Distributional effects of CAP instruments on farm household incomes

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Abstract

The Common Agricultural Policy (CAP) has evolved from an *allocative* towards a *distributive* policy. Distributive policies aim at correcting market outcomes according to politically determined objectives usually through transferring money from richer to poorer households. We compare the distributional effects of CAP direct payments in EU Member States. In general, poorer households benefit more from social transfers than richer ones, whereas larger farms get more direct payments than smaller ones. Direct payments which are basically linked to the acreage of farms seem to be not an adequate tool to ensure a fair standard of living of farm households, a major objective of the CAP.

Keywords: common agricultural policy, direct payments, household income, farm income, income distribution

1 Introduction

Until 1992, market price support and supply management policies were the major tools of the Common Agricultural Policy (CAP) to reach allocative and distributive policy objectives of the EC (the former EU). During the process of 'decoupling', which gained momentum after the 2003 CAP-reform, direct payments became the most important EU policy tool from a financial perspective. After this reform, direct payments are paid according to individual entitlements obtained during the reference period 2000-2002.

This new instrument (the *single farm payment*) is considered to be 'more decoupled' than the previously used instruments (payments based on historical areas and heads of livestock) according to OECD (2006). The consequences of the CAP reform are therefore consistent with the goal to reduce the link between production decisions and agricultural support. From an allocative point of view, the recent reform therefore contributes to the attainment of four major objectives of the CAP as defined in Art. 33 of the EC Treaty: (i) enhance competitiveness of the farm sector, (ii) stabilise markets, (iii) assure the availability of supplies, and (iv) ensure reasonable consumer prices.

A fifth objective of CAP is 'to ensure a fair standard of living for the agricultural community, in particular by increasing the individual earnings of persons engaged in agriculture'. The consequences of the CAP reform for this objective are unknown because information on distributive effects of direct payments is rare and evidence on the distribution of farm household incomes is particularly difficult to obtain. A reason is that established information systems to measure the effects of CAP on farm incomes are not adequate for such an analysis, as recently corroborated by the Court of Auditors (2004).

The income indicator of the *farm accountancy data network* (FADN) – 'farm family income' – is tricky to interpret, because many agricultural holdings are organised as companies. In addition, the sample of farms providing the information is considered to be not representative. The *economic accounts for agriculture* (EAA) is a satellite account of the national accounts. Its main indicators are 'factor income' and 'net entrepreneurial income'. Besides the fact that the quality of data supplied by some Member States seems to be poor, these indicators are only provided at sector level. Distributional comparisons can therefore only be made across countries or with other sectors. Comparisons among farm holdings within the farming sector of a country are not possible using this source. The same is true for the statistics on the *income of the agricultural households sectors* (IAHS; see Eurostat, 2002). The methodologies of the underlying concept are not harmonized which 'cast[s] doubt on the possibility of comparing data supplied by member states' (Court of Auditors, 2004). In principle, IAHS would allow to compare non-farm household incomes with farm-household incomes, however this seems not to be possible in all member states.

Direct payments amounted to approximately 26 billions € in 2001, which is equivalent to one third of the EU budget and 21 % of factor income in the agricultural sector, or 4 thousand € per AWU (annual working unit) employed in farming (according to EAA methodology). In all the statistics mentioned above, direct payments are included in aggregates together with other support or income positions and therefore cannot be singled out.

In this paper, we take a closer view at distributional aspects of the current and future CAP instruments, using data on direct payments of the reference period on which single farm payments are based on. We show that their allocation among farms is profoundly different across EU-15 Member States. A key question is whether direct payments are – as other distributive policies – an instrument to enhance the equality/equity of farm incomes. We cannot

answer that questions conclusively but we make an attempt to contribute to the discussion on this issue. We compare the distribution of direct payments for farm holdings across member states. In addition, we compare these transfers with the distribution of social transfers for households within EU member states. For Austria we are able to show how market incomes, social transfers, direct payments, and other CAP transfers are distributed across farm households.

The paper is structured as follows: in the next chapter we review the literature on distributive consequences of the CAP on farm household incomes. Then we present a methodology to derive indicators from budgetary statistics which allow a comparison of transfer and income distributions. Presentations of data and comparisons of income and transfer indicators are provided in the result section. The paper addresses the need to establish better statistics to measure farm household incomes and ends with policy conclusions.

2 Previous studies

Since long, agricultural economists (e.g. Koester and Tangermann, 1976) have considered the introduction of direct payments as an important step to mitigate the negative effects of market price support, among them the strongly regressive distribution effects.

Over the last years, OECD has repeatedly looked at the various dimensions of the distribution of agricultural incomes (see e.g. OECD, 2003). OECD (1999) analyses the distributional effects of agricultural policies in the mid-90s using own structural data and support estimates. In detail, the report compares the distribution of support in relation to output and income in OECD countries. The report concludes that the distribution of market price support is very similar to the one of output, differences in output, support, and income across regions are less than those across farm types or size classes, and distributions of output, support, and income in the countries reviewed has shown little change over the last ten years.

The general development of income distribution is analyzed in a study by Foerster and Pellizzari (2000), again commissioned by OECD. This analysis shows trends and driving factors in income distribution and poverty in 21 OECD Member countries and reveals that joblessness is a key factor in explaining why poverty often increased for groups at risk, e.g. households with one earner. The authors maintain that there has been no long-term improvement with respect to the distribution of disposable household incomes since the mid-1970s.

Kurashige and Hwan Cho (2001) examine the incidence of low income as well as the impact of social security policies of OECD countries in agriculture. Farm households are delineated according to farm self-employment income, 'low farm income' is defined as a certain fraction of a national median income. Based on six indicators, the degree of low income and inequality in income distribution, both for farm households and non-farm households, is scrutinized. Key results are that "low income" is higher among farm households than among non-farm households and that income distribution shows a higher degree of inequality in farm households than in non-farm households, despite the fact that in many countries the farm sector receives significant benefits from the social security system.

Allanson (2003) explores the redistributive impact of Common Agricultural Policy reform with reference to the distribution of farming incomes in Scotland. The proposed measure of redistribution is based on the change in the absolute value of the Gini coefficient, which is valid even though average pre-support farming incomes would be negative. The main result of this study is that the distribution of support through direct payments has exacerbated the inequality of farm incomes in Scotland in 1999/00. Also the changes introduced by the 2003 CAP reform will have no effect on the given redistribution of farm incomes.

Moreover, Allanson (2005) explores the redistributive effect of classical horizontal inequities induced by agricultural support policy. 'Horizontal inequity' within farm types, defined as the differences in the level of support received by farms of a given type and the level of pre-support income, is traced back to systematic differences in support levels between commodity regimes. The paper shows that for Scottish farms the overall redistributive effect of horizontal inequity is substantial and that current agricultural policy is not able to target support for farms with low levels of income.

At a different result arrives Keeney (2000) in a study of Irish agriculture based on individual farm records. Results are derived from a decomposition of the Gini coefficient of family farm incomes into two components, direct payments and market-based income. Keeney demonstrates that the direct payment of the MacSharry reform induced a more equal distribution of family farm incomes in Ireland. In a similar study, Frawley and Keeney (2000) confirmed this result that suckler cow premiums and other headage payments were the most effective measures. Cross compliance schemes and the special beef premium had a more moderate effect in terms of equity and arable aid payments contributed least to farm income equity. The authors concluded that a high proportion of dairy farmers among those with high farm incomes may have influenced these results. The territorial dimension of CAP expendi-

tures has recently been analyzed by Shucksmith et al. (2005). Looking at the regional distribution of CAP payments and their contribution to cohesion objectives, the authors arrive at similarly disturbing results. They state that CAP payments in general do not support territorial cohesion, because more prosperous regions get higher levels of CAP transfers. Pillar 1 support, both per ha of agricultural land and per annual working unit (AWU) is concentrated in the prosperous northern areas of Europe. Pillar 2 support, while being somewhat more dispersed, still reaches primarily the richer regions of Europe. So, the territorial effects of the CAP are substantially uneven and in general run counter to the stated cohesion objectives. At a similar result with respect to the distribution of farm support between continental and mediterranean agriculture arrive Mora and San Juan (2004). They present evidence that for widely acceptable definitions of equality, mediterranean farming is discriminated compared to continental farming. This result is mainly due to the fact that smaller and more labor intensive farms are disadvantaged in the CAP framework.

Hence, with hardly any exceptions, most studies looking at distributional effects of the CAP result in quite negative judgments: the current instruments of the CAP do not prevent a substantial part of farmers from being among the poorest citizens of EU member states. At the same time, direct payments to high-income farm units clearly fuel vast income inequalities in this sector.

2 Data and Methods

2.1 Direct Payments across Farms in EU-15 Member States

The most up-to-date figures on the distribution of direct payments across farm holdings were published by EUROSTAT in 2006. The data cover a period from 2000 to 2003. For Greece, only data on the two most recent years are available. For our quantitative analysis we use data from 2001.

In 2001, 4.5 million holdings in 14 member states, for which data are published, got direct payments amounting to 24.9 billion € (see Table 1). The distribution of direct payments is skewed towards larger units: 1.5% of the recipients get 27% of the transfers. On the other end of the distribution, farms receiving less than 5,000 € (76% of the holdings) get 16% of direct payments.

Table 1: Farm structure and direct payments in EU-15 member states

	holdings	UAA	AWU	DP 2001		DP 2003	
		2003		volume	recipients	volume	recipients
	1,000	1,000 ha	1,000	mil €	1,000	mil €	1,000
BE	55	1,394	73	315	48	414	48
DK	49	2,658	61	704	62	802	57
DE	412	16,982	689	3,986	362	3,902	344
GR	824	3,968	616	1,271	924	1,392	892
ES	1,141	25,175	998	3,987	929	4,279	900
FR	614	27,795	914	6,500	460	7,380	442
IE	135	4,372	160	854	135	1,102	129
IT	1,964	13,116	1,477	3,225	1,660	3,128	1,651
LU	2	128	4	19	2	26	2
NL	86	2,007	186	237	78	351	78
AT	174	3,257	175	520	146	601	137
PT	359	3,725	455	472	263	494	230
FI	75	2,245	98	392	72	436	69
SE	68	3,127	71	523	67	612	60
UK	281	16,106	352	3,161	211	3,123	149
EU14	5,341	122,088	5,711	24,891	4,496	26,652	4,298
EU15	6,159	126,055	6,327			28,044	5,190

Note: Recipients of direct payments are not necessarily classified as "holdings" according to the 2003 farm structure survey. BE = Belgium, DK = Denmark, DE = Germany, ES = Spain, FR = France, IE = Ireland, IT = Italy, LU = Luxemburg, NL = Netherlands, AT = Austria, PT = Portugal, FI = Finland, SE = Sweden, UK = United Kingdom, GR = Greece. UAA = utilized agricultural area, AWU = annual working unit.
Source: Own calculation based on EUROSTAT (DP from EUROSTAT, 2005 and 2006; other data from New-Chronos).

2.2 Household income in the EU

The European Community Household Panel (ECHP) is a standardized multi-purpose annual longitudinal survey carried out at the level of the European Union. It is centrally designed and coordinated by the Statistical Office of the European Communities (Eurostat), and covers demographics, labor force behavior, income, health, education and training, housing, migration, and other variables of interest. Two major areas covered in considerable detail within the ECHP are the economic activity and personal income of the individuals concerned. These inter-relationships can be studied and compared across countries. Comparability is achieved through a standardized design and common technical and implementation procedures, with centralized support and co-ordination of the national surveys by Eurostat.

Based on these data, EUROSTAT regularly publishes statistics on the income situation, the distribution of incomes across all households and various types of households. Most of the statistics are available from the NewChronos data-base. According to our knowledge there is currently no study available which examines farm households based on these panel data.

Micro data of this panel are available and can be used to carry out very detailed distributional analyses. For the purpose of this paper we use existing analyses based on this panel. Therefore, the specific definitions of household sizes and monetary units are not in any case the same as in the reference group of farm households or farm holdings.

2.3 Farm Household Income in Austria

Data for the analysis of farm household income structure and distribution are from the Austrian FADN (LBG, 2001, 2002, and 2003). The dataset contains records of 2,350 farms in the year 2000, 2,276 farms in 2001, and 2,288 farms in 2002. In this analysis, average figures for 2,572 different farms are calculated from the three-year panel record to offset annual anomalies[1].

The Agricultural Census of 1999 (LFBIS, 2001) is used to describe agricultural structures in Austria. About 38% of all surveyed farms (209,710) are run by full-time farmers, 44% are run by part-time farmers in the narrower sense, and 18% are operated by retired farmers. The distribution of FADN-farms according to Alpine Farming Zones is shown in Figure 1 (see row "farms"). One third of the farms is located in mountainous regions, classified from zone one (moderately mountainous) to zone four (very mountainous farm land).

The analysis of farm household incomes reveals that most farms have several sources of income. In the following text "farm household income" is (a) the total of market revenues from agricultural and forest activities net of operating expenses, investments, and depreciation plus (b) farm policy transfers, and (c) other revenues (e.g. off farm incomes, pensions, family allowances) of the farm operator household. Category (b) transfers are accounted for in a differentiated manner in order to capture the particular policy instrument: direct payments and premiums of the program for rural development which consists of less favored areas payments, agri-environmental payments, and other payments.

2.4 Lorenz Curve Estimation and Concentration Ratio Computation

[1] The number of 2,572 farms results because some farms have left LBG and others have been included. Consequently, not for all farms are 3-year average figures available, but are still included in this analysis.

Using the data on direct payments published by EUROSTAT 2005, we estimate Lorenz curves and compute concentration ratios (CR) to measure the distributional effects of direct payments among EU Member States in 2001. Hence, the Lorenz curve relates the cumulative proportion of direct payment units (farm holding), x, to the cumulative proportion of direct payment received, y, when units are arranged in ascending order of their direct payments. The data of EUROSTAT (2005) provides ten classes of holdings (x) and direct payments received (y), of which cumulative proportions are calculated. We use the functional form proposed by Rasche et al. (1980) to estimate Lorenz curves. The explicit functional form is as follows:

$$(1) \qquad y = \left[1 - \left(1 - x\right)^{\alpha}\right]^{1/\beta} \quad where\ 0 < \alpha \le 1,\ 0 < \beta \le 1;$$

The function possesses the proper convexity and slope constraints to assure that it always lies in the lower triangle of the unit square (Rasche et al., 1980).

A variety of statistical tools are used to obtain a quantitative measure of the difference between observed and predicted data from the Lorenz model (equation 1). The ability of the Lorenz model to predict the observed data is tested with a simple linear regression model through the origin. Predicted data is regressed against observed data and the hypothesis of the regression slope being equal to one is tested (H_0: $\beta = 1$). The regression model is described with the *slope estimate* ($\tilde{\beta}$) in tables 6 to 8 in the appendix. The proximity of model predictions with respect to observed data is described with the *Mean Absolute Error (MAE*[2]*)*, the *Root Mean-Squared Error (RMSE*[3]*)*, and *Theil's inequality coefficient* (*Theil*[4]), all measures equal to zero when predictions are perfect.

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[2] $MAE = \frac{1}{n}\sum_{i=1}^{n}\left|\hat{y}_i - y_i\right|$, where $\hat{y}$ is the predicted value, y is the actual value of individual i = (1,...,n).

[3] $RMSE = \sqrt{\frac{1}{n}\sum_{i=1}^{n}\left(\hat{y}_i - y_i\right)^2}$, where $\hat{y}$ is the predicted value, y is the actual value of individual i = (1,...,n).

[4] $Theil = \frac{\frac{1}{n}\sum_{i=1}^{n}\left(\hat{y}_i - y_i\right)^2}{\sqrt{\frac{1}{n}\sum_{i=1}^{n}\left(\hat{y}_i\right)^2} + \sqrt{\frac{1}{n}\sum_{i=1}^{n}\left(y_i\right)^2}}$, where $\hat{y}$ is the predicted value, y is the actual value of individual i = (1,...,n), Pyndick and Rubinfeld (1981, pp. 364-365).

The computation of CR, the Concentration Ratio (Gini coefficient) is based on the functional form specified in equation (1). It is defined:

$$(2) \qquad CR = 1.0 - 2.0\int_0^1 \left[1-\left(1-x\right)^{\alpha}\right]^{1/\beta} dx,$$

substituting variables

$$(3) \qquad u = 1-\left(1-x\right)^{\alpha},$$

this is equal to:

$$(4) \qquad \begin{aligned} CR &= 1.0 - 2.0\left(\frac{1}{\alpha}\right)\int_0^1 \left(1-u\right)^{1/\beta} u^{1/\alpha-1}\, du \\ &= 1.0 - \frac{2.0}{\alpha} B\left(1/\alpha, 1/\beta+1\right) \end{aligned},$$

where B represents the beta distribution. It ranges between zero (absolute equality) and one (absolute inequality).

Austrian IACS (Integrated Administration and Control System) data from 2001 are examined to validate the results of the concentration ratio computation from estimated Lorenz curves. There are 139,188 farms that have received direct payments in 2001. On average, an Austrian farm has received about 4,000 € on direct payments ranging between 116 € and 960,000 € (standard deviation is 7764 €). Because a sufficient number of observations is available the concentration ratio (Gini coefficient) is computed according to Dixon et al., (1987, 1988).

$$(5) \qquad G = \frac{1}{\bar{x}n\left(n-1\right)} \sum_{i=1}^{n} \left(2i-n-1\right) x_i$$

Data is ordered by increasing size of individuals, n is the number of observation in the sample, x is the total of direct payments of farm i (i = 1,...,n), and $\bar{x}$ is the mean of direct payments. Lorenz Curve estimations, Concentration Ratio computations, and statistical tests are obtained in the software package SAS (8.2).

3 Income and transfer distributions in EU member states

3.1 Concentration of direct payments in EU member states

Table 2 summarizes major results of the estimations of Lorenz curves and Gini coefficients (concentration ratio, CR) for single Member States and EU14. The data show that the distributions of direct payments and agricultural land are very similar in most member states, with Ireland being a notable exception. For a better characterization of the distributional differences across member states, we report average direct payments, and median direct payments.

Table 2: Distribution of direct payments, agricultural land (UAA) and livestock units (LU)

	direct payments 2001					LU 2003	UAA 2003
	Gini coef.	y|x=0.1	y|x=0.9	average in €	median in €	Gini coefficient	
BE	59.28	0.0032	0.5644	6,537	3,834	0.7052	0.5678
DK	58.15	0.0025	0.5907	11,343	6,586	0.7976	0.5614
DE	71.66	0.0029	0.3905	11,003	4,202	0.7651	0.6824
GR	-	-	-	-	-	0.9131	0.6595
ES	75.25	0.0003	0.3874	4,294	1,167	0.9422	0.8077
FR	59.61	0.0013	0.5951	14,117	7,980	0.7775	0.6070
IE	57.96	0.0033	0.5819	6,310	3,811	0.5801	0.4648
IT	76.29	0.0005	0.3620	1,942	867	0.9727	0.7777
LU	49.78	0.0056	0.6632	8,591	6,758	0.5761	0.5166
NL	57.71	0.0037	0.5803	3,048	1,746	0.7476	0.5729
AT	60.11	0.0027	0.5599	3,569	1,856	0.7029	0.6099
PT	87.09	>0.0001	0.2060	1,793	756	0.9078	0.8301
FI	49.54	0.0076	0.6499	5,415	3,897	0.7986	0.4620
SE	64.00	0.0015	0.5265	7,788	3,831	0.7947	0.5842
UK	75.47	0.0001	0.4108	14,988	3,632	0.8079	0.7299
EU14	77.30	0.0002	0.3647	5,537	1,207	0.8935	0.7809
EU15	-	-	-	-	-	0.9012	0.7899

Note: CR = concentration ratio. DP = direct payment, UAA = utilized agricultural area, LU = livestock units.
Source: own calculation.

The distributions of direct payments are exemplarily characterized by two points on the estimated Lorenz curves. The two points indicate the percentage of total direct payments that have been received by the lowest 10 % (y|x=0.1), and 90 % (y|x=0.9). Some validation of computation of the Gini coefficient in equation 4 is obtained by using IACS data from Austria and the computation method from Dixon et al., (1987, 1988) (equation 5). According to this computation method, the Gini coefficient is 59, and therefore very close to 60 computed with the method described in equation (2).

4 Household incomes, social transfers and direct payments in EU member states

In Table 3 we report results of analyses based on the European Household Panel, which allows reliable comparisons across EU member states without Finland and Sweden. Data

from 1995 were used to analyze the effects of social transfers for household incomes. Results from 2001 are used to show how household income (including transfers and pensions) is distributed among all EU-15 member states. These figures are representative for all households, among them farm households.

Table 3: Mean equivalent per capita income and social transfers (in PPP) 1995 and median annual disposable (equivalised) household income (in PPP) 2001

	mean equivalent per capita income and social transfers 1995						median household income 2001	
	income w/o transfers	pensions	social transfers other than pensions			total income	median	CR
			average	1st qu.	5th qu.			
	€	€	€	%	%	€	€	
BE	9,245	2,600	1,896	42	9	13,741	15,477	28
DK	10,123	1,515	2,267	52	6	13,905	16,245	22
DE	10,187	2,616	992	50	7	13,795	15,820	27
GR	6,723	1,540	131	48	10	8,394	9,072	33
ES	6,673	1,575	742	54	6	8,990	10,878	33
FR	9,606	2,470	1,326	46	6	13,402	14,608	27
IE	8,176	1,659	1,337	56	4	11,172	13,223	29
IT	7,294	2,322	312	42	9	9,928	11,740	29
LU	16,582	3,710	1,878	41	11	22,170	23,960	27
NL	9,042	1,867	1,613	56	6	12,522	13,848	27
AT	9,658	2,657	1,338	37	9	13,653	15,780	24
PT	6,103	1,178	397	34	12	7,678	8,278	37
FI							12,800	27
SE							14,170	24
UK	10,130	1,554	1,629	58	6	13,313	14,973	35
EU-13	8,939	2,129	1,061	51	7	12,129		
EU-15							15,499	30

Note: 1st qu refers to recipients in th 1st quintile class and 5th qu refers to recipients in the 5th quintile class.
Source: Bulletin EU 10-1999 (en): 1.8.2 and EUROSTAT, NewCronos.

The differentiation between social transfers with and without pensions is vital because in some countries pensions are an important distributive instrument. In other countries the pensions are mainly based on own contributions and should therefore not compared to those in the other countries. To control for this effect, we report the average social transfers other than pensions in Table 3. These figures show that the average social transfer (excluding pensions) was highest in Denmark and at very similar levels (in PPP) in France, Ireland and Austria. The lowest transfers were observed in Greece and in Portugal. The figures on the distribution of these transfers show that in each country the recipients in the first quintile ('1st qu.') got the largest share of transfers, in many cases more than half of all transfers. The median household income of all EU-15 member states is reported in the last but one column of Table

3. Household incomes show a comparatively equal distribution in the Scandinavian countries, Austria, Netherlands, Germany, and France. Income disparity is largest in the United Kingdome and Portugal.

Table 4: Incomes and characteristics of farm households and direct payments per person

	source of income		relative income	persons / household	reference period	DP 2001 / farm holding per person in household	
	agric.	social transf.					
	%	%	%	persons	year(s)	mean	median
BE	67.7	10.7	1.02	2.7	97-99	2,407	1,412
DK	52.5	9.4	0.76	2.6	97-99	4,388	2,548
DE	37.6	5.5	0.46	3.8	91-93	2,911	1,112
GR	59.2	7.5	0.71	3.3	96-98	-	-
ES	58.5	8.4	0.84	3.9	90	1,098	298
FR	68.7	11.4	-[1)]	3.4	95	4,1524	2,347
IE	67.5	10.1	1.15	3.9	87	1,602	967
IT	59.4	12.6	0.83	3.2	93-95	600	268
LU	65.9	16.1	0.00	4.2	89	2,081	1,613
NL	77.8	5	2.24	3.4	95-97	887	508
AT	66.2	15.1	-	3.9	98-00	923	480
PT	57.0	10.3	0.43	3.5	89	508	214
FI	34.2	14.5	0.96	3.4	97-99	1,592	1,146
SE	24.7	26.8	0.76	2.3	95-97	3,351	1,649
UK	56.6	11	-	3.4	96-97	4,407	1,068

Notes: Size of farm households in FR and UK set to the average of other member states. DP: direct payments per agricultural holding 2001. [1)] For France relative incomes are not shown in quantitative terms. The verbal comment reads: data show "... that the average disposable income of agricultural households appeared to be above the all-household average, suggesting that agricultural households in France were not a particularly disadvantaged group as a whole in terms of income" (EUROSTAT, 2002).
Source: EUROSTAT (2002: IAHS data) and EUROSTAT (2005: direct payments); own assumptions and estimates.

When we compare Gini coefficients of household incomes with those of direct payments per farm holding we observe some similarities. Gini coefficients are relatively high in both cases in United Kingdom, Portugal and Spain. In Germany household incomes are relatively equally distributed when compared to other member states. However, mainly due to the large farms in its Eastern Bundesländer, we observe quite a high concentration of direct payments in Germany (Table 2).

In all EU member states, transfers (other then pensions) per capita in 1995 are lower than the (estimated) median and average direct payment per agricultural holding in 2001. However, if we control for the size of agricultural households (see column persons/household

in Table 4), average transfers per household are similar to direct payments per agricultural holding divided by the number of persons in agricultural households in many EU-member states (e.g. the Netherlands, Italy). For some other member states this definitely is not true (e.g. France). One reason may be that many holdings in France are organised as companies and therefore should not be compared to family farms. Another reason may be that France is a special case because of other reasons, like a national farm policy with clear structural goals.

Table 5: Income source decomposition of Austrian farms (2000-2002)

		mean of		median	min	max
	sample	1st qu.	5th qu.	of sample		
			1,000 €			
farm household income	40.9	22.4	56.1	36.5	-23.2	278.2
(1) market income	10.9	-9.7	41.8	6.6	-51.5	262.4
(2) off-farm income	6.9	0.03	24.1	1.2	0.0	62.0
(3) social transfers	5.5	0.0	13.9	4.3	0.0	50.9
(4) CAP-transfers per farm						
direct payment	6.6	0.73	17.6	4.4	0.0	76.4
less-favored area payment	2.2	0.12	6.1	1.5	0.0	16.3
agri-environmental payment	6.8	1.31	15.7	5.4	0.0	59.3
investment aids and others	2.1	0.0	7.8	0.6	0.0	61.6
CAP transfers per hectare	0.5	0.18	0.76	0.5	0.0	3.7
farm and forest land (in ha)	46.0	12.6	106	36.0	0.4	558.0

Notes: Sample size: 2,572 farms of the Austrian FADN. 'Market income' is agricultural and forest market income, 'social transfer' are family allowances plus pensions, 'others' are investment aids and others.
1st qu refers to the average in th 1st quintile class and 5th qu refers to the average in the 5th quintile class.
Source: own calculation, based on LBG, various years.

The Austrian data set allows us to take a closer look at the combination of general social policies (in this case including pensions) and CAP transfers of different sources (see Table 5). The data are from FADN and therefore not representative for all farm households, because the smallest and largest holdings are not represented. The detailed differentiation between sources of income shows that many farms could not stay in business if there were no transfers (negative market income in the 1st quintile). A comparison between quintiles shows that the relatively equal distribution of 'farm household incomes' is the consequence of very unequal transfers. In the case of less favored area (LFA) payments the situation is the following: farms in mountainous regions get a median of 2,446 € (mean is 2,871 €) while those in the plains do not get support from this source. Analyses based on the whole sample (Schmid, Hofreither and Sinabell, 2006) show that less favored area payments are contributing to a more equal distribution of farm incomes while the other CAP transfers do not.

5 Conclusions and Discussion

In this analysis we used data on the distribution of direct payments in EU member states to calculate indicators which allow a comparison of distributional effects between and within countries. The distribution varies significantly among EU member states. Many of the smaller countries have comparable low concentration rates, while Portugal, United Kingdom, and Germany have very high ones.

A comparison between distributions of direct payments for farm holdings with incomes of all households shows a certain pattern. In many cases (with the exception of Germany) concentration rates of household incomes are high where direct payments are also very concentrated. Such country specific distribution patterns can be interpreted as a deliberate public choice to accept more inequality.

The level of social transfers per capita varies considerably across EU member states. Its absolute level, however, is in many cases quite similar to the level of direct payments when they are calculated per farm and divided by the number of persons in farm households. This result has to be interpreted with some caution because farm households and farm holdings are quite different entities in many countries. Another caveat has to be kept in mind: farm households benefiting from direct payments are among households getting social transfers.

One result, however, is very robust: lower income households get substantially more social transfers (excluding pensions) than higher ones. This result holds in every EU member state. Considering direct payments, the opposite is true: transfers are concentrated at larger holdings. An analysis of Austrian farm households shows that some instruments of the CAP, in particular support for farms in less favoured areas, is counterbalancing this effect. Therefore, what is true for direct payments is not necessarily true for other CAP payments.

In general, concerns about farm income distribution can be seen as facets of a discussion about distributive justice, which focuses on what is just or right with respect to the allocation of goods (or utility) in a society. Distributive justice concentrates on just outcomes and has been prominently –with a different focus – analysed by philosophers like John Rawls (1971) and Robert Nozick (1974). With respect to agriculture the interesting sub-branch of this theoretic discussion is entitlement theory where researchers are looking at the history of actions which have led to the current situation.

The question whether the actual distribution of CAP payments is just or unjust appeals to the historic development of the CAP. Following Nozick the current distribution of economic benefits in agriculture is just if these benefits have been justly acquired initially, and all later actions were “non-aggressive and consensual”. Hence, in accepting the democratic correctness of the decision process underlying agricultural policymaking, the legitimacy of the current effects of agricultural policy would hinge upon the correctness of its starting position in the past.

However, the early stages of European agricultural policy, with trade measures aiming at establishing high price levels at domestic markets, have recurrently been criticized by economists, who pointed out the regressive distributional effects of such policies. They proposed transitional direct payments as a viable alternative to mitigate these shortcomings.

Actually, direct payments have become a central element of agricultural policy making since the beginning of the 90s. However, the specific form in which such support has been introduced was not in line with the suggestions of economic science. The uneven distribution of benefits emerging from agricultural policies based on market price support, have carried on to subsequent reforms following the formula 'income compensation' for price reductions.

The potential of direct payments, to correct for the shortcomings of market price policies was widely left idle. As a consequence of the 1992 reform even substantial 'overcompensation' occurred (particularly grain farmers). Initially, the introduction of area and livestock payments was seen as the price for a system change in the "McSharry Reform" of 1992. A similar course of action has followed in the CAP reforms 1999 and 2003, which is more difficult to understand from a purely economic point of view. As a bottom line, the decoupled payments in their various forms left income distributions within European Agriculture more or less unchanged. If the CAP is developing into policy with a clearer distributive focus aiming at poverty alleviation, the system of direct payments needs to be overhauled considerably.

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Appendix

Table 6: Lorenz Curve parameter estimates, Standard Errors, and Goodness of Fit Measures for Direct Payments among Member States and EU14 (n=10)

Member	Parameter Estimates		Standard Error		Goodness of Fit Measures			
State	$\hat{\alpha}$	$\hat{\beta}$	$\hat{\alpha}$	$\hat{\beta}$	$\tilde{\beta}$	RMSE	MAE	Theil
EU14	0.5501	0.3281	0.00421	0.00427	0.999*	0.0027	0.0277	>0.00001
BE	0.6177	0.4824	0.0195	0.0212	1.006	0.0080	0.0727	0.00004
DK	0.6797	0.4455	0.00345	0.00320	0.999*	0.0013	0.0122	>0.00001
DE	0.3943	0.5493	0.0149	0.0313	0.997*	0.0130	0.1150	0.00014
ES	0.5372	0.3616	0.00389	0.00431	0.999*	0.0024	0.0226	>0.00001
FR	0.7389	0.3881	0.00330	0.00257	0.999*	0.0012	0.0091	>0.00001
IE	0.6432	0.4765	0.00591	0.00628	0.999*	0.0022	0.0184	>0.00001
IT	0.4775	0.3986	0.00838	0.0115	0.997*	0.0058	0.0594	0.00002
LU	0.7302	0.5014	0.0105	0.00969	1.000*	0.0025	0.0185	>0.00001
NL	0.6307	0.4899	0.0146	0.0163	1.002*	0.0061	0.0495	0.00002
AT	0.6253	0.4663	0.0109	0.0118	1.003	0.0047	0.0414	0.00001
PT	0.4247	0.2986	0.0404	0.0526	0.984*	0.0357	0.0350	0.00091
FI	0.6772	0.5478	0.0102	0.0113	0.999*	0.0028	0.0211	>0.00001
SE	0.6248	0.4222	0.00445	0.00449	0.999*	0.0020	0.0182	>0.00001
UK	0.6622	0.2759	0.00583	0.00438	0.999*	0.0028	0.0244	>0.00001

Note: BE = Belgium, DK = Denmark, DE = Germany, ES = Spain, FR = France, IE = Ireland, IT = Italy. LU = Luxemburg, NL = Netherlands, AT = Austria, PT = Portugal, FI = Finland, SE = Sweden, UK = United Kingdom. RMSE = Root Mean-Squared Error, MAE = Mean Absolute Error, and Theil = Theil's inequality coefficient.

* is not significant different from one (ρ-value > 0.05).

Source: own calculation.

Table 7: Lorenz Curve parameter estimates, Standard Errors, and Goodness of Fit Measures for Utilized Agricultural Area among Member States, EU14, and EU15 (n=8)

Member	Parameter Estimates		Standard Errors		Goodness of Fit Measures			
State	$\hat{\alpha}$	$\hat{\beta}$	$\hat{\alpha}$	$\hat{\beta}$	$\tilde{\beta}$	RMSE	MAE	Theil
EU14	0.5515	0.3180	0.0122	0.00991	0.999*	0.0040	0.0258	0.00002
BE	0.7488	0.4109	0.00564	0.00430	1.001*	0.0018	0.0121	>0.00001
DK	0.6530	0.4896	0.0160	0.0134	0.999*	0.0034	0.0202	0.00002
DE	0.4729	0.5072	0.00759	0.00898	1.000*	0.0025	0.0140	>0.00001
ES	0.3989	0.4129	0.0168	0.0206	0.999*	0.0057	0.0405	0.00004
FR	0.8234	0.3268	0.00847	0.00466	1.000*	0.0018	0.0121	>0.00001
IE	0.6782	0.5851	0.00314	0.00328	1.000*	0.0010	0.0065	>0.00001
IT	0.4267	0.4270	0.0122	0.0181	0.999*	0.0071	0.0467	0.00004
LU	0.9335	0.3517	0.0190	0.0103	1.000*	0.0043	0.0252	0.00002
NL	0.7162	0.4282	0.0190	0.0155	1.002*	0.0063	0.0379	0.00004
AT	0.4770	0.6003	0.0158	0.0247	1.001*	0.0075	0.0496	0.00005
PT	0.2378	0.5916	0.0113	0.0287	0.999*	0.0061	0.0403	0.00004
FI	0.7132	0.5578	0.00455	0.00443	0.999*	0.0014	0.0089	>0.00001
SE	0.6173	0.4929	0.0139	0.0127	0.999*	0.0035	0.0227	0.00001
UK	0.5683	0.3641	0.00454	0.00321	1.000*	0.0007	0.0050	>0.00001
GR	0.5140	0.4953	0.00864	0.0130	0.999*	0.0047	0.0318	0.00002
EU15	0.5378	0.3174	0.0150	0.0126	0.999*	0.0052	0.0343	0.00003

Note: BE = Belgium, DK = Denmark, DE = Germany, ES = Spain, FR = France, IE = Ireland, IT = Italy. LU = Luxemburg, NL = Netherlands, AT = Austria, PT = Portugal, FI = Finland, SE = Sweden, UK = United Kingdom, GR = Greece.

[1)] no standard error is approximated because the parameter estimate is bounded with 1.

RMSE = Root Mean-Squared Error, MAE = Mean Absolute Error, and Theil = Theil's inequality coefficient.

* is not significant different from one (ρ-value > 0.05).

Source: own calculation.

Table 8: Lorenz Curve parameter estimates, Standard Errors, and Goodness of Fit Measures for Livestock Units among Member States and EU14 (n=9)

Member State	Parameter Estimates		Standard Errors		Goodness of Fit Measures			
	$\hat{\alpha}$	$\hat{\beta}$	$\hat{\alpha}$	$\hat{\beta}$	$\tilde{\beta}$	RMSE	MAE	Theil
EU14	0.6203	0.1552	0.0269	0.0131	1.004*	0.0121	0.0953	0.00016
BE	0.7518	0.2744	0.0218	0.0121	1.002*	0.0067	0.0512	0.00005
DK	0.7445	0.1950	0.00789	0.00397	1.000*	0.0024	0.0176	>0.00001
DE	0.5779	0.3176	0.0226	0.0181	1.003*	0.0096	0.0756	0.00010
ES	0.5412	0.1284	0.0133	0.00675	1.001*	0.0070	0.0540	0.00006
FR	0.7191	0.2244	0.0489	0.0252	1.008*	0.0162	0.1233	0.00028
IE	0.5859	0.5261	0.0224	0.0242	1.005*	0.0077	0.0467	0.00006
IT	0.4785	0.1021	0.0146	0.00717	1.001*	0.0088	0.0674	0.00009
LU	1.0000	0.2690	-[1)]	0.00901	1.013*	0.0135	0.0928	0.00019
NL	0.6742	0.2762	0.0343	0.0222	1.002*	0.0129	0.0983	0.00020
AT	0.6778	0.3186	0.0166	0.0123	1.001*	0.0071	0.0513	0.00004
PT	0.3724	0.2837	0.00694	0.00847	0.999*	0.0050	0.0309	0.00003
FI	0.7206	0.2045	0.0439	0.0242	1.005*	0.0180	0.1417	0.00030
SE	0.6084	0.2660	0.0155	0.0109	1.003*	0.0067	0.0540	0.00005
UK	0.6516	0.2287	0.0196	0.0114	1.002*	0.0078	0.0583	0.00007
GR	0.5752	0.1520	0.0206	0.0117	1.006*	0.0116	0.0760	0.00011
EU15	0.6161	0.1485	0.0249	0.0119	1.004*	0.0114	0.0891	0.00015

Source: own calculation.

Note: BE = Belgium, DK = Denmark, DE = Germany, ES = Spain, FR = France, IE = Ireland, IT = Italy. LU = Luxemburg, NL = Netherlands, AT = Austria, PT = Portugal, FI = Finland, SE = Sweden, UK = United Kingdom, GR = Greece.

[1)] no standard error is approximated because the parameter estimate is bounded at 1.

RMSE = Root Mean-Squared Error, MAE = Mean Absolute Error, and Theil = Theil's inequality coefficient.

* is not significant different from one (ρ-value > 0.05).