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The role of CAP in enhancing farm incomes: the redistributive effect of direct payments in Italy

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Abstract

The CAP has traditionally provided support to European farms by means of f direct payments (DPs), in order to achieve the objective of redistribution of farm incomes (FIs). In Italy, this issue is particularly intricate for the national government, since it has to manage carefully the effects of the overall reduction of ceilings for DPs as well as those due to the process of internal convergence of payment entitlements. The present article aims to analyse whether the last CAP reform decreases DPs concentration and which is the potential effect of the new DPs scheme on the redistribution of FIs in Italy. The decomposition of the Gini coefficient allows to analyze the evolution of incomes and DPs distributions over the period 2013-2020. Empirical results based on Italian FADN database show that FI concentration in 2013 is high but DPs contribute to reduce inequality. Moreover, the CAP reform in 2020 is expected on the one hand to decrease DPs concentration, but on the other hand it limits the ability of such a policy tool to reduce FIs inequality due to the cut in DPs budget.

Keywords: Direct payments, Gini coefficient, Common Agricultural Policy, redistribution, farm income.

Introduction

The introduction of the decoupling policy of direct payments (DPs) coincided with a relevant increase in uncertainty due to the increasing volatility of global food prices and rising food security concerns, which have a negative impact on the stability of farm incomes (FIs). This has led to calls for maintaining agricultural support, stimulating farm investments and adopting productivity-enhancing modern technology (Rizov et al., 2013). Consequently, the debate over the Common Agricultural Policy (CAP) 2014-2020 began with the communication 'The CAP towards 2020', with which the European Union (EU) attempted to respond to new economic, social, environmental, climate-related and technological challenges.

Because agricultural and, increasingly, environmental interests are traditionally the most dominant interests in the development of CAP, EU institutions identified new objectives and political instruments that could improve the socio-economic condition of European farmers (Huang *et al.* 2010). First, the need for a better targeting of support, which would improve spending quality and remunerate farmers for the public goods that they provide, led to an innovative scheme of DPs that were designed to substitute for the Single Payment Scheme (SPS) (Westhoek *et al.* 2013). In addition, Regulation (EU) No. 1307/2013 recognised a strong mandate for each Member State (MS) to manage many aspects related to DPs. In particular, the so-called "national flexibility" offered the opportunity to improve the consistency between national targets and political decisions to allow a greater effectiveness of public resources spending (Erjavec *et al.* 2011; Grant 2010; van Ittersum *et al.* 2008; Westhoek *et al.* 2013).

In Italy, this task is particularly intricate for the national government because it must manage carefully the effects of the overall reduction of ceilings for DPs and those due to the internal convergence process. Specifically, policymakers attempted to reconcile the need to balance the level of payments per hectare between administrative regions, altimetric regions and agricultural sectors with increased requests for enhancement of the FI, in a sector where prices, income volatility and natural risks are marked, and profitability levels are, on average,

below those in the remainder of the economy (Severini and Tantari, 2013). As the national choices have a direct impact on the redistribution of DPs and the profitability of many farms, this article's objective is to analyze the impact of CAP reform on DPs and the income distribution in Italy, focusing on the following research issues: (1) whether CAP reform decreases DPs concentration in Italy and (2) the potential effect of the new DP scheme on the redistribution of FIs.

Political and theoretical framework

Italian decision on DPs 2015-2020

One of the main results of the inter-institutional debate, which is known as Trilogue, is the national flexibility that increases MSs' ability to implement the CAP in an effective manner. Consequently, the government must decide, above all, which optional payments of the new DP scheme to activate; the Italian budget for DPs in the period 2013-2019 is, on average, nearly 3.800 million €/year. The most important national choices made by the by Italian government are summarized in table 1 .

Table 1. Italian decisions on DPs.

Decision	National choice
Active farmer (exemption threshold)	<1250 € for other areas; <5000 € for mountain areas.
Minimum requirements for receiving DPs	<250 € DPs in 2015-2016; <300 € DPs in 2017
Regional or national model/internal convergence	National/Irish model
Basic payment (BP) scheme	58% of national budget
Redistributive payment	No
Greening (amount of payment)	30% of national budget (calculated as 30% of payment entitlements held by the farmer)
Areas that have natural constraints	No
Young farmers' scheme	1% of national budget (value: 25% of the average value of payment entitlements)
Coupled payment (CP)	11% of national budget (of which: 25.1% for beef, 20.8% for milk, 16.4% for olive oil, 14% for cereals, 8.3% for protein crops, 5.3% for rice, 4% for sugar beet, 3.5 for sheep, 2.6% for industry tomato)
Small farmers scheme (max. payment)	Yes (<1,250 €)
Degressivity and Capping (% reduction of DPs)	50%, if dir. paym.> 150M €; 100%, if dir. paym.>500M €; salary costs deducted.

Source: Ciliberti and Frascarelli (2015)

First, Italy extended the so-called "negative list" to include further business activities that should be excluded from receiving DPs. In addition, the government established certain criteria to identify active farmers (i.e., the beneficiaries of new DPs scheme), with flexible requisites for farmers in mountain areas and selective conditions for other areas. Nevertheless, regarding the minimum requirements for receiving DPs, Italy decided not to grant DPs to a farmer when the total amount of DPs claimed is less than 250 € (regardless of farm size) in 2015-2016 and less than 300 € after 2017.

More interestingly, the Italian government decided to apply the so-called Irish model (IRm) for internal convergence. In such a model, the mechanism for establishing entitlements

values depends on two main parameters: the IUV of payment entitlements (IUV) and the national unit value (NUV). In 2019, the latter can be simply determined by the following formula:

$$(X / Y) * (P / R)$$

where X is the national ceiling for the BP scheme for the year 2015, Y is the national ceiling for 2015, P is the national ceiling for the BP scheme for calendar year 2019 and R is the number of allocated payment entitlements in 2015, excluding those allocated from the national reserve.

The value of the payment entitlements that the farmers will receive during 2015-2019 will depend on the IUV, which in turn can be established as follows:

$$(x / y) * (A / B)$$

where x is the national ceiling for the BP scheme for the year 2015, y is the amount of the payments for 2014 under the SPS in the MS, A is the payments that the farmer received for 2014 and B is the number of payment entitlements that he is allocated in 2015, excluding those allocated from the national reserve.

In practice, the 'value' that is carried forward from 2014 is spread across the 'number' of entitlements that is allocated to the farmer in 2015. This IUV forms the basis of all subsequent convergence calculations for the value of those entitlements for each year of the scheme. All entitlements held under the BP scheme are subject to convergence. In simple terms, those who hold entitlements with an IUV that is greater than the BP scheme national average will see the value of their entitlements decrease over the five years of the scheme, whereas those with entitlements that have an IUV that is below 90% of the national average will see the value of their entitlements increase gradually over the five years of the scheme. Those who hold entitlements that have an IUV that is between 90% and 100% of the national average value will see no change. In addition to the standard level of convergence outlined above, a further test is applied whereby all farmers must achieve a minimum entitlement value of 60% of the national average by 2019. If a farmer does not achieve 60% under the standard convergence, the value of his entitlements will be increased in equal steps to ensure that this level is achieved by 2019. Moreover, the change introduces a "stop loss mechanism" that reduces losses (no more than 30% of their initial value in 2015) for high payment entitlements.

Furthermore, the allocation of national resources across the seven components of DP was the following: BP scheme received 58% of resources, greening received 30% of the budget (as established by the Reg.1307/2013), the young farmers scheme received 1% of national funds, the CP received 11% of funding and the small farmers scheme was activated. The redistributive payment and payment for areas with natural constraints were not activated. Other decisions are reported in table 1.

FI support and the redistributive issue

Farm subsidies were promoted by concerns for the chronically low and highly variable incomes of farmers, and the key stimulus for legislative action was the disparity between the income of farm and nonfarm households (Mishra et al. 2009). The existence of DPs is mainly justified by the need to provide income stability and compensation for higher production standards with regard to consumer protection, animal welfare and environmental conservation compared with many non-European countries (Uthes *et al*. 2011). Ongoing pressures from the WTO negotiations, criticism of its trade-distorting effects and consumer concerns regarding the safety and quality of agricultural goods, however, have induced a continual reform

process of the CAP. In recent years, the most relevant innovation in terms of FI support tools has been the introduction of decoupled payments by the EU, beginning with the 2003 Fischler Reform of the CAP (Moro and Sckokai 2013). Hennessy (1998) asserted that DPs often have other purposes in addition to income support. In fact, in a very unstable world market in which prices and yields fluctuate considerably, risk-averse producers may benefit considerably from income stabilization. It thus follows that corresponding to the income-stabilizing attribute is an insurance effect whereby income stabilization may affect optimal decisions. In addition, there is a wealth effect on optimal decisions, namely the higher average income arising from the support policy may affect producer decisions. Uthes *et al.* (2011) even analyzed the impacts of abolishing DPs and showed that rich regions that have a moderate dependence on DPs and either a relatively competitive agricultural sector or a highly diversified sector will surely find a means to cope with such a relevant policy change but that poor regions that have less favourable conditions for agriculture, insufficient marketing, processing and sales structures as well as a high dependence on DPs will be impacted most severely by a possible abolishment of DPs and will be left further behind.

Most DP instruments within the agricultural policy have at least the partial objective of income redistribution towards the neediest parts of the farming population (El Benni *et al.* 2011). It follows that, on the one hand, agricultural policy attempts to enhance the low average level of incomes; on the other hand, it must consider the income differences within the sector. The basis of the approach is the definition of the overall redistributive effect of agricultural policy as the difference between the inequality of pre- and post-support FIs; consequently, the aid cannot be considered equitable when the absolute level differs between farmers with a similar pre-support FI. Such an equal distribution of incomes across firms of different sizes or across firms located in different altimetric areas is indeed one of the main targets of the policy. Maintaining a fair standard of living for the agricultural community and decreasing the income disparities depend, in turn, on the distribution of direct aid across farmers. However, agricultural policies, at least in developed countries, barely fit into such basic ideals of distributional justice. The unequal distribution of economic benefits in the era of price support policies continues to function as an implicit benchmark of a 'fair' distribution pattern; however, gradually allocative policy objectives, which dominated at the beginning of the CAP, have been replaced by distributional policy objectives in CAP reforms (Sinabell *et al.* 2013). The OECD identified equity has an operational criterion to evaluate agricultural policies. Indeed, a system of economically viable, midsized, owner-operated family farms contributes more to communities than do systems that are characterized by inequality, large number of farm labourers with below average incomes and minimal ownership or control of productive assets. According to Mishra *et al.* (2009), FI inequality has an impact on (1) economic well-being, including farm family health, (2) the adoption of farming technology, (3) agricultural productivity, and (4) growth in the agricultural sector. It follows that if the purpose of farm policy is to raise farmer incomes and standards of living, policy provisions need to be reconsidered as changes occur in farm business, considering that, in certain regions, government payments play an important role in decreasing income inequality among farmers (Mishra *et al*. 2009).

Notwithstanding, the European Commission has for many years expressed concerns regarding the inequitable distribution of FI support because DPs are very concentrated (Allanson 2006). This finding confirms the idea that large farms have been the main beneficiaries of CAP support; consequently, the objective of guaranteeing income stability, which is to reduce poverty and improve the quality of life of rural households, is threatened. Eurostat data showed that PDs are mainly provided to high-income farms, which could be because the enhancement of the FI is not the sole objective that justifies the implementation

of direct aid (Sinabell et al. 2013). The role played by agricultural policies in income distribution has been analyzed in various studies. Several studies conducted in Europe have shown that DPs cause income inequality to decrease (Keeney 2000; Frawley and Keeny 2000; Severini and Tantari 2013a; 2013b; 2015). However, other studies have concluded that government payments increase income concentration (Allanson 2006; Schmid et al. 2006; El Benni et al. 2012). Specifically, Schmid et al. (2006) showed that in the EU, there are two types of MSs according to DP distribution: those with a low concentration (Finland, Netherland, Denmark) and those with a high concentration (Portugal, Italy, UK, Spain and Germany) of direct aid. Furthermore, the authors demonstrated that in 2001, 20% of all European farm households benefitted from 80% of the total DPs. Von Witze and Noleppa (2007) highlighted that although small or medium farms should represent the target of DPs, the main beneficiaries of such payments are farms with large cultivated areas. Other authors (Allanson and Rocchi 2008; Mishra et al. 2009) confirmed that the distribution of direct aid is largely unequal because high-income farms take a large share of the payments, as do the wealthiest farm households (Rocchi et al. 2005). Schmid et al. (2006) claimed that in most cases, DPs do not prevent a relevant share of European farmers from remaining in the poorest decile. Conversely, El Benni et al. (2011) showed that direct aid can reduce the inequality in the distribution of FIs. Keeney (2000) stated that after the introduction of McSharry reform, direct aids, although they were strongly concentrated, had a redistributive role in Ireland and were able to contrast and reduce the unequal impact of the market income (e.g., FI minus DPs). This results was due to the increasing share of DPs on FIs; thus, without DPs, the concentration of FI and its unequal distribution across farms could have increased. In that regard, it should be noted that the process of the liberalization of agricultural world markets has led to an increasing share of farmers who generate negative market incomes but that the share of DPs on FI has increased considerably, a situation that is unheard of in any other sector (El Benni 2011).

Research hypotheses

Because DPs have offered support for FIs for a very long time without, at least explicitly, fostering the provision of public goods, their role was mainly redistributive. The scientific and political debate on long-run impacts of the implementation of CAP obviously focused not only on the redistributive consequences of DPs but also on the outcomes of the last CAP reform, which showed that direct aids are considered the best alternative to pursuing new political objectives and limiting the concentration of FIs. However, because decoupled payments are viewed as redistributive tools, they would have achieved certain concrete results in such a direction; however, on the contrary, they contributed to an increase (or, at least, did not adequately hinder) in the level of inequality of FI distribution. Because CAP 2014-2020 in Italy will cause a reduction of the national ceiling of DPs and a shift from the "historical" model to the flat rate model by means of an internal convergence mechanism, this paper's objective is to analyze whether and how this reform will affect FI inequality. Against the theoretical background and given the Italian choices on DPs, the following research hypotheses are tested:

H1: The application of CAP reform 2014-2020 in Italy causes a decrease in the concentration of DPs.

H2: the application of CAP reform 2014-2020 in Italy improves the redistributive role of DPs.

Methodology

The decomposition of Gini coefficient: static and dynamic analyses

The Gini coefficient (G) is a commonly used measure in income inequality research. This coefficient measures the relative income inequality and ranges between 0 and 1. If FI is equally distributed (i.e., all farms have the same income), the G would be 0. With greater income inequality, the G approaches a value of 1 (i.e., a single farm generates the entire population income). To estimate G, income Y is assumed to be a random variable that is distributed with mean μ over the farm population. With F(Y) being the cumulative distribution function of income (ranked in non-decreasing order) and cov being a covariance indicator, G can be written as follows (El Benni 2013; Mishra et al. 2009):

$$x = 2\mathrm{cov}\frac{[\mathrm{Y}, \mathrm{F(Y)}]}{\mu}$$

Many studies have formulated G decomposition schemes and relative measures that capture the impact of various components of income on inequality (Lernan and Yitzhaki 1985; Pyatt *et al.* 1980). Specifically, the decomposition of G by a component of FI (e.g., market income and DPs) was frequently applied in the economic literature to measure the effect of different income sources on aggregated income inequality (El Benni *et al.*, 2011; Severini and Tantari 2013a; 2013b; 2015; Keeney, 2000; Lerman and Yitzhaki, 1985).

In practical terms, the static analysis of the decomposition of G aims to analyze the concentration of total income as the sum of income concentration from k different sources Y_k, with $F(Y_k)$ denoting the cumulative distribution function of the income source under consideration. Therefore, the decomposed G[1] can be written as follows:

$$\mathrm{G} = \sum_{\mathrm{k}=1}^{\mathrm{k}} \frac{\mathrm{cov}[\mathrm{Yk}, \mathrm{F(Y)}]}{\mathrm{cov}[\mathrm{Yk}, \mathrm{F(Yk)}]} * \frac{2\mathrm{cov}[\mathrm{Yk}, \mathrm{F(Yk)}]}{\mu\mathrm{k}} * \frac{\mu}{\mu\mathrm{k}} = \sum_{\mathrm{k}=1}^{\mathrm{K}} \mathrm{Rk} * \mathrm{Gk} * \mathrm{Sk} = \sum_{\mathrm{k}=1}^{\mathrm{K}} \mathrm{Ck} * \mathrm{Sk}$$

The Gini correlation coefficient R_k ranges between -1 and +1; if the income of the kth income source increases (decreases) with increasing total income, R_k is positive (negative), and if R_k equals 0, the income source is a constant that does not contribute to total income inequality. G_k is the G of the k_{th} income source and shows how the income from the specific income source is distributed within the population. S_k is the share of the k_{th} income source on the total income. The product of R_k and G_k yields the concentration coefficient (or Pseudo-G) of the k_{th} income source ($C_{k)}$, which measures how the income from each source is transferred across a population ranked with respect to the level of total income received. The C_k is 0 if all income groups receive an equal amount of income of the given income component, is negative if income from a specific source accrues mainly to the farms in the lower tail of the distribution of total income, and is positive if richer households receive a large proportion of the income from the specific income component. In addition, a C_k that is larger than the G of aggregate income proves that the income component in question has had an unequalising effect of the observed aggregate income distributions (El Benni 2011; Keeney 2000). Furthermore, Pyatt *et*

[1] Keeney (2000) and Mishra et al (2009) noted that with a substantial incidence of negative incomes, G(Y) may become overstated, perhaps causing values greater than 1. However, the decomposition procedure remains applicable as long as the average value of all income sources is positive (Pyatt et al 1980).

al. (1980) and Lerman and Yitzhaki (1985) developed a measurement that partitions the overall inequality of a particular distribution in to contributing components. This measurement, in the case of the income, explains the proportional contribution to inequality (P_k) by the kth income source:

$$\mathrm{Pk} = \frac{\mathrm{Rk} * \mathrm{Gk} * \mathrm{Sk}}{\mathrm{G}}$$

To evaluate the marginal impact of a single income component on income inequality, Lerman and Yitzhaki (1985) derived a measure of the rate of change of the G with the mean of the kth income component, from which it is possible to derive the elasticity (η_k) of G toward changes in the income components, as follows:

$$\eta_k = \frac{u_k}{G} * \frac{dG}{du_k} = \frac{1}{G} * \left[\frac{u_k}{\mu} * (C_k - G)\right]$$

This allows the measurement of the impact of a 1% change of a single income source on the income concentration. Specifically, the Gini elasticity η_k is larger (smaller) than 1 if the amounts received under the specific income component raise more (less) than is proportional to total income. In case of unit elasticity, the distribution of income from a particular income source is proportional to the distribution of total income; thus, the concentration coefficient and G coincide (Keeney 2000; Podder 1995).

The dynamic analysis implemented by Keeney (2000) is instead conducted on the basis of the specification of Podder and Chatterje (1988) to consider the contribution of a change in overall inequality due to the change in the components of income over time. Therefore, the change of the G over time is divided into a share effect (SE) and a concentration effect (CE):

$$\Delta G_t \approx \mathrm{SE}+\mathrm{CE}$$

The change in the aggregated G from period t-1 to t is given by $\Delta G_t = G_t - G_{t-1}$. Changes in the G can be attributed to a change in the share of the k_{th} income component in total income $\Delta S_{k,t} = S_{k,t} - S_{k,t\ -1}$ and to the change in the concentration coefficient between period t-1 and t, namely $\Delta C_{k,t} = C_{k,t} - C_{k,t\ -1.}$ In practice, the SE shows how a change in the share of a specific income component affect the change in overall Gini. In contrast, the CE shows how a change in the distribution of source incomes over the ranges of total income affects the change of the G. In sum, the approximation of the total derivative of the G with respect to time is

$$\Delta G_t \approx \sum_{k=1}^{K} C\ k,t * \ \Delta S_{k,t} + \sum_{k=1}^{K} S\ k,t * \ \Delta C_{k,t}$$

where the first summation group represents that part of the change that is due to SE and the second summation group is the CE.

Data

Two static analyses of the disaggregation of the G have been performed. The first used the Italian FADN database for the year 2013 (*ex post* analysis), with a sample of 11.319 farms corresponding to 800.834 farms (Table 2), and the second used a simulation of DPs in 2020 (*ex ante* analysis). This latter has been run using the software implemented by Ciliberti and

Frascarelli (2014), which rigorously considers all of the technical mechanisms established by Reg.(EU) 1307/2013 and the Italian decisions shown above. Therefore, the above-mentioned software is used to simulate the impact of CAP reform on DPs[2] in 2019-2020. According to Keeney (2000) and Severini and Tantari (2012), the considered income parameter is FI[3]. It is composed of two main components: market based income (MI) and DPs. The former can be calculated by subtracting the amount of DPs from FI. DPs have been identified by considering solely the annual payments granted to farmers in the context of the market and income support policies; they are split into two components: the SPS, which are based on the ownership of payment entitlements, and the CP.

The dynamic analysis compares the *ex post* and *ex ante* analyses previously described. Here, the purpose is to evaluate the effects of Italian decisions regarding the new DP scheme on the decomposition of G, particularly on the concentration of DPs; moreover, special focus is accorded to the variation of the marginal effects on FI concentration.

Table 2 – FADN 2013: characteristics of the sample

Geographic area			**Altimetric zones**			**Economic size**			**Farm type (based on standard output)**		
	Sample	Represented farm (weighted sample)		Sample	Repr. farm (w. s.)		Sample	Repr. farm (w. s.)		Sample	Repr. farm (w. s.)
	%			%			%			%	
Northern IT	43.3	29.7	Mountain	20.5	15.4	Small (4000-25000 €)	26.9	62.3	Specialist field crops	26.5	25.1
Central IT	18.6	14.3	Hill	46.0	49.2	Small medium (25000-50000 €)	19.2	16.0	Specialist horticulture	7.0	3.9
Southern IT	38.1	56.0	Plain	33.5	35.4	Medium (50000-100000 €)	21.0	11.0	Specialist permanent crops	26.7	46.0
						Medium large (100000-500000 €)	26.1	9.5	Specialist grazing livestock	24.1	12.8
						Large (> 500000 €)	6.9	1.2	Specialist granivors	4.5	0.9
									Mixed cropping	6.6	7.7
									Mixed livestock	0.6	0.3
									Mixed crop-livestock	4.1	3.3

Source: FADN

[2] Specifically, two of the four components of new DP scheme are considered in the simulation: BP and GR, which account for approximately 90% of the Italian ceiling on DP in 2020. CP is maintained stable (at 2013 level) because nearly all farms that received coupled aid in 2013 will receive them in 2020, whereas payment for young farmers is not considered because it is very marginal (1% of the national ceiling).

[3] FI is provided by subtracting from Farm Net Value Added the remuneration for inputs (work, land and capital), which are not the property of the holder (i.e. wages, rent and interest paid).

Results

The results show the evolution of income distribution over the time due to the decomposition of income concentration in the (two) periods observed to verify whether the last CAP reform changed the manner in which DPs affect the income distribution in Italy. Although the analyses explain all of the considered income sources, particular emphasis is accorded to DPs because, for the first time in the long CAP history, they have been strongly affected by national decisions.

The correlation matrix among FI, other economic indicators (farm net value added, total output), work unit (WU), the utilized agricultural area (UAA) and the DPs (table 3) shows that the latter are very strongly correlated with UAA but are less correlated with WU. Regarding FI, the correlation between FI and WU is stronger than those between DPs and WU, whereas the correlation between FI and UAA is weaker than that between DPs and UAA. In addition, it should be noted that in 2013, DPs are more correlated with UAA than with FI; thus, to receive direct aid, owning land appears more important than generating income.

Farm income inequality can be preliminarily explored by ranking farms by income levels in 2013 and dividing them into decile groups (table 4). This process allows a first evaluation of the extent of income disparity: the farms belonging to the top two deciles always take more than 75% of the entire FI, 70% of the Farm Net Value Added[4] and 70% of total output (TO); however, they absorb no more than 45% of WU and UAA. DPs are also concentrated because the top three deciles received approximately 70% of direct aids. Conversely, farms under the median value produce a very small share of FI, although they employ 27% of WU and farm 21% of UAA. In addition, they received less than 20% of the DPs in 2013.

Table 3. Correlation matrix

	FI	FNVA	TO	WU	UAA	DPs
FI	1					
FNVA	0.967	1				
GFI	0.829	0.869	1			
WU	0.623	0.737	0.610	1		
UAA	0.363	0.405	0.400	0.343	1	
DPs	0.412	0.431	0.562	0.263	0.497	1

Source: own elaboration

Table 4. Distribution of FI and DPs by deciles of income classes, 2013 (% of the sample)

Decile group	FI	FNVA	TO	WU	UAA	DPs
1	-3.0	0.9	3.4	6.4	5.1	5.0
2	0.6	1.1	1.0	3.5	2.3	2.4
3	1.2	1.7	1.7	4.6	3.3	3.0
4	2.0	2.5	2.4	6.0	4.8	3.8
5	3.0	3.4	3.1	6.9	6.0	4.7

[4] FI before wages, rent and interests paid.

6	4.3	4.6	4.1	7.8	8.0	5.9
7	6.1	6.4	5.9	10.0	11.7	7.7
8	9.0	9.0	8.2	11.5	13.0	10.4
9	15.3	14.9	13.7	14.4	16.8	15.8
10	61.5	55.5	56.5	28.8	29.2	41.2

Source: own elaboration

Static and dynamic analyses

In Italy, FI has a G of 0.77, which shows that it is highly concentrated (table 5). The relative importance (S_k) of the three considered income components is not homogeneous because MI represent approximately 75% of the total income, whereas DPs represent 25%. Therefore, MI strongly affects the income level and distribution. It is strongly concentrated (G=0.91), and its relative contribution to inequality is very high because it generates approximately 86% of the overall income inequality.

Table 5. Gini decomposition of total income. Year 2013.

	Gk	Rk	Sk	Ck	Pk	η
FI=MI+DPs						
MI	0.910	0.953	0.749	0.867	0.843	0.094
DPs	0.714	0.677	0.251	0.483	0.157	-0.094
FI	0.770	1.000	1.000	0.770	1.000	0.000
FI=MI+(SPS+CP)						
MI	0.910	0.953	0.749	0.867	0.843	0.094
SPS	0.722	0.660	0.232	0.477	0.143	-0.088
CP	0.922	0.612	0.019	0.564	0.014	-0.005
FI	0.770	1.000	1.000	0.770	1.000	0

Source: own elaboration

The comparison across direct aids highlight that SPS represent the largest portion of the support provided by DPs (approximately 90%) in both 2013 and 2020; the remainder of the DPs are provided by CPs. DPs are also concentrated because their Gs are greater than 0.70 in both periods; however, this value steadily decreases from 2013 (0.714) to 2020 (0.647) as a consequence of the implementation of the model of internal convergence (table 6).

DPs have an equalizing effect due to two main motives: their concentration is lower than that of FI, and the correlation coefficient of SPS (Rk) is not as high (0.677). Thus, although the relative share of SPS is lower than that of MI, the magnitude of the marginal equalizing effect is approximately the same (but with an opposite sign) as that of MI. Specifically, a unitary increase in this source of income could reduce income concentration by 0.094% and 0.088% in the pre- and post-reform periods, respectively, with the SPS before (ηk = -0.088%) and PB and GR after the reform (ηk = -0.085%) playing a stronger redistributive role than Cp (ηk = -0.005%). This reduction is also because SPS and PB+GR have low concentration coefficients and represent a large share of FI than CPs. As previously shown, although the CAP reform reduces the concentration of DPs, the G elasticity highlights a decrease of the equalizing effect; this is caused by the decrease in the national budget for DPs, which has direct consequences on the DPs-FI ratio (which decreases from 25% to 20%).

Table 6. Gini decomposition of total income. Year 2020.

	Gk	Rk	Sk	Ck	Pk	η
FI=MI+DPs						
MI	0.871	0.985	0.796	0.858	0.886	0.090
DPs	0.647	0.666	0.204	0.431	0.114	-0.090
FI	0.770	1.000	1.000	0.770	1.000	0.000
FI=MI+(PB+GR)						
MI	0.871	0.985	0.796	0.858	0.886	0.090
PB + GR	0.646	0.645	0.185	0.417	0.100	-0.085
CP	0.922	0.612	0.019	0.564	0.014	-0.005
FI	0.770	1.000	1.000	0.770	1.000	0.000

Source: own elaboration

The comparison of the results between the *ex post* and *ex ante* analyses elucidates the impacts on FI distribution due to the last CAP reform. Because the *ex ante* simulation solely considers the change in a specific FI component, that is, the DP in 2020, the variation of the concentration of FI in the post-reform period cannot be observed. It follows that the objective of the dynamic analysis is not to evaluate the general impact of the reform on FI distribution but to investigate how the Italian decision on DPs affects their concentration. Specifically, the dynamic analysis focuses mainly on the determinants of the variation of the G_{SPS} (the G of the SPS component of DPs) because the *ex ante* approach permits the simulation of the trends of the main DPs component in 2020: PB and GR, which received approximately 90% of the national budget for direct aid.

Static analyses show that the G of SPS income decreased from 0.714 to 0.647. Table 7 highlights that such a decrease of SPS concentration (−0.067) can be fully attributed to a change in the concentration of the various sources (PB and GR) because the CE is negative. This result depends on the decrease in both the concentration of both of the new components of DPs and their relative contribution to inequality (which decreases from 0.14 to 0.10). Conversely, the share effect contributes to an increase in income inequality because the relative importance of the equalizing income source DPs decreased. Such an effect stems from the decrease of the SPS-FI ratio as a consequence of the budget reduction that, in turn, increases the relative importance of the un-equalizing income source (MI).

Table 7. Decomposition of the observed changes of G_{SPS} from 2013 to 2020.

	Absolute change of the Gini coeff. (ΔG)	SE	CE
SPS	-0.067	0.002	-0.067

Source: own elaboration

Discussion

Empirical evidence shows a large concentration of FI in Italy that is in accordance with previous studies. G_{FI} is also higher than that reported by Keeney (2000) for Ireland in the 1990s, by El Benni and Finger (2012) for Switzerland and by Allanson (2006) for Austria in the last decade but is smaller than in the US, as shown by Mishra *et al.* (2009). In this section, the research hypotheses are discussed given the empirical results.

With regard to H1 (the application of CAP reform 2014-2020 in Italy causes a decrease in the concentration of DPs), the decomposition of G shows that the new DP scheme in Italy leads to a more equal redistribution of DPs. In particular, such effects are due to the implementation of the IRm of internal convergence, which bridges the gap of the entitlements' value across Italian farms and makes them progressively less dependent on the rank of FI (Ciliberti and Frascarelli, 2014). The convergence model indeed penalizes sectors that have a high FI but are largely dependent on DPs (high DPs/FI ratio), whereas it increases the share of direct aids both for sectors that traditionally do not benefit at all from such a form of support (vineyard, fruit and vegetables) and for low-income production sectors that are located in disadvantaged areas (livestock and grazing). In addition, both of the main components of the new DP scheme, PB and GR, show a positive and equalizing effect that suggests that, on the one hand, they succeed in reducing the concentration of direct aids and, on the other hand, they are able to contribute positively to enhance the FI in a progressive manner.

Regarding H2 (the application of CAP reform 2014-2020 in Italy improves the redistributive role of DPs), the analysis of the G elasticity highlighted that although the implementation of new DPs scheme in Italy causes a decrease in the concentration of SPS (PB+GR after 2020), the marginal impact of this income component on income inequality declines. There are two main reasons for such an effect. The first is that Italy chose to activate CP (that is, a highly concentrated payment) instead of redistributive payments or payments for areas with natural constraints that could have further hindered FI inequality. The second relates to the decision to reduce the budget for DPs in Italy in an attempt to overcome the disparities across MSs. These actions indeed decrease the share of DPs on FI and reduce the ability to contrast the unequal redistributive effect of the MI. Thus, the CAP reform in Italy frustrates the valuable attempt to create and reinforce a public instrument to hinder the unwanted effects of the market forces, which are detrimental to both farm profitability and, as an indirect consequence, the provision of public goods.

Conclusion

The decomposition of the Gini coefficient allowed us to analyze the evolution of the FI and DP distribution over the 2013-2020 period. Empirical results based on the FADN 2013 database showed that FI concentration in Italy is high; however, DPs contribute to reduce farm inequality. This occurs because DPs are very concentrated, although less so than the MI. In sum, the income-equalizing role of DPs is because i) they are less correlated with income levels than other income sources and, notably, market income, and ii) on average, DPs represent nearly 25% of the entire FI. Furthermore, the results highlighted that an increase/decrease in the budget for DPs could improve/worsen the redistribution of FI and reduce/increase its concentration.

The main focus of this paper was the redistributive effect of the new DP scheme in Italy, where approximately 90% of the national ceiling was devoted to the BP scheme and the GP (which have replaced the old SPS). Both static and dynamic analyses highlighted that a steady decrease in DP concentration is expected because Italy will progressively shift from the "historical" regional model to a flat rate national model during the transitional 2015-2020 period (by means of the so-called IRm for internal convergence). Conversely, the general decrease in the Italian budget for DPs (from 4.300M € in 2013 to 3.700M € in 2020) is expected to negatively affect the ability of these payments to oppose the regressive effect due to market incomes, particularly for regions and sectors that mainly benefitted from the SPS introduced by 2003 Fischler reform.

In conclusion, the results indicate that the implementation of CAP reform in Italy is able to foster a more equal redistribution of DPs and a widespread provision of public goods. Furthermore, both the negative impacts of the external convergence process of DPs (that has strongly penalized Italy) and the EU budget reduction have decisively limited the ability of DPs to reduce the income inequality generated by the progressive liberalization of agricultural markets.

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