The impact of the reform of the milk quota regime on the Italian dairy sector

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Abstract

This paper analyses the impact of the milk quota regime reform, actually under discussion, on the European countries with a detailed focus on the Italian milk and dairy sector. The dismantling of the milk quota regime is already on the EU agenda, but how and when to do it is still matter of debate. A possibility is to enlarge gradually the size of the national quotas, up to the full dismantling in 2015 ("soft landing"). Meanwhile, the discussion on Health Check of the CAP is under way. In this work we analyse the possible impacts of the reform of the milk quota regime on the basis of a Computable General Equilibrium (CGE) approach, using two models in sequence: the Global Trade Analysis Project (GTAP) model is used to evaluate the impacts of different scenarios of milk quota reform on the EU market and to compute the price changes outside Italy; these, in turn, are used as inputs for the MEG-D model, that focuses on the Italian milk and dairy market. The two models were run together with two specific objectives: the first was to avoid, in evaluating the impacts of reform of the milk sector regime in Italy, running the model with rough price estimates taken for secondary sources; the second, to have more specific results on the outcome at the national level. Particularly, the model takes in account the particular relevance of quality products (GDO) in Italian diary sector.
In order to evaluate the impact of the "soft landing" reform scenario, we run a "comparison" scenario where the milk quotas are fully abolished in the 2009.

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I. Introduction

The common market organisation (CMO) for the dairy products was reformed in 2003 within the package of the Fischler reform. It was established then that direct payments introduced in the CMO with Agenda 2000 (direct premium to milk producers and supplementary premium) had to be included in the de-coupled single payment starting from a year between 2005 and 2007, according to the single Member State choice. The reform also established the prosecution of the milk quotas regime up to 2015, even though it was considered the possibility to anticipate this deadline with the Health Check proposal of the Fischler reform in 2008. In fact, in the debate leading to the 2003 reform, a scenario of drastic abolition of the quota regime in 2009 was discussed, with the explicit goal of reorienting the dairy sector to the market force; however, in that occasion it was clearly highlighted the possible risks of such a sudden switch to the "liberalization" of the milk markets: a sudden reduction of prices (only partially compensated by the introduction of direct payments), and a possible de-structuring of the sector, followed by a possible shift of the production localization from higher production cost areas (mountains, disadvantaged areas) to plain and more competitive areas.

The Health Check proposal features a specific section on the issue of the milk quota removal, where it is clearly stressed the anachronism of such a measure that was implemented in 1984 as a temporary one and never abolished since then. In the paper the Commission highlights also how a growing demand for higher value products has been developing, with a consequent price increase and decline in the use of market intervention measures, especially for butter and skimmed milk powder.

Given this picture, the Health Check proposal suggests a possible "soft landing" of the milk quota regime removal, so that to prepare the land for the full abolition in 2015. One of the suggested possibilities of "soft landing" is the progressive enlargement of the quota per country, in order to make quotas less restraining on production. The level and the growth rate of the quota release is to be agreed, on the base of specific studies in course, and the Commission suggests also that specific "accompanying measures" can be taken into consideration, possibly within the second pillar of the CAP.

Given such debate at the EU level, in this paper the effects on the Italian market of different scenarios of quota removals at the EU level are compared, taking into consideration also the most plausible general changes in the political framework of the CAP and given the expected evolution of the macroeconomic general scenario. To this end, two different general equilibrium models have been linked together: the GTAP (Global Trade Analysis Project) model, that provides the global macro picture following

possible external shocks, and a general equilibrium multi-sector mode (MEG ISMEA) that provides the evaluation of the impact of policy changes on the Italian agri-food system. The combination of these two models produces the outcomes of the different hypotheses of milk quota regime changes, within a time horizon from 2009 to 2015.

The paper is organized as follows: in section II the main methodological aspects are considered, with specific reference to the two models used. Section III features the scenarios assumed in the paper, that include two different hypotheses of milk quota removal. The main outcomes are presented in section IV and some concluding remarks in section V.

II. Methodological aspects

In this work a two step approach has been followed, working with the GTAP model as global framework and with the MEG ISMEA for the specific Italian case.

GTAP is a static, multi-region, general equilibrium model which assumes representative consumers and producers, together with a government sector; all incomes are assumed to accrue to a single "regional" household, hence all distributional aspects are overlooked; government costs and revenues do not balance, and discrepancies accrue to the regional household. The model includes explicit treatment of international trade and transport margins, a "global" bank designed to mediate between world savings and investment, and a consumer demand system designed to capture differential price and income responsiveness across countries (Armington, 1969). As documented in Hertel (1997) and on the GTAP web site (www.gtap.org), the model includes: demand for goods for final consumption (based on a Constant Difference of Elasticity functional form), intermediate use and government consumption, demands for factor inputs (based on a Constant Elasticity of Substitution functional form), supplies of factors and goods, and international trade in goods and services. Trade data come from COMTRADE while trade policy data come from the MacMap-HS6 database (Bouët *et al.*, 2001). Products were chosen with an evident emphasis on agriculture and food, where the model maximum desegregation has been used, since they are the most protected products by tariffs; for the other sectors, manufacturing and services, some branches have been aggregated. No changes have been made on the factors. The aggregation works with 25 sectors/products and 23 countries/regions. Once the sectoral, factor and regional aggregation has been done, several modifications have been applied on the benchmark to update it to the 2004. Being the database referred to year 2001, the construction of the 2004 baseline required a number of shocks. Particularly, two different types of shocks were introduced. Firstly,

exogenous variables were shocked up to the levels for year 2004. These are:

- population and labour force, whose projections are retrieved from LABORSTA (www.laborsta.ilo.org) of the International Labour Organization of the United Nations (ILO);
- total factor productivity, whose projections are those proposed by Hertel and Martin (2000) on the basis of a number of studies on the topic.

Secondly, a number of policy shocks were introduced, accounting for some of the most important changes occurred in the agricultural and agricultural trade policy frameworks between 2001 and today. Particular consideration was given to the CAP, which has undergone significant modifications over this period: the residual implementation of the "Agenda 2000" reform and the Fischler reform of 2003 (Bach *et al*., 2000; van Meijl and van Tongeren, 2002). Moreover, the enlargement of the EU, and the related extension of the CAP to ten new Members was taken into account.

Since the paper is dealing with milk quotas, in the standard GTAP model a module dealing with production quotas has been introduced (Pearson 2007)[1]. The idea is that the output quota is exogenous while the output tax due to the quota is endogenous. Moreover, in GTAP the normal output tax (TO) becomes, in the sector with quota, endogenous where the extra power tax due to quota is added to the normal tax (or subsidy) introduced in the baseline. In other words, when the quota is not filled, the output tax equals the output tax introduced in the baseline while, when the production overtakes the quota, the model generates the extra tax due to the quota (Harrison *et al*., 2004)[2].

The parameters for the ratio of the production to the quota in each EU country are taken by Lips and Rieder (2005) and updated to 2007 with data from the EU Commission (agri/39669/2007). Given the values of the ratio of production to quota, when the quota is eliminated the model adjusts the market price dropping any quota rent.

The MEG ISMEA is a dynamic computable general equilibrium model for the Italian economy, particularly focused in the agro-food chain. Micro-data have been aggregated to the macro level to build the Input/Output table and the Social Account Matrix (ISMEA 1997 and 2005). The SAM which is at the basis of the CGE model has been recently updated to 2003. In MEG ISMEA the economy is disaggregated in 45 sectors, of which: 23 for agriculture plus fishery, 13 for food industry, 7 for other industries and 2 for the service sector. In this occasion, the model has been modified to consider quality production in the Italian milk sector. The diary sector has

[1] See also http://www.monash.edu.au/policy/gpquota.htm.

[2] The amount of the extra tax is strictly connected with the value of the ratio of the quota and production: if this ratio is equal or greater than 1 the quota is not binding and there is not any extra tax, while if this ratio is less than 1 then the quota is binding and there is a tax (or quota rent) due to the quota.

been separated in two different sectors, one producing GDO dairies, the second all the other milk derivatives. Accordingly, in the primary sector it is considered, on the one side, the sector producing milk destined to GDO products, which is considered a specific product which cannot be imported; on the other side, milk for the other products, which can be produced internally or imported.

Each sector in the model produces a single output, using intermediate goods and primary factors according to a two-level CES production function. The agricultural sectors use 6 production factors: independent farm labour, dependent labour, land (distinguished in three types), agricultural capital and animals (distinguished in four types). The other sectors use 2 production factors: non agricultural capital and labour[3]. The household sector is also disaggregated in 11 household typologies, of which 7 family-farm households, 1 rural class, 3 urban classes graduated in terms of income levels. This classification allows an accurate distributional and welfare analysis of the impact of agricultural policies upon policy relevant farm-household types. Each household type maximizes a CES utility function given a budget constraint. Household preferences are described using a two-stage budgeting process. In the first stage, the utility function depends on aggregate consumption and leisure, where households have to decide how to allocate their full income between consumption and leisure. In the second stage, households choose, on one side, how to allocate aggregate consumption between the goods produced in the 45 economic sectors and, on the other side, how to allocate labour supply into independent farm labour and dependent labour. The full income depends on leisure remuneration and on disposable income, that is given by the net remuneration of the production factors, by pension benefits, by interests on the public debt and by transfers, among which, with the introduction of the CAP reform, are the de-coupled payments (ISMEA, 2004). A constant fraction of full income is saved to cover investment expenditures.

The government is represented in the model as a non-maximizing agent. Government revenues are represented by direct and indirect taxes, while government expenditures are represented by government demand of market goods, by the payment of pension benefits, interests on the public debt and subsidies to productive factors.

In this *Walrasian* economy, the CAP instruments are introduced. Regarding the milk sector, milk quotas are modelled, taking into account the recurrent Italian situation of production over quota and the need to pay annually a big amount of super-levies.

International trade is introduced in the model by considering two trade areas: European Union (EU

[3] Dependent labor is assumed perfectly mobile in every sector, non agricultural capital is perfectly mobile in every non-agricultural sector, agricultural capital and independent farm labor are perfectly mobile in every agricultural sector, land is mobile only among some agricultural sectors and animals are considered as a specific factor.

25) and the rest of the world (ROW). As for the GTAP model, the traditional Armington specification is used, so the national good and the imported good have different prices. On the contrary, from the export side, the good sell in the domestic market and the exported good are perfect substitute (Gohin, Guyomard and Le Mouël, 2004) and sold at the same domestic price. The model dynamic is assured by sector productivity evolution and by capital supply growth. The exogenous sector productivity dynamics in the time horizon considered in the simulations, have been estimated for each sector considering historical trends and qualitative evaluations about future sectoral prospectives. Specifically, for agricultural sectors historical yields have been analyzed and projected with Arima techniques, while for food industry sectors the labour productivity available data have been analyzed[4]. The evolution of international prices in MEG ISMEA is also exogenous. Here, results obtained by GTAP simulations have been used to obtain the annual dynamics of average prices for EU and ROW areas. Actually, the global model gives the world framework for the Italian scenario.

III. The scenarios simulated

According to what already discussed during the preparatory phase of the CAP reform in 2003, and drawn on by the Health Check proposal in 2007, two different hypotheses of changes of the milk quota regime have been considered in this paper, within a time framework up to 2015 (Binfiled *et al*., 2008; Patton *et al*., 2008; Lehtonen, 2008).

The starting point is the definition of a baseline scenario to refer to for the evaluation of the effects of the different scenarios of milk quota dismantling. It overlaps with the policy status quo, that is the course of the 2003 reform with no relevant changes up to 2015 and it is characterized by the following elements: partially de-coupled payments (with different de-coupling rate for the single Member States, according to the decisions taken in 2003) for the Fifteen and totally de-coupled payments for the NMS; 5% rate of modulation; milk quotas implemented up to 2015; population, labour and total factor productivity growth at rates foreseen by the ILO; differentiated rates of sector productivity in Italy according to the ISMEA estimates (ISMEA, 2005).

More in detail, about the milk sector in Italy, the underlying assumption is that the increases in the animal yields per head, given by the bettering of the techniques and of genetics, are overall tightly constrained by specific regulations, such as the implementation of the Nitrates Directive. Such a constraint is very relevant for the bovine sector in Italy, that tends to be highly intensive.

[4] The main data sources used are ISTAT and the forecast for Italy elaborated by OECD and Oxford Economic Forecasting Ltd (OEF).

Given the baseline scenario, two alternative scenarios are simulated by the two in-raw models[5]:

- One that includes the full quota dismantling in 2009, without any "soft landing" (NQ1);
- One that considers a quota "soft landing", that is a progressive loosing of the quota equal to 2% per year starting from 2008 and full dismantling in 2015 plus the export subsidies elimination in 2013 (NQ2).

IV Results

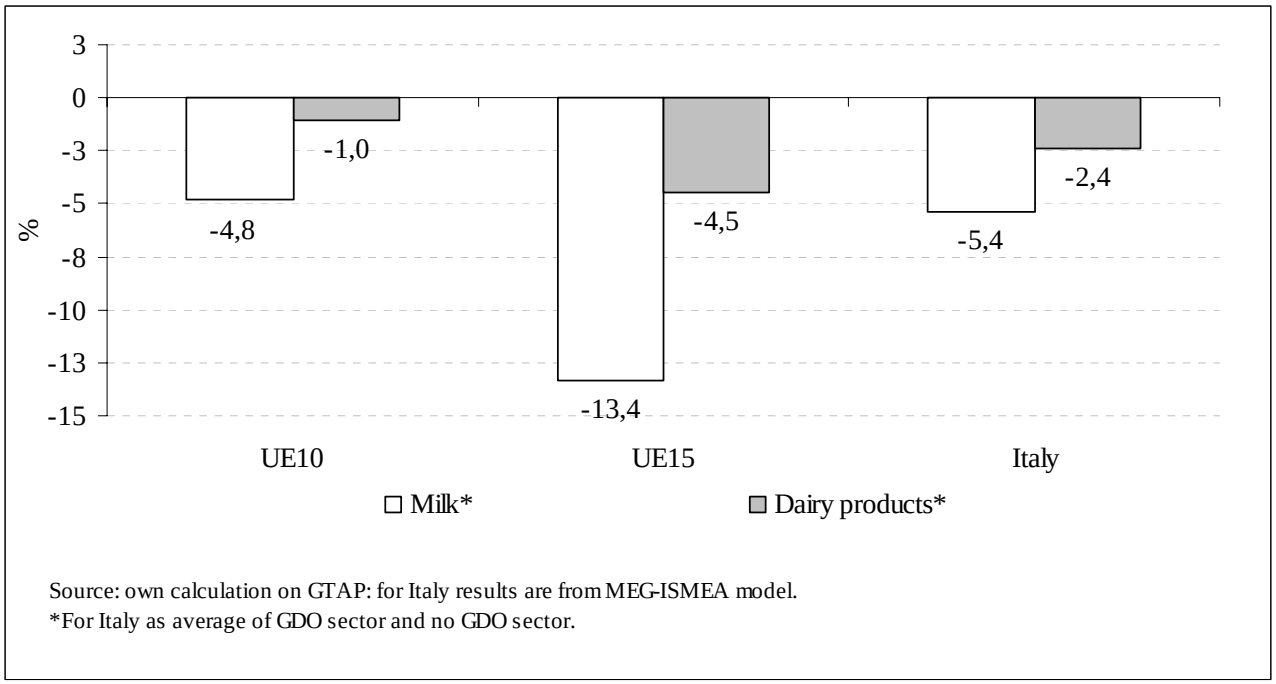
The value added of this analysis consists in evaluating the impact of the reform of the milk quota regime using two models that take into account the effects of the reform both at the EU and Italy level. GTAP supplies the impact of the reform in some of the largest milk and dairy producing countries and the price changes in EU that are, in turn, used as inputs in the MEG ISMEA model, focused on the Italian case.

4.1. The 2009 scenario

The abolition of quota rent in 2009 is an "extreme" scenario, whose application could have significant effects on the sector and especially on the milk and dairies prices.

[5] Results show figures as net effect, that is, the difference between the results of the simulated scenarios and the baseline. Moreover, both scenarios NQ1 and NQ2 have been simulated also under the hypothesis of Health Check implementation (total de-coupling from 2013 and modulation at 13%) but, since results do not differ substantially from the reported scenarios they are not presented here. However, figures could be asked to the authors.

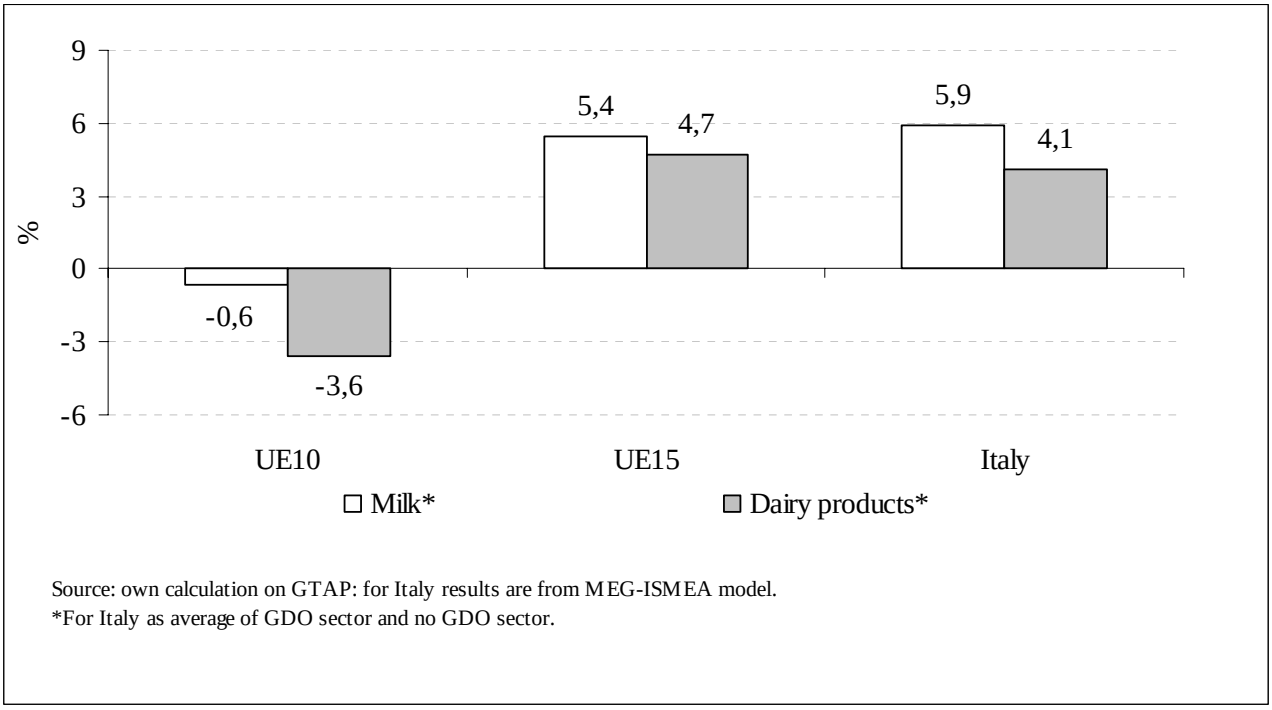
Fig. 1 – Price changes, for milk and dairy products, due to abolition of milk quota in 2009 ***(% difference to baseline scenario)***



Source: own calculation on GTAP: for Italy results are from MEG-ISMEA model.
*For Italy as average of GDO sector and no GDO sector.

On average, for the EU15, due to the abolition of quotas the milk price decreases about 13.4% with the dairy products showing a lower drop off. For the NMS (EU10) the changes are less strong: -4.8% for milk and -1% for dairy. For Italy, looking at the MEG ISMEA model results, price change of total milk, an average of milk for GDO productions and for no GDO ones, equals to 5,4%, while for total dairy products, GDO and no GDO, price change is around -2,4%. The difference between the price change in EU15 and in Italy, lower for the latter, is probably due to the relevance of the GDO sector, for which the price elasticity is lower compared to the no GDO sector. On the production side (fig. 2), the EU15, on average, shows an increase of the output, both for milk and dairy, around 5%. It is worth noting that the Netherlands shows the strongest increase of the output of milk and dairy among the EU countries (by 25%). The result is different for the EU10, where milk and dairy output, on the whole, decreases respectively by -0,6% and -3.6%.

Fig. 2 – Output changes, for milk and dairy products, due to abolition of milk quota in 2009 ***(% difference to baseline scenario)***



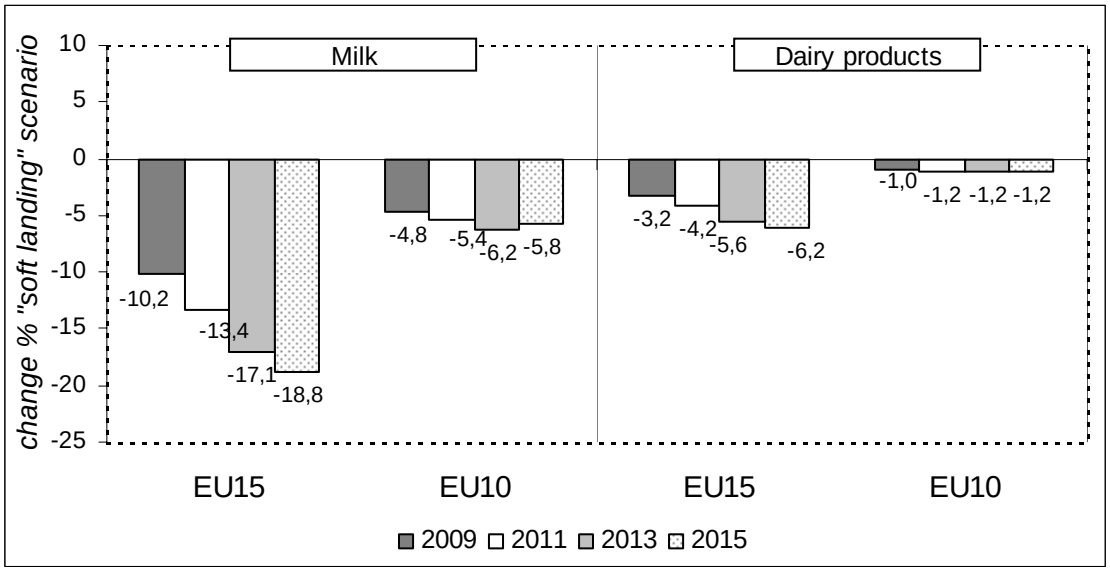
Source: own calculation on GTAP: for Italy results are from MEG-ISMEA model.
*For Italy as average of GDO sector and no GDO sector.

In Italy changes are quite similar to those of the EU15, with an increase of milk production by 5,9% and by 4,1% for dairy products, in both cases as an average of GDO and no GDO sectors.

4.2. The "soft landing" scenario

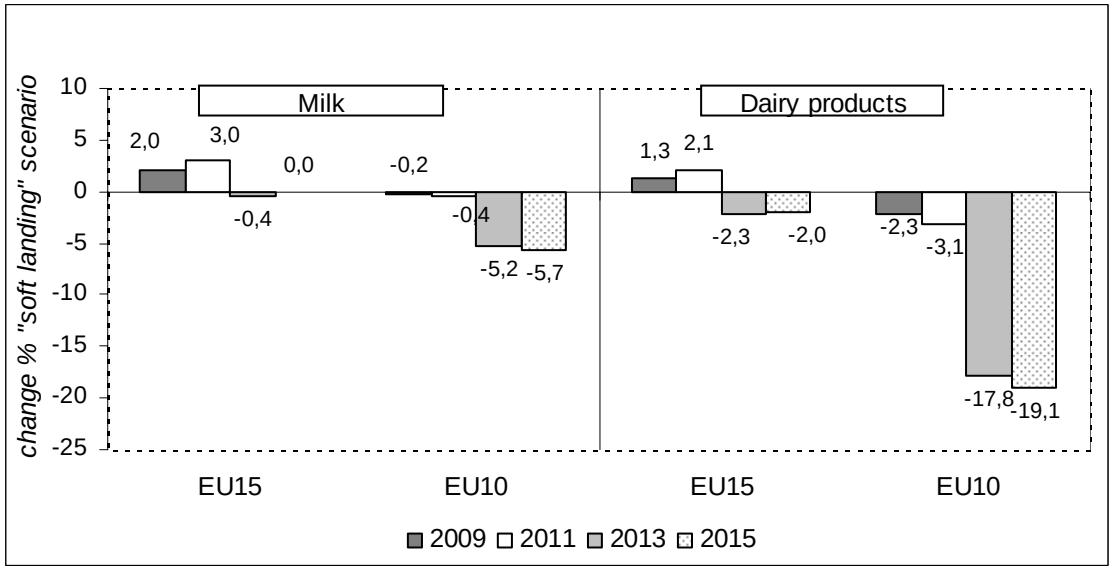
Looking at the scenario where the phasing out of the milk quotas is done progressively (2% per year) between 2009 and 2015 (fig. 3), results show, for the EU15, that the fall of the milk price is, at the end of the period, about -19%, with Spain (-26.8%) recording the highest change. A similar situation, only with lower values, is showed by the dairy sector, where the price change, on average, is around -6% for the UE15. Looking at the production, the two main results are: the differences among countries about the milk output and the difference in output change, both for milk and dairy sectors, between 2009-2011 and 2012-2015 (fig. 4). With regards to the first point, Austria, Germany and France show quite a small increase in the milk output, while the Netherlands (7%) and, to a lesser extent, Spain (3.6%), show a significant growth of milk output.

Fig. 3 – Milk and dairy: price changes in the "soft landing" scenario in EU_25 ***(% difference to baseline scenario)***



Source: Elaborations on GTAP

Fig. 4 – Milk and dairy: output changes in the "soft landing" scenario in EU_25 ***(% difference to baseline scenario)***



Source: Elaborations on GTAP

Moving to the second aspect, the maximum output capacity is achieved during the 2009-2011, with an adjustment of the production structure in the last two periods, where the abolition of export subsidies boost the phenomenon. Clearly, given the reform of subsidies, for dairy products this "path" is even stronger, with an output reduction in 2012-2015.

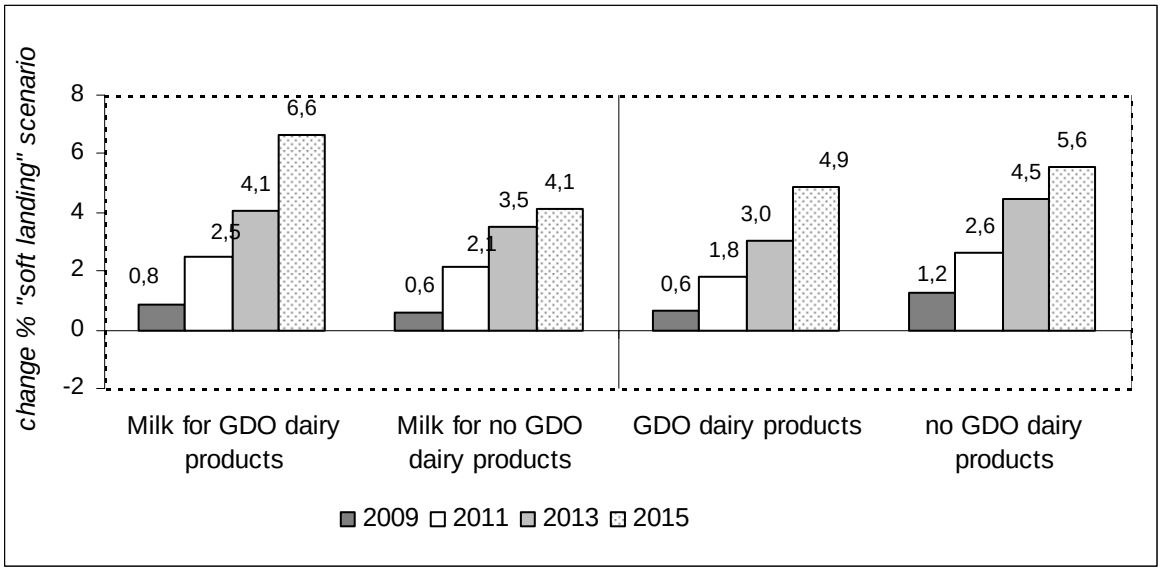
4.3. Detailed results for Italy

On the production side (fig. 5), the model shows that the foreseen growth in the baseline scenario of the milk output, as average of milk for GDO and no GDO, in 2015, without any reform, is stable in respect to the year 2007, the last pre-reform year (+0,3%); the net increase (given by the difference between the baseline trend and the increase due to the quota dismantling) with the quota reform, is by 5,3%[6]. Similarly (fig.6), with regards to prices, the model forecasts a figure in the 2015 that is, in the baseline scenario without any reform, increasing of 6,0%; with the reform, instead, results show a stability for total milk price; so, the net effect of the reform is a reduction of the milk price (-6% in 2015). Looking at these results, then, the impact of the reform in Italy is significant both in terms of price reduction and output growth even if changes are not so evident as for other EU partners.

More interesting it is to look at the difference between milk for the GDO sector and that for no GDO sector. Even if the results are close, it is clear that the impact on milk output for the GDO sector is lower, especially in the 2015 Looking at the total change (given by the baseline trend plus the change due to the quota dismantling) when the price for milk for no GDO dairy products is still decreasing while the high quality milk shows a small increase by 0,5% (fig. 7). For the dairy sector this difference is even strong. Similar to the impact on price is the impact on production, with a higher increase of milk production in the case of GDO sector (+7,7% in 2015, in respect to 2007, corresponding to a +6,6% as a net effect of the reform). On the contrary, for no GDO dairy production results show a higher increase in output (+10,0% in 2015 to 2007) with respect to the GDO sector (+6,6%). It seems that the no GDO sector benefits more from the price reduction of the main input, i.e. milk, because of the availability of low price milk imported from EU.

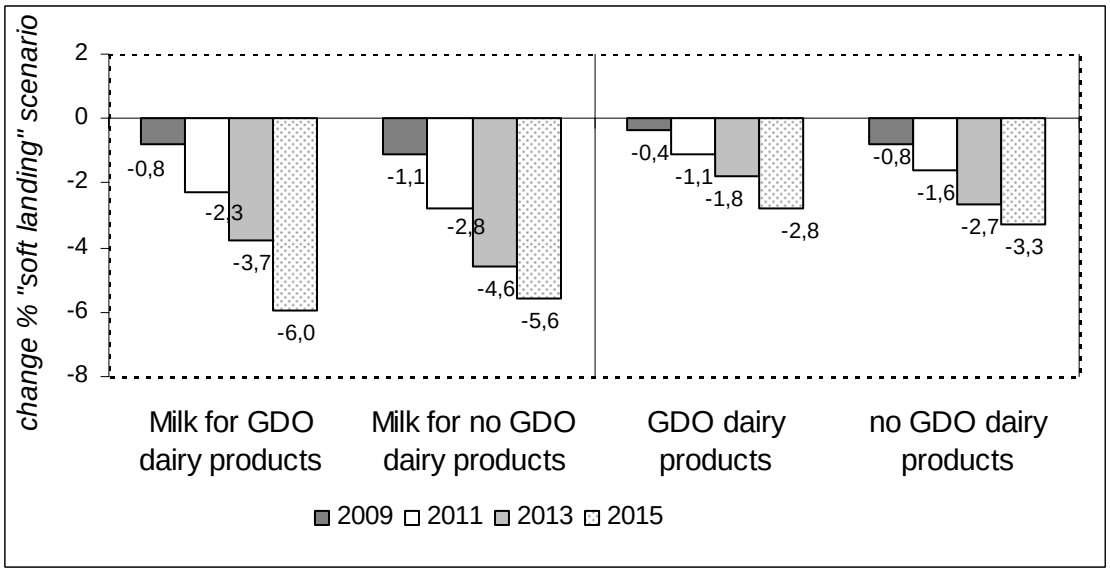
[6] It is worth to note that in the MEG-D we take into account the nitrate directive by a zero growth of the productivity in the sector.

Fig. 5 – Milk and dairy: output changes in the "soft landing" scenario in Italy *(% difference to baseline scenario)*



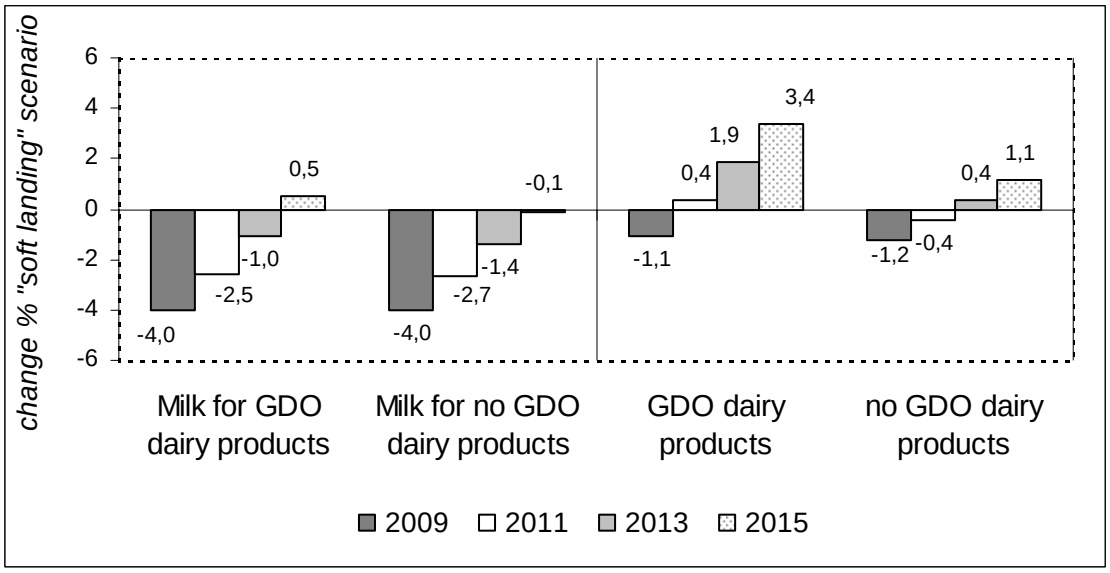
Source: Elaborations on MEG ISMEA

Fig. 6 – Milk and dairy: prices changes in the "soft landing" scenario in Italy *(% difference to baseline scenario)*



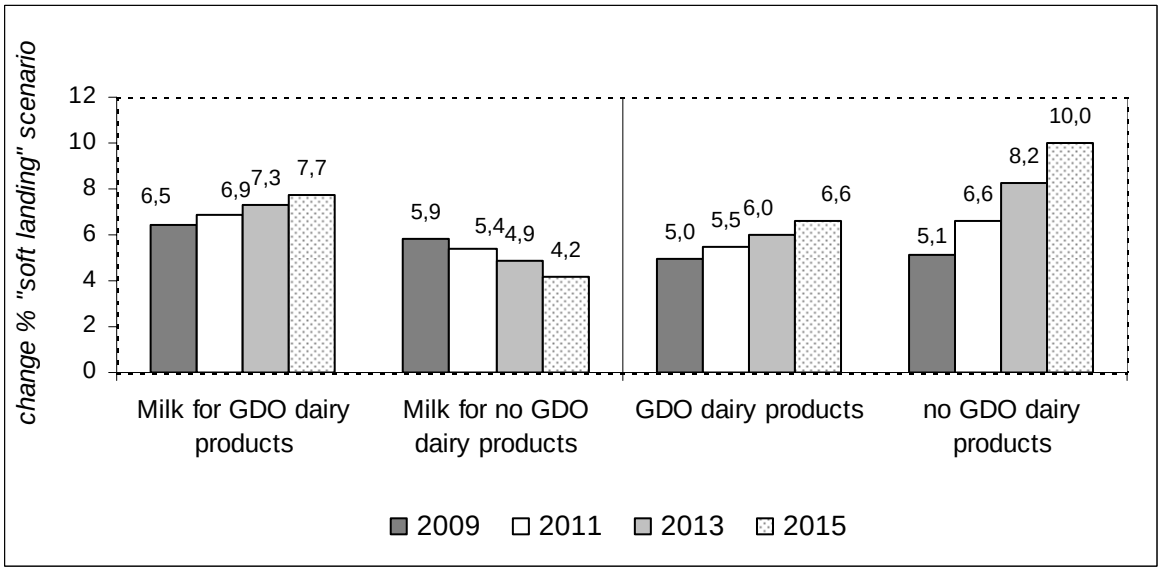
Source: Elaborations on MEG ISMEA

Fig. 7– Milk and dairy: prices changes in the "soft landing" scenario in Italy *(% change to 2007)*



Source: Elaborations on MEG ISMEA

Fig. 8– Milk and dairy: output changes in the "soft landing" scenario in Italy *(% change to 2007)*



Source: Elaborations on MEG ISMEA

IV. Conclusions

The analysis of the reform of the milk quota regime in the EU shows that the abolition of quota does have relevant effects on the milk and dairy sector. For the milk sector, price in the EU falls, on average, by 13% in the case of abolition in 2009 and by 19% in 2015. Output, instead, shows a significant change in some countries, like the Netherlands and Italy, while at the EU average the output remains rather stable. In any case, the difference between the 2009 scenario and the "soft landing" is not large but, in the case of the soft landing scenario changes are homogenously distributed along the years and consequently it appears to be a more suitable solution in order to avoid a shock in the sector.

However, it must be noted that the abolition of export subsidies also impacts significantly on the milk and dairy sector, contracting the output in both cases.

Using this approach we have seen that the effects of the reform of the milk quota regime in Italy is significant but not as dramatic as expected. Between 2009 and 2015, the growth of output is about 5 percent points higher than the projections without the reform while, for prices, the difference is around 6 percent points.

Finally, moving to some methodological considerations, a value added of this paper is the joint use of two models, GTAP and MEG ISMEA, which allows the analysis of the impact of the reform both in EU and in Italy as two steps of the same process. The MEG ISMEA model provides a detailed analysis of the impact of the reform of milk quota regime in Italy using as inputs the outcomes of the GTAP model i.e. price changes. This has been possible because of the introduction of the module for the output quota in GTAP, which represents a good improvement in this field of analysis.

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