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How do different off-farm income sources affect income inequality among farm households?

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Abstract

This paper investigates how different off-farm income sources and CAP direct payments affect income inequality among farm households. It uses the Gini coefficient and its decomposition on the whole sample of FADN individual farms of Italy in 2011. CAP direct payments and the overall off-farm incomes reduce income concentration. However, of the five considered off-farm income sources, only pensions significantly decrease it. This suggests that, if decreasing income inequality is a relevant goal, CAP direct payments and pensions are two important policy tools to do so, while this may not be the case of policies increasing other off-farm income sources.

Keywords: Farm household income; Income concentration; Gini coefficient disaggregation; Off-farm income.

1. Introduction

Income distribution among farmers is still one important issue of Common Agricultural Policy (CAP) and it played a prominent role in the recent CAP reform discussions. However, due to the ever increasing role of off-farm incomes (OFI), the emphasis has moved from farm incomes (FI) to total farm household incomes (FHI) (Hill, 2012). This also asks for considering the income distribution effects of a wider range of policies other than traditional agricultural policies, including rural development, regional, tax and welfare policies. This paper, investigates the impact of different off-farm income sources, as well as of CAP direct payments (DP), on income inequality among farm households in Italy.

The objectives of the paper are to assess: 1) level of concentration of FHI; 2) how DP contribute to the concentration of FI and FHI; 3) whether OFI as a whole would bring about a reduction in FHI concentration; 4) the effect of the different OFI sources on FHI concentration.

Many of the papers on income distribution calculate Gini coefficients from samples of individual farms but only some of these disaggregate them by income source (e.g. El Benni and Finger, 2013; Mishra et al., 2009; Severini and Tantari, 2013). While the increased resilience on OFI has stimulated a growing interest on the effect of OFI on FHI concentration, in Europe, with the noticeable exception of El Benni and Finger (2013), most of the papers focus on the concentration of FI only. This seems a limitation because analyzing the role of OFI on FHI concentration leads to a more comprehensive view of the income distribution among farm households. This could feed the debate on whether governments should pursue a more egalitarian income distribution when also OFI are accounted for and, if this is the case, whether this should be done by means of agricultural policies, rural development policies or even by more general policies such as tax and welfare policies.

2. Data and methods

The analysis is based on all individual farms belonging to the Italian Farm Accountancy Data Network (FADN) in 2011 corresponding to a weighted sample of 728,440 families.

Farm Household Income (FHI) consists of Farm Income (FI) and Off-Farm Income (OFI). FI is made of revenues from farming activities and CAP direct payments (DP) minus costs for intermediate consumptions and external factors. Subtracting DP from FI gives a residual that we named Market Income (MI) and that is negative in some farms.

The Italian FADN provides data regarding the relative importance of the following five OFI sources: wages, income from independent activities, pensions, income from capital and a residual group of off-farm income sources. FHI has been first decomposed into MI, DP and OFI. OFI has been further subdivided into the five previously mentioned OFI components.

The Gini coefficient¹ has been decomposed by following Pyatt et al. (1980):

$$G = \sum_{k=1}^K R_K * G_K * S_K \quad (1)$$

R_k denotes the “Gini correlation” between income component k and the rank of total income (i.e. the covariance between income from the k -th income component and the rank of total income, divided by the covariance between income from this component and the rank of this same income component). G_k denotes the Gini coefficient for the k -th income component. S_k denotes the income share of the k -th income source.

Equation (1) means that each income component influences income concentration according to how important that source of income is (S_k), and to how it is distributed among the sample (G_k), as well as according to the level of the “Gini correlation” (R_k) (Stark *et al.*, 1986).

Pyatt et al. (1980) and Lerman and Yitzhaki (1985) developed a measure that partitions the overall inequality of a particular distribution into contributing components. This measure, in the case of income, accounts for the ‘proportional contribution to inequality’ of the k -th income source:

$$P_K = (R_K * G_K * S_K) / G \quad (2)$$

To evaluate the effects on inequality associated with marginal changes in single income components, Lerman and Yitzhaki (1985) derived the following:

$$M_k = \frac{\partial G / \partial \varepsilon_k}{G} = P_k - S_k \quad (3)$$

This measures the relative change of the concentration of total income due to a one percent change of income source k -th (ε_k).

¹ The Gini coefficient (G) measures the inequality among values of a frequency distribution (levels of income in this case). A G of zero expresses perfect equality (all values are the same), while a G of one expresses maximal inequality among values. With a substantial incidence of negative incomes, G may become overstated, perhaps causing values greater than 1. However, the used decomposition procedure remains applicable also in this latter case as long as the average value of all income sources is positive for the entire sample as in our dataset (Pyatt et al., 1980).

3. Results of the empirical analysis

Average farm household income is around 35,000 Euros and in around 6% of the cases FI are negative indicating that, in these cases, DP do not compensate for negative MI. FHI is quite concentrated, showing a Gini coefficient of around 0.53. OFI represent around 41% of FHI, DP 21% and MI the remaining 37.5% (Table 1). The concentration of these sources of income strongly differs. MI are very concentrated (Gini coefficient of 0.987) because the large heterogeneity in asset positions among farms makes it possible to have huge differences in MI levels among farms. This also explains why there is a not negligible number of farms showing in a particular year negative values of MI. DP and OFI are less concentrated having Gini coefficients of 0.713 and 0.66 respectively.

Table 1 - Gini decomposition of Farm Household Income and Farm Income. Year 2011.

		Share	Gini coefficient	Correlation coefficient	Concentration coefficient	Proportional contribution to inequality	Marginal effect (%)
		S	G	R	C	P	M
Market income	MI	0,375	0,987	0,731	0,721	0,509	0,134
Direct Payments	DP	0,212	0,713	0,496	0,353	0,141	-0,071
Off-farm income	OFI	0,413	0,660	0,681	0,450	0,350	-0,063
Farm household income	FHI	1,000	0,531	1,000	0,531	1,000	0,000
Market income	MI	0,638	0,987	0,882	0,870	0,777	0,139
Direct Payments	DP	0,362	0,713	0,617	0,440	0,223	-0,139
Farm income	FI	1,000	0,714	1,000	0,714	1,000	0,000

Note: FHI = MI + DP + OFI; FI = MI + DP. Source: Own elaboration on Italian FADN sample.

While the Gini coefficients of DP and OFI are quite similar, the degree of correlation with the rank of total income (R) is higher for OFI, meaning that this source of income is more important for high income families. The relative contribution of OFI to total inequality (P) is 35% while that of DP is around 14%. While the share of MI is only 37.5%, these contribute to around 51% of the FHI concentration.

The marginal effect of OFI is quite similar to that of DP (Table 1). Both sources of income reduce total income inequality but the magnitude of this effect is scarce. Because of its high degree of concentration, MI increase total income inequality. The opposite is true for DP. This is because, while highly concentrated, DP show a small correlation coefficient, suggesting that DP are relatively more important for low income families.

The concentration reducing effect of OFI is low because OFI is generated by different sources, each one contributing differently to the inequality of family income. Pensions and wages generate the biggest shares of OFI (Table 2). Among the different OFI sources, pensions are the least concentrated and have the lowest Gini correlation. This is why pensions are the only OFI source reducing FHI inequality to a not negligible extent (Marginal effect is -0.077) (Table 2).

The other important sources of OFI (wages and incomes from independent work) tend to have only a very limited, but often positive, effect at margin on FHI concentration. This is because their Gini coefficients and correlations are higher than those for pensions.

Table 2 - Gini decomposition of Farm Household Income with all Off-Farm Income sources. Year 2011.

	Share	Gini coefficient	Correlation coefficient	Concentration coefficient	Proportional contribution to inequality	Marginal effect (%)
	S	G	R	C	P	M
Market income	0,375	0,987	0,731	0,721	0,509	0,134
Direct payments	0,212	0,713	0,496	0,353	0,141	-0,071
OFI:						
Pensions	0,176	0,735	0,409	0,301	0,100	-0,077
Wages	0,165	0,872	0,650	0,567	0,176	0,011
Independent work	0,058	0,952	0,605	0,576	0,063	0,005
Capital	0,012	0,987	0,497	0,491	0,011	-0,001
Other off-farm income	0,003	0,996	0,166	0,165	0,001	-0,002
Farm household income	1,000	0,531	1,000	0,531	1,000	0,000

Source: Own elaboration on Italian FADN sample.

4. Discussion

The paper has shown that considering just FI allows only a partial analysis of the income distribution among farm families. In particular, the whole OFI and DP both reduce the inequality of FHI among farm families. This is because families earning more limited farm incomes often have a larger share of their income coming from OFI and from DP.

The effect of a unitary increase of the share of OFI in the Italian farm families is lower than the values estimated by Mishra et al. (2009) in the US but in line with most of the values estimated by El Benni and Finger (2013) in Switzerland. The marginal effect of OFI in the concentration of the income of Italian farm families seems limited because pensions are the only component reducing FHI concentration while wages and incomes from independent activities have opposite (even if limited) effects.

Enlarging the focus to FHI allows to consider the potential impact of a larger set of policies other than just agricultural policies, too. Indeed, the results of the analysis have shown that not only DP but also pensions are currently important policy tools to reduce income inequality among farm families, if this is perceived as a policy relevant goal. In particular, every change in welfare policies resulting in a reduction in the level of pensions currently earned by member of farm families (as well as a cut in DP level) could increase income inequality. On the contrary, increasing the level of income coming from wages and from independent activities is not expected to reduce income inequality. This seems to suggest that rural development policies and other regional policies aimed at increasing the level of the income coming from off-farm working opportunities could not be effective in reducing FHI inequality, unless these are specifically focused on low income families.

Apart the well-known difficulties in measuring FHI (Hill, 2012), the analysis is subject to some limitations to be overcome in future researches. In particular, it seems important: to consider additional years; to consider sub-samples of families located in different regions and zones of Italy; to compare the income disparity within farm families with that within non-farm families.

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