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THE EFFECTS OF DECOUPLING ON THE COP SECTOR IN ITALY: AN EX-POST PERFORMANCE ANALYSIS

JEL classification: Q18

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***Abstract.** One of the main objectives of the 2003 CAP reform was enhancing farm competitiveness by enabling farmers to catch market signals and to adjust their production level and specialisation accordingly.*

The aim of this paper is to evaluate the effects of decoupling on the COP sector in Italy, by comparing some structural and economic indicators, based on ISTAT and FADN data, of a sample of farms before

and after the 2003 reform.

The analysis shows an improvement in the economic performance both for farms that kept COP specialisation and for farms that opted for a different specialisation, suggesting that decoupling farm support from production has contributed to a more efficient and market-oriented COP sector in Italy.

Keywords: CAP, decoupling, Italian FADN, COP sector.

1. Introduction

The 2003 CAP reform (also known as Fischler reform) has implied a big change in the recent history of the CAP. It can be considered a breaking point with the past and, at the same time, it has paved the way to a new direction for the future. The breaking point is represented by the switch to decoupled payments as the main support measure, a change that started in 1992 with the MacSharry reform and reversed the logic itself of public support in agriculture. At the same time, the reform opened the way to an ongoing process of changes that led to the CAP Health Check of 2009 and to the following debate on the CAP post-2013 (European Commission, 2010).

One of the main goals of the reform was enhancing the competitiveness of farms by enabling farmers to catch market signals and adjust their production level and specialisation accordingly. However, one of the main risks related to the implementation of this reform was an increasing abandonment of the primary activity, especially in marginal and mountain areas, where farms are not as potentially competitive as the ones in the plains.

The aim of this article is to analyse the behaviour of COP (cereal, oilseed and protein crops) farms in Italy before and after the implementation of decoupling, by comparing the estimated results of some structural and economic indicators. The specific aim is to analyse the economic

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performance of a sample of COP farms using data from the Italian Institute of Statistics (ISTAT) and the Italian Farm Accountancy Data Network (FADN).

The following section provides a brief description of the Fischler reform, with particular emphasis on the main changes that have affected the COP sector, together with an overview of the available literature dealing with the effects of decoupling introduced by the 2003 reform. Section 3 addresses the structural dynamics of the COP sector in Italy before and after the decoupling, through an analysis of ISTAT data. The ex-post analysis through FADN data is presented in section 4, where the effects of decoupling for the COP sector in Italy are analysed by observing the economic performance of a constant sub-sample of farms during the 2003-2007 period. Finally, section 5 draws some conclusions from the main results of the analysis.

2. Background

2.1. The Fischler reform

The 2003 CAP reform was implemented mainly to address the following issues: (i) the improvement of EU agricultural competitiveness; (ii) the enhancement of a sustainable model of agriculture, through better market orientation but also through tighter cross-compliance of support to minimum environmental and agronomic standards; (iii) the improvement of rural development measures, with a transfer of resources from the first to the second pillar of the CAP; and (iv) the tailoring of the CAP tools to the needs of Member States and their territories, renewing their role in the decision process regarding CAP implementation.

To achieve these objectives, decoupling, cross-compliance, modulation and flexibility became the keywords of the reform process. In practice, the main feature of the new CAP after the Fischler reform was the fully decoupled Single Payment Scheme (SPS), as reported in EC Regulation 1782/2003. The real revolution of the SPS was the break of any explicit link with production, with support assuming the feature of fully decoupled income integration.

Decoupling was accompanied by a process of devolution in the decision making process, since Member States were enabled to choose, among a predetermined set of measures, those they thought were the better suited for their agriculture.

In Italy the implementation of the reform was quite controversial. Even though decoupling was immediately and fully implemented from the first possible year (2005), Italy opted for the historical model of SPS and decided to defend the status quo in terms of distribution of direct payments between historical receipts, by rejecting any form of regionalisation that would have significantly redistributed the financial resources amongst beneficiaries and territories.

With specific regard to the COP sector, Italy opted for a fully decoupled support, which prevented the sector from retaining part of the payments that were still partially coupled¹. The reform also modified the previous payments for durum wheat and protein crops: durum wheat producers received a specific quality premium (40 euro/ha), an aid granted only for traditional production areas², while protein crops received a specific area payment of 55.57 euro/ha. Moreover, the COP sector also received a specific support within the framework of article 69 of EC

¹ The reform offered the possibility of retaining up to 25% of the payments coupled (according to the older area payments for arable crops) or, alternatively, up to 40% of the durum wheat supplement payment.

² In Italy the traditional areas coincide with the Central and Southern administrative Regions: Abruzzo, Basilicata, Calabria, Campania, Lazio, Marche, Molise, Umbria, Apulia, Sardinia, Sicily, Tuscany.

Reg. 1782/2003, equal to 180 euro/ha granted to farmers using quality certified seeds for wheat, durum wheat, maize, or those who apply a biennial rotation³.

2.2. Literature review

The literature dealing with the effects of decoupling on farm decisions is quite extensive, focusing especially on the effects on the US agricultural sector. At the EU level the assessment of the effects of the single payment scheme introduced by the Fischler reform covers a wide spectrum of issues and methodologies. Some of the works are based on qualitative assessment (Garcia-Alvarez-Coque, 2003; Schroeer, 2004; Swinnen, 2008), while others are of a quantitative nature. Most of them are actually based on ex-ante hypotheses, while the ex-post analyses are less developed.

Ex ante evaluations are more numerous and rather diversified on a geographical base (from single regions to the EU level) as well as on the sector coverage. The results of the impact assessment suffer from the constraints of the underlying hypotheses, the types of model utilised, their different capacity to simulate the policy changes, the projections on price trends, and several other limitations. The assessments, moreover, suffer from the simplification needed to simulate the “degree of decoupling” of the single payment. For example, Gohin (2006) and Balkhausen *et al.* (2007) highlight how the results of the impact assessment of the Fischler reform are affected by the assumptions made about the “degree” of decoupling of Agenda 2000’s direct payments, which represents the reference scenario⁴.

Based on the assumption that decoupled payments have, in fact, an impact on farm choices, the ex-ante studies analyse the most relevant transmission mechanisms⁵. In this literature the most investigated aspect concerns the effect of decoupled payments on the business risk: if farmers are risk averse and if such aversion decreases with increasing wealth, a decoupled payment could lead to an increase in production, a wealth effect and an insurance effect. The first effect is related to wealth available to farmers and will make them more inclined to take the business risk, the second effect works by reducing the volatility of farm income and, consequently, inducing farmers to assume the risk of producing⁶. As highlighted by Moro and Scokoi (2001) the insurance effect has little impact, while the wealth effect is more pronounced. An in-depth analysis of the wealth effect of direct payments based on historical yields and acreage can be founded in Féménia *et al.* (2010).

Another observed mechanism is related to the ability to obtain credit (see Goodwin and Mishra, 2005): since the decoupled payment represents an increase in wealth and, most importantly, a stable component of total income, farmers could get more credit than they would obtain in the absence of a decoupled payment and therefore could increase production and/or investments.

Another mechanism again, observed as an impact of decoupled payments is related to the decision of continuing or abandoning farming. The decoupled payment, in fact, may induce farms, which in the absence of payment would leave production, to stay in business, slowing down the process of structural adjustment.

³ The actual payments per hectare granted to farmers under article 69 in the period 2005-2008 have been rather smaller than the theoretical ones (around -70%).

⁴ The review in Balkhausen, Banse and Grethe (2007) compares 8 selected simulation models whose common feature is the comprehensive coverage of EU agriculture, with a multi-product structure.

⁵ See Moro, Scokoi (2011) for a literature review on the issue of the impact of decoupling on farm choices.

⁶ See also OECD (2001) for more details on these two effects.

A further mechanism has to do with the impact of decoupling on the factors of production, increasing the cost of land (and thus reducing the mobility of land) or affecting the availability of family labour on- and off-farm⁷.

Not irrelevant, then, is the expectation of future policy changes influenced by the current behaviour of farmers. Also in these cases, studies highlight the existence of a link with direct payments, but again there is little analysis focusing on the EU.

Amongst the ex-ante evaluations, the impact assessment of the EU (European Commission, 2003a) based on the communication of July 2002 (European Commission, 2002) is particularly relevant, since it includes six studies, of which two were released by the European Commission Services and four were assigned to external Institutes and run with the support of the FAPRI, CAPRI, CAPMAT and CAPSIM models. Very important are also the successive simulations of the OECD (2004). Regarding the cereal sector, both studies highlight a reduction in the area planted, following the reform, partially offset by an increase in yields. Overall, the reform had a positive effect on the competitiveness of the sector and agricultural incomes. Subsequently, following the presentation of legislative proposals in January 2003 the European Commission (2003c) has produced an update of the two impact assessments carried out by DG AGRI (European Commission, 2003b), whose results do not differ substantially from those produced a few months earlier in terms of allocation of land among crops.

Much fewer evaluations deal with an ex-post approach, usually focusing on rather limited territories. In Blanco et al. (2008), the ex-post analysis deals with the capacity of Positive Mathematical Programming models (PMP) to forecast a change in cropping patterns in an irrigated area of central Italy as a consequence of the Fischler reform. In Gallerani et al. (2008), the ex-post analysis is based on an empirical survey of 82 farm households in Emilia Romagna where an ex-ante analysis of the decoupling impact was integrated with a specific focus on farmers' investment behaviour. The same authors (Viaggi et al., 2009) have extended their analysis to the investment behaviour of 250 farm households in eight Member States. The study shows that in limited cases where families have reacted to the decoupling, the behaviours were different between the more efficient and more dynamic (decoupling was seen as an opportunity to invest in the farm) and the smaller and poorer (who saw the introduction of the SPS as an opportunity to extend production).

Petrick and Ziel (2009) have investigated, through an econometric ex-post evaluation, the impact of the reform on agricultural employment in three Länder in Germany, pointing out that the 2003 CAP reform did not have desirable effects on job maintenance and on the creation of new jobs in agriculture.

Zhu and Lansink (2010), using FADN data (1995-2004), analysed the impact of decoupling on the technical efficiency of crop farms in three member States (Germany, the Netherlands and Sweden). Their study concludes that the Fischler reform "might not have positive impacts on the technical efficiency in the case study countries, while coupled subsidy might have positive impacts at least in the Netherlands and Sweden". This is because, the (extra) income deriving from the decoupled subsidies might have induced farms to work less efficiently.

In this article, an ex-post analysis was carried out in order to investigate trends in Italian COP farms, in terms of diversification and economic performance, after the Fischler reform in com-

⁷ Ciaian, Kancs, Swinnen and Vranken (2010) assess the impact of decoupled payments on land values. Brady, Ekam, Rabinowicz (2010) summarizes the main results of the IDEMA project which aims to assess the impact of the move from the direct payments granted by Agenda 2000 to the decoupled payment of income support of the Fischler reform.

parison with a pre-reform period. In particular, the analysis is based on a constant sub-sample of 6,232 farms included in the FADN dataset between 2003 and 2007. The originality and significance of the work lies in the fact that there are no similar works available for the COP sector in Italy at farm level and covering the entire national territory.

3. The COP sector in Italy and the evolution of CAP support

ISTAT data (Farm Structure Surveys) on COP specialised farms show that during the 2003-2007 period the sector experienced a significant decrease in the number of farms (-24.4%). This was particularly evident in mountainous and hilly areas (Table 1:).

| Years | Mountains | Hills | Plains | Total |
|----------------|-----------|---------|---------|---------|
| 2003 | 30,889 | 140,990 | 143,462 | 315,340 |
| 2005 | 22,901 | 111,600 | 132,627 | 267,128 |
| 2007 | 15,804 | 95,756 | 126,980 | 238,539 |
| % change 07/03 | -48.8 | -32.1 | -11.5 | -24.4 |
| Diff. 07-03 | -15,085 | -45,235 | -16,482 | -76,801 |

Source: own calculations on ISTAT data (Italian Farm Structure Surveys 2003, 2005 and 2007)

Although this decrease involved all the altimetric areas, significant differences were observed in the four different Italian macro-regions: the reduction of specialised farms was particularly significant in the hilly areas of Central Italy, in the plains of North-West Italy (-24.5%) and in all the altimetric areas of Southern Italy (-38.8%). This decrease in specialised farms also involved a significant reduction of the related Utilised Agricultural Area (UAA), with a reduction of almost 840,000 ha (-27.7%) during the 2003-2007 period at national level.

| Years | Mountains | Hills | Plains | Total |
|----------------|-----------|-------|--------|-------|
| 2003 | 267 | 1,389 | 1,370 | 3,026 |
| 2005 | 181 | 1,029 | 1,266 | 2,476 |
| 2007 | 118 | 875 | 1,195 | 2,187 |
| % change 07/03 | -55.9 | -37.0 | -12.8 | -27.7 |
| Diff. 07-03 | -149 | -515 | -175 | -839 |

Source: own calculations on ISTAT data (Italian Farm Structure Surveys 2003, 2005 and 2007)

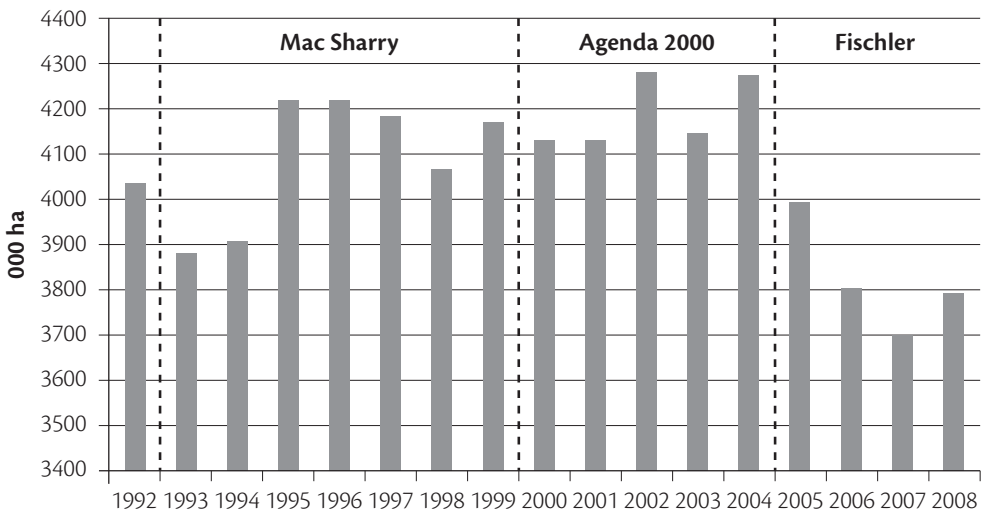
In the context of the 2003 CAP reform, the introduction of decoupling for COP crops may have played a significant role in the structural changes described above. Indeed, the reduction of farm numbers and of UAA was particularly high in the hilly and mountainous areas of Central and Southern Italy, where the transition from coupled aids to the SPS could have decreased the profitability of COP crops. Nevertheless, in order to analyse more in depth the effects of decoupling on the national COP crops sector, it is necessary to observe whether the decoupling has determined some important changes or shocks in relation to the long-terms structural dynamics of the sector. When observing the evolution of the areas with cereals in Italy during the period 1992-2008 (Figure 1), it may be argued that the evolution of the CAP, especially the Common

Market Organisation for cereals, has played a leading role in determining the observed trends for the following reasons:

- the initial reduction of the cereal area after 1992 may be considered a consequence of the implementation of the MacSharry reform, which introduced compulsory set-aside as a tool for limiting EU cereal production. At the same time, in the long term, compensatory payments which were introduced to counterbalance the reduction in institutional prices contributed to maintaining the production of cereals in areas where otherwise cereals would not have been cultivated;
- even though market support mechanisms were further reduced in the context of the 1999 reform (Agenda 2000), in Italy (and in Spain) the regionalization plans for homogeneous areas of yield increased the reference yields for the calculation of payments for cereals, which maintained the incentive to produce cereals⁸ (LMC International, 2005);
- the decoupling introduced in the framework of the 2003 CAP reform (implemented in 2005) may have contributed to the significant reduction of the area cultivated under cereals in 2006 and 2007;
- the increase in the cereals area in 2008 is mainly due to market dynamics, especially to the strong increase of prices for wheat and maize in the second half of 2007. In addition, in 2008, compulsory set-aside was abolished.

It may also be argued that, during the decade prior to decoupling, coupled payments in some ways slowed down the structural changes in the sector, since in many cases the production of cereals was not changing according to market signals and coupled payments increased the

Fig. 1 - The evolution of the area under cereals in Italy (1992-2008)



Source: own calculations on ISTAT data (annual data on production, years 1992-2008)

⁸ In Italy, the reference yields in the regionalisation plans were differentiated between maize and “other cereals” and between irrigated crops and non-irrigated crops. Usually the highest yields concerned irrigated maize.

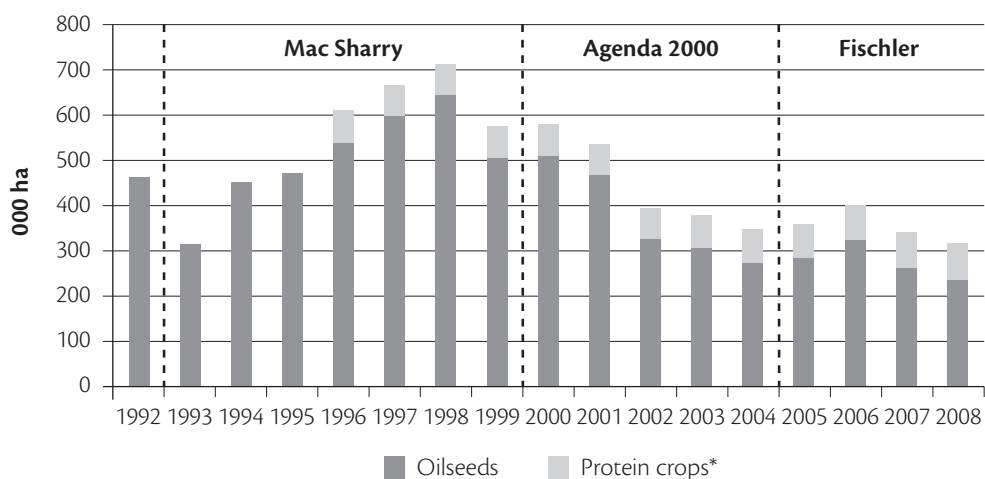
dependence of producers on CAP support (LMC International, 2005). Nevertheless, as already argued, CAP support was not the only factor influencing the observed trends: the significant increase in the area (and production) of cereals in 2008 for example was the result of the combination of agricultural policies and of the market situation (abolition of compulsory set-aside, higher market prices) which seemed to favour the expansions of cereal production (especially soft wheat) in some areas of the country.

During the same observation period (1992-2008) the oilseeds area (soyabean, sunflowers and rapeseed) experienced a trend quite similar to that of the cereals area. On the contrary, protein crops shared an extremely uniform trend, with an average of 70,000 ha during the 1996-2008 period⁹ (Fig. 2).

In the case of oilseeds and protein crops, a strong link may be observed between the evolution of CAP support and the cultivated area:

- the partially decoupled payments introduced by the MacSharry reform in 1992 may be considered the main factor affecting the increase in the area cultivated under oilseeds during the period 1993-1999, since the calculation of payments involved higher amounts for oilseeds compared to cereals;
- the trend in cultivated area during the period 1999-2008 reflects exactly the evolution of direct payments. The period 1999-2001 is one of transition towards the downwards alignment of payments between cereals and oilseeds, a process which was completed in 2002, when a strong decrease in the area was observed. Protein crops, on the contrary, maintained an area payment higher than cereals and oilseeds, after Agenda 2000, in order to ensure an adequate profitability of these crops.

Fig. 2 - The evolution of the area under oilseeds and protein crops in Italy (000 ha) (1992-2008)



* Data not available for 1992-1995

Source: own calculations on ISTAT data (annual data on production, years 1992-2008)

⁹ Protein crops (peas, field beans, and sweet lupins) represent a very small portion of the COP production in Italy (on average 1.5% of the COP area).

4. An ex-post analysis through FADN data

4.1. Data, methodology and research questions

Italian FADN gathers information on around 15,000 farms¹⁰ using the common European methodology that enables comparative analysis. The FADN data-set includes only “commercial farms”, which are farms whose economic size is such as to be considered to have market relationships. A “commercial farm” is defined as a farm which is large enough to provide a main activity for the farmer and a level of income sufficient to support his family. In practical terms, in order to be classified as commercial, a farm must exceed a minimum economic size¹¹. The sample is random and it can be stratified according to the geographical location, the economic dimension and the specialisation (Type of Farming - TF).

In order to follow the behaviour of the same group of farms in the years affected by the Fischler reform, a constant sub-sample of farms was utilised, including 6,232 households spread across all Italian administrative regions (a number significant enough for reaching the research objectives). In more detail, both the diversification of farms production systems and the evolution of the economic performance of COP farms were observed from 2003 to 2007. Data have actually been stratified by geographical areas (according to Italian macro-regions) and by altimetry (mountains, hills, plains). In this way, it was possible to assess the diversified reactions to the reform in different areas of the country.

The type of farming considered in this paper is “specialised COP” (principal TF 13) that included 904 specialised farms in 2003¹². According to FADN methodology, the farms specialised in COP production (TF 13) comprise all farms where the production of COP crops contributes more than 2/3 of farm’s total Standard Gross Margin¹³.

Amongst these 904 COP farms, 547 were still in the same TF 13 (specialist COP) in 2007, while 357 abandoned the specialisation migrating towards other TFs.

The paper aims at answering to a specific set of questions through a group of structural and economic indicators, including Farm Size, Gross Output, Net Income and the amount of direct payments per farm. The farm’s performance was analysed comparing the structural and economic indicators before the CAP reform (average 2003-04) and after its take off (2007) for farms that kept the specialisation in the COP sector and for those that during the same period changed specialisation.

In more detail, in order to analyse the overall performance of COP farms in Italy in the years immediately after the implementation of the Fischler reforms, we set up a series of more specific questions whose answers will form the bulk of this paper:

1. How many farms, specialised in COP crops in 2003 (TF 13), have changed their specialisation during the 2003-2007 period?
2. What is the economic performance of the farms that kept the COP specialisation (547 farms) in all the period under study?

¹⁰ Since 2008, due to the structural changes in Italian agriculture recorded by the 2005 ISTAT Structural Farm Survey, the Italian FADN sample was reduced to 11,686 farms.

¹¹ The minimum economic size of FADN farms corresponds to around 4,800 euros of Standard Gross Margin.

¹² FADN farms are classified in 17 principal Types of Farming: specialist cereals, oilseed and protein crops (TF 13) and other 16 TF, as reported in table 3.

¹³ The concept of Standard Gross Margin is used to determine the economic size of farms, which is expressed in terms of European Size Units.

3. What is the performance of the farms that opted for a change in the specialisation (357 farms)?
4. What is the result of the comparison between the same set of indicators in 2007 and in 2003 between COP farms and farms that changed specialisation?

A few words of advice are necessary for a better understanding of both the significance and the limitations of the observed results:

- The analysis of the economic performance of farms was carried out at current values. While this may be considered a significant limitation in assessing the impact of the decoupling, it may be argued that, by analysing the performances of farms in a real situation, the observed results are even more interesting and reliable;
- Although the data regard a sub-sample of FADN farms which is not representative of the universe of farms, the observed trends may be useful for understanding the main impacts of the Fischler reform on the COP sector, especially with regard to the economic performance of farms;
- Even though the farms under study are specialised in COP production, they also cultivate other types of crops which may have influenced to some extent their overall economic performance.

4.2. Comparing samples

Although the evolution of CAP support certainly played a leading role in influencing the structural changes, it is also clear that the observed economic performance of COP farms were also influenced by other factors such as: (i) the dynamics of the markets for products¹⁴; (ii) the evolution of production costs (i.e. cost of fertilizers, machineries etc.); (iii) the evolution of production techniques. For this reason, the analysis was supported by the Student's *t-test*¹⁵

Among the most commonly used statistical significance tests, Student's *t-test* is used for the comparison of two means. Two-sample *t-tests* for a difference in mean have been applied: a) on two different samples of farms belonging to TF 13 - Specialized COP and TF 14 - General field cropping (unpaired, independent sample), year 2007; b) on the same sample TF 13 that has been considered for year 2003 and 2007 (paired, dependent sample). The Student's *t-test*, allows comparing the means of two samples so the null hypothesis is that the difference is random. Looking at the mean of the variable Net Income in the two larger groups of farms, TF 13 and TF 14, year 2007, the question is whether this difference is due to chance or to other factors. Table 3 (left side), shows that the *t-test* value 2.031 is higher than the tabulated one for $P = 0.05$. Therefore, the null hypothesis is rejected, meaning that the difference between the means of the observed variable is statistically significant with a probability level of 5%. So there is a probability of less than 5% that the difference is due to chance. In other words, we can say that the difference observed between the two samples belonging to the two different TF is significant at $p = 0.04254713$.

Investigating farms before and after decoupling aims to establish in particular whether the

¹⁴ It must be highlighted that in case of COP crops, food and non-food markets must be taken into account, since the majority of COP products may also be utilized as feedstuffs in the livestock sector and for the production of biofuels.

¹⁵ The main objective of this test is to compare the mean of some variables within two groups and to determine whether their difference is significant or occurred by chance. Is this difference due to random or to other factors? This test assumes a normal (gaussian) distribution for the populations of random errors, and that there is no significant difference between the standard deviations of both population samples.

difference between means of Net Income is statistically significant, so subjects are considered prior and after the treatment. The results are shown in the right side of table 3. The test cannot determine with certainty that the null hypothesis is true, but can only provide a level of probability and give evidence of the strength with which the data reject the null hypothesis. Relying on results, it is possible to state that there are some factors other than chance that affected the Net Income trend of these samples and which have helped make them different on average. In fact, the *t-test* value 5.762 is higher than the tabulated one for $P = 0.05$. Therefore, even in this case the null hypothesis is rejected, so there is a probability of less than 5% that the difference is due to a random event (the test result shows that this probability is very close to zero). It seems important to emphasize that the test provides a powerful result especially in the case of the comparison before and after the introduction of decoupling. However, it is not possible to attribute with certainty the outcome of this difference to the agricultural policy, but only give it a high probability.

Tab. 3 - The application of the Student's t-test for TF 13 and TF 14 (2007); TF 13 (2003/2007) P = 0,05

| | TF 13 | TF 14 | TF 13 | TF 13 |
|------------------------|-----------------|-----------------|-------------------|-----------------|
| | Net Income 2007 | Net Income 2007 | Net Income 2003 | Net Income 2007 |
| n | n1 = 623 | n2 = 173 | n1 = 902 | n2 = 623 |
| mean | m1 = 54993.79 | m2 = 33395.78 | m1 = 25313.21 | m2 = 54993.79 |
| standard dev. | s1 = 135051.62 | s2 = 68549.83 | s1 = 62738.63 | s2 = 135051.62 |
| t-Student | 2.031 | | 5.762 | |
| degrees of freedom | 794 | | 1523 | |
| P (significance level) | 0.04254713 | | 0.000000010042933 | |

Source: own calculations on FADN data

With regard to the impact of subsidies on Net Income, table 4 shows the results for the most represented TF of the FADN sub-sample considered (constant sample).

Tab. 4 - Impact of subsidies on Net Income TF 13, 14, 60, 81

| Type of Farming | 2005 | | 2007 | | DELTA |
|-------------------------------|-------------|------------------------|-------------|------------------------|--------------|
| | n. of farms | % Subsidies Net Income | n. of farms | % Subsidies Net Income | |
| Specialized COP | 746 | 93.4 | 623 | 59.2 | -36.6 |
| General field cropping | 87 | 79.2 | 173 | 46.4 | -41.4 |
| Mixed cropping | 39 | 58.6 | 55 | 42.9 | -26.8 |
| Field crops-grazing livestock | 13 | 69.9 | 26 | 51.3 | -26.6 |
| Total | 885 | 84.2 | 877 | 54.3 | -35.5 |

Source: own calculations on FADN data

In 2005, after decoupling had been implemented, TF 13, 14, 60 and 81 represent 98% of the sub-sample and they represented the 97% in 2007. The impact of subsidies on Net Income has declined considerably during the period considered, from 84.2% to 54.3% (as a whole). The sector with the most relevant reduction (-41.4%) is the general field cropping, followed by the farms specialized in COP production.

As far as the subsidies are concerned, the *t-test* has been applied looking both at the overall subsidies that farms received (TF 13) and at only those referred to the first Pillar (table 5).

The null hypothesis is rejected again: the *t-test* value shows that there is a very low probability that the difference between means of subsidies received by farms before and after the implementation of decoupling is due to a random event.

Tab. 5 - Student's t test implementation for TF 13 (2003/2007), P = 0,05

| | Total subsidies 2003 | Total subsidies 2007 | Total subsidies 2003 | Total subsidies 2007 |
|-----------------------|----------------------|----------------------|----------------------|----------------------|
| n | n1 = 895 | n2 = 618 | n1 = 897 | n2 = 894 |
| mean | m1 = 20083.14 | m2 = 32821.44 | m1 = 19172.81 | m2 = 25976.27 |
| standard dev. | s1 = 32910.98 | s2 = 88847.37 | s1 = 30764.43 | s2 = 74300.70 |
| t-Student | 3.918 | | 2.533 | |
| degrees of freedom | 1511 | | 1789 | |
| P(significance level) | 0.0000932633 | | 0.011387949 | |

Source: own calculations on FADN data

4.3. Diversification

With regard to the first research question, related to the diversification of production systems of the farms in the sub-sample, the in- and out- flows of COP farms (principal TF 13) were observed from and to other general TFs (TF 1-8) during the 2003-2007 period. It is worth noting that the number of farms within TF 13 decreased by nine units in the time span considered. In a previous time span (1998-2000) specialised farms in TF 13 increased by 101 units (+14%) This is referred to a constant sample of FADN farms in 1998-2000.. In other words, there seems to be a breaking point in the dynamics of the TF before and after the years under study.

With regard to TF 13, several farms have changed their specialisation in the period under study: 410 specialised moved towards the TF 13, while 419 left the TF 13 towards other types of farming. It may be argued that though farms, in general, kept a rather extensive specialisation, they had the possibility, given the decoupling of direct payments, to shift to other types of production without losing the support and moving towards more remunerative products, following market signals.

Table 6 shows the net outcome of the migration of farms from and towards TF 13 for each year. It highlights that the majority of flows took place in 2005, when 77 farms left the TF13: 50 farms left the COP specialisation but remained within the general TF 1 (general field cropping), while a consistent number of farms (19) moved towards mixed cropping. These data show that during the first year of implementation of Fischler reform, Italian COP farms increased the differentiation of their production systems, since the flows described above involved 53% of the COP farms under study.

Diversification affected not only the crop specialisation, but also the land use within the TF 13, that includes different grain crops (soft and durum wheat, oats, maize and so on). Figure 3 shows that the area covered by durum wheat has decreased, in the period under study, by about 2,000 hectares, with the largest drop recorded in 2005, the first year of the implementation of the 2003 CAP reform.

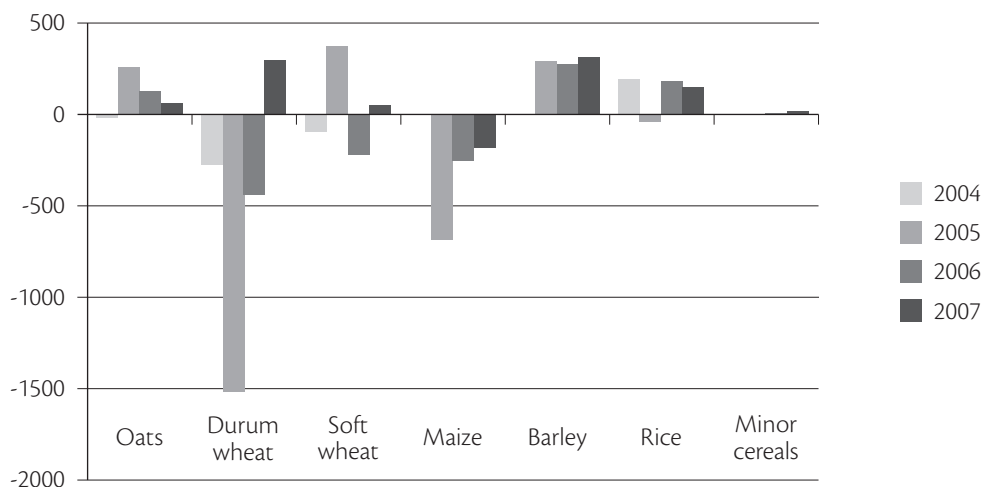
Tab. 6 - Balance of flows of COP farms (TF 13) with respect to the other TF

| Principal type of farming | | 2004 Nr. | 2005 Nr. | 2006 Nr. | 2007 Nr. | TOTAL Nr. |
|---------------------------|---|-------------|-------------|-------------|-------------|--------------|
| 14 | General field cropping | 18 | -50 | 25 | -3 | -10 |
| 20 | Specialist horticulture | -1 | 1 | 0 | 1 | 1 |
| 31 | Specialist vineyards | 0 | 1 | -1 | 0 | 0 |
| 32 | Specialist fruit and citrus fruit | 0 | 1 | 1 | -1 | 1 |
| 33 | Specialist olives | 1 | -3 | -1 | 1 | -2 |
| 34 | Various permanent crops combined | -2 | -1 | 1 | -1 | -3 |
| 41 | Specialist dairying | -2 | 1 | 1 | 1 | 1 |
| 42 | Specialist cattle-rearing and fattening | 1 | 0 | 0 | 2 | 3 |
| 43 | Cattle-dairying, rearing and fattening combined | -1 | 0 | 1 | 0 | 0 |
| 44 | Sheep, goats and other grazing livestock | 0 | 0 | 1 | 0 | 1 |
| 50 | Specialist granivores | 0 | -2 | 1 | 1 | 0 |
| 60 | Mixed cropping | 2 | -19 | -20 | 24 | -13 |
| 71 | Mixed livestock, mainly grazing livestock | - | - | - | - | - |
| 72 | Mixed livestock, mainly granivores | 0 | -1 | 1 | 2 | 2 |
| 81 | Field crops-grazing livestock combined | 5 | -4 | 1 | 5 | 7 |
| 82 | Various crops and livestock combined | 0 | -1 | 1 | 3 | 3 |
| TOTAL FARMS | | 21 | -77 | 12 | 35 | -9 |

Source: own calculations on FADN data

This supports the idea that the reform did actually favour a reorientation of production towards products with better market conditions compared to those whose production was mainly justified by the support granted. In this case, the announced reform enhanced the choice of new crops, within the same type of products: the area under “other cereals” has, in fact, increased from 2005 on, with the only exception of maize. In the case of soft wheat the increase in area is not as linear as for the other crops..

Fig. 3 - Annual variations of the area under cereals, 2003-2007 (ha)



Source: own calculations on ISTAT data (annual data on production, years 1992-2008)

4.4. The economic performance of farms

Together with the flows of farms in terms of specialisation, as already shown, the paper aimed at observing the economic performance of a constant sub-sample of farms during the period 2003-2007. The second question addresses the issue of the performance of farms that, within this constant sub-sample, kept the specialisation on COP crops over the period under study. Table 7 shows an improvement of the economic indicators for farms in terms of Gross Output and Net Income. It is worth underlining that, in absolute values, the increase in Gross Output is larger than that in Net Income, which is due to an increase in both fixed and variable costs.

In 2007 public support from the first pillar of the CAP decreased both in the mountain and hill areas, while it increased in the plains, resulting in a decrease of the share of direct payments on Net Income everywhere, although more clearly in the mountain areas. Thus, even though public support decreased in the mountains and in the hills, specialised farms have improved their economic performance in the hills and even more so in the mountains. This may be explained by the fact that these are the farms that have chosen to maintain their specialisation, which was justified by the related overall good economic results.

Tab. 7 - The economic indicators of the same 547 COP farms in 2003-04 and in 2007

| | | Avg. 2003-04 | | | 2007 | | | % change 2007/2003-04 | | |
|---------------------------------|-----|--------------|--------|---------|-----------|--------|---------|-----------------------|-------|--------|
| | | Mountains | Hills | Plains | Mountains | Hills | Plains | Mountains | Hills | Plains |
| Farms | Nr. | 28 | 220 | 299 | 28 | 220 | 299 | | | |
| Gross output per farm | € | 27,740 | 58,594 | 116,956 | 39,671 | 82,155 | 158,925 | 43.0 | 40.2 | 35.9 |
| Farm Net Income | € | 7,895 | 18,678 | 41,388 | 18,073 | 37,348 | 70,936 | 128.9 | 100.0 | 71.4 |
| Direct payments per farm | € | 9,430 | 20,369 | 34,499 | 8,494 | 19,102 | 40,578 | -9.9 | -6.2 | 17.6 |
| Direct payments/Farm net Income | % | 119.4 | 109.0 | 83.3 | 47.0 | 51.1 | 57.2 | -60.6 | -53.1 | -31.4 |

Source: own calculations on FADN data

Meanwhile, what happened to the farms that did change their specialisation? When considering the third question, we observed the trend of the same indicators for the 357 farms that during the same period abandoned the TF 13 (table 8).

Tab. 8 - The economic indicators of the 357 farms leaving TF 13 in 2003 and in 2007

| | | 2003 | | | 2007 | | | % change 2007/2003 | | |
|---------------------------------|-----|-----------|--------|--------|-----------|--------|--------|--------------------|-------|--------|
| | | Mountains | Hills | Plains | Mountains | Hills | Plains | Mountains | Hills | Plains |
| Farms | Nr. | 47 | 211 | 99 | 47 | 211 | 99 | | | |
| Gross output per farm | € | 51,683 | 58,054 | 60,942 | 65,761 | 86,269 | 96,551 | 27.2 | 48.6 | 58.4 |
| Farm Net Income | € | 14,589 | 19,980 | 20,241 | 23,237 | 45,150 | 39,069 | 59.3 | 125.9 | 93.0 |
| Direct payments per farm | € | 12,230 | 17,705 | 12,697 | 9,871 | 15,454 | 15,159 | -19.3 | -12.7 | 19.4 |
| Direct payments/Farm net Income | % | 83.8 | 88.6 | 62.7 | 41.4 | 34.3 | 50.1 | -50.6 | -61.3 | -20.1 |

Source: own calculations on FADN data

In this case, all the indicators show an improvement, the structural ones at a slower pace, more noticeable in the case of the economic indicators. Direct payments only show a decrease in the mountains and in the hills, while on the plains an increase of 19.4% is recorded. Both Gross Output and Farm Net Income show an increase, especially in the hills and plains areas. On the

other hand, the underlying hypothesis in this case is that these farms, being free from any constraint in terms of what to grow and in what amounts, have opted for other products according to market signals, with possible positive agronomic effects also on soil use.

Data in table 8 show that the share of direct payments on Farm Net Income decreases everywhere, even though in a more limited way in the plains. This confirms that farms reduced their dependence on direct payments (especially in the mountains and hills). Farms in hilly areas have been particularly able to better their economic performances thanks to a change in specialisation. It is worth underlining, in fact, that it is in the hills that the highest reduction of area sown to durum wheat was recorded (-1,583 hectares in 2007 compared to 2003).

All in all, data show that the choice of moving away from specialisation in the COP sector for these farms was definitely positive, especially in the more marginal areas. It is also worth remembering that the process of income diversification enhanced by the CAP has had a positive effect on farms, and especially on those in marginal and more remote areas (see Wilson, 2007 and 2008). To address the final question, we first compared the performances of farms that have kept the COP specialisation with those that have not in 2007, then we look at the starting point, comparing the same group of farms in 2003 (tables 9 and 10). In the first case, results are different according to the altimetry (table 9): for farms located in hilly and mountain areas the economic results in 2007 are better for those farms that have modified their specialisation, even with a reduced share of support per farm (as in the hills); on the contrary, for farms located in the plains, results are better for COP farms than for those that changed specialisation.

Tab. 9 - Comparison between COP farms and farms leaving FT 13 in 2007

| | | COP farms | | | Farms leaving FT 13 | | | Difference % Farms leaving FT 13/COP farms | | |
|---------------------------------|-----|-----------|--------|---------|---------------------|--------|--------|--|-------|--------|
| | | Mountains | Hills | Plains | Mountains | Hills | Plains | Mountains | Hills | Plains |
| Farms | Nr. | 28 | 220 | 299 | 47 | 211 | 99 | | | |
| Gross output per farm | € | 39,671 | 82,155 | 158,925 | 65,761 | 86,269 | 96,551 | 65.8 | 5.0 | -39.2 |
| Farm Net Income | € | 18,073 | 37,348 | 70,936 | 23,237 | 45,150 | 39,069 | 28.6 | 20.9 | -49.1 |
| Direct payments per farm | € | 8,494 | 19,102 | 40,578 | 9,871 | 15,45 | 15,159 | 16.2 | -19.1 | -62.6 |
| Direct payments/Farm net Income | % | 47.0 | 51.1 | 57.2 | 41.4 | 34.3 | 50.1 | -11.9 | -32.9 | -12.4 |

Source: own calculations on FADN data

The share of public support on Farm Net Income in the case of the former COP specialised farms is definitely smaller than for those still specialised in COP, and in any case well below the value featured by the sector in 2003-04. Looking at the comparison in 2003 for the same farms, we can get a clearer picture of the situation before the reform and we can check if the differences found in 2007 were already there in pre-reform years (table 10). The best economic results were observed for COP farms, confirming the hypothesis that decoupling pushed the least efficient farms to change their specialisation in order to meet market requirements and to rethink the farm production systems and production plans.

Tab. 10 - Comparison between COP farms and farms leaving FT 13 in 2003

| | | COP farms | | | Farms leaving FT 13 | | | Difference % Farms leaving FT 13/COP farms | | |
|---------------------------------|-----|-----------|--------|---------|---------------------|--------|--------|--|-------|--------|
| | | Mountains | Hills | Plains | Mountains | Hills | Plains | Mountains | Hills | Plains |
| Farms | Nr. | 28 | 220 | 299 | 47 | 211 | 99 | | | |
| Gross output per farm | € | 27,740 | 58,594 | 116,956 | 51,683 | 58,054 | 60,942 | 30.3 | -29.3 | -61.7 |
| Farm Net Income | € | 7,895 | 18,678 | 41,388 | 14,589 | 19,980 | 20,241 | -19.3 | -46.5 | -71.5 |
| Direct payments per farm | € | 9,430 | 20,369 | 34,499 | 12,230 | 17,705 | 12,697 | 44.0 | -7.3 | -68.7 |
| Direct payments/Farm net Income | % | 119.4 | 109.0 | 83.3 | 83.8 | 88.6 | 62.7 | 78.4 | 73.3 | 9.7 |

Source: own calculations on FADN data

5. Concluding Remarks

The analysis presented in this paper clearly reveals the positive impacts of decoupling on the COP crops sector in Italy, especially with regard to its main objective, which is increasing the market orientation of farms. These results confirm the conclusion reached by the impact assessment carried out by the European Commission in the aftermath the publication of the proposals.

Data show that after the Fischler reform a significant number of COP farms changed their specialisation. Together with the reduction of COP farms – which was particularly evident in mountain areas – an increase of the average UAA was also observed, indicating that this de-specialisation involved to a greater extent smaller and more marginal farms. The specialised COP farms showed a significant reduction in the area invested in durum wheat, particularly in 2005, that is the first year of the implementation of the Fischler reform, as reaction to the possibility of following market signals in production choices.

The analysis of the economic performance of farms confirmed that the change of specialisation concerned the less efficient farms with the worst economic results, resulting in a general improvement of the performance of the COP sector, both in terms of Gross Output and of Farm Net Income. It is also worth mentioning that, during the 2003-2007 period, farms leaving the COP sector also improved their economic performance. This could be linked to the evolution of the type of CAP support: for many farms coupled support had become a constraint rather than an opportunity, while the shift to a decoupled system of support gave the COP farms the possibility of re-orienting production plans, at the same time receiving the support. This could have involved a transition towards more profitable products or towards the production of non-agricultural services.

The positive effects of decoupling were also confirmed by other evidence: while in 2003 the economic performance of farms leaving the COP sector was worse than those of farms that kept the COP specialisation, in 2007 an improvement of all the economic indicators was generally observed. On the other hand, farms that kept the same COP specialisation through the years under study improved their economic performance. This result may be considered an effect of the re-organisation and structural changes of the COP sector, since it was reached in a general context of reduction of public support and of a slow declining trend in prices.

This evaluation may also be useful for a better understanding of the structural dynamics of the sector which were observed through the analysis of ISTAT data: the reduction in the number of farms and of the related UAA may be considered closely related to the evolution of the policy

framework. From this perspective, decoupling was certainly a key issue, since it de-linked the production of COPs from public support, by enhancing the ongoing process of specialisation and concentration on larger and more market-oriented farms.

To conclude, the analysis suggests rather clearly that the main goal of decoupling, which is getting farms more oriented towards market needs, has been basically met in the COP sector in Italy. Indeed, data shows that, because of its structural and market features, commercial farms in this sector were able to modify their strategies according to the needs of the market and that decoupling was a positive evolution in CAP support in increasing this capacity. At the same time, data also shows that first pillar payments have continued to play a central role in the overall market performance of the sector, even after the decoupling, a factor that will have to be taken into great consideration in the debate on the CAP post-2013, since the new EU agricultural policy could involve a significant reduction in the budget for the COP sector and, above all, a consistent redistribution of financial resources amongst Member States and territories.

However, additional research is needed both for understanding in depth the effect of decoupling on the agricultural sector, extending the analysis to other sectors and to other countries, and for analysing the potential impact of a reduction of support on farm strategies as result of the next reform of the CAP.

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