Vertical and horizontal decomposition of farm income inequality in Greece

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Abstract

Policy makers intervene in agriculture aiming to achieve a wide range of socioeconomic objectives, one of which is concerned with the improvement of farm income. Despite continuous reforms in agricultural policies, concern about inequality remains very strong given both the highly skewed income distribution and the heterogeneity among farms. This paper aims to empirically examine the distributional implications of CAP reforms on farm income in Greece, estimating Gini coefficients and Generalized Entropy measures to explain inequality through vertical and horizontal decomposition. The results show that disparities are linked to structural factors such as size, specialization and region, owing mainly to subsidies tied to output.

Key words: *Income inequality, Agricultural policy, Micro Analysis of Farm Firms*

Introduction

Policy makers intervene in agriculture aiming to achieve a wide range of socioeconomic objectives, one of which is concerned with the improvement of farm income. The dispersion of government support benefits across farmers essentially affects distributional goals of maintaining an adequate standard of living for farmers and minimizing income disparities. Despite continuous reforms in agricultural policies, concern about inequality remains very strong given both the highly skewed income distribution and the heterogeneity among farms.

The early stages of the Common Agricultural Policy (CAP) in the European Union, intended to establish high price levels at domestic markets with trade measures, have been criticized due to the regressive distributional effects of such policies on farm income. Market price support payments are considered relatively ineffective in income transfer efficiency terms, allowing a large share of government support to be directed to unintended recipients (OECD, 1996). Transitional direct payments were proposed as a viable alternative to mitigate these shortcomings, whereas the range of concern has been expanded to new issues such as the environment, sustainability and rural development. However, government support continues to leave agricultural income distributions within Europe more or less unchanged. Recently, fully decoupled payments were introduced, as they are expected to correct market outcomes according to politically determined objectives through more effective income transfers to farmers. This type of support is anticipated to minimize economic distortions and distributive leakages, since the effects on production decisions are minimal (OECD, 2003).

Despite the profound CAP reforms and the renewed interest in the welfare aspect of the CAP, the unequal distribution of income and government support is continuously considered an essential reason for CAP's reduced effectiveness. Government support is

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unequally distributed among farms and often concentrated on a small number of commodities, in certain regions and on larger farms, thereby alleviating income disparities (OECD, 2003). For instance, in Ireland, the distribution of farm income appears to have altered substantially over the MacSharry CAP reform period, owing to the partial substitution of market price support by direct payments. The distribution of direct payments has actually become more unequally distributed since then (Keeney, 2000). In Scotland, the same effect is observed introducing direct payments, and the Fischler CAP reform seems to have no effect on the given redistribution of farm income (Allanson, 2003). Moreover, Mediterranean farming is discriminated compared to continental farming, due to the fact that smaller and more labor intensive farms are disadvantaged in the CAP framework (Mora and San Juan, 2004). Overall, most studies looking at the distributional effects of the CAP conclude that, in the EU, poorer farms benefit more from government support than richer one, but larger (and high income) farms get more direct payments than smaller ones. As a result, direct payments, which are linked to the acreage of farms, cannot be considered an effective instrument to ensure a fair standard of living for farms, since such instruments do not prevent a substantial part of farmers from being among the poorest citizens of the EU member states (Schmid *et al.*, 2006).

Consequently, changes in agricultural policy instruments from market price support to (fully) decoupled payments have undoubtedly affected farm income, and the related increase in transparency with respect to the distribution of government support have gradually increase the awareness of the distributional problem. This paper, therefore, aims to empirically examine the distributional implications of CAP reforms on farm income in Greece, presenting the most effective instruments in favoring income distribution equity and evaluating them with regard to the operational criteria of targeting.

In particular, Gini coefficients and Generalized Entropy measures of inequality are computed to explain inequality through decomposition of the levels of farm income inequality and changes in its components. The decomposition is both vertical and horizontal. Vertical decomposition into the contributions of the various sources of farm income and subpopulations determine the distributional implications of government support and examine whether their magnitude depends on farm location, specialization, and economic size. Horizontal decomposition into within and between subpopulations inequality determine farm income inequality within group and between groups. The linked Lorenz curves are also presented, whereas bootstrapping techniques are used to examine the robustness of the results. Farm income is disaggregated by income source into income from government support and net income from market sources. The analysis covers three sequent CAP regimes, based on the (1992) MacSharry CAP reform, the Agenda 2000 CAP reform, and the (2003) Fischler CAP reform. Data is retrieved by the FADN (Farm Accountancy Data Network) database for the years 1998 (4,700 farms), 2002 (4,054 farms) and 2007 (3,934 farms)[2].

The rest of the paper is organized as follows. Section 2 describes the methodology used to measure and decompose income inequality. The following section reviews the level, sources and distribution of farm income in recent years, providing details of the data used. Section 4 presents and discusses the empirical results, whereas conclusions and policy implications are included in the final section.

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[2] Source: "EU-FADN – DG AGRI L-3".

Methodology

The impact of CAP reforms on the distribution of farm income in Greece will be measured using as inequality measure, the Gini coefficient (Gini, 1921), and its decomposition by source of income and subpopulations. The Lorenz curves (Lorenz, 1907) based on the estimations of the inequality measures are also presented, as well as a family of inequality indices originating from quite different considerations.

Following Lerman and Yitzhaki (1985), the Gini coefficient for total income inequality, G, can be represented by:

$$G = \sum_{k=1}^{K} S_k G_k R_k$$

(1)

where S_k denotes the share of component k in total income, G_k is the source Gini corresponding to the distribution of income from source k, and R_k is the Gini correlation of income from source k with the distribution of total income. If an income source represents a large share of total income, it may potentially have a large impact on inequality. However, if it is equally distributed ($G_k = 0$), it cannot influence inequality, even if its magnitude is large. On the other hand, if this income source is large and unequally distributed (S_k and G_k are large), it may either increase or decrease inequality, depending on which individuals earn it at which points in the income distribution. Moreover, if this income source is unequally distributed and flows disproportionately toward individuals at the top of the income distribution (R_k is positive and large), its contribution to inequality will be positive. However, if it is unequally distributed but targets poor individuals, it may have an equalizing effect on the income distribution, and the Gini coefficient may be lower with this income source than without it.

Moreover, using the Gini decomposition by income source, the effect of changes in a particular component (e.g. government support) on inequality can be estimated, holding income from all other sources constant. Assuming an income change from source k to be equal to ey_k, where e is close to 1, then it can be shown that the partial derivative of the Gini coefficient with respect to a percentage change e in source k is equal to:

$$\partial G / \partial e = S_k (G_k R_k - G)$$

(2)

The percentage change in inequality resulting from a small percentage change in income from source k is, therefore, equal to its initial share in inequality minus its share in total income. Consequently, if the Gini correlation between an income source and total income, R_k, is negative or zero, an increase of this source necessarily decreases inequality. If the Gini correlation is positive, then the impact on inequality depends upon the sign of $(G_k R_k - G)$. A necessary condition for inequality to increase is that the inequality of this source must exceed the inequality of total income; i.e. $G_k \succ G$ (since $R_k \le 1$).

A number of additional inequality measures will also be computed in this paper following Cowell (1995). These are the Generalized entropy class, E_θ, and its prominent members; i.e. the Theil index, T, the Mean logarithmic deviation, L, and half the squared coefficient of variation, c. The general formula for the Generalized entropy indices is:

$$E_\theta = \frac{1}{\theta^2 - \theta}\left[\frac{1}{n}\sum_{i=1}^{n}\left(\frac{y_i}{\bar{y}}\right)^\theta - 1\right]$$

(3)

where y_i is the income of individual i, and $\bar{y}$ is the mean income for n individuals in the population and for $\theta \neq 0,1$. Different values of θ correspond to differences in the sensitivity of the inequality index to differences in income shares in different parts of the income distribution. The more negative θ is, the more sensitive is the index to differences in income shares among the poor. The more positive θ is, the more sensitive is the index to differences in income shares among the rich.

For $\theta = 0$, the so-called Mean log deviation can be derived, which is the average deviation between the log income shares and the log shares that would represent perfect equality. The Theil index is given by E_θ, for $\theta = 1$. This index is always positive and if it is equal to zero, perfect equality prevails. Moreover, half the square of the coefficient of variation is denoted by E_θ, for $\theta = 2$, assuming that the coefficient of variance is the standard deviation divided by the mean.

Apart from decomposing inequality by income source, these measures can be used to decompose inequality by subpopulations, based on farms economic size, regions and specialization. To analyze inequality within and between groups in the population, let there be l such groups so that every individual belongs to one and only one group, while the proportion of the population falling in group j be fj. Assuming that the mean income in group j is given by $\bar{y}_j$, and that the share of group j in total income is g_j, E_θ can be measured as follows:3

$$I_{total} = I_{between} + I_{within} = \left[\frac{1}{\theta^2-\theta}\left(\sum_{j=1}^{l}f_j\left(\frac{\bar{y}_j}{\bar{y}}\right)^\theta - 1\right)\right] + \left[\sum_{j=1}^{l}w_jI_j\right]$$

(4)

where $w_j = g_j^\theta f_j^{1-\theta}$. The between group component of inequality is found by assuming that everyone within a group receives that group's mean income; whereas the within group inequality is a weighted average of inequality in each subpopulation, although the weights, w_j, do not necessarily sum to one.4.
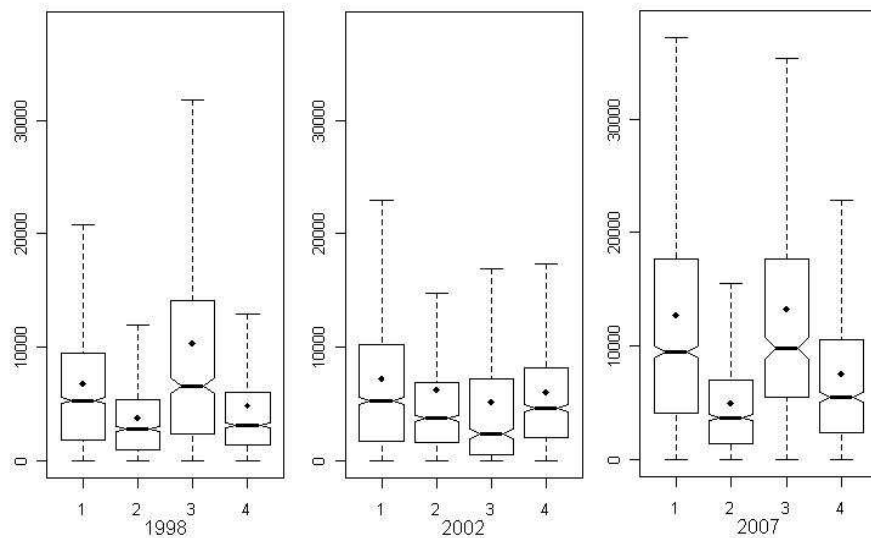
Farm Income and Government Support

Factors such as farms location, economic size and specialization affect total farm income. Using the FADN database, farms located in Thessaly appear to have the highest average income in 1998 and 2002 (€22,000 and €32,000, respectively), whereas in 2007, farms in Macedonia-Thrace are ranked first with €43,000. For farms located in Epirus-Peloponnese-Ionian Islands, the Agenda 2000 reform has the highest impact on their income, while the Fischler's reform the smallest. Owing to differences in farm size (stremmas of land) and in levels of government support between commodities, there are also income disparities between farm types, although they are not as large as between

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3 The following stand: $g_j = f_j\bar{y}_j / \bar{y}$, $\sum_{j=1}^{l}f_j\bar{y}_j = \bar{y}$, $\sum_{j=1}^{l}g_j = 1$, and $\sum_{j=1}^{l}f_j = 1$.

4 The within group component weights will only sum to one if $\theta = 0$ (the case of *L*) or if $\theta = 1$ (the case of *T*).

farms classified by their economic size. Overall, the largest farms, and often the wealthiest, are the main beneficiaries of the CAP reform, indicating that government support is inequitable.

Figure 1 - Government support

Note: 1: Macedonia-Thrace, 2: Epirus-Peloponnese-Ionian Islands,
3: Thessaly, 4: Central Greece-Aegean Islands-Crete.
Source: own calculations using the FADN dataset.

The share of government support in total farm income, in 1998, was 39.4% in Thessaly, 30% in Macedonia-Thrace and about 20% in the other regions. In 2002, this share has decreased only in Macedonia-Thrace and Thessaly. In the latter, the reduction was more than 20%, although farms in this region have the highest average income. The Fischler's reform has increased farm subsidies for all regions except Epirus-Peloponnese-Ionian Islands and overall, it has led the share of government support in total farm income very close to that of the Agenda 2000. When farms are differentiated by their economic size, the share of government support in total farm income varies in 1998 from 20% to 37%. As expected, the highest share is found for the largest farms (more than 40 ESU), while small farms are less dependent on support than large ones. These figures are lower for the year 2002, whereas they increase in 2007. While the small and medium farms (0 to 16 ESU) experienced a reduction in the share of government support in their income in 2002, the highest reduction is observed for the largest farms, as their share was reduced to 22%. For 2007, all shares have increased, with the highest change to be observed for the very small farms, as their share increased by almost 30%. In terms of farms specialization, government support was reduced for crop producers, while the opposite effect is observed for livestock producers in 2002. As a result, crop producers that received 2.1% higher subsidies than the average support in 1998 ended up receiving 3.4% lower subsidies than the average in 2002. On the other hand, livestock producers moved from -11.5% to 18.4% in the same years. For the year 2007, it is observed that both crop and livestock producers have received higher support, while a 50% increase in support for crop producers resulted in a similar average support as for livestock producers. These figures indicate that a significant part of total

farm income is derived from the market and not from the CAP schemes. Additional information is provided by the box-plot charts illustrated in Figure 1 where the median of government support for the different CAP regimes at a regional-level is presented. The mean is also marked by a dot for comparison reasons.

## Empirical Results

Decomposing inequality by income sources

The Lorenz curves estimated show that disparities between farms in terms of the distribution of government support exist, owing to differences in levels of commodity support and location (Figure 2). It is obvious that total income and support are distributed more equally in Macedonia-Thrace than in the other regions under all CAP regimes. In all three regions apart from Thessaly, income distribution is less equal after the implementation of the Agenda 2000. However, government support is markedly more concentrated than total farm income. In Macedonia-Thrace and Central Greece-Aegean Islands-Crete, changes in the distribution of support were smaller and almost identical, although income inequality is higher in the other two regions after the Agenda 2000. Note further that the dispersion of government support decreased significantly only in Thessaly between 2002 and 2007.

Table 1 presents the Gini coefficients resulting from different income sources. Based on the first column, agricultural income comprises the majority of total farm income. It is obvious that, for instance, the contribution of government support to farm income ranges from 34.2% of total farm income in Thessaly to 15.0% in Epirus-Peloponnese-Ionian Islands, for 2007. The results included in the second column point out the importance of government support in reducing farm income disparities. In all regions, income inequality decrease when government support is considered. In Macedonia-Thrace, for example, Gini drops by 6.2, 4.1 and 4.7 percentage points when subsidies are included for the three CAP regimes, respectively. The Agenda 2000 reform has led to a significant positive percentage change of the Gini coefficient for all regions except of Thessaly, where the change was small. On the other hand, the Fischler reform had an indiscernible impact on income distribution with very small changes of the Gini coefficient (2%-3%), which is positive for Macedonia-Thrace and Central Greece-Aegean Islands-Crete and negative for the other regions. However, the Gini coefficients for the subsidies appear to increase after the Agenda 2000 CAP reform at the national as well as the regional level, followed by a reduction only under the latest examined CAP reform. The only exception is the one of the region Central Greece-Aegean Islands-Crete, whereas the highest changes are observed in Thessaly.

In terms of the Gini correlations, the variation observed in the different regions under the three different CAP regimes is striking. An income source may be unequally distributed yet favor the poor, as is the case for subsidies. Subsidies that have an unequalizing effect on total income inequality are highly correlated with total income in Thessaly in 1998 (0.80), while in 2002 and 2007 the correlation appears to be much lower (0.46 and 0.67 respectively), indicating that the McSarry reform favors the rich more than the Agenda 2000 and the Fischler reforms. The importance of the Gini correlation is also evident when the percentage contribution of each income source is compared to total farm income inequality. Although a 1% increase in government support, other things

being equal, reduces the Gini coefficient of total income by 0.030% and 0.047% in 2002 and 2007 respectively, the opposite effect is observed in 1998.

Figure 2 - Evolution of the concentration of total farm income and government support per region
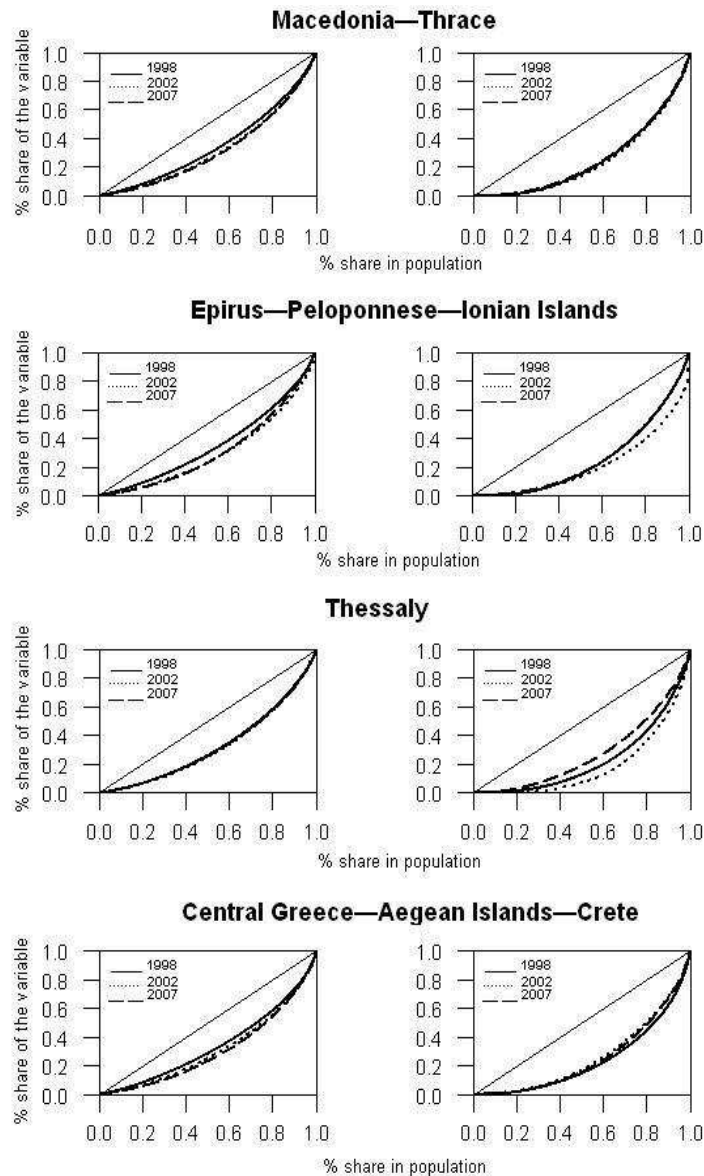
Source: own calculations using the FADN dataset.

Moreover, the difference between the impacts of small changes in both income sources upon inequality in the different regions is large. A 1% increase in subsidies reduces inequality in Macedonia-Thrace, but increases inequality in Thessaly in 1998. Thus, the impact of marginal changes in government support upon inequality as captured by the Gini coefficient is ambiguous. It depends essentially upon where farmers are situated in the overall farm income distribution, the share of government support in farm income, the distribution of the support itself, and the location of the farm.

Table 1 - Gini decomposition by income source

Income source	Share in total ncome (S_k)			Income source Gini (G_k)			Gini correlation with total income rankings (R_k)			Share in total income inequality			% Change in Gini from a 1% change in income source[*]		
	1998	2002	2007	1998	2002	2007	1998	2002	2007	1998	2002	2007	1998	2002	2007
							Greece								
Agricultural income	0.731	0.785	0.751	0.352	0.417	0.428	0.895	0.953	0.945	0.719	0.827	0.788	-0.012 (-.025, .001)	0.041 (.010, .058)	0.037 (.028, .045)
Subsidies	0.269	0.215	0.249	0.545	0.547	0.524	0.615	0.558	0.628	0.281	0.174	0.212	0.012 (-.001, .025)	-0.041 (-.058, -.010)	-0.037 (-.045, -.028)
Total income				0.320	0.378	0.385							(.312, .329)	(.366, .394)	(.377, .394)
							Macedonia-Thrace								
Agricultural income	0.695	0.758	0.704	0.371	0.400	0.420	0.876	0.937	0.932	0.732	0.792	0.739	0.037 (.018, .056)	0.033 (.020, .048)	0.035 (.020, .048)
Subsidies	0.305	0.242	0.296	0.502	0.522	0.488	0.541	0.592	0.674	0.268	0.208	0.261	-0.037 (-.056, -.018)	-0.033 (-.048, -.020)	-0.035 (-.048, -.020)
Total income				0.309	0.359	0.373							(.298, .320)	(.347, .370)	(.361, .385)
							Epirus-Peloponnese-Ionian Islands								
Agricultural income	0.823	0.799	0.850	0.318	0.425	0.424	0.961	0.972	0.981	0.829	0.815	0.906	-0.001 (-.018, .017)	0.016 (-.075, .071)	0.056 (-.046, .066)
Subsidies	0.171	0.201	0.150	0.504	0.587	0.494	0.609	0.635	0.496	0.171	0.185	0.094	0.001 (-.015, .018)	-0.016 (-.071, .075)	-0.056 (-.066, .046)
Total income				0.306	0.405	0.391							(.289, .322)	(.371, .457)	(.375, .406)
							Thessaly								
Agricultural income	0.606	0.842	0.658	0.339	0.394	0.418	0.843	0.952	0.911	0.498	0.872	0.705	-0.108 (-.128, -.084)	0.030 (.004, .055)	0.047 (.015, .082)
Subsidies	0.394	0.158	0.342	0.550	0.635	0.454	0.805	0.461	0.675	0.502	0.128	0.295	0.108 (.084, .128)	-0.030 (-.055, -.004)	-0.047 (-.082, -.015)
Total income				0.348	0.362	0.355							(.329, .368)	(.345, .380)	(.328, .388)
							Central Greece-Aegean Islands-Crete								
Agricultural income	0.801	0.785	0.793	0.350	0.446	0.445	0.952	0.967	0.969	0.815	0.868	0.855	0.014 (-.011, .039)	0.083 (.065, .099)	0.062 (.046, .078)
Subsidies	0.199	0.215	0.207	0.533	0.477	0.498	0.572	0.501	0.564	0.185	0.132	0.145	-0.014 (-.039, .011)	-0.083 (-.099, -.065)	-0.062 (-.078, -.046)
Total income				0.328	0.390	0.400							(.305, .354)	(.361, .431)	(.380, .423)

[*]: 95% bias-corrected bootstrapped percentile confidence intervals in parentheses.

Decomposing inequality by subpopulations

In this subsection, total inequality is decomposed into the abovementioned between group and within group inequality. Differentiating farms by location, the between groups component accounts for just 3.4% of the overall inequality, whereas the within groups share is 9.1% for the year 1998 (Table 2). This means that the elimination of income differences between groups of farms will not reduce total inequality by more than 3.4%. Accordingly, policies aiming at the reduction of inequalities within each farm category will contribute more to the reduction of total income inequality. Under the Agenda 2000, the within group inequality increases further, so that the total Gini coefficient also increases by 18%. The redistributive effect of the within groups component still exceeds that of the between groups, though the latter was slightly reduced. Remarkable is the reduction of the within groups component for government payments under the Fischler reform in comparison to those under the previous CAP regimes. Similar arguments can be derived differentiating farms by specialization. However, when farms are grouped by their economic size, the impact of the within groups component is much lower than that of the between groups. In general, it can be argued that between group inequality arises from systematic differences in farms economic size, whereas within group inequality is associated with differences in the level of support between commodity regimes. The results obtained using only government support are in accordance to those for total farm income.

Table 2 - Gini coefficients, Generalized entropy measures and their decompositions

		Total inequality			Between group inequality			Within group inequality		
		Gini coefficients								
		1998	2002	2007	1998	2002	2007	1998	2002	2007
ESU	*Income*	0.320	0.378	0.385	0.222	0.280	0.282	0.061	0.067	0.071
	Subsidy	0.545	0.547	0.495	0.286	0.266	0.284	0.124	0.130	0.108
Region	*Income*	0.320	0.378	0.385	0.034	0.024	0.058	0.091	0.109	0.120
	Subsidy	0.545	0.547	0.495	0.183	0.061	0.190	0.151	0.163	0.006
Specialization	*Income*	0.320	0.378	0.385	0.009	0.010	0.050	0.238	0.278	0.260
	Subsidy	0.545	0.547	0.495	0.018	0.028	0.148	0.421	0.408	0.358
		Generalized entropy measures								
		1998	2002	2007	1998	2002	2007	1998	2002	2007
E(-1)	*Income*	0.197	0.348	0.376	0.087	0.151	0.006	0.110	0.197	0.370
	Subsidy	0.160	1.453	1.692	0.151	0.144	0.152	1.459	1.310	1.541
E(0)	*Income*	0.171	0.248	0.263	0.085	0.138	0.006	0.086	0.110	0.257
	Subsidy	0.550	0.541	0.534	0.141	0.128	0.137	0.409	0.413	0.397
E(1)	*Income*	0.178	0.262	0.284	0.088	0.141	0.006	0.090	0.121	0.242
	Subsidy	0.453	0.544	0.419	0.151	0.131	0.138	0.302	0.413	0.280
E(2)	*Income*	0.232	0.477	0.302	0.099	0.164	0.006	0.132	0.313	0.297
	Subsidy	0.629	3.108	0.520	0.190	0.157	0.156	0.440	2.950	0.364

The additional measures of inequality are also presented in Table 2. The Generalized entropy measure of inequality is used with different choices of θ, which reflects a measure of the degree of sensitivity to transfers at each income level. Decompositions of total income and government support inequalities by economic size are also provided (Table 3). The within group inequality is the dominant component of the overall inequality and is rising with Agenda 2000, as well as with the Fischler reform, though having some exceptions. This trend is observed regardless of the inequality measure used. Moreover, the between group component is also rising when using the Gini coefficients.

The lowest economic size group generally has the higher inequality, which decreases in the next economic size group, but thereafter increases as the economic size of the group increases.

Table 3 - Gini coefficients and Generalized entropy measures by economic size

	ESU	0-<4			4-<8			8-<16			16-<40			>40		
		Gini coefficients														
		1998	2002	2007	1998	2002	2007	1998	2002	2007	1998	2002	2007	1998	2002	2007
	Income	0.268	0.288	0.311	0.214	0.247	0.286	0.212	0.23:	0.270	0.24C	0.246	0.247	0.274	0.331	0.251
	Subsidy	0.458	0.531	0.493	0.445	0.475	0.445	0.465	0.42§	0.384	0.478	0.494	0.399	0.472	0.678	0.411
		Generalized entropy measures														
		1998	2002	2007	1998	2002	2007	1998	2002	2007	1998	2002	2007	1998	2002	2007
E(-1)	*Income*	0.122	0.152	0.177	0.082	0.130	0.176	0.084	0.13C	0.148	0.111	0.220	0.120	0.154	0.606	0.126
	Subsidy	0.865	0.927	0.922	0.999	0.858	1.060	1.289	1.051	1.067	1.313	1.170	1.590	1.592	4.387	1.915
E(0)	*Income*	0.116	0.141	0.158	0.076	0.107	0.138	0.075	0.09§	0.123	0.098	0.110	0.103	0.128	0.222	0.108
	Subsidy	0.364	0.404	0.461	0.371	0.384	0.420	0.418	0.35§	0.349	0.436	0.441	0.407	0.486	0.938	0.473
E(1)	*Income*	0.126	0.157	0.164	0.077	0.110	0.132	0.074	0.09:	0.118	0.101	0.101	0.101	0.121	0.269	0.107
	Subsidy	0.278	0.352	0.420	0.264	0.344	0.347	0.292	0.251	0.259	0.315	0.330	0.271	0.334	1.204	0.290
E(2)	*Income*	0.160	0.218	0.201	0.087	0.139	0.143	0.081	0.11:	0.129	0.121	0.110	0.112	0.131	0.561	0.120
	Subsidy	0.285	0.495	0.556	0.263	0.737	0.447	0.296	0.24:	0.294	0.326	0.357	0.270	0.333	6.663	0.265

Conclusion

In order to formulate appropriate policy instruments to aid farmers, it is clear that an understanding of the composition of incomes earned by farmers is necessary. In addition, the potential impacts of income changes from different sources should be understood. This paper examined the average contributions of incomes from agricultural activities and government support in different CAP regimes, as well as the extent to which policies contributed to the observed situation. The distribution of income among Greek farmers, decomposed by income source and subpopulations, was analyzed using farm data, while differentiating farms by their location, specialization and economic size. The focus was on the alternative distributional effects of income from government support, and on the implications of these effects for policy.

The results show that income inequality has increased, farms' degree of dependency on support is decreasing, and agricultural income presents a rather stable share in total farm income over time. However, the larger the share of agricultural income to total income, the larger the distribution of income inequality appears to be. Disparities are also linked to structural factors such as size, specialization and region, owing mainly to subsidies tied to output. Disparities between farm types are linked to differences in the level of support by commodity, whereas disparities between regions stem from specialization and natural features specific to each region.

On the other hand, the importance of government support in alleviating farm income inequality should be highlighted. Income disparity tends to increase owing at least partially to continuous CAP reforms. The distribution of support is rather unequal, as most support goes to larger farms, often the richer ones. Although support linked to production levels is provided to all farms, whatever their income situation, in some cases, support has even increased income disparities. As far as farms' location and specialization is concerned, research findings indicate that farm income inequality is the highest for the farms located in Northern Greece and for those farms producing crops. Increases in government support have differential effects between regions, while differences in the distribution of income and support across farm types or size classes are less than across regions.

Consequently, government support may not be an effective tool for social policy,

since agricultural subsidies are dependent on agricultural production or land ownership and as a result non-poor farmers and landowners reap the bulk of the aid while poor non-farmers are disadvantaged. If government support focuses on social income equality, it should be targeted at (non-)farms with low income and wealth. A possible implementation of a flat rate after 2013 may not then lead to the expected decrease of income inequality, if it is associated with land ownership or production.

To sum-up, analysis gives rise to some quite interesting policy considerations. Support policies have raised farm income to some extent, and have reduced income variability, but with significant leakage to unintended beneficiaries. The use of indicators other than farms' income to target agricultural support inevitably results in some degree of income inequality due to the provision of different levels of support to farms with identical pre-support incomes. Since government support does not have a neutral impact upon the distribution of farm income, a government with a stand in favor of reducing inequalities may wish to alter its magnitude. One should also take into account the fact that although a society concerned with equity will try to adjust unequal income distribution by means of government transfers, concern with economic efficiency dictates that small, uncompetitive farms should not receive support. New policies should be, therefore, carefully weighed before implementing them to achieve income equality via the promotion of objectives related to rural development, sustainability and environmental protection.

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