Entity Type	Definition
Agricultural holding	Commercial operation that is involved in agricultural activities, whatever its size and its locations and legal structures, as long as it sells agricultural produce, and the different activities in the holding (and locations) have a joint use of resources like labour, capital or management.
Natural person	Any person that is connected to the farm or the farm household, be it as a worker, owner or living in the household that has part of its income from management and investment activities in an agricultural holding
Household	A group of persons that lives together in a regular way, e.g. by living under one roof and consuming a number of meals a week together
Location	Place that can be identified geographically
Legal structure	A juridical title used to run a commercial operation
Activity	Production line within a holding (e.g. growing of sugar beet, keeping beef cattle, making cheese).
Off farm income source	An origin of a revenue (salary, investment income, pension, etc.) for a natural person other than income from the agricultural holding in which one is active, or non agricultural business income.
Non agricultural business	Commercial operation that is not involved in agricultural activities
Assets and liabilities	Items that are owned and obligations that a business has.

Figure 4.4 Definitions for the reference data model presented in figure 3.3

An agricultural holding has a legal structure. Sometimes it has more than one. A quite common example from the Netherlands is the farm where there is a legal father-son partnership that runs the operations, and where part of the land is owned by the father as his private business and rented out to the partnership. And sometimes the son is likewise the owner of recently bought milk quota. In fiscal terms there are then three operations with their own fiscal income calculation. Legally and fiscally speaking, it is the legal structure (including the private business of a person) that owns the assets and liabilities.

Agricultural holdings perform activities, like growing crops, keeping animals. But they can also include diversified activities like agri-tourism, food processing, retail, nature management, health care, forestry, contracting of machinery or even activities that do not have a synergy with agriculture or the rural environment. In central Europe some large (former state) farms are still active in totally different business activities. And some farmers are just using the legal structure of the farm for other gainful activities. As decision making in the farm is influenced by such activities (e.g. labour saving strategies or investments), it would be a mutilation of reality if such activities would not be accounted for.

The traditional agricultural activities are used to classify farms in farm types and size classes, like dairy farms, olive farms and mixed farms, or small and large farms.

Behind the agricultural holding are persons. They work at the farm or own the farm. Some persons only work on the farm and are not a part of the farm family or its households. Those are called personnel and provide the external labour input. Although the CAP states that is aimed at all that work in agriculture, in policy analysis they are often not dealt with in detail.

Natural persons that own the farm are the farmer/owners. It is attractive to know their family relationship. Many farms nowadays have more than one farmer/owner. In the Netherlands this used to be father/son partnerships, to make the (fiscal) transfer of the farm to the next generation easier. Over the last ten years the importance of farmer/spouse partnerships has increased very much, which has a fiscal (and originally emancipatory) background.

Unrelated to this ownership structure, family members are a member of a household. Especially the next generation can be working on the farm or be partly owner, and (still) live in his/her parents' household, or can have started a household of his own. Needless to say that households can have members that work on the farm, but are not an owner. Which implies that the family farm income has to support several workers. It is equally possible that some households have members with an off-farm job, or another fixed income source like a pension, social security payments or revenues from capital investments. It could also be that he/she runs a self-employed business (through an independent legal structure) that is totally separated from the agricultural holding.

The composition of the household brings us to the issue of time. We should realise that also in the agricultural sector relationships are not that stable anymore. Children leaving the household to live on their own and marriage are nothing new. In the last 15 years however also cohabitation (not necessarily for a long period) and divorces have come to the farming community. In some cases this can have large effects on wealth.

Not only households, but also legal structures change quite often. Where in the Netherlands today about 4% of the farms disappears every year, we found out in analysis for the implementation of the new CAP that every year about 10% of the farms experience

changes in legal title (mainly due to entry or exit of partners and intra-generational transfer).

In addition to the traditional farm typology to characterise agricultural holdings, figure 4.3 suggests some other interesting typologies, that are probably just as relevant:

- a typology of agricultural holdings to the degree in which they are active in crop production, animal husbandry and the list of diversified activities mentioned above (agri-tourism etc.)
- a typology of households involved in ownership of agricultural holdings, to the degree in which the household members are involved in agricultural holdings with traditional agriculture, with diversified activities, in a non-agricultural self-employed business, have a job elsewhere or have another fixed income source. The USDA-ERS has started to move their farm typology in this direction (e.g. Mishra, 2002). One of the types of large farms is the category of non-family farms. Under the small family farms they classify as separate entries the Retirement farms (operator is retired and does not have an income lower than \$ 20.000,- a year, as this would make it a limited-resource farm) and the Residential/lifestyle farm (where the operator reports a major occupation other than farming).

#### 4.5 Some data from the Netherlands

As agricultural statistics find it hard to innovate and adapt to new realities (Abitabele, 1999) it is not easy to provide empirical data on the theoretical reference model. However the renewed FADN system in the Netherlands partly fills the gap. Some warnings should be given in advance. We report here data on 2001, the first year this data was gathered. Gathering new types of data starts often with problems and anomalies. And incentives exist for data collectors to leave the most complicated cases (e.g. holdings with subsidiaries abroad, or with large retail shops) out of the data collection. To avoid the impression that we can provide at this moment representative data for the Netherlands as a whole, we have not calculated weighted averages and a percentage distribution.

*Table 4.1 Agricultural holdings classified to the number of entrepreneurs per holding in the Netherlands, 2001*

Agricultural holding with...	Number of holdings
1 entrepreneur	334
2 entrepreneurs	382
3 entrepreneurs	70
4 entrepreneurs	19
5 entrepreneurs	2
Total	807

That having said, table 4.1 shows that the number of holdings with one entrepreneur seems to be a minority. The classic example that we described at the start of this paper, the farm with the male farmer/father being the only owner/manager is clearly not a good reference anymore.

Table 4.2 provides data on the relationship between the agricultural holding and the number of households that it supports. It shows that the number of cases with two or even more households per farm, are numerous, but the classic reference of one household per farm is still the overwhelming majority.

*Table 4.2 Agricultural holdings classified to the number of households per holding in the Netherlands, 2001*

Agricultural holding with...	Number of holdings
1 household	703
2 households	80
3 households	18
4 or more households	6
Total	807

The combination of tables 4.1 and 4.2 implies that in many cases the entrepreneurs are living together in one household, be it as a father-son, man-wife or man-wife-child family relationship (table 4.3). In households with more entrepreneurs the age of the oldest entrepreneur is higher, indicating a number of parent-child (classic: father-son) partnerships to transfer the farm to the next generation. These farms are also larger (in terms of European Size Units).

*Table 4.3 Agricultural holdings classified to the number of households and the number of entrepreneurs per holding in the Netherlands, 2001*

Agricultural holding with...	Number of holdings	Persons from the households involved in the farm
1 household, 1 entrepreneur	333	1.7
1 household, 2 entrepreneurs	321	2.3
1 household, 3 or more entrepreneurs	53	3.5
2 households, 2 entrepreneurs	57	2.8
Others (more households, more entrepreneurs)	43	3.8
Total	807	2.2

It shows in table 4.4 that most agricultural holdings are located at one site. As in a number of cases there are incentives in Dutch agricultural regulations as well as for our data collectors not to consolidate operations in two locations into one holding (although labour, capital and management are shared, and products are moved from one holding to the other), in reality the share of holdings with more than one location is higher. It is also hardly surprising that a large number of holdings is not using the agricultural VAT system (in which a *forfait* is used in stead of a normal VAT accounting system) anymore (table 4.6). Moving fertilizers and pesticides from the low VAT rate of 6% to the high one of 19% has contributed to the fact that many farmers adopted the normal VAT system, in which paid VAT can be deducted. With the unexpected effect that the marginal tax rate on these inputs dropped in stead of increased.

*Table 4.4 Agricultural holdings classified to the number of geographical locations per holding in the Netherlands, 2001*

Agricultural holding with...	Number of holdings
1 location	796
2 locations	10
3 locations	1
Total	807

Farms are nowadays organised in different juridical forms (table 4.5). Most popular is the (fiscal) partnership in which two, three or more entrepreneurs are working together. The classic one-man-business is second. More official forms like the limited company or the limited partnership are also often present.

*Table 4.5 Agricultural holdings classified to their juridical form, the Netherlands, 2001*

Juridical form	Number of holdings
One-man-business	264
Partnership	428 b)
Limited partnership a)	79
Limited company	36
Total	807

a) In Dutch: V.o.F. and C.V.; b) Data under review.

Table 4.6 *Agricultural holdings classified to the VAT system adopted, the Netherlands, 2001*

VAT system	Number of holdings
Agricultural forfait system	348
Normal VAT accounting system	459
Total	807

### *Typology*

Traditional typologies classify farms in types arable farms, dairy farms etc. and into size classes measured in European Size Units. Inspired by the USDA-ERS, in table 4.7 we introduce a new typology for dairy farms, based on the scale and potential future development of the farm. We create three classes:

1. large farms: farms with more than 100 dairy cows;
2. modal farms: farms with less than 100 dairy cows where the farm is the primary source of income for the household and the head of the farm is younger than 55 years or has a successor;
3. other farms, essentially retiring farmers and part-time farmers. The farm is run as a part time farm or the head of the farm is over 55 years without a successor.

Table 4.7 *Results of dairy farms, 1990 and 1999*

	1990 total	1999			
		total	large scale farmers	modal farmers	other farmers
Number / % of farms	33,500	27,800	11%	79%	10%
Share of production (%)		100	23	70	7
Utilised area (ha)	29	33	66	30	26
Milk quota per farm	318,200	398,600	846,000	350,700	280,400
Dairy cows per farm	49	53	112	47	39
Labour input (hours)	3,980	3,930	6,250	3,700	3,150
Labour costs (€)	53,900	69,500	109,400	65,700	55,000
of which calculated for family (%)	96	98	96	99	97
Farm labour income of the family (€)	20,700	11,900	40,200	9,600	-1,200
Per 100 kg milk					
Labour costs (€)	16.76	17.30	12.69	18.61	19.99
Labour income (€)	7.06	3.27	5.23	2.90	0.17

Source: Farm Accountancy Data Network..

Since 1990 the family labour income from dairy farming has decreased with almost 50% to € 11,900, which is below the poverty level in the Dutch social security system. Especially the modal and other farms do not gain enough income from dairy farming. This shows that on average dairy farming is not economically viable in the Netherlands. There are different strategies to continue farming in the (near) future, the three main strategies are represented by the different types:

- *Large farms*

The large scale farmers, that supply nearly one quarter of the milk production, try to secure their income by growth and usually high labour productivity. The family works on the farm. They have a strategy of efficiency of scale, resulting in low cost per ESU. The labour costs per 100 kg of milk € 12.69 compared to € 18.61 for modal farmers. The large scale farmers have no capacity to work outside the farm, although sometimes the partner has a part-time job off farm. Their main strategy is to grow by investing in milk quota to reduce the cost price of the milk. They outsource more and more work to agricultural contractors.

- *Modal farmers*

The modal farmers usually have to compete with the large scale farmers. They have a focus on low costs. Often relative a high amount of family labour input is required. About 15% of these farmers are active in multifunctional agriculture. The margin per labour unit is usually lower than for the large scale farmers. Modal farmers gain often not enough income from the prime agricultural activity and therefore they move to multifunctional farming or sometimes organic farming. Compared to the large scale farmers, a larger proportion of their income is earned off farm. They usually compensate the low margins per hour by the amount of hours (60 to 80 hours a week).

- *Retiring farmers and part-time farmers*

For this group, farming is a way of live (the residential/lifestyle farm), although it does not provide them with a high enough income. The main income is usually off-farm income. With farmers who are in the process of stopping, the farm is run down by reducing investments, consuming depreciation, and selling off parts of the farm. The residential farmers gain their income mainly off farm. They appreciate the living in the countryside and the farming can sometimes be considered as a large scale hobby.

The typology developed also helps to investigate structural changes. Figure 4.5 provides data for all Dutch holdings. In 2000 almost 12,000 holdings could be characterised as large farms (12% of the total farms). These farms supply about 43% of the Dutch agricultural production. The modal farms are with 50% by far the largest group. The 38% of the farms that is classified in the group of other farms, are only responsible for 13% of the agricultural production.



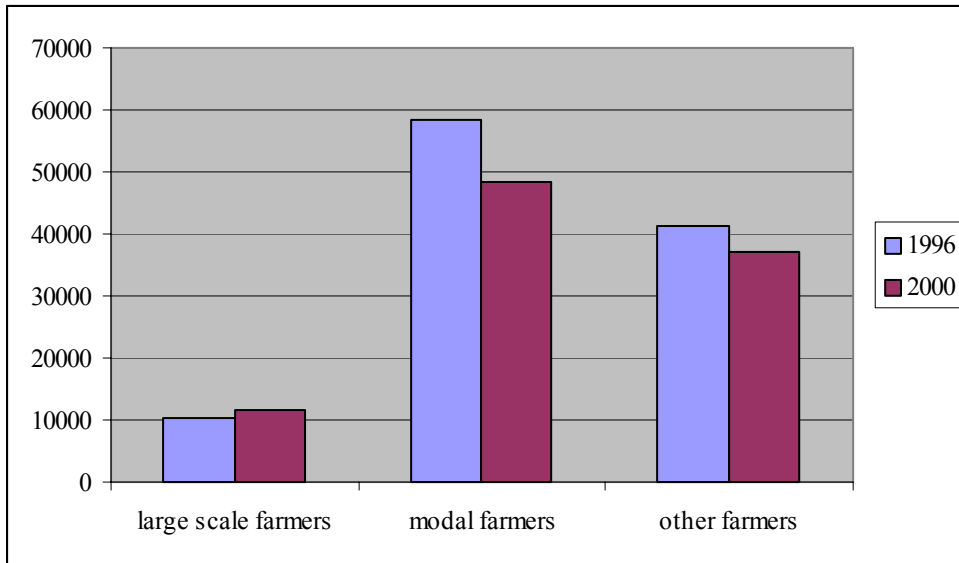


Figure 4.5 Structural development of number of Dutch agricultural holdings, 1996-2000

The number of farms is reducing rapidly: in the period 1996-2000 the total number of farms reduced with 11%. In this period the share of large farms in the total number grew by 12%, because not many of these farms stopped and some larger modal farms developed into large farms. On the other side, some modal farms moved into the group of the other farms, because they became part-time farms or the farmer turned 55 years of age (without indicating that a successor was expected). The modal farms diminished by 17% and the other farms by 10%. Other shifts between groups occurred, but were limited. These shifts were mostly caused by changes in the availability of a successor.

#### 4.6 Discussion

This paper suggests that, based on reports from trade journals and literature on multifunctionality, it is time to update our reference on the definition of the farm and its relationship to the farm family. For this we developed a more complex data model that could fulfil this need.

This data model is not necessarily the only possible and the best reference for European farming. Testing it in data-gathering will learn that it has to be adapted to local circumstances (especially in fiscal and farm transfer issues). Where reality will show that in some aspects the data model is still too simple to reflect reality, in other aspects it can perhaps be simplified. This depends on results from using it. The case we would like to make here is that we should no longer be satisfied with the old reference model and move forward.

Some will like to raise the question why we should move. Perhaps especially also in France, where the public administration has for a long time been reluctant to collect data

on off-farm activities and income in e.g. the FADN system, worrying about boycotts by the private sector (Abitabile 1999).

A number of answers can be given to this question. First of all, it is also in the interest of the private sector that decision making by policy makers is based on reality. And reality includes the new reference of the farm and its households. A clear example is that national governments in the EU use fiscal and legal policies to support their farm sector. If such policies are not disclosed in public data sets, it is impossible to monitor if competition stays fair. A second reason is that new policies (e.g. on cross compliance, new CAP, rural development) are introduced. To understand the effects of such policies, we need to take the whole array of opportunities and their risks and returns to farmers into account. Referring once again to Williamson (2003): we have to study the farm-household complex as well as the farm in the market, to understand and contribute to the high performance of the economic system. Otherwise policy research will be of limited value or even wrong. And that could lead to policy decisions that are against the interest of farmers. Del'homme (2000) made the point that farmers and their advisors also need relevant reference systems. And last but not least: the farm sector receives a lot of state support, now also in the form of direct subsidies with marginal obligations. The biggest beneficiaries are not the poorest members of the society, nor of the farm community. In the longer run it is even in the interest of the sector in total to show that at least some of the beneficiaries are poor households and do not have significant income outside agriculture nor are very wealthy. If this transparency is not provided and the CAP not better targeted towards it, the pressure to abolish this type of CAP will grow even more.

We end with discussing the policy implications of this. Three major ones stand out. First of all for some types of agricultural policy there are no implications. For veterinary policy for instance the size and organisation of the activity is not relevant. The stamping out methods used in classical swine fever, food and mouth disease or avian influenza imply that every animal in a region should be killed or vaccinated, including hobby animals with non-agricultural families. For such policies it seems correct to call everybody a farmer that owns a sheep or grow some vegetables, even if they are not sold in the market. Secondly there are policies that are very much touched by having a correct reference of the modern farm. The Common Agricultural Policy with its objective to support the income of farmers is an important example. Here the implications range from having a good definition of a farm that is eligible for a (modulated) direct payment, to the (transfer) efficiency of the policy for farms and farmers that are much more complex and dynamically organised. Thirdly policy makers and researchers should have their public monitoring instruments (data sets, farm typologies) reframed to the new reference concept, to take into account the new reality of modern farming.

## **4.7 Conclusion**

In a tradition of reframing our concepts of the family farm, this paper argues that we need to update our references of the farm and its relation to the farm households. Writing down our references in a data model helps to make our references clear and debatable. The new reference model developed here shows much more complexity than the old ones, as for ex-

ample used in agricultural statistics. Further testing and data gathering is needed for fine tuning the reference at a European scale. First tests in the Netherlands support the model. We recommend the introduction of such a complex data model in national and the EU FADN systems. We also recommend a further development of new typologies of farm holdings and farm households, following the lead taken by the USDA-ERS in this respect. Where the new CAP is much less interested in particular agricultural crops and markets, and moves to a general level of support per hectare, technical details lose their importance in policy research and give way to analysing the incentives for resource allocation within the farm households. This asks for an adequate and up to date reference model.

### *References*

Abitabile, C., G. Beers, G. Bonati, K. de Bont, B. Del'homme, G. Larsson, H. Lindén and K.J. Poppe, *Ricastings - the feasibility of a new farm return for the FADN*, The Hague, 1999.

Chen, P.P., 'The entity-relationship model: towards a unified view of data', In: *ACM Transactions on Database Systems*, 1:1, March 1976, p. 9-36.

Del'homme, B., 'Relevance in farm management diagnosis by a new information approach: towards a reference information system', In: G. Beers et al.: *Pacioli 7 - Agenda 2000 and the FADN Agenda*, LEI, The Hague, 2000.

FADN, *Farm Return Data Definitions*. Website RICA: <http://cec.eu.int>

Huylenbroeck, G. van and G. Durand (eds), *Multifunctional Agriculture*, Ashgate Aldershot, 2003.

Poppe, K.J. (ed), *Pacioli 11 - new roads for farm accounting and FADN*, LEI, The Hague, 2004.

Poppe, K.J., 'Experiences with ARTIS', In: G. Beers, K.J. Poppe and A. Leuftink: *Pacioli 8 Innovations in the FADN*, LEI, 2001.

Mishra, Ashok K. et al., *Income, wealth, and the economic well-being of farm households*, USDA-ERS, 2002.

Reinhardt, N. and P. Barlett, 'The persistence of family farms in United States agriculture', In: *Sociologia Ruralis* 29 (1989) p. 203-225.

Williamson, Oliver E., *Transaction cost economics and agriculture: an excursion*. Paper for the EAAE seminar in Gent, 2003.

## 5. The impact of enlargement and CAP reform to Latvian farmers

*Dr.oec. Valda Bratka*<sup>1</sup>

### *Abstract*

Accession of Latvia to the European Union may have a significant impact to the Latvian economy and particularly to agriculture. After accession the conditions for agricultural production and for further development will be closely linked with the implementation of Common Agricultural Policy.

At the end of 2002 Latvia signed Treaty of Accession with the EU, where the main general principles of accession and the results of negotiations concerning agriculture were fixed: production quotas, base areas, reference yield, the amounts of eligible rights of direct payments, support level and phasing in up to level of the old member countries. On June 26, 2003 the Council of Agriculture Ministers of the European Union passed a resolution about common agricultural policy reform. Both these circumstances are expected to have a significant effect on the future of Latvian agricultural producers, and on their competitiveness in the common European market.

Latvian State Institute of Agrarian Economics has carried out a study with the purpose to estimate the effect of the said two processes on the agricultural sector as a whole, and on individual farm groups. The present paper presents the quantitative assessment of enlargement and CAP reform taking into account input and output price changes within the common EU market and support policy changes - effect of decoupling and modulation to different farm types based on Latvian 2001 FADN data.

*Key words:* enlargement, common agricultural policy (CAP), CAP reform, single area payment (SAP), modulation, quantitative analysis, farm net value added (NVA).

### **5.1 Introduction**

Since May 1, 2004 Latvia is a full-fledged EU member country, and this will bring large changes to the Latvian economy. The changes are expected to effect agriculture as well: and not only in the connotation with the fact that the sector is joining the common European market, but also a result of the Common Agricultural policy reforms, providing the decoupling of support from production. How will these changes affect the farms in Latvia; which of the farm groups will benefit from the income increase after joining the EU; will there be any farm groups who will be losers from the changes? These are the questions keeping busy every single agricultural producer; they are also important for the Latvian society in general, and largely defined the topic of the study.

---

<sup>1</sup> Latvian State Institute of Agrarian economics.

The EU-financed project, with the objective to evaluate the effects of enlargement and CAP reform on the agricultural sector of the new EU member states, to simulate possible development scenarios for different farm groups and to assess them, is already at the final stage. This is an evidence to the significance of the chosen research topic not only in the new member states but also in the entire enlarged Europe. The study has been carried out as a part of a thematic block of Enlargement Project, implemented by Institute for Prospective Technological Studies.

The questions is topical not only for Latvia, but for all the new EU member states as well: upon the initiative of Estonian, Latvian and Lithuanian Ministries of Agriculture, and in co-operation with the researchers in working in the area of agricultural economics, a study was carried out in order to assess the effects of the EU CAP Reform on the agricultural and rural sector in the Baltic countries. The study evaluated the impact of the change of the policy on agricultural sector in general, employing methodology of economic accounts for agriculture, using agriculture simulation model, also the changes in farm income as a result of agricultural policy changes for farms with different specialization were evaluated, using FADN data as a basis.

This paper describes the results of quantitative assessment of enlargement and CAP reform taking into account input and output price changes within the common EU market and support policy changes - effect of decoupling and modulation to different farm types based on Latvian 2001 FADN data.

## **5.2 Materials and methods**

The study has been carried out using 350 Latvian FADN 2001 farm data, collected and classified, according to EU FADN methodology, accounting data from Latvian farms with different specialization, economic size and located in different regions of the country. The research is based on quantitative analysis - change in income as a result of Agenda 2000 scenario and CAP Reform scenario, assuming that farm production structure, the output volume, production technology, technical support and labour input remain unchanged. The evaluation has been made for the below listed farm groups:

- average farm;
- field, mixed cropping farms;
- grazing livestock farms;
- granivores (pigs and poultry farms);
- mixed farms.

Key data describing agricultural production in different farm groups are presented in table 5.1.

Entering the common EU market for agricultural products, the prices of output and input will change. Changes have been assessed comparing the prices in Latvia and in the EU countries located closer nearby, or having similar natural conditions. Price levels (excluding milk price, which will be reduced according to the decrease of target price for

Table 5.1 Main characteristics of agricultural production by type of farming

	All farms	Field, mixed cropping	Grazing livestock	Pigs, poultry	Mixed farms
Labour input, AWU	1.9	1.7	2.4	26.7	2.0
Unpaid labour, AWU	1.7	1.6	1.7	1.0	1.8
Economic size, ESU	4.3	4.5	5.9	200.7	3.6
Agricultural Area, ha	35.7	36.3	51.3	72.5	34.3
Rented AA, ha	9.8	11.4	19.2	30.4	8.0
Use of AA					
Cereals, %	31.7	46.3	11.3	13.4	21.0
Potatoes, %	2.0	2.5	1.2	0.6	1.7
Sugarbeet, %	0.8	1.9	0.0	0.0	0.0
Fodder crops, %	15.7	7.7	36.1	1.9	20.7
Pastures, meadows, %	24.4	18.5	46.2	4.7	27.4
Other use, %	15.7	20.4	3.3	14.3	12.8
Unused AA, %	9.8	2.8	1.9	65.1	16.3
Livestock units	8.9	4.2	22.1	758.8	10.4
Grazing livest.density, LU/ha	0.4	0.3	0.5	0.2	0.5
Dairy cows, num.	4.0	1.4	14.4	0.8	5.6
Other cattle, num.	4.3	2.2	14.1	0.3	5.7
Pigs, num.	7.5	5.6	0.9	1,526.1	6.2
Poultry, num.	52.8	12.6	5.1	37,517.7	10.0
Yields					
Wheat, t	2.8	3.1	2.2	3.2	2.3
Rye, t	2.0	2.0	1.4	4.5	2.0
Barley, t	1.9	1.8	1.9	3.0	1.9
Oats, t	1.8	1.6	1.7	2.0	2.0
Potatoes, t	13.9	14.1	12.3	14.1	13.8
Sugarbeet, t	30.7	30.7	-	-	31.3
Milk, t	3.8	4.0	3.9	3.4	3.7

Source: Latvian FADN 2001 data.

milk<sup>1</sup>) have been forecasted equal for the whole simulation period from 2006 to 2013 and in both scenarios (table 5.2).

Milk price will be affected by the planned intervention price cuts for butter and skim milk powder; it will change depending on the scenario (table 5.3).

The increase of input prices has been observed already starting with the beginning of 2004: to energy and fertilizers; together with the increase of agricultural output prices, also the price of seed and feed will increase. A significant price increase may be expected for services due to increase of labour costs (table 5.4).

<sup>1</sup> Council Regulation 1999R1255 Article 3.

Table 5.2 *Output price changes within common EU market, %*

Products	Compared to 2001
Wheat	15
Rye	10
Barley	14
Oats	15
Other cereals	10
Rape seed	7
Sugar beet	40
Beef	23
Pork	-1
Poultry	-5
Sheep	20

Source: LSIAE and author calculations based on EUROSTAT data.

Table 5.3 *Milk price changes within common EU market, %*

	2006	From 2010
Agenda 2000	65	54
CAP Reform	37	34

Source: Council Regulation EC No 1787/2003, LSIAE and author calculations.

Table 5.4 *Input price changes, %*

Inputs	Compared to 2001
Seed	11
Fertilizers, plant protection	10
Other specific crop production	10
Feed	7
Insemination, veterinary costs	50
Other specific livestock production	10
Upkeep of machinery and buildings	10
Fuel and lubricants	20
Electricity, heating	35
Services, machinery rental costs	20

Source: LSIAE and author calculations.

As a result of negotiations between Latvia and the EU, an agreement has been reached about the base areas, reference yield (2.5 tons per hectare), number of animals, premiums and quotas for the calculations of direct payments. The new Member States will gradually phase-in EU agricultural direct payments between 2004 and 2013. The direct payments will start with 25% from the direct payments rates applied in the EU in 2004, 30% in 2005 and 35% in 2006 and will increase by 10 percent steps to reach 100% of the applicable EU level in 2013. Within the carefully defined limits, the new member states will have the option to 'top-up' these EU direct payments with national subsidies (table 5.5).

Table 5.5 *Level of direct payments 2006 - 2013, sources of financing, %*

Year	EU budget	Rural development	Latvia additional
2006	35	5	25
2010	70	0	30
2013	100	0	0

Source: Treaty of Accession.

CAP reform package make significant changes to the acquis on which the accession negotiations were based. EU Commission has prepared a legislative proposal for a Council Decision adapting the Act of Accession to the Treaties on which the EU is founded, following the reform of the CAP. During the first years after accession all new Member States have possibility to choose among following forms of direct payments:

- payments coupled with production (acreage or headage payments administrated under classic scheme of IACS);
- single Area Payments (SAP) applied to utilized (kept in a good agricultural condition) agricultural area;
- de-coupled farm payments or single payment scheme (SPS), which should be introduced in the period 2005-2009.

According to official view of Ministry of Agriculture of the Republic of Latvia the direct support to agricultural producers will be administrated in the form of Single Area Payments.

After Latvia's accession to the EU, the possibility opens to receive less favoured area (LFA) payments. According to the draft Rural development plan, areas of four categories have been set for Latvia: Category 1 where the support is EUR 50; Category 2 EUR 62; Category 3 EUR 71, and areas not falling under LFA status.

Farm income has been assessed for years 2006, 2010 and 2013 for EU CAP Agenda 2000 and CAP Reform scenarios, assuming that farms receive (claim) 100% of the available support. In Agenda 2000 scenario the support has been calculated including the direct payments envisaged by the EU Regulation 2529/2001. In the CAP Reform scenario the support is calculated proceeding from the single area payment scheme, where a payment



per 1 ha of land maintained in good agricultural condition is calculated by dividing the national package for Latvia (EU Regulation 1784/2003 and Accession Agreement) with the justified area of 1.47 million ha of agricultural land. The calculated 100% SAP rate per 1 ha of agricultural land is EUR 96.89, including the compensation payments due to reduction of intervention price for skim milk powder and butter. The direct payment level in cases of Agenda 2000 and CAP Reform are provided in table 5.6.

Table 5.6 *Level of direct payments for Agenda 2000 and CAP reform*

Payment object	Unit	Agenda 2000		CAP reform
		2006	2010	
Field crops: wheat, ray barley, oats, other cereals, rape, flax	ton	63	63	
Protein crops	ton	72.5	63	
Aid for protein crops	ha	-	55.57	
Dairy premium	ton	11.49	17.24	24.49
Special beef premium	animal	210	210	
Suckler cow premium	animal	200	200	
Veal (1-7 month) slaughter premium	animal	50	50	
Beef slaughter premium	animal	80	80	
Extensification premium	animal	100	100	
Sheep and goat premium	animal	21	21	

Source: Council Regulation EC No 1784/2003, Council Regulation EC No 2529/2001.

One of the changes that is the hardest to predict is labour costs, which will definitely increase. To avoid this problem, the farm operating results are evaluated according to their net value added (NVA) by the farm, which serves as a source for remuneration of the labour input, for of interest and rent payments, and, also the potential profit, which, in its turn, is a source for investment and development. In order to evaluate and compare the performance of farms that differ in size, a measurement net value added per annual work unit is used (NVA/AWU).

### 5.3 Results obtained

The output value, direct payment and net value added changes have been estimated for the Latvian farms with economic size over 1 ESU for following groups: Average farm, Field and mixed cropping, Grazing livestock, Pigs and poultry, and Mixed farms.

Average farm output value, as a result of the EU common market impact, is expected to increase in 2006 by 19% under Agenda 2000 scenario, and by 14% under CAP Reform scenario over 2001 level; and in the year to come, in 2010 and 2013, considering the decrease of intervention price for milk, a small decrease of value by 2% is expected under Agenda 2000 scenario and by 1% under CAP Reform scenario (table 5.7). The forecasted input price increase is 11%.

Table 5.7 Results for average farm in Agenda 2000 and CAP reform scenario, EURO

	2001	Agenda 2000		CAP reform	
		2006	2010	2006	2010
Output	11,967	14,238	13,990	13,588	13,516
Inputs	10,617			11,545	
NVA without subsidies	2,108	3,451	3,204	2,801	2,730
Subsidies (production linked)	574	3,774	4,949	3,774	4,878
NVA	2,682	7,225	8,153	6,575	7,608
NVA / AWU	1,407	3,792	4,278	3,451	3,993

Source: Author calculations.

An average farm net value added is expected to increase 2.7 times in 2006 and 3 times starting with 2010 under Agenda 2000 scenario, whereas the increase under CAP Reform scenario is slightly below 2.5 times and 2.8 times respectively, because the justified areas will be starting with 1 ha of agricultural land, which expands the group eligible to direct payments.

A notable increase in support to agriculture is expected after the EU accession: 6.6 times in 2006 and more than 8 times after catching up with the old member states in 2010. For the first time Latvian agriculture producers are eligible to LFA payments, which in year 2006 will contribute a half of the support received by an average farm (figure 5.1) or even more, because the share to be paid by the Latvian side depends on the budget; during the years to come the EU contribution share will increase, thus, the support will on a lesser degree depend on the budget and political decisions.

As a result of the EU CAP, though, in 2006 Latvian agricultural producers will be eligible to maximum 65% of the direct payments available to the old member states, the support will increase significantly (6.6 times), and 8.6 times starting with 2010 under Agenda 2000 scenario. Under CAP Reform scenario the increase in 2010 is not that big - the support calculation base changes with the introduction of area-related payment scheme, according to which all national envelope is divided by the area of land maintained in good agricultural condition. Consequently, the compensation for the decrease of milk price will be allocated not exclusively to milk producers: it will be equally distributed between all users of agricultural land irrespective of their specialization.

Grazing livestock farms (figure 5.2) and Pig and poultry farms (figure 5.3) will be the ones that are affected by the change of the base most of all.

The support received by Grazing livestock farms is expected to increase from 4.4 times to 6.0 times under Agenda 2000 scenario, and from 4.1 times to 5.2 times under the Reform scenario. Yet, it should be noted that the said support level will be guaranteed only starting with 2013; in the previous years it depends on the budget possibilities and the decisions by the Latvian politicians: in 2006 25% and in 2010 up to 30% of the total direct payments. Payments for operating in LFA build a considerable part of the support: in 2006 they make over 40% for Grazing livestock farms, and in the years to come about one-third of total support.

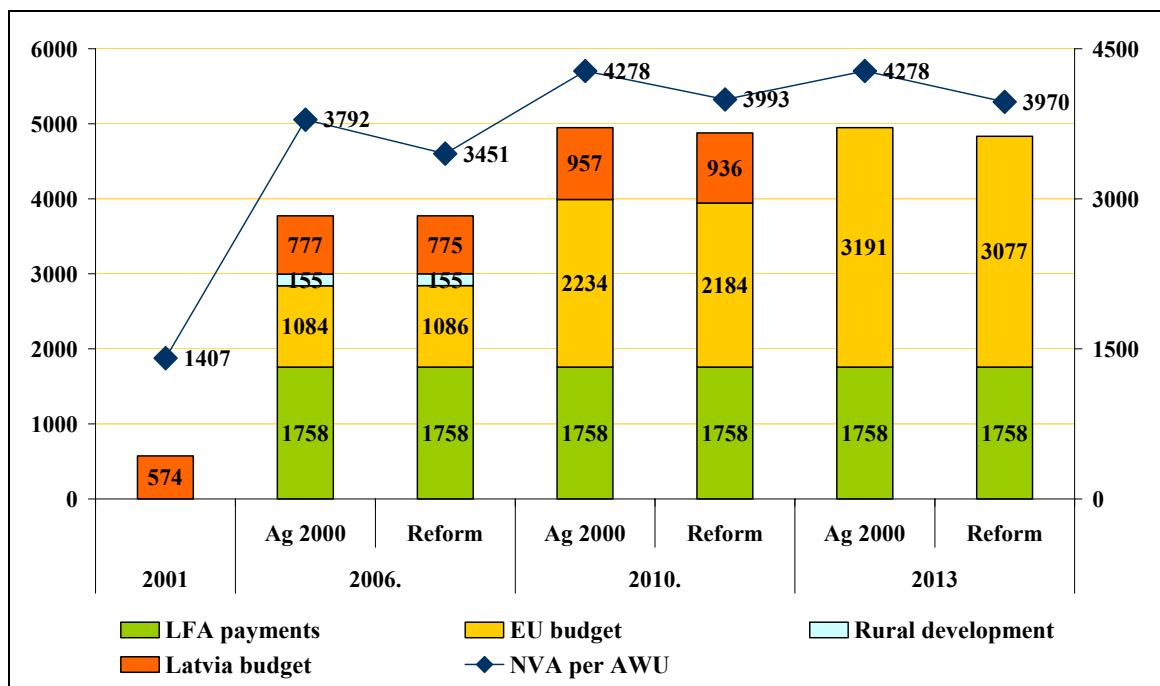


Figure 5.1 Support level, sources of financing and NVA per AWU: average farm 2001-2013, euro

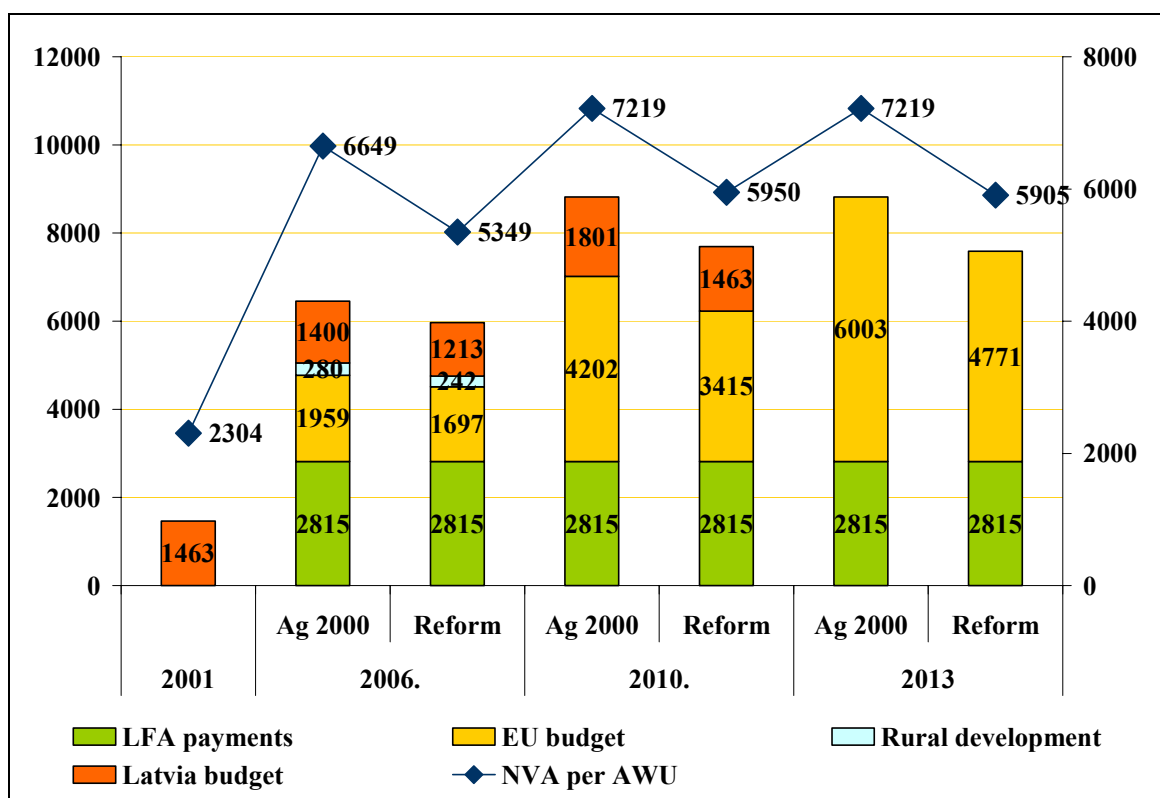


Figure 5.2 Support level, sources of financing and NVA per AWU: Grazing livestock farms 2001-2013, euro

Net value added in Grazing livestock farms drops significantly (by 20%) under the Reform scenario, which envisages a steeper decrease of milk prices compared to Agenda 2000 scenario, and the compensations locked in the total national package do not extend to these farms.

Pig and poultry farms income (net value added) will significantly reduce a result of the EU common market, because the pork and poultry prices might reduce, whereas the input prices might increase: in 2001 this farm group had the highest NVA per labour unit EUR 10903, than, as a result of the EU common market impact, under the Agenda 2000 scenario in year 2006 it will level out with Grazing livestock farms. However, this farm group will not have any material NVA/AWU changes in the forecast period, though it is the only farm group who will benefit of growth of support size as a result of the reform, because Agenda 2000 does not provide for direct payments for Pig and poultry farming, whereas in the case of Reform the support is paid per ha of land maintained in good agricultural condition.

The NVAV/AWU changes in the farms between the years 2006 and 2010 are described in figure 5.4. As a result of joining to the common EU market, the income will increase in all farm groups except for Pig and poultry farms. Field and mixed cropping

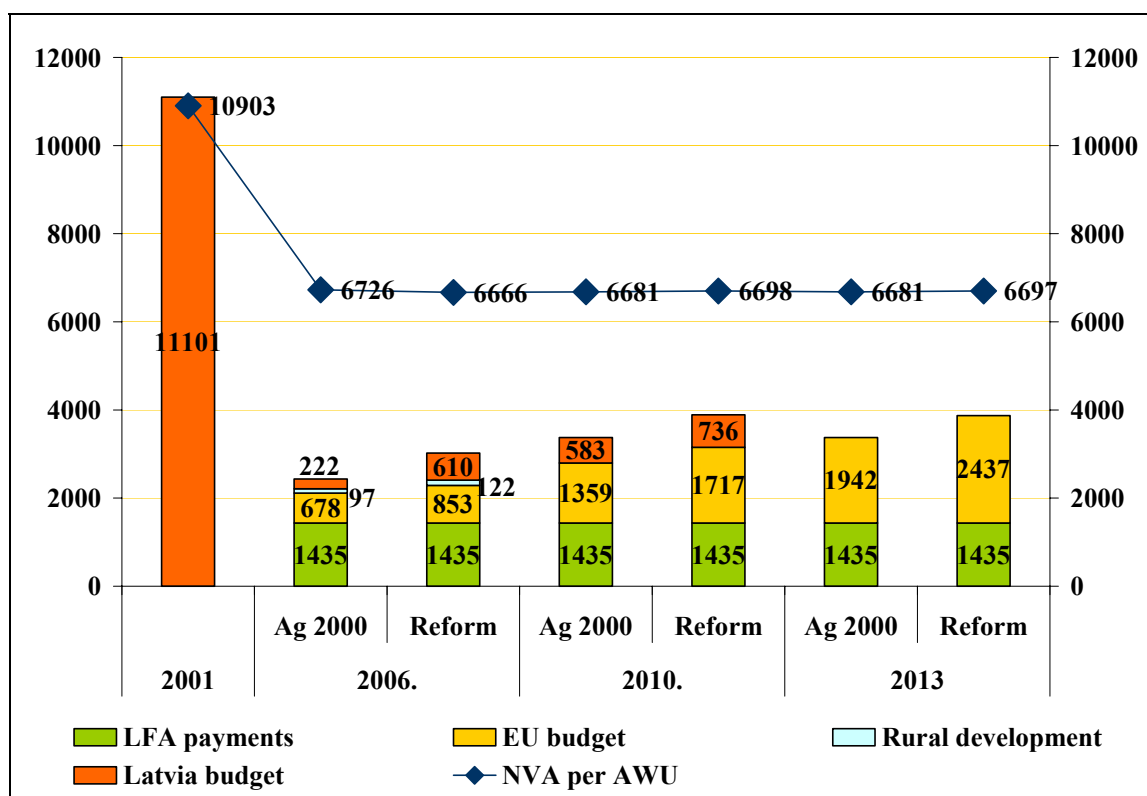


Figure 5.3 Support level, sources of financing and NVA per AWU: Pigs and poultry farms 2001-2013, euro

farms will experience the most changes, where NVA/AWU will increase from 3.1 to 3.8 times with practically no differences between the scenarios; yet, this farm group will have the lowest NVA/AWU. Mixed farms will demonstrate a slightly higher figure; Grazing livestock farms, compared with 2001, will demonstrate a growth by 2.8 to 3.1 times under Agenda 2000 scenario and by 2.3 to 2.6 times for the Reform scenario. If under Agenda 2000 scenario Grazing livestock farms have the highest NVA/AWU, then, under the Reform scenario it is Pigs and poultry farm group who demonstrate the highest figure.

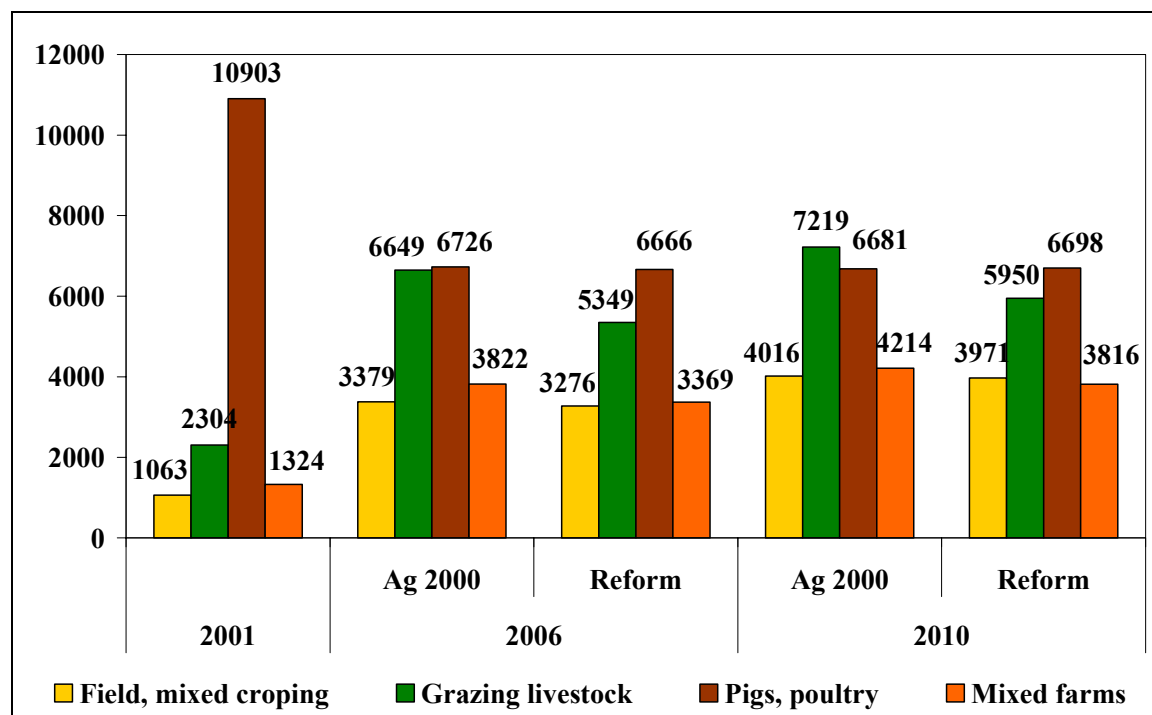


Figure 5.4 NVA per AWU in Latvian farms in Agenda 2000 and CAP reform scenarios 2001-2013, euro

Table 5.8 Modulation results

Farm types	Number of farms	Subject to modulation	%	Modulation result EURO
All farms > 1 ESU	57,388	7,226	13	2,486,138
including:				
- field, mixed cropping	25,053	3,892	16	1,494,365
- grazing livestock	1,829	563	31	195,610
- pigs and poultry	64	14	21	995
- mixed	30,442	2,754	9	795,168

Source: author calculations.

Starting with year 2013 the EU financed support rate is 100%, and modulation approach is applied to the Latvian farms as well - a support amount over EUR 5000 is reduced by 5%, and is channeled to the common fund to be used for the financing of rural activities, and the member state may retain up to 80% of these moneys. The modulation results are presented in table 5.8 out of 57,388 farms with economic size over 1 ESU, 13% fall under modulation; the aggregate amount of modulation fund is EUR 2.5 million.

Field and mixed cropping farms will be the most generous contributors to the farms - EUR 1.5 million, and 16% of farms will be a subject to modulation. Grazing livestock farms make the highest share - 31% - of the number of farms undergoing modulation; yet, these farms build only 3% of total number of farms. Therefore, the proceeds as a result of modulation are mere EUR 200 thousand.

Analyzing the impact of CAP Reform on farm groups in the period between 2006 and 2013, (figure 5.5 in 2006, figure 5.6 in 2010 and figure 5.7 in 2013), one can see that the steepest average NVA/AWU fall is in year 2006, EUR 341, while the received support amount practically does not change. In 2010 the changes are the least. In 2013, as a result of modulation, the support reduces, and, NVA reduces respectively.

Yet, the results may vary considerably between farms of different specialization: Grazing livestock farms are affected most by CAP Reform: NVA/AWU reduces by EUR 1300. Though NVA reduces for Field and mixed cropping farms as well, this farm group benefits from a small increase of support. Only Pig and poultry farm, under the Reform

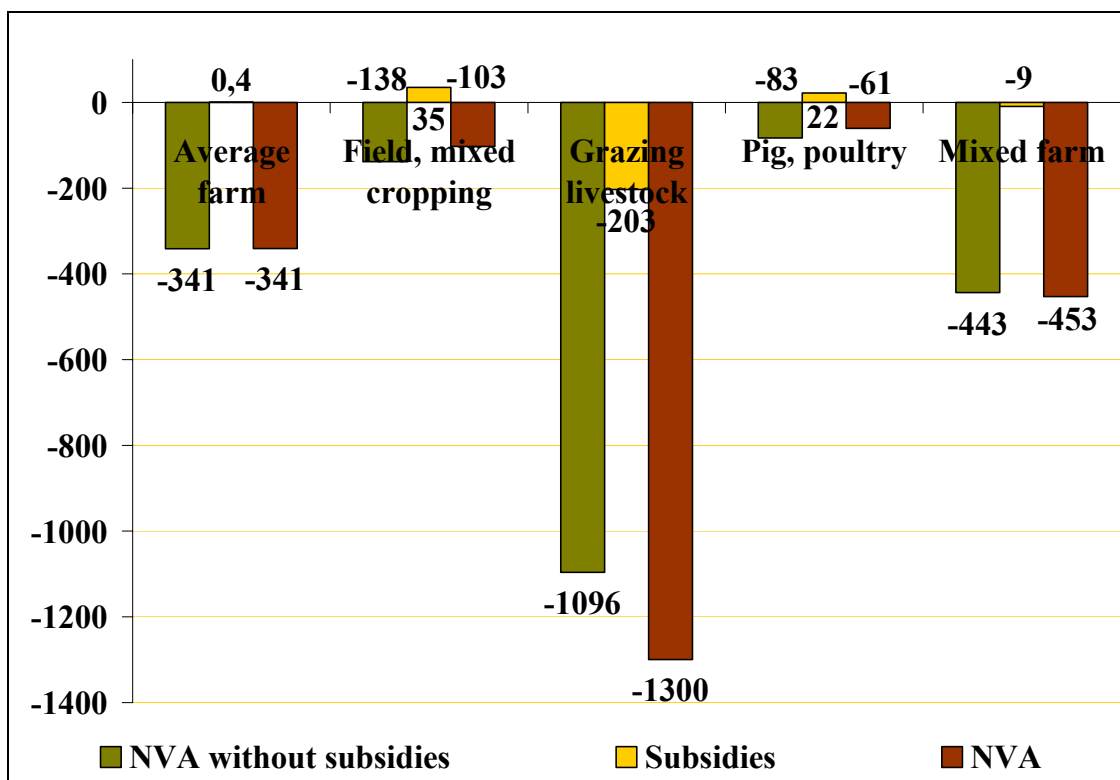


Figure 5.5 Impact of CAP reform to farms NVA and support level in 2006 per AWU, Euro

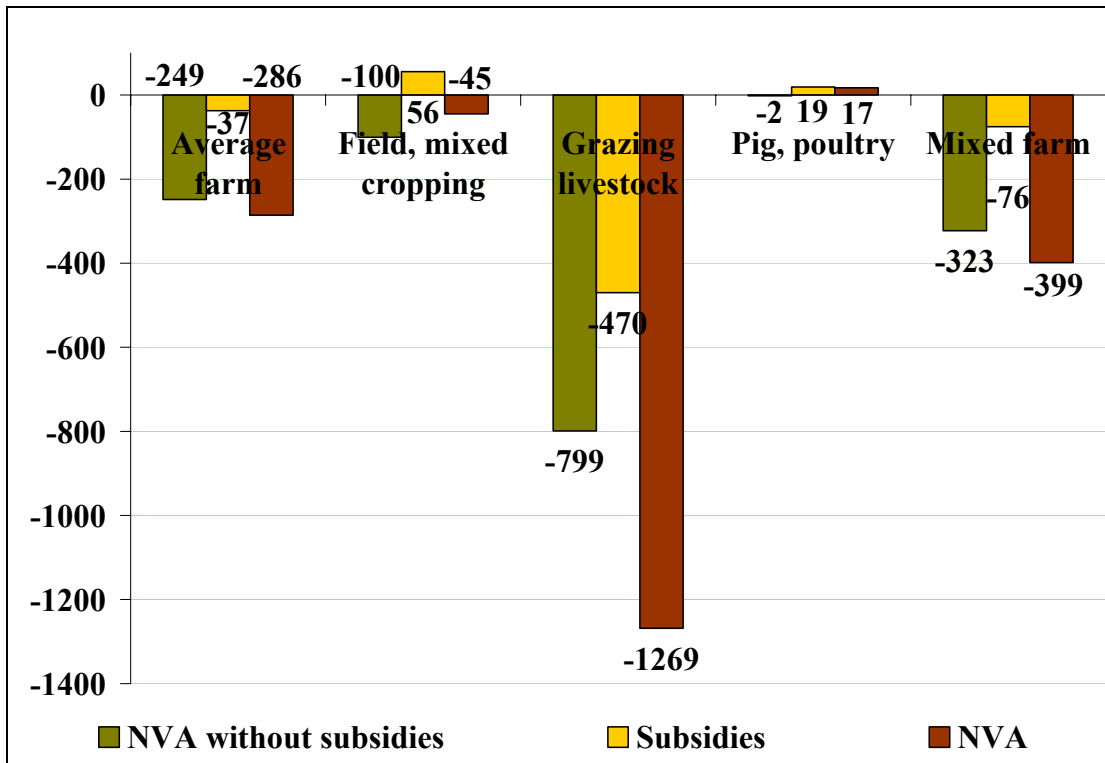


Figure 5.6 Impact of CAP reform to farms NVA and support level in 2010 per AWU, Euro

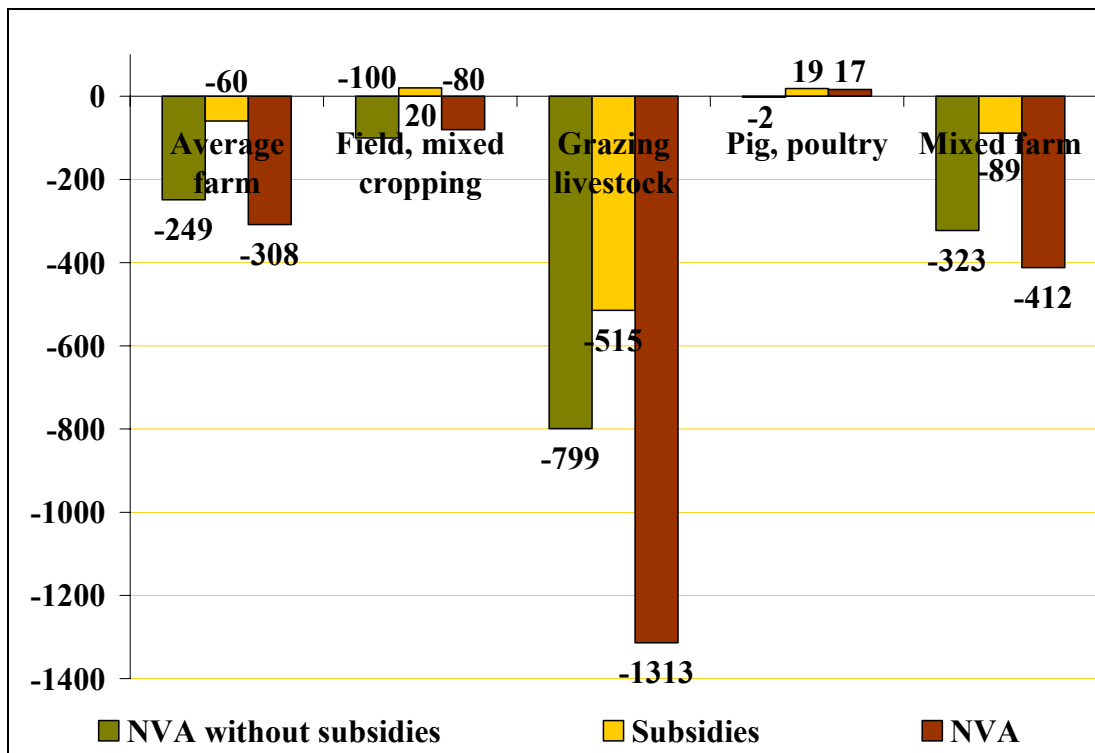


Figure 5.7 Impact of CAP reform to farms NVA and support level in 2013 per AWU, Euro

scenario, have a small increase in support and, starting with 2010, also a positive change in NVA. However, it should be taken into consideration that this is exactly the farm group to have a notable NVA decrease as an impact of EU common market, and the positive effect of the Reform is negligible.

#### 5.4 Conclusions

The exchange rate has a material impact on the results: the higher the EUR to LVL exchange rate, the more will agricultural producers benefit via direct payments and support for operations in LFA.

The forecasted income (net value added) increase, as a result of the EU common market and support, is expected to be about 3 times in average:

- 3.1 to 3.8 times in Field and mixed cropping farms;
- 2.3 to 3.1 times in Grazing livestock farms;
- a decrease in Pig and poultry farms - by about 61% compared to year 2001 level.

In 2001 Pig and poultry farms, demonstrated the highest NVA per labour unit amounting to EUR 10903, which exceeds that of Grazing livestock farms 4.7 times, while, as a result of the EU common market, this figure for both farm groups practically equalizes.

As a result of CAP Reform, the income is expected to reduce for all farm groups by 21% in 2006 and by 14% in 2010, except for Pig and poultry farms, and this is the result of single acreage payment - the direct payments are no longer related to production, but the entire national envelope has been distributed to justified area 1.47 million hectare of agricultural land maintained in good condition.

The Reform will have the highest effect on Grazing livestock farms, because it envisages a notable cut on dairy intervention price (for butter and skim milk powder), which has the largest effect exactly on this farm group: the compensation is locked in the national envelope and paid for land maintained in good agricultural condition irrespective of specialization.

Though, for most of farms the income is expected to increase, yet, the farm production and cost structure that is in place right now will fail to support a sufficient income level for Latvian agricultural producers even after the EU accession. Technical restructuring and increase of efficiency are mandatory prerequisites for assuring the competitiveness of Latvian agriculture in common EU market.

Decoupling of direct payments from production, and application of single acreage payment scheme without any extra payments might serve as motivation for the low efficiency farms to cease production in case the income will be lower than the costs of maintaining land in good agricultural condition.



## References

85/377/EEC, Commission Decision of 7 June 1985 establishing a Community typology for agricultural holdings, [http://europa.eu.int/comm/agriculture/rca/legalbasis\\_en.cfm](http://europa.eu.int/comm/agriculture/rca/legalbasis_en.cfm)

Josling T. After Cancún, *What Next for Agricultural Subsidies/EuroChoices*, Agri-food and rural resources, Volume 2, No.3 2003 - p.12-17.

Council Regulation (EC) No 1782/2003 of 29 September 2003 establishing common rules for direct support schemes under the common agricultural policy and establishing certain support schemes for farmers and amending Regulations (EEC) No 2019/93, (EC) No 1452/2001, (EC) No 1453/2001, (EC) No 1454/2001, (EC) 1868/94, (EC) No 1251/1999, (EC) No 1254/1999, (EC) No 1673/2000, (EEC) No 2358/71 and (EC) No 2529/2001.

Council Regulation (EC) No 1787/2003 of 29 September 2003 amending Regulation (EC) No 1255/1999 on the common organisation of the market in milk and milk products.

European Commission Directorate-General for Agriculture. Newsletter Special Edition July 2003. CAP reform summary: Proposals adapting CAP reform texts and Act of Accession: [http://europa.eu.int/comm/agriculture/capreform/enlarge/index\\_en.htm](http://europa.eu.int/comm/agriculture/capreform/enlarge/index_en.htm)

Jasjko D., A. Miglavs and D. Feldmanis, *The structural Changes in Latvian Agricultural Sector after Application of CAP Reform. / Proceedings of the International Scientific Conference. Economic Science for Rural development, Possibilities for rural Development in the Enlarged Europe*, Jelgava, No 5, 2004 - p. 25-34.

LR Ministry of Agriculture. Rural Development Plan for Latvia for Implementation of Rural Development Program 2004-2006. Riga, 2003 - pp. 85.

LR Ministry of Agriculture. Draft Law 'On Agriculture and Rural development' (draft prepared on 19.06.2003).

LR Ministry of Agriculture. The draft of 'Vienotā platības maksājuma ieviešanas kārtība Latvijā', pp. 7 (version prepared on 19.01.2004).

Operating results of Latvian agricultural producers in 2001 (Latvijas lauku saimniecību darba ekonomiskās analīzes rezultāti 2001). - Riga.: LVAEI. pp. 280.

Salputra G. and D. Jasjko, *Development of Latvian Agricultural Sector: Quantitative Assessment of the Accession Effects/Proceedings of the International Scientific Conference. Economic Science for Rural development, Possibilities for rural Development in the Enlarged Europe*, Jelgava, No 5, 2004 - p. 35-43.

Treaty of Accession (<http://www.kum.hu/eu/angol/aa00012.en03.doc>), [www.vm.ee/eng/euro/kat\\_308/3641.html](http://www.vm.ee/eng/euro/kat_308/3641.html), [www.euro.lt/sutartis/en/sutartis.htm](http://www.euro.lt/sutartis/en/sutartis.htm)

## 6. Use of micro data in policy analysis - the case of the 'mid-term review' of CAP

*Werner Kleinhanß*<sup>1</sup>

### 6.1 Introduction

This paper deals with a rather broad range of aspects: the distribution of farm and off-farm income, the share of subsidies on farm income and also its distribution. In the main section, impacts of policy decisions are discussed using the mid-term review (MTR) and the national implementation in Germany as an example.

Farm accounting data from the German national network (INLB) as well as from the EU (FADN) are used. Statistical methods, simulation approaches as well as mathematical (non-linear) programming models are used.

### 6.2 Distribution of income in farm households

Due to the increasing share of part-time farming in Germany, farm income alone is not an adequate indicator to describe the income situation. Off-farm income from different sources is included in the INLB, but only for single farms. This data is not available for enterprises organised as partnerships or legal entities, which are mainly represented in the East of Germany. Although data is available, rather intensive plausibility checks are required before using the data. Another problem is that off-farm income is usually taken from tax declarations which necessarily have a time lag. Although we have had access to national farm accounting data since 1995/96, we only use data from a constant sample of two years (2001/02 and 2002/03) because we have not yet implemented the new aggregation scheme of EU-FADN for the previous years. The sample of about 5,400 farms is about half of the whole network, representing about 130,000 farms (about half of the total of farms represented).

The distribution of farm and total income is shown by the Lorenz curves (see figure 6.1). Farm income is largely unequally distributed (2001/2002):

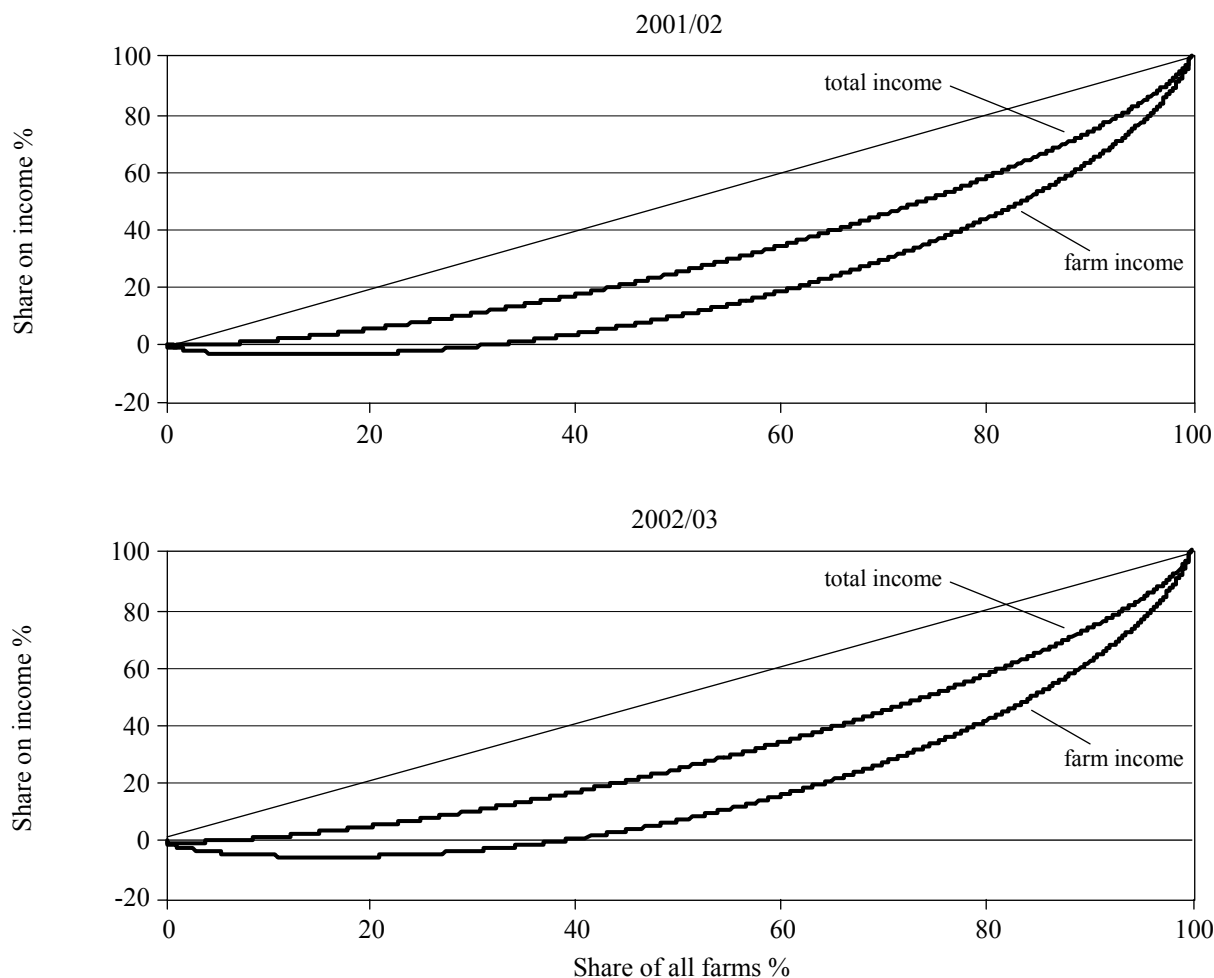
- about 20% of farms earn about half of the farm's income;
- for 30% of the farms, negative income is indicated (this share increased in 2002/03).

Due to off-farm income, the total income is more equally distributed:

- 40% of the farms earn 20% of total income;
- another 20% of farms earn 40% of total income;
- only 5% of farms have rather very low or negative total income.

---

<sup>1</sup> Institute of Farm Economics, Federal Agricultural Research Centre, Braunschweig, Germany.



Source: INLB, Sample of 5400 farms, representing 130000 farms.

Figure 6.1 Distribution of income in farms in Germany - 2001/02 (Lorenz curve)

It is worthwhile to look at the different sources of income by farm size and farming type (see figure 6.2). From the total income of the sample, 55% remains from farm income, 30% is off-farm income and about 15% from social transfers.

Compared to the average, income composition is different by farm size and types. Three farm groups of up to 100 ESU<sup>1</sup> almost have an income level in the average range. For the smallest sized farms, (up to 16 ESU), around 10% remains from farm income, while three-quarters are off-farm income. In the other group (<40 ESU), 40% remains either from farm or off-farm income respectively. In farms with <100 ESU, income composition is the reverse of the smallest group. Farms of >100 ESU show higher income levels. It must be mentioned that social transfers are almost constant for all farm groups.

<sup>1</sup> Economic Size Unit: 1 ESU = 1,200 euro.

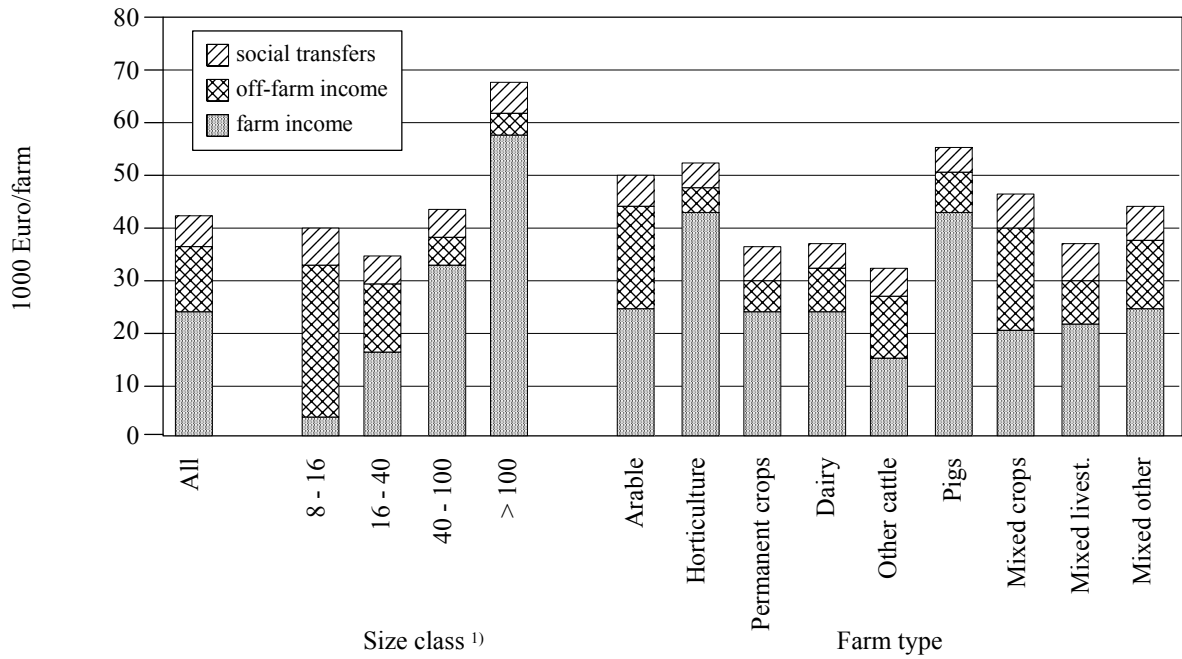


Figure 6.2 Structure of income by farm type or size 2001/02

1) 1,200 euro.

Source: INLB, Sample of 5,400 farms, representing 130,000 farms.

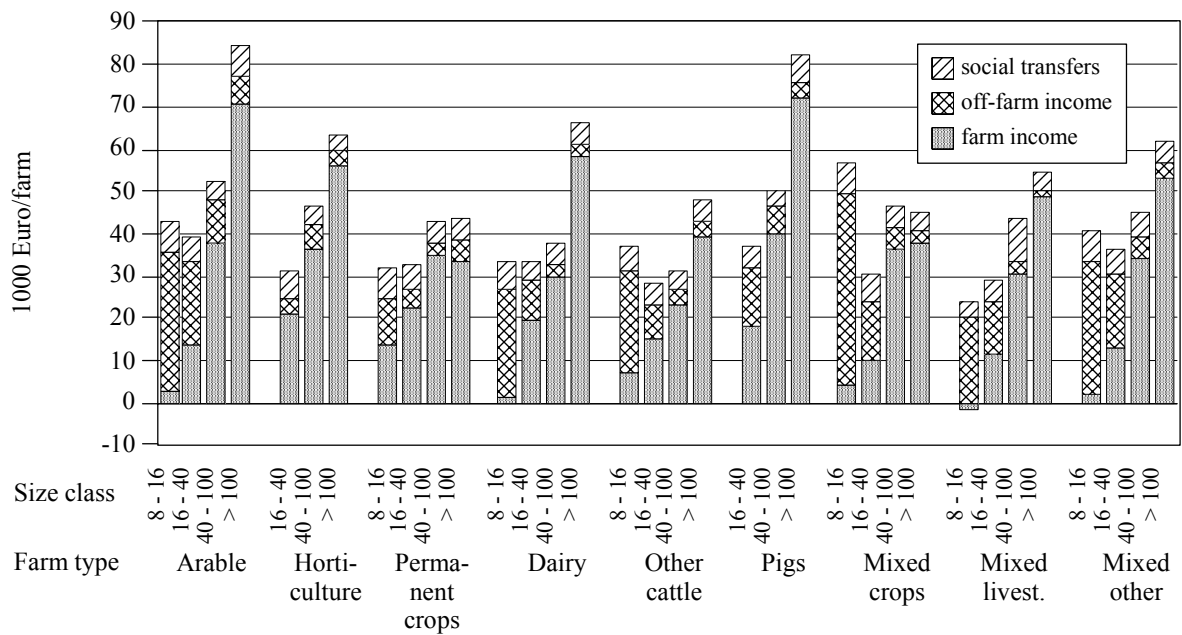


Figure 6.3 Income composition by farm type and size

Source: INLB, Sample of 5,400 farms, representing 130,000 farms.

There are also differences in income composition and total income by farm types (figures 6.2 and 6.3). Arable farms, horticultural farms, pig farms and parts of mixed farms show an above average income level, while permanent crops, dairy and other cattle farms are below the average. The ranking deviates from year to year. Due to price changes, the incomes of pig farms decreased in the succeeding year.

### 6.3 Distribution of subsidies respectively direct payments

During the reforms of CAP - reducing price protection and partial compensation with direct payments - direct payments became an important factor for the creation of income. The question of de-coupling is also of importance, but will be discussed at the end of this paper.

Referring to the above-mentioned sample, the level of subsidies is shown in figures 4.4 and 4.5. On average more than half of farm income remains from subsidies, thereof 70% from direct payments, 5% from subsidies on inputs and around 25% from other subsidies (including agri-environmental payments, less favoured area allowance and other Pillar-II measures). Direct payments are strongly correlated with farm size and differ by farm type.

- as more than 70% of direct payments are for arable crops, they are related to farm size;
- arable farms, other cattle and mixed farms show the highest level of direct payments, whilst for horticulture and permanent cropping farms the level is low.

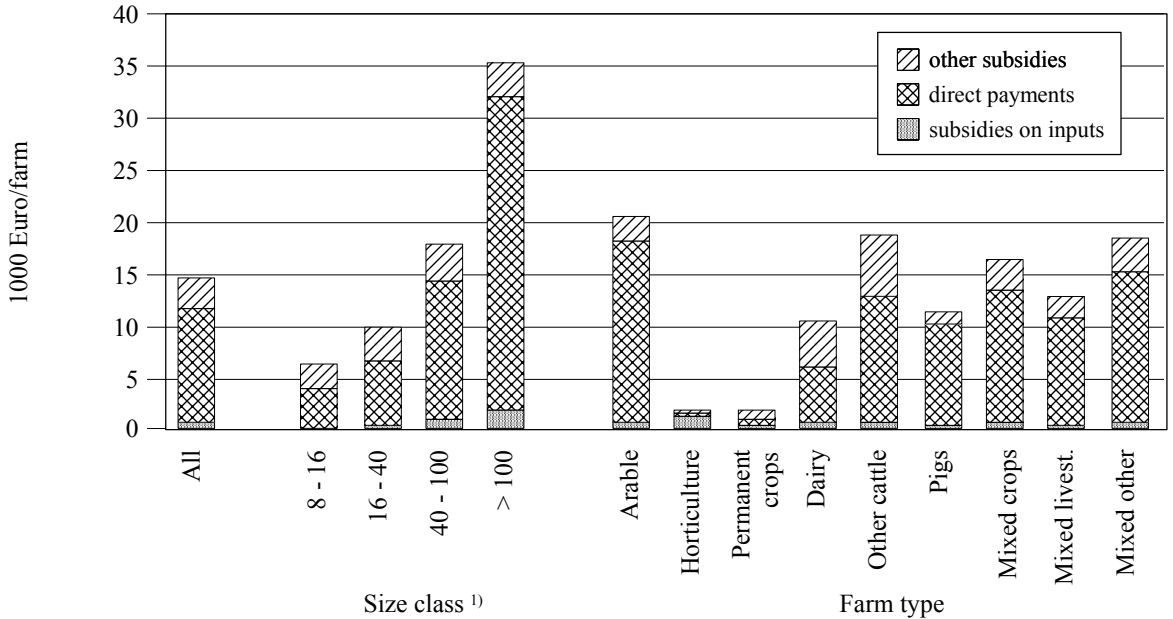


Figure 6.4 Subsidies by farm type or size 2001/02  
 1) 1,200 euro.  
 Source: INLB, Sample of 5,400 farms, representing 130,000 farms.

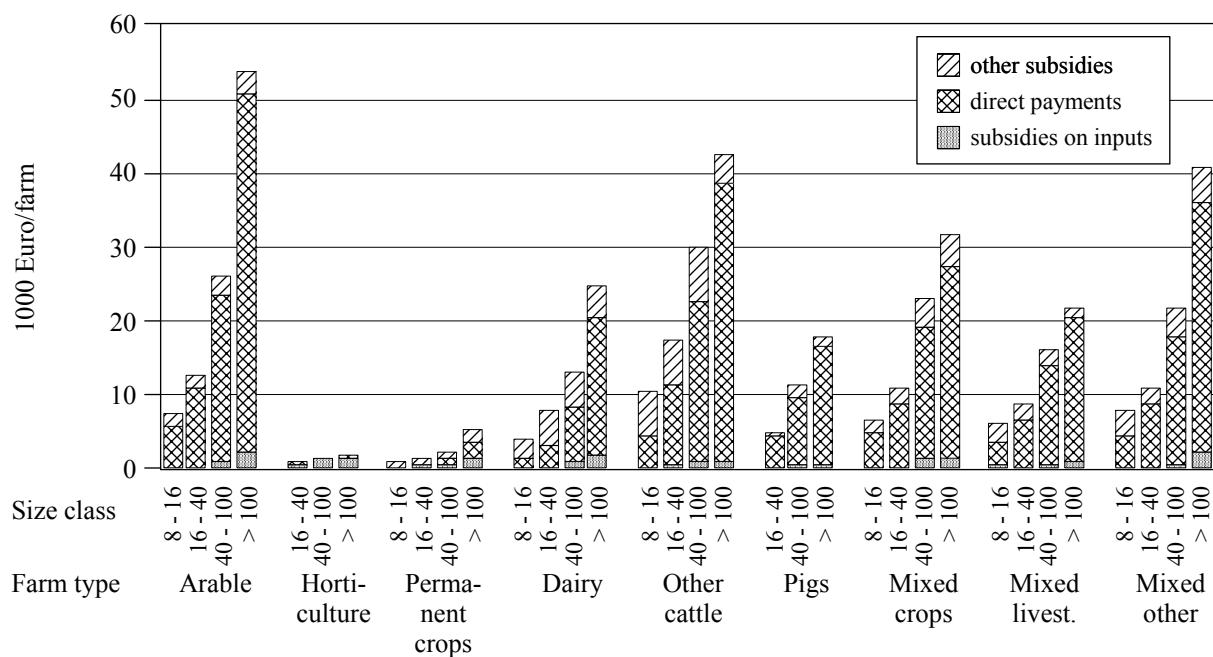


Figure 6.5 Structure of subsidies by farm type and size  
 Source: INLB, Sample of 5,400 farms, representing 130,000 farms.

Distribution of *direct payments by EU Member States* is shown in figure 6.6, based on a projection for 2006. Also, the distribution of farms related to the level of direct payments is shown. In the EU, about half of farms get less than 3,000 euro of direct payments due to small farm structure, especially in the South. Only 5% of farms get more than 50,000 euro.

Directs payments are unequally distributed. There is

- a high share of direct payments in farms getting more than 50,000 euro in Germany, the UK and France;
- a high share of direct payments below the franchise within the modulation scheme (5,000 euro) are found in Greece, Portugal, Italy, but also in the Netherlands; this share of direct payments will be excluded from modulation.

Based on these graphs impacts of modulation can be assessed. Modulation is aiming at a transmission of parts of direct payments from Pillar-I towards Pillar-II of CAP. Further, the payment level per farm will be influenced by a franchise (excluded from reductions of premia), capping of premia beyond a ceiling or modifying the premium level with regard to labour input, size and income (as in the former French scheme). Referring to the proposals of the MTR, reduction of direct payments by modulation is shown in figure 6.7.

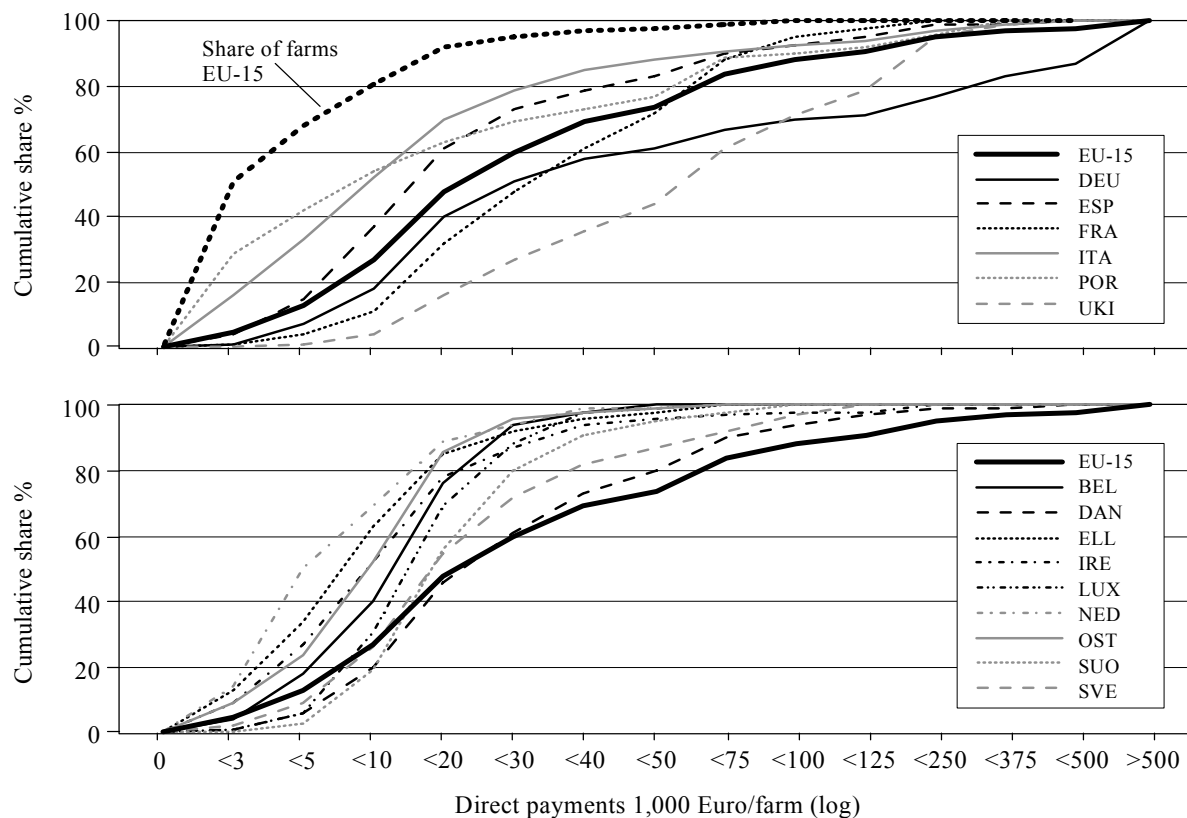


Figure 6.6 Distribution of direct payments in EU-15

Source: Own calculations on base of INLB-EU-GD AGRI/A.3, 1999/2000.

With reference to the position paper of the Commission, it can be mentioned that capping leads to strongly differentiated effects between both the farms and the member states:

- in the first year, direct payments would be proportionally reduced by 3%, while the premiums above the capping level would be reduced by 100%. On average, premium would be reduced by one third in farms affected by capping;
- since in the European Union about four percent of the farms would be affected, while about 45% of the premium volume affected by capping remains in the East of Germany; farms in this region would mainly be affected.

The option of capping was cancelled in the legislative proposal. The effects of modulation for the East of Germany would therefore be smaller despite the suggested premium shortening of up to 19% under conditions of the legislative proposal. The final decision (3-5% reduction of direct payments beyond the franchise) has no such consequences, and it has lower distribution effects by farm types, size and regions. Nevertheless, it is of interest of some policy makers to 'modulate' direct payments also with regard to working units, etc., and, last but not least, to reduce or to transmit direct payments from Pillar I towards Pillar II.

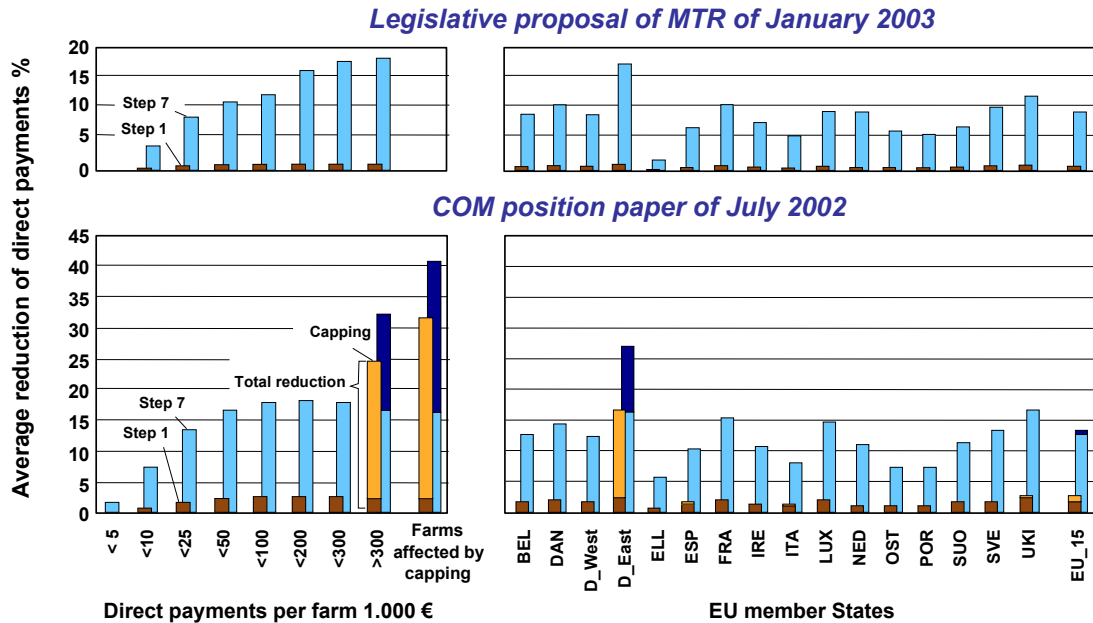


Figure 6.7 Impacts of different proposals on modulation of direct payments  
 Source: Own calculations on base of INLB\_EU\_GD AGRI/A 2, Wj 1999/2000.

#### 6.4 Policy impacts of MTR and its national implementation on farm income and income distribution

It is always clear that the Luxembourg decisions for price policy measures can be seen in the light of a review. Rather far reaching decisions were made with regard to de-coupling, and also the obligatory modulation of direct payments. Beside the standard model of de-coupling, the 'Single Payment scheme' (SP), Member States will have different options of national implementation:

- the regional implementation based on § 58 of the regulation (Rat der Europäischen Gemeinschaften, 2003), which means that instead of the individual farm premium level of a reference period, entitlements can be calculated on the basis of regional premia plafonds, which must be related to land, so that unified hectare-based entitlements remain;
- the partial de-coupling of arable crops and in the livestock sector (besides milk premium);
- both systems can be combined.

The German Federal government and most of the Laender are in favour of a so-called 'Kombimodel' (BMVEL, 2004). It will be introduced stepwise between 2005 and 2012, starting with regionally differentiated premia for arable land, grassland (lower level) and individual farm premia (based on milk premia, special headage premia, etc.), ending in unified entitlements for agricultural land (differentiated by Laender). The Danish scheme is comparable with the first step of the German one.



The German system will have large distribution effects by regions, farm types, intensity, etc., especially in its final stage (Kleinhanss, 2003). They can neither be identified at the sector level, nor on the basis of the Lorenz curves shown in figure 6.8. The latter indicates a largely unequal distribution of direct payments mainly due to large sized farms in the East of Germany.

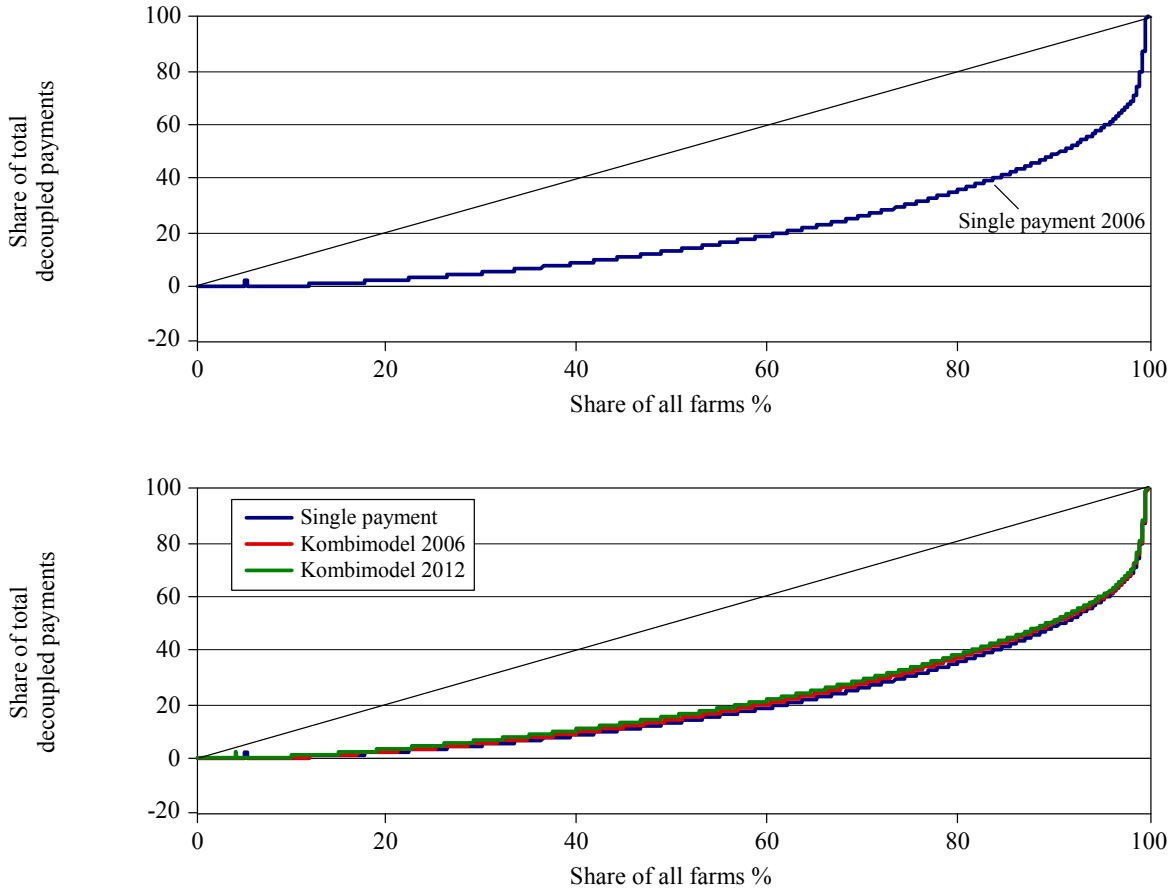


Figure 6.8 Distribution of decoupled payments under MTR in Germany (Lorenz curve) - projections without Modulation

Source: INLB 1999/2000, 10,800 farms, representing 250,000 farms.

Direct payments at the county level, which are projected on the basis of INLB data, are shown in figure 6.9 for both the Single Payment scheme and the Kombimodel. In the first case, rather high payment levels can be seen in the northwest and the southeast due to a high concentration of bull finishing and milk production. The Kombimodel reduces the variances in premium levels between the regions. There are a large number of winners and losers even at the regional level.

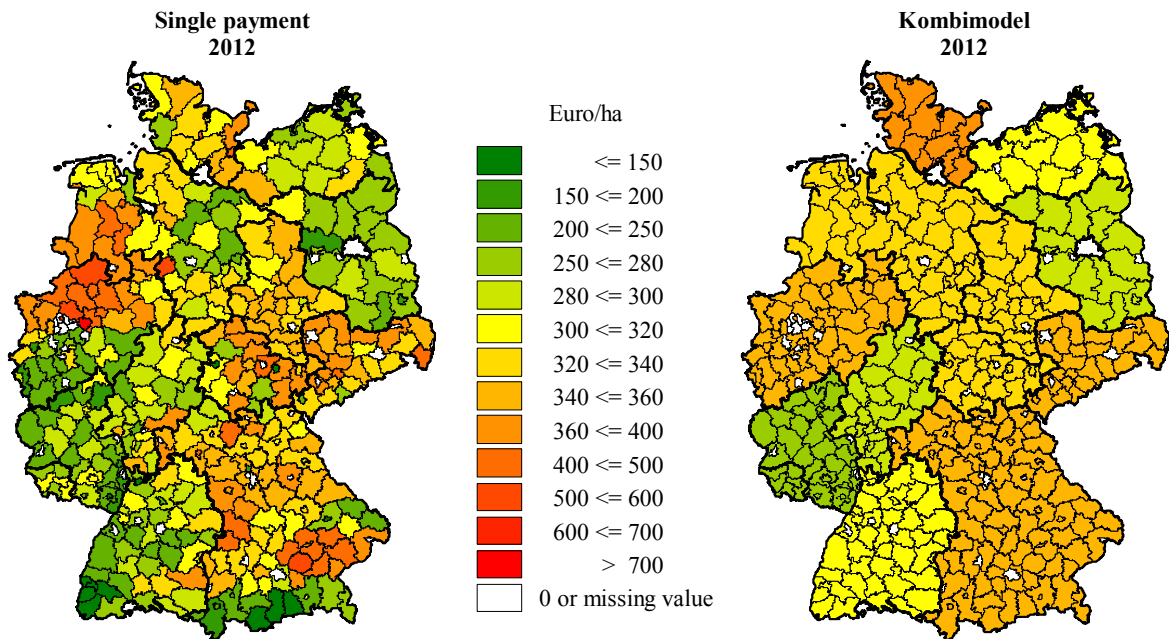


Figure 6.9 Single payment versus Kombimodel

Figure 6.10 shows, that on average, farms with milk production will profit by around 4% higher premia. Farms with suckler cows will profit in the first period, while they will lose in the latter period. Farms with bull finishing will lose about 10% of their premia. On the other hand, farms with sugar beets, which were not yet affected by CAP reforms, will gain, as long there is no reform of the market regime for sugar.

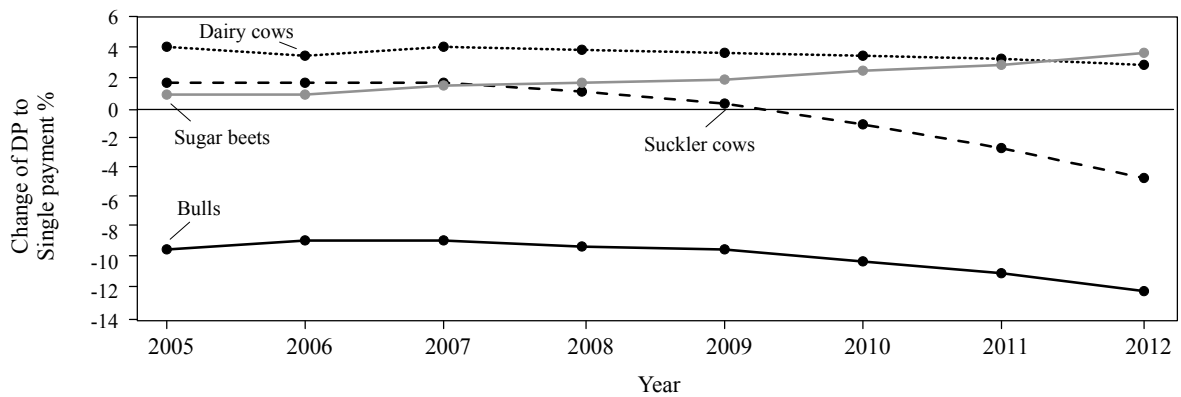


Figure 6.10 Change of direct payments (DP) by the 'Kombimodel' on the average of farms with ...  
Source: FARMIS, own calculation based of BMVEL-INLB.

Changes of direct payments depend largely on the intensity or concentration of production. Figure 6.11 shows, that dairy farms with low levels of milk production per hectare of grassland will gain, while farms with high milk production per ha will lose up to 20% of direct payments in the final stages of the scheme.

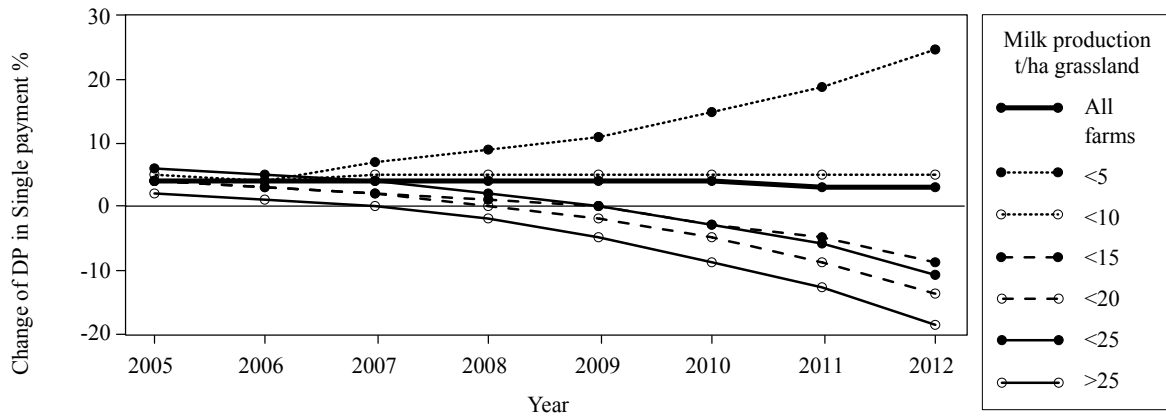


Figure 6.11 Change of direct payments by the 'Kombimodel' in farms with dairy cows  
Source: Own calculation based of BMVEL-INLB.

*MTR impacts* on land use, supply, income and income distribution, as well as impacts on rental values for milk quotas and land are assessed for both the single payment scheme and the Kombimodel. A non-linear optimisation farm group model, representing the German farm sector, is used. 430 rather homogeneous farm groups are built based on INLB (Jacobs, 1998; Bertelsmeier, 2004; Kleinhanss et al., 2003). Scenarios are defined for 2010, assuming a full implementation of policy measures. A projection of Agenda 2000 is used as reference. Therefore we do not run the model for the phasing-in period.

#### Impacts on land use and production

Changes of land use and crop production are affected by the following policy changes:

- abolition of rye intervention;
- lower demand for roughage fodder as a result of adjustments in beef production due to de-coupling;
- de-coupling of direct payments.

Cereal production will be reduced by 8%, mainly resulting from a decrease in rye production of more than 20% and a higher set aside in less favoured areas (table 6.1). The reduction of food-oilseeds by four percentage points is based on the fact that it loses competitive ability under de-coupling, particularly in low yielding regions. The existing premium incentive for *silage maize* is waived out via de-coupling. It will be partially substituted for by less intensive field fodder crops. There will be no significant increase of set-aside, but a greater fallow of arable land.

Table 6.1 Impacts of MTR on production and income on the average of farms represented (2010, milk price -15%)

Scenarios		Reference	Single payment	Kombimodel
<i>Activities/relative change %</i>				
Cereals	ha/%	27	-9.3	-7.5
Rye	ha/%	3	-23.7	-21.8
Protein crops	ha/%	1	-13.5	-11.9
Oilseeds a)	ha/%	5	-0.7	0.3
Set aside b)	ha/%	3	0.2	0.6
Silage maize	ha/%	4	-7.2	-3.5
Other arable fodder	ha/%	3	31.4	29.8
Sugar beets	ha/%	1	3.0	3.4
Potatoes	ha/%	1	2.8	4.4
Grassland	ha/%	15	-0.1	1.3
UAA	ha/%	56	-1.4	0.3
Grassland fallow	ha/%	0	-0.2	0.0
Fallow arable land	ha/%	1	152	4
<i>Livestock production/relative change %</i>				
Milk	t/%	103	-0.2	0.0
Beef	t/%	4	-13.7	-13.5
<i>Income/relative change %</i>				
Direct payments	Tsd. EUR %	16.9	5.5	3.2
NWSF c)	Tsd. EUR %	27.8	1.2	-0.3

a) Without non-food rape; b) Including non-food rape; c) Net value of factor costs.  
Source: FARMIS, own calculations based on BMVEL-INLB.

The strongest adjustment reactions can be found in *beef production*, although no specific price-policy measures were introduced (see figure 6.13). Bull fattening and suckler cow holding, previously favoured by high production-related premiums, will be reduced under a de-coupling scheme. Bull fattening will be reduced by 26% on average, whereby the adjustments in the north and south will rather be below the average. The number of suckler cows will go down by 19%, whereby the adjustments in the north and the centre are substantially more pronounced than in the other regions.<sup>1</sup> Beef production will be stabilised by the constant supply of cow meat as well as the expansion of heifer fattening, which is why the relative change are less pronounced (-14%) than that of bull meat. The adjustment reactions occur although a rather favourable development of beef prices is assumed.

<sup>1</sup> If agri-environmental measures with a minimum cattle density are applied, suckler cow holding could be stabilised (agri-environmental measures are not specified in the model). The compensatory allowance for less favoured areas, considered in the model as area premium, has no obvious effect on suckler cow production.

In contrast to beef, *milk production* will not be reduced despite de-coupling of the milk premium under condition of 75% price transmission (Bertelsmeier et al., 2004). The main changes in the milk sector are the following (see figure 6.12):

- increasing quota trade and re-allocation of milk production from small farms towards the larger ones;
- significant decrease of the quota price due to lower milk price and the de-coupling of milk premia (which will be shown later).

A final conclusion is that the scope and allocation of production will be significantly influenced by de-coupling as long there is a total de-coupling, but the type of de-coupling, either Single Payments or the Kombimodel, will not induce significantly different allocation effects.

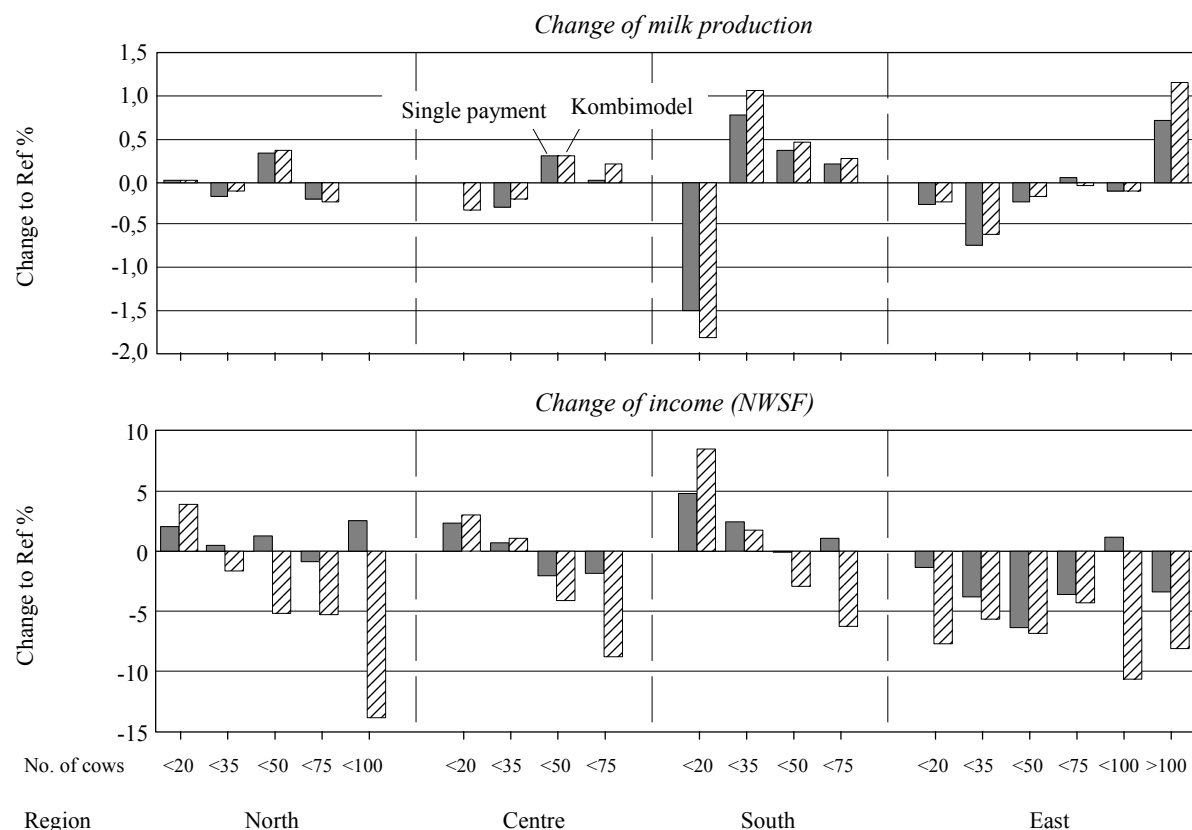


Figure 6.12 MTR impacts in farms with dairy cows (milk price -15% including quota trade)

Source: FARMIS, Kleinhanß/Hüttel FAL-BW.

### Impacts on income and income distribution

The two schemes will, however, have different impacts on incomes. The net-value added at factor costs (NWSF) is used as an income indicator in the following. On average, there will

be a small increase of income of 1% under conditions of the Single Payment scheme, while for the Kombimodel, income will not change at all.<sup>1</sup>

Impacts on *income distribution* can only be identified on a rather disaggregated level. Figure 6.12 shows income changes in farms with dairy cows, differentiated by the number of cows and regions:

- under the Single Payment scheme, there will be a slightly increase in income in small farms (West) mainly due to higher beef prices, and decreasing incomes in the East due mainly to modulation;
- as a result of the Kombimodel, positive income effects can be expected by small farms (West) due mainly to higher beef prices, but increasing income losses with increasing farm size (number of cows) and intensity (milk production per hectare of roughage area).

Income effects for farms with beef fattening are shown in figure 6.13.

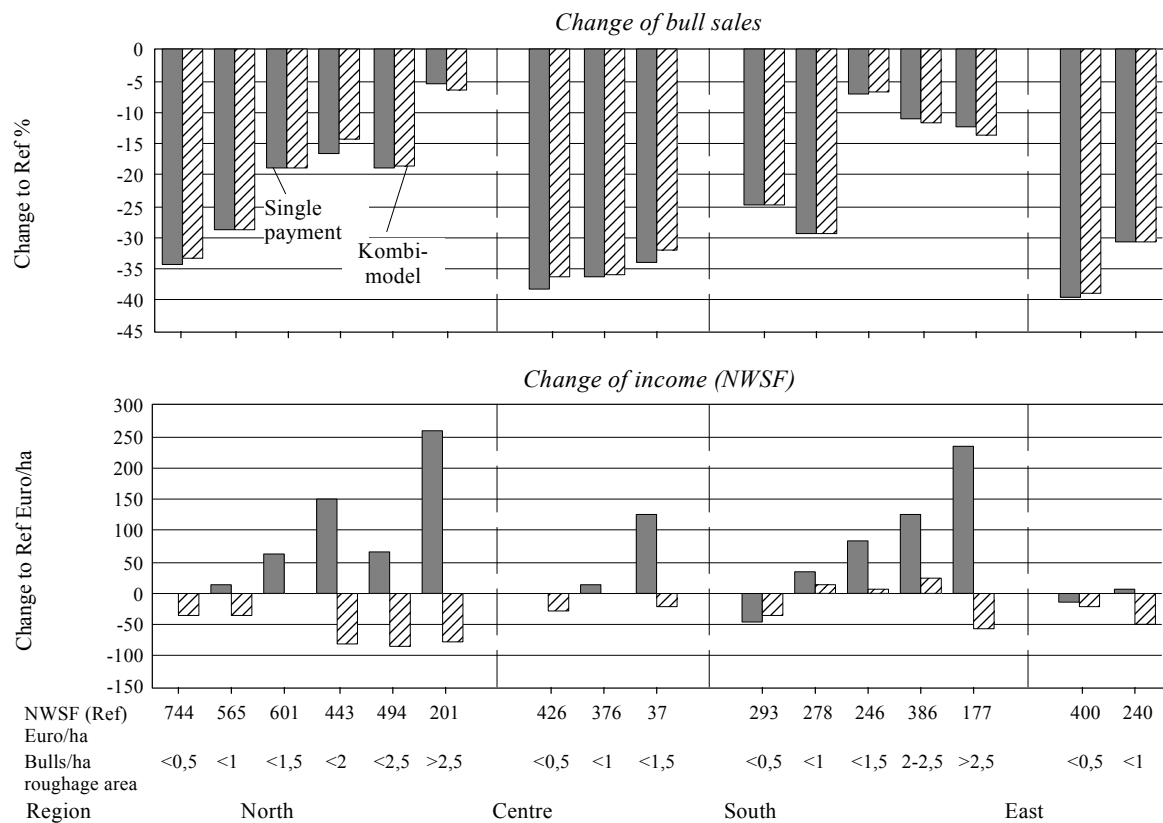


Figure 6.13 MTR impacts in farms with fattening bull (>10 Bulls, milk price -15%)  
Source: FARMIS, own calculations on base of INLB.

<sup>1</sup> The slightly lower income level is mainly influenced by the fact that entitlements for the Kombi-model are derived from statistical data base, while INLB date are not at all consistent to them.

- Under the Single Payment scheme income increases with livestock density mainly due to increasing beef prices, but also due to farm adaptations. Even if the number of beef cattle is reduced, the latter does not affect the premium level.
- Under the Kombimodel, premium reductions are so high, that the above-mentioned income effects are not only neutralised, they are even higher, meaning negative income effects remain in farms with a high density of beef production.

*Impacts on rental values for milk quota and land*

Price policy measures and de-coupling will also affect values of land and quota. Referring to this question, the farm group model has been extended to deal with quota trade and renting-in/out of land with/without transmission of entitlements (Bertelsmeier, 2004).

Figure 6.14 shows that rental values for milk quotas will decrease more than half due to the reform. Changes of quota prices are mainly influenced by the level of lowered milk prices under conditions of de-coupled payments (which do not influence producer incentive prices). They are not influenced much by the type of de-coupling.

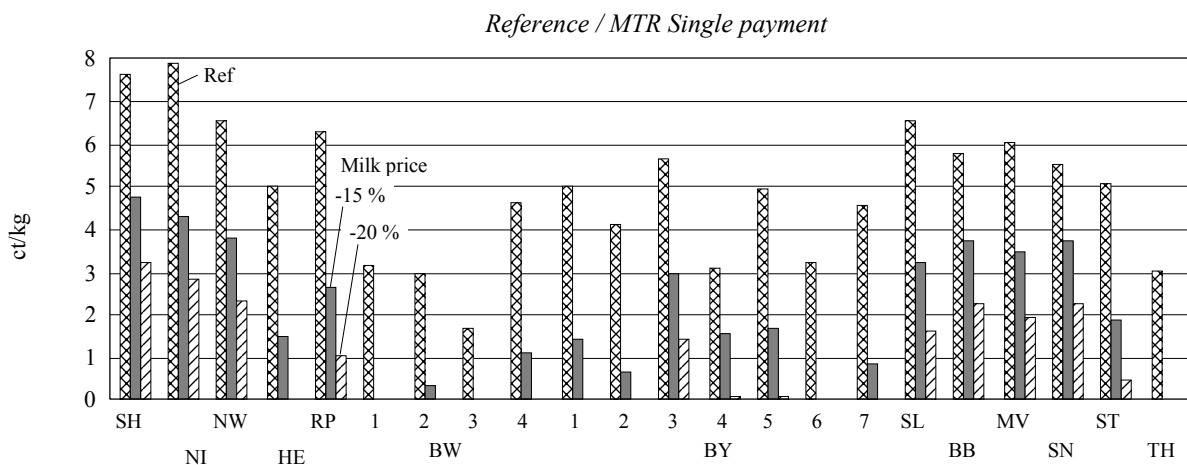


Figure 6.14 Equilibrium prices of milk quota in German trade regions  
Source: FARMIS, Kleinhanß/Hüttel FAL-BW.

*Rental values for land* will be influenced as follows (figure 6.15):

- under the Single Payment scheme, rental prices will go down for arable land and grassland, but much less for the latter ones;
- under the Kombimodel, rental prices for arable land will reach the rather high level of the reference or even increase. For grassland, rental values will increase drastically. The main reasons are that there is almost no land free of entitlements, and the premium level, especially for grassland, is much higher than present rental prices.

Finally it can be concluded, that beef and dairy farms with above average level of intensity will be affected most. Income losses are so high, that investments and farm

developments might be negatively affected. This could be avoided by a scheme like the Danish one, which is comparable to the first step of the German Kombimodel.

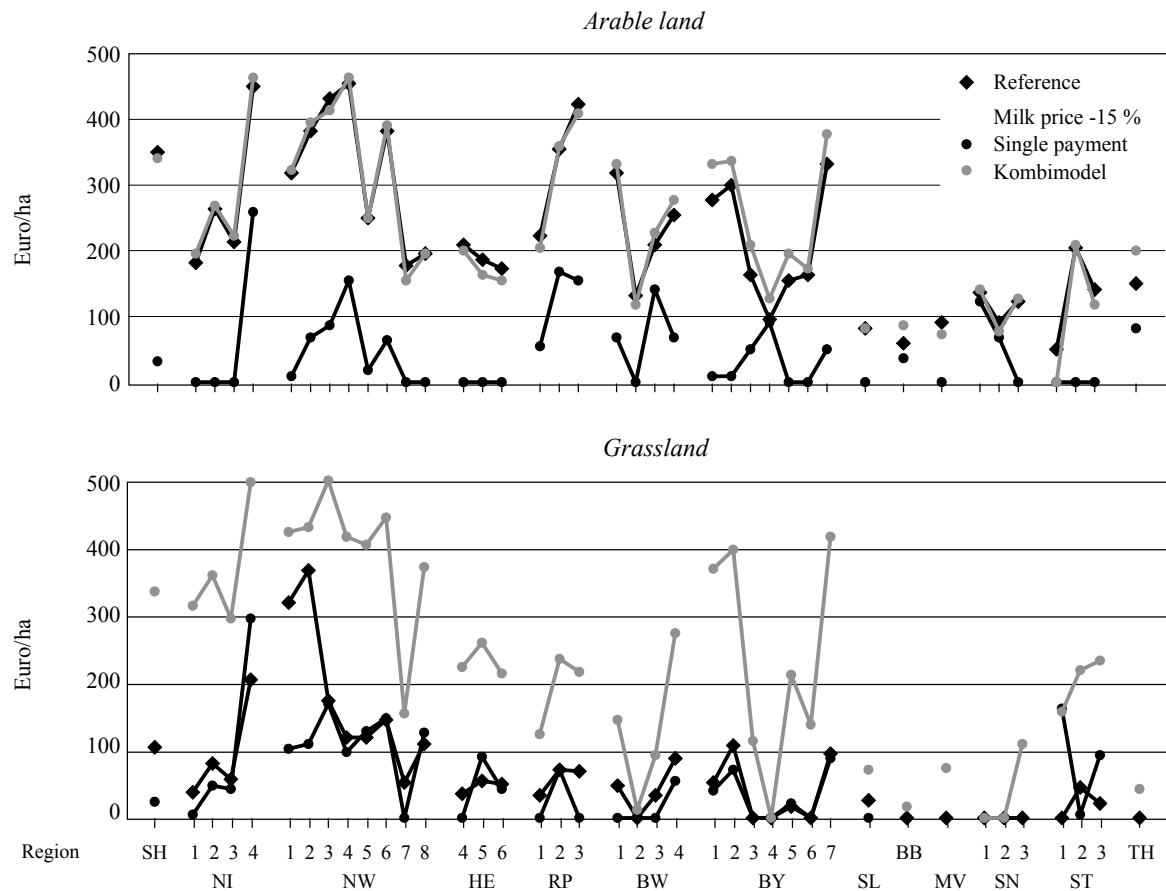


Figure 6.15 Impacts of decoupling on rental value of land at regional level  
Source: FARMIS, Kleinhanß/Hüttel FAL-BW.

## 6.5 Conclusions

Conclusions to the subject under consideration are:

- individual farm (accounting) data is required for the analysis of farm income and distribution effects of policy reforms. Data is not at all valid for other income sources (off-farm income, social transfers), which became more important due to structural changes and economic development;
- different methods are required to deal with these questions. Disaggregated farm models, embedded in a network of micro and macro models, are needed to assess impacts of drastic policy changes such as total de-coupling or the distribution effects of policy intervention like capping premia within modulation or the implementation of de-coupled payments as in Germany;



- another experience gained is that policy measures are tailored in such a way that rather moderate income effects at sector level remains; otherwise it would be politically difficult to obtain majorities at the EU level. Nevertheless, distribution effects should not be forgotten;
- farmers are able to adapt farm organisation with respect to changing economic conditions. But there are restrictions in farm adaptation, so that negative economic effects could remain. This will especially true for rather radical policy changes in the short term.

### *References*

Bertelsmeier, M., *Wirkungen von direkten Transferzahlungen auf Boden- und Quotenmärkten sowie Abschätzung von Überwälzungseffekten*. Endbericht zum Forschungsauftrag des BMVEL, Institut für Betriebswirtschaft der FAL, Braunschweig (unpublished), 2004.

Bertelsmeier, M., W. Kleinhanss and F. Offermann, *Rahmenbedingungen und Folgen unterschiedlicher Milchmarktpolitiken in Nordrhein-Westfalen*. Studie im Auftrag des Ministeriums für Umwelt- und Naturschutz, Landwirtschaft und Verbraucherschutz des Landes Nordrhein-Westfalen. Institut für Betriebswirtschaft der FAL, Arbeitsbericht 04/2004. [www.bw-fal.de](http://www.bw-fal.de), 2004.

BMVEL (Bundesministerium für Verbraucherschutz, Ernährung und Landwirtschaft), *Entwurf eines Gesetzes zur Umsetzung der Reform der Gemeinsamen Agrarpolitik*. [www.verbraucherministerium.de](http://www.verbraucherministerium.de), 2004.

Jacobs, A., *Paralleler Einsatz von Regionen- und Betriebsgruppenmodellen in der Agrarsektoranalyse*. Schriftenreihe des Bundesministeriums für Ernährung, Landwirtschaft und Forsten, Angewandte Wissenschaft, Heft 470, 1998.

Kleinhanss, W., *Verteilungseffekte regionaler Acker- und Grünlandprämien im Vergleich zur Betriebsprämie*. *Agra Europe* <Bonn> 44(41), 2003.

Kleinhanss, W., M. Bertelsmeier, D. Manegold, F. Offermann, B. Osterburg and P. Salamon, *Folgenabschätzung der Legislativvorschläge zur Halbzeitbewertung der Agenda 2000*. Braunschweig: FAL, 105 p Arbeitsbericht 3/2002 des Instituts für Betriebswirtschaft, Agrarstruktur und ländliche Räume, 2003.

Rat der Europäischen Gemeinschaften, Verordnung (EG) Nr. 1782/2003 des Rates von 29. September 2003. Amtsblatt der Europäischen Union, Nr. 270/1-69. Luxemburg, 2003.

## 7. Farmers income distribution and subsidies: Product discrimination in direct payment policies for continental and mediterranean agriculture

Ricardo Mora and Carlos San Juan <sup>1 2</sup>

### *Abstract*

In this paper we propose an index to evaluate how egalitarian the direct payment policy in the European Common Agricultural policy is. Our index can be suitably defined to incorporate flexible definitions of egalitarian income support objectives. In the empirical illustration, we present strong evidence of discrimination against Mediterranean versus Continental farming for sensible definitions of equality in the ex-post distribution of per capita income, a result in line with the existing literature. In addition, we also show that, within these two types of farms, smaller and more labor intensive farms are discriminated. If land value is introduced in the objective function of the policy maker, then no discrimination against Mediterranean farming can be observed. However, the result on the discrimination for smaller farms (both in terms of their land value and in terms of their economic size) and for labor intensive farms (both in terms of working hours and units of labor) still holds.

*Key Words:* Direct payments, Income distribution, CAP reform, favoritism.

### **7.1 Introduction**

This paper's main motivation is the measurement of the unequal distribution between farmers of direct payments which arises because of the European Common Agricultural Policy (CAP). The CAP's recent reform proposals imply a sharp increase in the role of direct payments as a tool to support farm income without disturbing international markets. From 1990 until 2001, direct income payments in the European Union jumped from 6.4 per cent to 19.9 per cent of total Gross Value Added at basic current prices, an astonishing 311.4 per cent increase. In the new CAP, the vast majority of subsidies will be paid independently from the volume of production. In 2001, direct income programs entailed 19.9 per cent and 20.0 per cent of total Gross Value Added at basic current prices in the European Union and Spain respectively and the figure is expected to increase.

In this paper we propose a very simple approach to measure the unequal distribution between farmers of direct payments based on the empirical literature on wage discrimination. From the onset of the CAP, a minimum income for the farmers was a target of the

---

<sup>1</sup> Address for correspondence: Dpto. Economía. C/Madrid, 126 28903 Getafe. Madrid. Spain.  
e-mail: csj@eco.uc3m.es, Universidad Carlos III de Madrid.

<sup>2</sup> We acknowledge financial support from the Spanish Ministry of Agriculture and Ricardo Mora acknowledges financial support from the Spanish DGI, Grant BEC2003-03943. We also wish to thank Jose Eusebio de la Torre for his invaluable assistance in the process of table editing.

policy. In fact, one of the main explicit objectives of the CAP as defined in the Treaty of the European Economic Community, Article 33, was 'to ensure a standard of living for agricultural community, in particular by increasing the individual earnings of persons engaged in agriculture'. Currently, 'Eradication of poverty' is also one of the Union's objective in the 'Draft Treaty Establishing a Constitution for Europe' (Art. 3 point 4). The importance of the minimum income objectives is also prevalent in the aims of the reform proposals. In a recent explanation of these proposals, Commissioner Fischler pointed out that 'A key principle of the new CAP is decoupling, which spells more market orientation, less trade distorting support, and places the focus on quality rather than quantity. It means that from 2005 onwards, the majority of subsidies will come in the form of a single farm payment, will be independent of production, and instead tied to farmers' meeting mandatory food quality, safety, environmental, and animal welfare standards under the principle of *cross-compliance*'.<sup>1</sup>

Given the strategic role that direct payments are going to play in the future distribution of resources among the farmers of the European Union, it is of great interest to provide a quantitative approach to measure the degree by which these programs are biased against or in favor of certain products. The allocation of direct aid spending among farmers is very unequal in two ways. First, the bulk of direct income support is concentrated in few beneficiaries. For example, in its MEMO/02/198 the Commission acknowledges that in the 2000 financial year, 5.39 per cent of beneficiaries received 50.22 per cent of all payments for the 15 EU countries except Greece (for which no published data is available). In the case of Spain, 3.34 per cent of beneficiaries received 38.20 per cent of all payments. Second, and probably related to the first issue of inequality, the distribution of direct aid payments among crops is very asymmetrical. The most important action under which farmers receive income is the set-aside program and animal premiums. As a result, the percentage of payments which was directed towards arable crops and livestock in the year 2000 amounted to 92.71 and 79.78 per cent of all payments in the EU and Spain respectively. Although not data is available for the distribution of direct income payments by crops, it is still possible and illustrative to look at the CAP budget distribution by crops as direct income programs are an important share of this total. In this respect, in 1999, 45.65 per cent of total CAP expenditure was allocated to arable crops, 11.71 per cent to beef and veal, 6.41 per cent to dairy products and 5.41 per cent to sugar. Overall, Continental products neared 70 per cent of all payments. In contrast, Mediterranean products received less than 12 per cent. The most important actions for Mediterranean products are aids for fruit transformation and market withdrawals. As a result, fruits and vegetables obtained 3.70 per cent of overall expenditure, olive oil earned 5.31 per cent and wine received 2.10 per cent.

---

<sup>1</sup> Fischler, in the speech 04/177 which took place on the 14th of May, 2004. See EUROPEAN COMMISSION. As confirmation of the re-enforcement of the role of direct payments in the future Commission's proposal to Reform the Mediterranean products, the Commissioner says: 'Within the framework of a given budget, these answers can be summarized as follows: the best way to support producers is to directly support their income'. Videoconference with Greek journalists in Brussels on the 15th of April, 2004.

As for Spain, a country with a larger share of Mediterranean agriculture, the unbalanced distribution of CAP expenditure still favoured Continental products and is broadly similar to the EU as a whole. In 2000, arable crops reached 37.8 per cent, the figure being 26.7 per cent for cereals. On the other hand, fruit and vegetables only accounted for 8.6 per cent of total expenditure. The main difference with respect to the EU distribution of aid rests on the importance of olive oil and wine in Spanish agriculture. As a result of this, aid to olive oil and wine amounted to 15.8 per cent 4.1 per cent respectively in 2000. In order to evaluate the distributional impact on the proposed single payment by farm, it is necessary to assess the current system's asymmetry and test if the *status quo* could be maintained through the new scheme.

The literature about direct payments and the CAP reforms focuses on the relation between direct payments and their international aggregate income effects both to Member States and third countries rather than the relation between direct payments and the redistributing effects between farmers' incomes. Josling (2003) is concerned that changes in domestic policy to shift from price support to direct payments may have unexpected distributional effects as direct payments may become themselves entitlements unrelated with the original justification. There are also some fears about the distributional effects of free trade negotiations as in Boussard et al. (2004) and Timmer (2000). The European Commission has provided evaluations on the aggregate effects on cohesion stemming from the CAP, as in Commission (2004).

Surprisingly, to our knowledge, there is an absence of studies on the distributional impact of the direct aid programs. In this paper we aim to do this by proposing a very simple empirical approach which draws heavily on the literature on wage discrimination as in Oaxaca (1973). In these studies, differences in average wages between groups are the result of several factors. First, average differences in human capital lead to expected average productivity differentials, and these result in differences in average wages between any two groups of workers. Workers suffer from discrimination if they cannot obtain the wages that their productive activity would normally command. Previous models on labor market discrimination, as in Thurow (1969), Bergmann (1971), and Madden (1975), suggest that this effect should be decomposed into two components, the cost imposed to those discriminated, and the benefit obtained by those favoured. We apply the basic tools of this literature to study which major crops are favoured or discriminated by the direct income support system in the CAP. We focus our empirical illustration to Spain's most representative farm types of Continental versus Mediterranean agriculture: cereals versus fruits and vegetables.

The rest of the paper is organized as follows. Section 2 presents the definition of egalitarian direct payments policies. Section 3 is devoted to the measure of direct payment policy bias. Section 4 describes the data and presents main results. The paper ends with a summary of the findings, and briefly discusses their implications for efforts to reform the CAP.

## 7.2 Egalitarian direct payments policies

The observed income of the farm,  $Y$  results from the sum of direct payments,  $D$ , plus all other incomes,  $R$ , (such as agricultural income and rural tourism or other non-agricultural earnings),

$$Y = D + R.$$

The second term,  $R$ , implicitly includes the effect of price support policies under CAP programs (guarantee price, tariffs, quotas, calendars of import, etc.) on top of the other farm earnings. For any given farm with vector of characteristics  $X \in R^n$ , an *ex-post* egalitarian direct payment policy which guarantees a minimum income  $C$  per worker can be defined as a real function  $D(X) : R^n \rightarrow R$  such that

$$D(X) + R = C * L$$

where  $L$  is the number of workers in the farm. If we normalize this condition by dividing by  $R$  and take logarithms we get:

$$\log(D(X)/R + 1) = \log(C) + \log(L) - \log(R)$$

Taking into account that  $\log(D(X)/R + 1) \approx D(X)/R \equiv d(X)$ , we have:

$$d(X) = c + l - r + \varepsilon \quad (1)$$

where lowercase represents the logarithm of the variable and  $\varepsilon$  is an error term. Equation [1] simply states that farm direct payments as a fraction of all other incomes should approximately be a linear function of the logarithm of the number of workers minus the logarithm of non-direct-payments for each farm.

Let us now assume that  $X$  represents the farm's specialization in a product (i.e. the farm type),  $X = k$ ,  $k = 1, \dots, K$ . A *between*-types egalitarian policy satisfies:

$$d_k = c + l - r + \varepsilon, \quad k = 1, \dots, K. \quad (2)$$

A policy is said to be non-egalitarian *within* farm type  $k$  if

$$d_k = \beta_{0k} + \beta_{1k} * l + \beta_{2k} * r + \varepsilon \quad (3)$$

and  $(\beta_{0k}, \beta_{1k}, \beta_{2k})' \neq (c, 1, -1)'$ . Note that a policy is non-egalitarian between different farm types if there are at least two types of farms,  $k'$  and  $k''$ , such that  $(\beta_{0k'}, \beta_{1k'}, \beta_{2k'})' \neq (\beta_{0k''}, \beta_{1k''}, \beta_{2k''})'$ . If a policy is non-egalitarian among farm types, then it is non-egalitarian. Whenever a policy is non-egalitarian among farm types, at least one farm type will suffer discrimination, that is, farms of that type will receive less than what they would receive if they were of any other type. Similarly, at least one farm type will enjoy favoritism, i.e., farms of that type will have preferential treatment. In this situation, we can state that the policy has bias in favor of some types and against some others. Since this is a measurement problem, we

need an statistical strategy to determine the bias in direct payment policies. In the next section, we use decomposition techniques from the wage discrimination literature to present a framework to do so when  $K = 2$ .

It is possible in this framework to propose more flexible definitions of egalitarian policies. For example, it may be argued that minimum income objectives for farmer or agricultural worker should be corrected for differentials in costs of living across regions. Assume that there are  $J$  regions in the country. A simple way to account for persistent differences in these costs is by allowing for different minimum income objectives by region. Then, an egalitarian policy now takes the form:

$$d_{jk} = c_j + l - r + \varepsilon, \quad j = 1, \dots, J; k = 1, \dots, K. \quad (4)$$

where  $c_j$  is the target level for region  $j$ . More generally, it can be argued that income policies should also reflect other objectives enshrined in the design of agricultural policy. For example, it could be the case that the policymaker wants to give more income per worker to those farms where land is more extensive, irrespective of output levels. One rationale for this could be that environmental care of large extensive farms require more maintenance costs. Then, an egalitarian policy where the farm's exogenous characteristics,  $z$ , like location or size, are given premium vector  $\gamma$  would be:

$$d_k(z) = \gamma z + l - r + \varepsilon, \quad k = 1, \dots, K. \quad (5)$$

Here we do not intend to study the appropriateness of the policy premia  $\gamma$ , but simply to assess whether they differ by crop type (between farm-type discrimination), and also whether the policy is egalitarian within each type of holding.

### 7.3 Measuring direct payment policy bias

In this section, we outline a methodology to measure policy bias between any two types of farms. Without loss of generality, assume the egalitarian policy guarantees a minimum equal to all farms and consider farm types  $k = 1$  and  $k = 2$ . Assume that we have a sample of  $N_1$  type 1 farms and  $N_2$  type 2 farms. In vector notation, the policy equation for type 1 farms takes the form:

$$y_1 = X_1 b_1 + e_1 \quad (6)$$

where  $y_1 = (d_{11}, d_{12}, \dots, d_{1N_1})'$ ,  $X_1 = (1_{N_1}, l^{N_1}, r^{N_1})'$ , so that matrix  $X_1$  is composed of column vector of ones and the  $N_1$ -dimension column vectors representing the logarithm of farm labor,  $l^{N_1} = (l_1, l_2, \dots, l_{N_1})'$ , and the logarithm of other incomes,  $r^{N_1} = (r_1, r_2, \dots, r_{N_1})'$ . The column vector  $b_1 = (\beta_{01}, \beta_{11}, \beta_{21})'$  includes the policy parameters for type 1 farms. Finally  $e_1 = (\varepsilon_1, \varepsilon_2, \dots, \varepsilon_{N_1})'$  is the vector of error terms. Similarly, the policy equation for type 2 farms takes the form:

$$y_2 = X_2 b_2 + e_2 \quad (7)$$

We can write average policy equations within each group as:

$$\begin{aligned}\bar{y}_1 &= \bar{X}_1 b_1 + \bar{e}_1 \\ \bar{y}_2 &= \bar{X}_2 b_2 + \bar{e}_2,\end{aligned}\tag{8}$$

where the bar superscript stands for the average operator. Let  $b$  be the policy structure that would exist if farmers from groups 1 and 2 were treated equally by the direct income policy. It is straightforward to decompose the average policy structure for each farmer type in three components. For example, take farmer type 1's average subsidy per nonsubsidy income:

$$\bar{y}_1 = \bar{X}_1 b + \bar{X}_1 (b_1 - b) + \bar{e}_1\tag{9}$$

The first term on the right-hand side of the equation,  $\bar{X}_1 b$ , amounts to the average ratio if the policy was egalitarian. The second term,  $\bar{X}_1 (b_1 - b)$ , accounts for the actual policy divergence from the egalitarian benchmark. Following Oaxaca (1973), if this term is positive, it is natural to call it 'favoritism' as it reflects the fact that farms of this type are getting more subsidies than the egalitarian allocation among farm types. Likewise, if the term is negative, then it can be called discrimination against type 1's farming. The last term,  $\bar{e}_1$ , measures average errors and should typically be close to zero.

Finally, we can account for the differences between the two types of farming by subtracting the average of the second type from the average of the first type, so that we have:

$$\bar{y}_1 - \bar{y}_2 = \bar{X}_1 (b_1 - b) + \bar{X}_2 (b - b_2) + (\bar{X}_1 - \bar{X}_2) b + (\bar{e}_1 - \bar{e}_2)\tag{10}$$

The first two components in the right hand-side of the equation measure the importance of different premia for the two groups. If the first term is positive, this indicates that group 1 benefits from favoritism while a positive sign in the second coefficient would indicate that group 2 is the victim of discrimination. The third component measures the effect of different average labor units and non-subsidy income by farming type on the policy gap. Finally, the last component reflects the importance of average error terms and it is assumed to be close to zero.

The decomposition in Equation (10) cannot be computed because  $b$ ,  $b_1$ , and  $b_2$  are unknown vector parameters. Assuming that the process of receiving subsidies is exogenous to the farmer, estimation by OLS of policy Equations (6) and (7) only provide consistent estimates for  $b_1$  and  $b_2$ , leaving  $b$ , the egalitarian policy structure, partly unidentified.

Under the egalitarian policy structure,  $(\beta_{0k}, \beta_{1k}, \beta_{2k})' \neq (c, 1, -1)'$ . In the context of wage discrimination in the labor market, Neumark (1988) has given some clues on the nature of non-discriminatory wage structures by using an extension of the employer discrimination model of Arrow (1972) and Becker (1957). In our context, Neumark's approach implies that if policy makers only care about the proportion of each type of farmer receiving support within each type of support program, then the egalitarian policy  $c$  is:

$$c = \frac{c_1 N_1 + c_2 N_2}{N_1 + N_2} \quad (11)$$

Equation (11) shows that the egalitarian policy constant term,  $c$ , is a weighted average of each group's term,  $c_k$ ,  $k = 1, 2$ . Thus, following Neumark (1988)'s suggestion, we can estimate the egalitarian constant term by pool OLS regression of each farm's  $d - l + r$  over a constant in the entire sample. Oaxaca and Ransom (1994) showed that Neumark's pooled decomposition is a generalization of previous proposals by Oaxaca (1973), Reimers (1973), and Cotton (1988).

The econometric strategy when the egalitarian policy is evaluated within regions, thus allowing differing minimum objectives across them, is a simple generalization of this approach. In particular, the coefficients  $c_j$ ,  $j = 1, \dots, J$  can be estimated by pool OLS regressions of  $d - l + r$  over regional dummy variables using the entire sample.

Finally, the econometric strategy when the egalitarian policy is evaluated within regions and taking into account other objectives in the policy is again simple to compute. In particular, the coefficients  $\gamma$  can be estimated by pool OLS regressions of  $d - l + r$  over regional dummy variables and the other relevant characteristics (from the point of view of the policymaker) using the entire sample.

In the next section, we apply this decomposition to study the income between Mediterranean and Continental farmers in 16 Spanish regions.

## 7.4 Presentation of Data and Results

### 7.4.1 Data set and variables

We use data from the 2001 Red Contable Agraria Nacional (RECAN), an annual national survey prepared by the Spanish Ministry of Agriculture. This survey is part of the European Farm Accounting Data Network (FADN). The questionnaire is filled in by county accountancy agencies that collect information directly from the commercial farms. It has information on direct payments and other incomes of around 7000 farms and 70 crops. We focus our study on the two most important major farm types for the Spanish Continental and Mediterranean agriculture: Cereals versus Fruit and Vegetables oriented farms. Finally, the survey also provides information on the number of people employed and working in the farm, and land area.

In Spain, Continental-type farms are geographically concentrated in the center of the country while the Mediterranean coastal regions produce mainly Fruit and Vegetables. Although our illustration does not include olive oil or wine, two important Mediterranean products, we do not intend to imply that they are not interesting from the point of view of the distributional effects of direct payments policies. On the contrary, given that the former has enjoyed until 2004 significant direct subsidies while the latter has not, it would be very interesting to understand the implication soften this differentiated treatment under our framework. We leave this issue for future research.

In the analysis, we look at the continental farm type vis-a-vis the Mediterranean oriented holdings. So, the sample is divided into two sub-samples. The Cereal farming sample



consist of 1,267 while the Horticulture sample is 74. The variable specification includes the logarithm of number of hours worked, the AWU per farm, the direct payments linked both to the products and inputs as for any other concepts (set a side, early retirement, mountain areas, etc.) the farm agricultural income and other rents (non agricultural earnings), land area and value. In both types of agriculture, farmers' unions and regional authorities provide both information and advise on how to apply for direct subsidies. Most of these subsidies are automatic in the sense that within a farm type, all farmers qualify. Specialization in Spanish agriculture by regions is driven by fundamentals and market access - and is not policy driven - (see, for example, Mora and San Juan, 2004). Thus, it is reasonable to assume that, in spite of the admittedly small sample for fruits and vegetables, there is not a sample selection problem on the direct payments program neither for cereals nor fruits and vegetables. For simplicity, we will refer the latter as 'horticulture' in the following.

#### 7.4.2 Results

Before presenting the regression results, we provide a summary of descriptive statistics related to the average level of subsidies per farm in tables 7.1 to 7.4. Table 7.1 shows the distribution of average payments per farm by economic size class. Controlling for size, Continental farms always receive more direct payments than horticulture type farms. Overall, the latter receive around 10 per cent of the average payment assigned to the former.

*Table 7.1 Direct payments per farm*

Economic size class (ESC)	Average payments (euros)		
	cereals	horticulture	total
Less than 2 ESU	4,472.13	.	4,472.13
From 2 to less than 4 ESU	2,721.64	403.68	2,224.94
From 4 to less than 6 ESU	3,495.34	.	3,495.34
From 6 to less than 8 ESU	5,156.36	.	5,156.36
From 8 to less than 12 ESU	6,651.98	522.05	6,389.27
From 12 to less than 16 ESU	9,519.75	619.68	9,138.31
From 16 to less than 40 ESU	17,040.81	1,795.55	16,045.97
From 40 to less than 100 ESU	34,716.76	3,484.20	32,677.52
From 100 to less than 250 ESU	84,785.41	6,657.90	79,690.13
Equal or greater than 250 ESU	247,654.30	.	247,654.30
Total	21,467.60	2,171.22	20,340.58

In table 7.2, we present direct payments per annual working units (AWU) by economic size and region for cereals. Overall, in each of the regions, the larger the size of the farm, the larger the average value of the subsidy. Average payments per worker tend to be

Table 7.2 Direct payments per Annual Working Units. Cereals

Region	Economic size class (ESC)										total	
	I	II	III	IV	V	VI	VII	VIII	IX	X		
Galicia	.	.	1,735.98	2,166.29	2,670.36	.	.	.	.	.	.	2,408.45
Asturias	.	.	.	.	.	.	.	.	.	.	.	.
Cantabria	.	.	.	.	.	.	.	.	.	.	.	.
País Vasco	.	.	.	.	.	11,501.85	17,286.27	29,467.52	.	.	.	21,853.59
Navarra	.	.	5,461.20	.	5,489.31	7,380.54	16,968.12	22,380.45	29,933.22	.	.	21,020.55
La Rioja	.	.	.	.	10,014.91	.	.	.	.	.	.	10,014.91
Aragón	.	2,576.07	3,252.20	5,431.03	6,907.32	10,733.28	16,687.64	24,811.63	21,210.94	.	.	16,819.65
Cataluña	.	2,576.15	.	3,068.13	4,071.63	4,506.27	12,171.54	17,091.08	27,238.98	.	.	12,995.55
Baleares	.	.	.	.	.	.	.	.	.	.	.	.
Castilla y León	.	5,346.47	6,886.94	11,731.51	10,386.51	11,662.44	17,295.30	23,565.74	22,343.61	23,192.43	.	19,460.98
Madrid	.	.	.	2,141.04	4,208.46	4,747.28	7,372.38	11,714.31	28,301.89	44,173.21	.	9,679.24
Castilla La Mancha	2,777.72	3,731.70	7,426.74	5,167.15	9,570.17	9,744.87	18,822.01	27,712.69	19,824.53	.	.	16,625.32
Valencia	.	.	.	.	.	5,798.43	8,529.50	.	.	.	.	6,591.03
Murcia	.	.	7,087.50	.	.	.	6,615.00	25,482.98	.	.	.	19,499.02
Extremadura	.	.	3,959.05	4,612.42	5,657.42	7,423.51	9,831.93	15,925.02	.	.	.	9,832.41
Andalucía	.	11,909.31	6,383.95	7,247.29	9,799.02	14,354.61	16,344.97	31,589.05	58,357.17	84,964.82	.	25,073.76
Canarias	.	.	.	.	.	.	.	.	.	.	.	.
Total	2,777.72	3,405.93	4,556.84	5,846.03	7,290.12	9,353.29	14,879.69	23,798.95	26,019.89	31,165.16	.	17,085.53

Table 7.3 Direct payments per Annual Working Units. Horticulture

Region	Economic size class (ESC)										total
	I	II	III	IV	V	VI	VII	VIII	IX	X	
Galicia	.	.	.	.	.	.	.	.	.	.	.
Asturias	.	.	.	.	.	.	.	.	.	.	.
Cantabria	.	.	.	.	.	.	.	.	.	.	.
País Vasco	.	.	.	.	.	.	.	.	.	.	.
Navarra	.	403.68	.	.	.	.	.	.	.	.	403.68
La Rioja	.	.	.	.	.	.	737.23	322.91	.	.	457.65
Aragón	.	.	.	.	.	.	.	.	.	.	.
Cataluña	.	.	.	.	248.41	.	.	.	.	.	248.41
Baleares	.	.	.	.	.	.	.	.	.	.	.
Castilla y León	.	.	.	.	583.36	543.19	1,082.90	.	.	.	940.86
Madrid	.	.	.	.	.	341.56	782.51	1,751.37	1,448.37	.	1,226.76
Castilla La Mancha	.	.	.	.	.	661.28	1,906.67	1,525.76	.	.	1,638.28
Valencia	.	.	.	.	367.35	.	.	70.66	.	.	233.52
Murcia	.	.	.	.	.	.	1,862.33	.	.	.	1,862.33
Extremadura	.	.	.	.	.	.	965.34	2,145.66	7,136.06	.	2,358.96
Andalucía	.	.	.	.	.	.	406.33	.	.	.	406.33
Canarias	.	.	.	.	.	.	.	.	.	.	.
Total	.	403.68	.	.	347.52	531.53	1,229.44	1,375.09	2,874.85	.	1,253.91

Table 7.4 Direct payments per Gross Added Value

Region	Working hours per Gross Added Value classes											
	cereals horticulture					total						
	I	II	III	IV	total	I	II	III	IV	total		
Galicia	.	.	.	0.546	0.546	.	.	.	.	.	0.546	
Asturias	.	.	.	.	.	.	.	.	.	.	.	
Cantabria	.	.	.	.	.	.	.	.	.	.	.	
País Vasco	.	0.470	0.525	0.702	0.654	0.488	.	.	.	.	0.488	
Navarra	.	0.508	0.506	0.687	0.670	0.512	.	0.029	0.019	0.026	0.504	
La Rioja	.	.	0.391	.	0.391	.	.	0.032	0.048	0.041	0.070	
Aragón	.	0.504	0.607	0.602	0.668	0.544	.	.	.	.	0.544	
Cataluña	.	0.378	0.477	0.433	0.704	0.425	.	.	0.055	0.055	0.421	
Baleares	.	.	.	.	.	.	.	.	.	.	.	
Castilla y León	.	0.566	0.716	0.642	0.638	0.628	0.036	0.066	.	0.040	0.613	
Madrid	.	0.356	0.415	0.476	0.470	0.401	0.040	0.041	0.122	0.097	0.344	
Castilla La Mancha	.	0.479	0.547	0.470	0.544	0.495	0.082	0.159	0.085	0.106	0.457	
Valencia	.	.	.	0.563	0.696	0.639	.	0.025	0.004	0.024	0.015	0.215
Murcia	.	0.498	.	0.413	0.773	0.492	0.011	0.125	.	.	0.056	0.340
Extremadura	.	0.339	0.500	0.602	0.731	0.546	0.152	0.081	0.027	.	0.089	0.512
Andalucía	.	0.536	0.583	0.587	0.676	0.544	.	.	0.031	0.037	0.033	0.542
Canarias	.	.	.	.	.	.	.	.	.	.	.	.
Total	.	0.510	0.620	0.589	0.643	0.552	0.089	0.073	0.062	0.084	0.075	0.532

higher in the Continental regions. In table 7.3, we present similar information for Horticulture. For the country as a whole we again observe that size is related to average payments. However, the distribution of direct subsidies between regions is more volatile and much less connected to production. For example, Valencia, a main producer for citrics presents a very low average precisely because citrics receive very little support from the CAP in the form of direct payments.

Average subsidy payments by region and labor intensity are presented in table 7.4. Four classes of labor intensity, ranging from the less intensive (I) to the more labor intensive types of farms (IV) are considered. Average payments seem to be uncorrelated to the intensity of labor in the production process at national and regional levels both for Cereals and Horticulture. A similar result is obtained if, instead of using working hours, we use number of workers.

Thus, to sum up, subsidies are larger for cereals and for larger farms. Their association with the number of working units (or the number of workers) is not direct. There are also important variations by regions. Simple direct descriptive statistics from the RECAN data set therefore replicate well-known results already pointed out even by the European Commission. Direct payments program seem to lead ex-post to a very unequal distribution of resources per working unit. In the following, we assess to what extent this basic finding is replicated in our methodological framework. To do so, we are going to consider four alternative definitions of an 'egalitarian' policy.

We refer to 'Egalitarian 1' as a policy of direct payments which would guarantee the same level of income per working hour in any region regardless of the type of farming. We define 'Egalitarian 2' as the policy under which all farmers within the same region would be guaranteed the same amount of income irrespective of the type of farming. 'Egalitarian 3' would be the policy under which all farmers within the same region and the same land *area* would obtain the same income regardless of the type of farming. Finally, 'Egalitarian 4' would be the policy under which all farmers within the same region and the same land *value* would attain the same income regardless of the type of farming.

To what extent the ex-post distribution of direct income payments between farms reflects an 'Egalitarian 1' or 'Egalitarian 2' policy within types of farming can be assessed by inspection of the regression results at table 7.5. The first three columns refer to 'Egalitarian 1'. The first four columns are the regressions carried out within types of farming. Thus, the first two column results are obtained from the sample of Cereal-type farms, while the results in column 3 (coefficients) and 4 (t-values) refer to the sample of Horticulture-type farms. The third column estimates are obtained from the pool sample. Note that the coefficients for  $l$  and  $r$  in this column are restricted to 1 and -1 respectively, so that the values in this column reflect the egalitarian policy '*a la Neuman*'. The same structure is replicated in columns 7 to 8, but in relation to 'Egalitarian 2'.

We can conclude that neither for Cereals nor for Horticulture the policies are Egalitarian 1 or 2 since the parameter estimates for  $l$  and  $r$  are significantly different from 1 and -1 respectively. For Cereals the ex-post distribution of subsidies seems to replicate a policy which gives a premium to farms with a large economic size (the parameter for  $r$  is close to -0.5) and a penalty for labor intensive farms (as the parameter for  $l$  lies below 0.5). For example, looking at the results from the 'Egalitarian 1' regressions, we can conclude that if

Table 7.5 Policy regressions. OLS estimates

	Equal income			Equal income within regions		
	cereals	horticulture	egalitarian 1	cereals	horticulture	egalitarian 2
Constant	3.39 (16.64)	0.60 (2.45)	2.47 (117.60)			
Galicia				2.10 (7.85)		0.71 (2.96)
País Vasco				3.18 (14.10)		2.83 (22.53)
Navarra				3.21 (14.92)	1.15 (4.50)	2.89 (32.63)
La Rioja				2.66 (5.36)	1.27 (4.55)	1.81 (5.98)
Aragón				3.06 (14.98)		2.50 (48.42)
Cataluña				2.85 (13.13)	1.28 (4.26)	2.35 (23.64)
Castilla y León				3.14 (15.21)	1.18 (4.69)	2.47 (72.83)
Madrid				2.62 (11.73)	1.28 (4.82)	1.97 (22.77)
Castilla La Mancha				3.03 (15.32)	1.36 (5.03)	2.66 (51.04)
Valencia				2.72 (8.84)	1.19 (4.50)	1.79 (7.50)
Murcia				2.86 (9.45)	1.26 (4.73)	2.59 (9.40)
Extremadura				2.82 (13.14)	1.31 (4.87)	2.01 (39.15)
Andalucía				3.24 (15.71)	1.20 (4.47)	2.97 (51.82)
<i>l</i>	0.35 (12.69)	0.03 (1.08)	1.00	0.42 (14.80)	-0.05 (-1.59)	1.00
<i>r</i>	-0.54 (-45.80)	-0.07 (-3.08)	-1.00	-0.57 (-47.72)	-0.07 (-3.12)	-1.00
R2 (adjusted)	0.6378	0.0928	0.0000	0.8860	0.6030	0.9317

Note: Egalitarian 1: Minimum income; Egalitarian 2: Minimum income within regions.

Table 7.6 Policy regressions. OLS estimates. Controlling for land area/land value

	Equal income within regions and land area			Equal income within regions and land value		
	cereals	horticulture	egalitarian 3	cereals	horticulture	egalitarian 4
Galicia	3.52 (20.55)		-0.41 (-1.97)	2.69 (15.98)		-1.24 (-5.77)
País Vasco	4.15 (28.92)		1.22 (9.67)	3.32 (23.45)		0.34 (2.32)
Navarra	3.97 (29.17)	1.79 (7.81)	1.26 (12.29)	3.14 (23.30)	1.48 (7.04)	0.36 (2.74)
La Rioja	3.82 (12.22)	1.54 (6.77)	0.70 (2.73)	2.99 (9.61)	1.23 (5.51)	-0.53 (-1.97)
Aragón	3.81 (29.47)		0.84 (10.03)	2.99 (23.30)		-0.04 (-0.34)
Cataluña	3.99 (28.78)	1.67 (6.76)	0.96 (9.29)	3.17 (23.23)	1.36 (5.70)	0.09 (0.71)
Castilla y León	3.92 (29.97)	1.45 (7.07)	0.85 (11.12)	3.10 (23.89)	1.14 (5.69)	-0.06 (-0.51)
Madrid	3.73 (26.15)	1.50 (6.99)	0.55 (5.76)	2.90 (20.67)	1.19 (5.62)	-0.43 (-3.45)
Castilla La Mancha	3.83 (30.49)	1.53 (7.08)	1.10 (13.62)	3.00 (24.18)	1.22 (5.67)	0.17 (1.54)
Valencia	3.46 (17.84)	1.52 (6.98)	0.62 (2.99)	2.63 (13.63)	1.21 (5.74)	-0.47 (-2.14)
Murcia	3.43 (18.00)	1.58 (7.23)	1.17 (4.87)	2.60 (13.69)	1.27 (5.99)	0.14 (0.55)
Extremadura	3.68 (27.06)	1.53 (7.07)	0.39 (4.70)	2.86 (21.22)	1.22 (5.72)	-0.51 (-4.48)
Andalucía	4.17 (31.76)	1.53 (6.94)	1.40 (16.85)	3.34 (25.82)	1.22 (5.71)	0.52 (4.60)
<i>a</i>	0.48 (42.61)	0.11 (6.07)	0.38 (22.97)	0.48 (42.61)	0.11 (6.07)	0.42 (23.68)
<i>l</i>	0.17 (9.06)	-0.10 (-3.58)	1.00	0.17 (9.06)	-0.10 (-3.58)	1.00
<i>r</i>	-0.67 (-85.34)	-0.09 (-4.71)	-1.00	-0.67 (-85.34)	-0.09 (-4.71)	-1.00
R2 (adjusted)	0.9551	0.7483	0.9519	0.9551	0.7483	0.9528

Note: Egalitarian 3: Minimum income per worker within regions and land area; Egalitarian 4: Minimum income per worker within regions and land value.

Table 7.7 Decomposition of average direct payments shares

	y	Egalitarian 1		Egalitarian 2		Egalitarian 3		Egalitarian 4	
		x · b	favoritism	x · b	favoritism	x · b	favoritism	x · b	favoritism
Cereals	1.097	1.073	0.023	1.082	0.014	1.114	-0.017	1.091	0.006
t-ratio		43.52	5.105	44.08	3.14	45.07	3.79	44.06	1.18
Horticulture	0.087	0.461	-0.375	0.317	-0.230	-0.194	0.281	0.180	-0.093
t-ratio		7.19	6.01	4.33	3.23	2.56	3.91	2.13	1.17

Note: t-ratios obtained from 1,000-replication bootstrap.

the ex-post distribution reflects the authorities objectives, then rather than aiming towards a minimum income  $C$  such that  $d = \frac{CL}{R}$  the direct payments policies is closer to the function  $d = \sqrt{\frac{CL}{R}}$  as far as Cereals are concerned.

For Horticulture, the conclusions are slightly different, as the parameter for  $l$  is not significant neither for 'Egalitarian 1' nor for 'Egalitarian 2'. The number of working hours (or indeed the number of workers, which is not shown for brevity) is not influencing the amount of direct payments received by farms. Thus, there seems to be no connection to any objective of income support by worker or working hours for Horticulture. Of course, this absence of link implies a penalty *per worker* or *per working hour* in the policy. With respect to economic size, we find evidence supporting the claim that the larger the farm, the larger is the ex-post support, as the parameter is negative and smaller than 1.

In table 7.6, we present the regression results concerning 'Egalitarian 3' and 'Egalitarian 4' policies. These definitions of policies are more flexible definitions of equity as they allowed for income to differ between farmers along with the amount of land. The difference between 'Egalitarian 3' and 'Egalitarian 4' lies in the fact that the quality of land varies significantly across types of farming. In particular, land values are much higher in Horticulture than in Cereals, where pecuniary returns per square hectare are much lower.

As in the previous two policies, we reject for both types of farming that the CAP implies an *ex-post* distribution of payments which are egalitarian within types of farming. As in Table 4, we can also conclude that labor intensive farms are heavily discriminated, but in this case the result also applies to Horticulture farming. As in 'Egalitarian 1' and 'Egalitarian 2', we also observe that smaller farms in term of overall income are penalized in both types of farming. We also find that land areas and values are significant factors to explain variation of support between farms. Larger farms in terms of their land receive more direct support.

Until now, we have been able to conclude that the CAP does not result in an *ex-post* equal distribution of income amongst farmers within type of farming. However we have still not addressed the issue of discrimination and favoritism between types of farming. We do this in table 7.7. We present a decomposition of average direct payment shares by type of farming into the components set up in Equation [9] using the estimates from Tables 5 and 6. Note that as we carry out OLS estimations with constants, error terms sum up to zero by construction and the third term in the decomposition therefore disappears.

Negative values under the heading 'Favoritism' imply of course 'Discrimination'. For cereals, the shares under the different policy objective ranges from 1.073 ('Egalitarian 1') to

1.114 ('Egalitarian 3'). Given that the actual average share is 1.097 we find favoritism in all definitions except 'Egalitarian 3' which place great importance in giving a premia to land area. Of course, the results are symmetric for Horticulture. Note that there is 'Favoritism' only under 'Egalitarian 3'. Sample size for each type of crop will of course determine how far is the policy within each type of crop from the 'Egalitarian' policy *à la Neumann*. Therefore the effect of discrimination for Horticulture on the average share is always larger than the effect of favoritism for Cereal.

It should however be stressed that all estimates are significant, except for 'Egalitarian 4'. Using the 'Egalitarian 4' variable specification, we find that the CAP direct payments policy renders an ex-post distribution of income which does not amount to neither discrimination nor favoritism for any type of crop. Given the fact that 'Egalitarian 4' implies a payments scheme which controls for land values -and therefore, monetary crop returns this finding suggests that the policy is driven to compensate land capitalized values.

## 7.5 Some thoughts as concluding remarks

A main contribution of the paper is to propose a measure to evaluate how egalitarian the direct payment policy in the CAP is. We propose definitions of favoritism and discrimination among different farm types and within farm types. Our indexes can be suitably defined to incorporate flexible definitions of egalitarian income support objectives.

We present strong evidence of discrimination against Mediterranean versus Continental farming for sensible definitions of equality in the *ex-post* distribution of per capita income, a result in line with the existing literature. In addition, we also show that, within these two types of farms, smaller and more labor intensive farms are discriminated.

Finally, we find that if land value is introduced in the objective function of the policy maker, then no discrimination against Mediterranean farming can be observed. However, the result on the discrimination for smaller farms (both in terms of their land value and in terms of their economic size) and for labor intensive farms (both in terms of working hours and units of labor) still holds.

We started this research motivated by the reform proposals for the CAP. In the words of the EU Commissioner, agricultural support in the EU is 'now no longer coupled with output volumes but largely paid out as direct support to farmers' incomes'. (Fischler, 16 March 2004 *Bulgaria and the EU* National and International Economic University, Sofia). Why do we still find biases in 2001? The problem seems to be that applying the direct payment on historical basis and allowing the creation of a new kind of 'property rights' (payments property) on the past level of protection the direct payment effectively links support to the size of the farm. There are important political restrictions to the effective reform of the CAP towards a more equal and fair policy. Commissioner Fischler tried to introduce dynamic modulation on the 2003 CAP reform. But the biggest setback for Fischler's reform in 2003 proposals came as some countries blocked a plan to cut the prices at which the EU guarantees to buy cereals. Mr Fischler had hoped to bring EU prices closer into line with those on the world market. The Commission has also difficulties in the application of a planned reduction of direct payments for bigger farms from 2007 onwards. To the credit of the EU authorities, their plans aim to correct the current imbalance that 80 per

cent of CAP currently goes to only 20 per cent of the farms. The proposed system introduces the principle of progressive contributions according to the overall amount of direct payments received in order to ensure that reductions in direct payments are balanced and simple to apply. Regardless of whether the proposals are effective and reach a successful outcome, it seems undisputable that the re-distributional effects of the new support system is a key question for farmers' income in the future and should have a significant differentiated impact by region.

### *References*

Arrow, K., 'Some Mathematical Models of Race Discrimination in the Labor Market'. In: *Racial Discrimination in Economic Life*, ed Anthony Pascal, 187-203. Lexington: D.C. Heath, 1972.

Becker, G.S., *The Economics of Discrimination*. Chicago: University of Chicago Press., 1957.

Boussard, J.M., F. Gérard, M.G. Piketty, A.K Christensen and T. Voituriez, *May the pro-poor impacts of trade liberalization vanish because of imperfect information?* Contributed paper selected for presentation at the 25 th IAAE Conference, Durban, South Africa, August 16-23, 2004.

Commission, *Common Policies and Cohesion*, Brussels, 2004.

Cotton, J., 'On the decomposition of wage differentials'. *Review of Economics and Statistics* 70, 236-243, 1988.

Cotton, J., 'Color or Culture?: Wage Differences among Non-Hispanic Black Males. Hispanic Black Males and Hispanic White Males'. *Review of Black Political Economy* 21(4), 53-67, 1993.

Heckman, J.J., 'Sample selection bias as a specification error'. *Econometrica* 47, 153-162. University Press, NY, 1979.

Josling, 'Key issues in the World Trade Organization Negotiations on Agriculture', *American Journal of Agricultural Economics* 85(3):663-667, 2003.

Mora, R. and C. San Juan, 'Geographical Specialization in Spanish Agriculture Before and After Integration in the European Union' *Regional Science and Urban Economics* Vol 34(3): 309-320, 2004.

Neumark, D., 'Employers' Discriminatory Behavior and the Estimation of Wage Discrimination'. *Journal of Human Resources* 23, 279-295, 1988.



Oaxaca, R., 'Male-female Wage Differentials in Urban Labor Markets'. *International Economic Review* 9, 693-709, 1973.

Reimers, C., 'Labor Market Discrimination Against Hispanic and Black Men'. *Review of Economics and Statistics* 65, 570-579, 1983.

Timmer, P., 'The macro dimensions of food security: economic growth, equitable distribution, and food price stability', *Food Policy* 25, 283-295, 2000.

Thurow, L.C., *Poverty and Discrimination*. Brookings Institution, Washington, DC, 1969.

## 8. A short history of the FADN and other activities than agriculture

*Keijo Hyvönen*<sup>1</sup>

In Council Regulation 79/65 the field of survey of the FADN was defined so that it should cover those agricultural holdings, which:

- are run as market-oriented holdings, and
- provide the main occupation of the operator

During the first three years data was taken only from agricultural holdings having an area exceeding five hectares, with the exception of holdings producing wine, fruit, vegetables and olives.

In 1972 the definition was amended. In addition to being market-oriented, the holdings in the field of survey should:

- provide the main occupation of the operator;
- ensure the employment, per year, of at least one worker (1 work unit). This threshold could, however, be reduced to 0.75 work units.

European size units were introduced in 1981. After this amendment, the field of survey of the data network should comprise all the agricultural holdings having an economic size equal to or greater than a threshold expressed in European size units (ESU), irrespective of any outside work the operator may engage in. In spite of the change, also after 1981 0.75 AWU seems to have been in many Member States a pre-condition for a holding to be included in the sample.

Although other activities than agriculture, pursued by the farmer or the farming family, should not prevent a holding to be included in the sample, the contents of the European farm return still consists mainly of agriculture.

According to Commission Regulation 2237/77, data in the farm return concern exclusively the agricultural holding. These data refer to activities of the holding itself and, if appropriate, to both forestry and tourism connected with the farm. Nothing connected with any non-farming activities of the holder or of his family, or with any pension, inheritance, private bank accounts, property external to the agricultural holding, personal taxation, private insurance, etc., is to be taken into account in preparing the farm returns. In practice, data on contract work, forestry and tourism are registered in the farm return.

In the beginning of 90's, a study concerning pluriactivity and non-farm incomes of agricultural households was conducted, with a detailed proposal how these items should be recorded. However, doubts were cast whether the Council Regulation made possible to collect such a data. The proposal did not lead to any changes in the Farm Return.

---

<sup>1</sup> Head of unit AGRI.G.3, European Commission.

## FADN field of survey

### ■ 1965: agricultural holdings, which:

- are run as market-oriented holdings, and
- provide the main occupation of the operator

### ■ 1972: agricultural holdings, which:

- provide the main occupation of the operator
- ensure the employment, per year, of at least one worker (1 work unit); this threshold could, however, be reduced to 0.75 work units



## FADN field of survey

### ■ 1981: agricultural holdings:

- having an economic size equal to or greater than a threshold expressed in European size units (ESU)
- irrespective of any outside work the operator may engage in



## Contents of the farm return

- data in the farm return concern exclusively the agricultural holding
- data refer to activities of the holding itself and, if appropriate, to both forestry and tourism connected with the farm
- nothing connected with any non-farming activities of the holder or of his family, or with any pension, inheritance, private bank accounts, property external to the agricultural holding, personal taxation, private insurance, etc., is to be taken into account in preparing the farm returns.



European Commission - Directorate General for Agriculture

Hyyvönen/AGRI-G.3

## Other activities on the holding

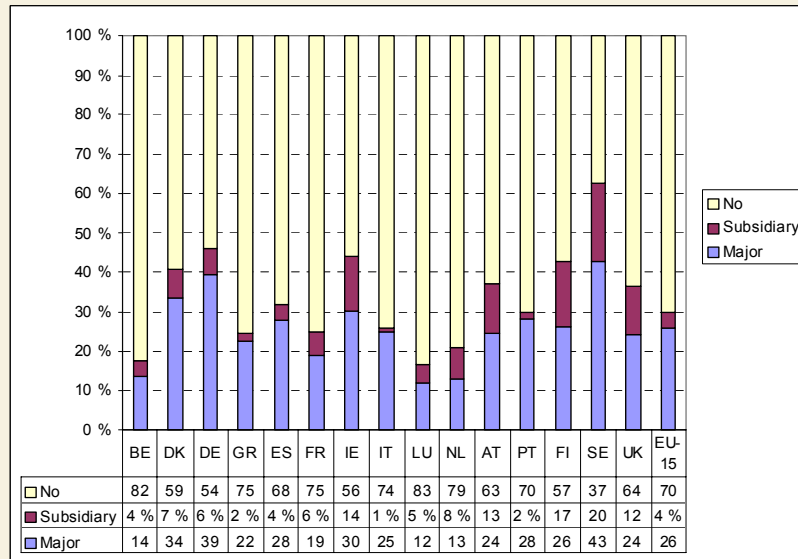
- Contract work; 12% of holdings
- Forestry; 5% of holdings (not FIN, SWE)
- Tourism; 1% of holdings
- Processing of milk; 3% of holdings



European Commission - Directorate General for Agriculture

Hyyvönen/AGRI-G.3

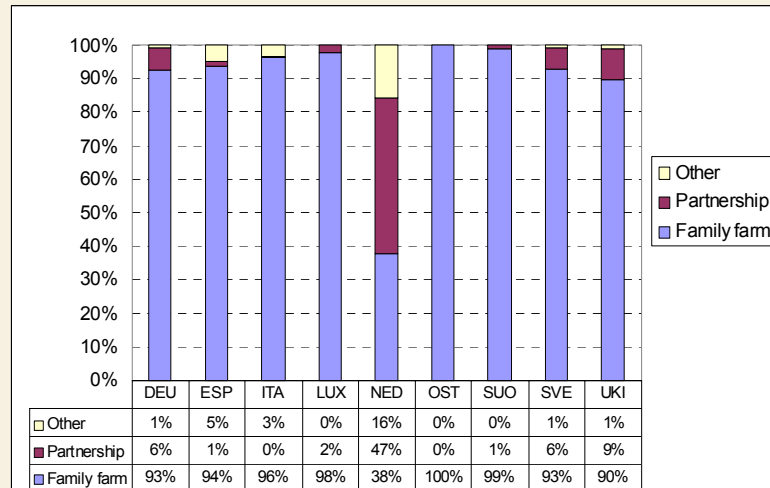
## Other gainful activity of the sole holder (Census 2000)



European Commission - Directorate General for Agriculture

Hyytiäinen/AGRI-G.3

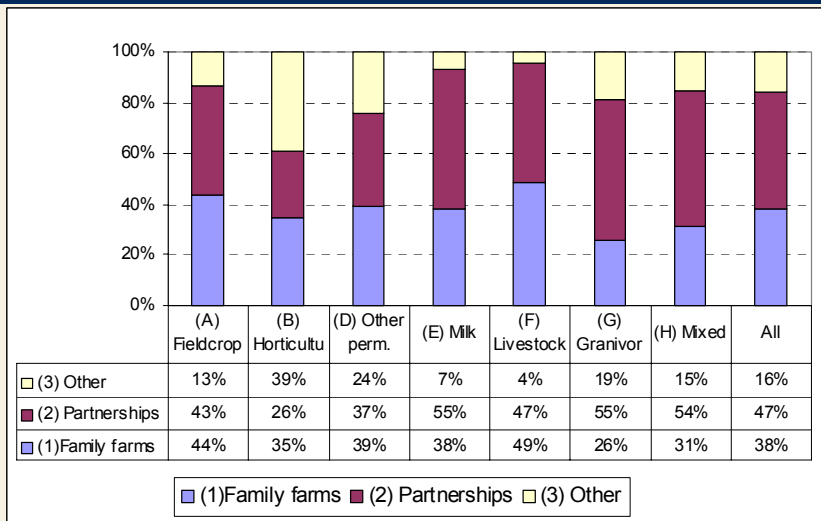
## Organisational form in 2002 (Source:FADN)



European Commission - Directorate General for Agriculture

Hyytiäinen/AGRI-G.3

## Organisational form 2002, the Netherlands



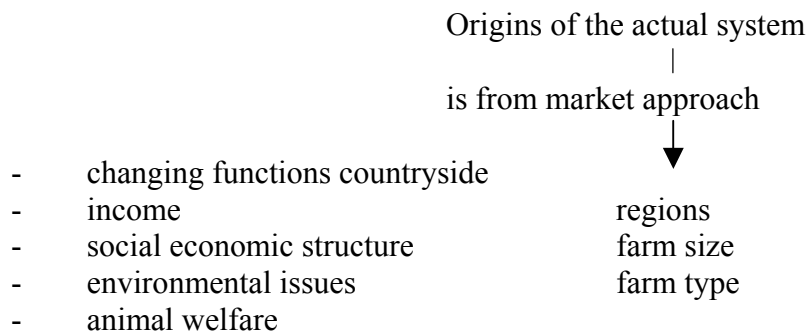
# Workgroupsession Typology

A workgroup session has been organised on typology. Several reasons underpin this choice. The change in the CAP (single historic farm payment) severely effects the current EU Typology. Multifunctionality and non-farm income is the other reason for discussing this topic. Results are given below.

## *Group 1*

Do we need a classification and why?  
What are the classification factors?  
What are the available data?

We want a stable system  
We need a basic structure



Looking for revision ...  
with regard to - policy  
                          - research  
or                       - ...

There arises a need for new data on:  
(Family) Business or Household

## *Group 2*

- which users?
- which typology? household typology
- which types? business typology





## Appendix 1 List of participants

Bratka, Vlada  
Latvian State Institute of Agrarian Economics  
14 Struktoru Str.  
LV-1039 Riga  
Latvia  
valda@lvaei.lv

Connolly, Liam  
Teagasc  
19 Sandymount Avenue Ballsbridge Dublin  
4 Dublin  
Ireland  
Iconnolly@athenry.teagasc.ie

Doria, Paola  
INEA  
Via Barberini 36  
00187 Rome  
Italy  
paola.doria@inea.it

Hansen, Øyvind  
NILF  
Mørkvedbukta  
8020 Bodø  
Norway  
oyvind.hansen@nilf-nn.no

Haukas, Torbjørn  
NILF  
P.O. Box  
5020 Bergen  
Norway  
torbjorn.haukas@nilf-ho.stat.no

Hyvönen, Keijo  
European Commission  
Rue de la Loi 200 L130/3/120  
B-1049 Bruxelles  
Belgium  
keij.Hyvonen@cec.eu.int

Karlsson, Ann-Marie  
Statistics Sweden  
Statistics Sweden  
701 89 Örebro  
Sweden  
annmarie.karlsson@scb.se

Kinsella, Anne  
Teagasc  
19 Sandymount Avenue Ballsbridge Dublin  
4 Dublin  
Ireland  
akinsella@hq.teagasc.ie

Kleinhanss, Werner  
Federal Agricultural Research Centre  
Bundesallee 50  
38116 Braunschweig  
Germany  
werner.kleinhans@fal.de

Kostov, Mitko  
Macedonian National Extension Agency  
Kliment Ohridski 5/3 Bitola  
389 Bitola  
Macedonia  
mitko.kostov@mt.net.mk

Meier, Beat  
Agroscope FAT  
Taenikon  
CH-8356 Ettenhausen  
Switzerland  
beat.meier@fat.admin.ch

Poppe, Krijn  
LEI  
Postbus 29703  
2502 LS The Hague  
Netherlands  
krijn.poppe@wur.nl

Puurunen, Maija  
MTT Agrifood Research Finland  
Lutnantintie 13  
FIN-00410 Helsinki  
Finland  
maija.puurunen@mtt.fi

San Juan, Carlos  
Univ. Carlos III of Madrid  
C/Madrid 123  
28903 GETAFE (Madrid)  
Spain  
csj@eco.uc3m.es

Temelkovska, Anita  
State Statistical Office of Macedonia  
Dame Gruev 4  
1000 Skopje  
Macedonia  
anitat@stat.gov.mk

Zwieten, Dineke van  
Ministry of Agriculture, Nature and Food Quality  
Postbus 482  
6710 BL Ede  
Netherlands  
d.m.van.zwieten@minlnv.nl