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Economic Impact of Rural Development Plan 2007 2013 in Tuscany

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Abstract - In 2007 in every European Union region, involved in the planning of Rural Development Plan (RDP), an independent evaluator should assess the impact of the plan in term of value added and productivity. Each region has adopted different methodologies but few of them have followed the indications of Common and Monitoring Evaluation Framework (CMEF) to evaluate the net value deriving by direct and indirect effect. IRPET, the Independent evaluator of Tuscany, utilising REMI-IRPET model has assessed the impact of RDP on the main economic variables until 2020. Among 30 different measures it has been chosen only 5 of them that cover more than 54% of total amount of public and private investments. The economic impacts are also evaluated at provincial level.

Keywords - evaluation, regional model, rural development

INTRODUCTION

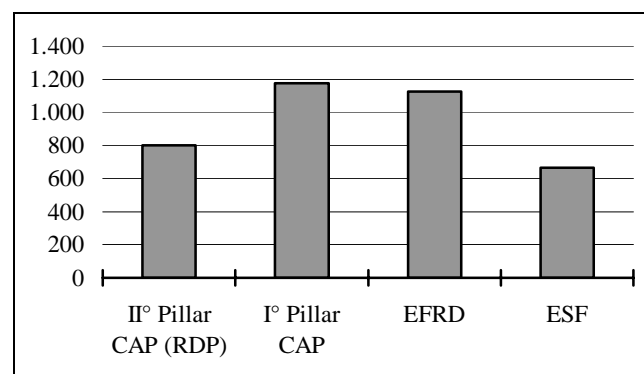
The rural development policy must be complementary with other agricultural policies. The efficiency of the policy could be better improved only throw a coordination of all the agricultural public supports and transfer payments.

More precisely, as mentioned in article 5 of the Reg. 1698/2005, the support by the EAFRD (European Agricultural Fund for Rural Development) has to be coherent with the objectives of the European Fund for Regional Development (EFRD), the European Social Fund (ESF) and with the European Fisheries Fund (EFF).

During the present programming period (2007-2013) Tuscany will receive about 3.8 billions of euro, (considering only the main public funds Fig. 1). More than half of the total budget will be allocated to the CAP policy (I Pillar + II Pillar). The EAFRD allocation for Tuscany is almost 370 million of euro, (0,4% of the all EAFRD), the other ones are both

national and regional funds. The total resources for RDP are about 8% of yearly output of Tuscan agricultural. The new RDP is an important opportunity for the regional agriculture to increase competitiveness and reducing its dependency on public support, 31% the average share of farm production value deriving from the main form of support [1].

Fig. 1 The main public policies with regional impact during 2007-2013 in Tuscany



Source: Tuscany Region and IRPET

The relevance of resources allocated in the new RDP needs for a careful assessment of the impacts both in qualitative and in quantitative terms. After the CAP Mid Term Review, in the last few years many models were developed to carry out impact studies, following different alternative approaches: a good review of these models is represented in the proceedings of 89th European Seminar of the European Association of Agricultural Economists held in Parma in 2005 [2].

The majority of papers presented in Parma aimed to assess the impacts of the CAP first pillar reform while, only a few studies were focus on to Rural Development policy. For example Crescenzi [3] [4] analysed the interaction between Rural Development on other regional policies. Other studies have analysed the impact of agro environmental measures on

agricultural abandonment [5] or have been focused on environmental features and the evolution of agricultural policy following a multicriteria approach [6]. Conversely it is very difficult to find studies aiming at analyse the economic impacts of the RDPs. Only few researchers, like Bossard, analysed the methodologies adopted in Brittany (France) to evaluate the effects of Rural Development policy on Local regional growth [7] while Midmore used input-output model to assess the regional agricultural policy impact [8]. This scarcity of contribution it is probably due to the intrinsic difficulty of modeling the impact of RDP, the major goal of which is to lead to a structural regionally localised change of the economy in the medium run together with the general lack of data.

New efforts in modeling the economic impacts of RDP are needed in order to answer to the question of UE commission on the evaluation of economic, environmental and social impact of structural funds.

In the recent years the approach to the evaluation of RD plans has changed [9] [10]. Only ten years ago one of the major aims of DGA (Directorate General for Agriculture) was to help the local Managing Authority (UE Regions or States) to develop an evaluation methodology at local level. As a consequence the need to compare different RDPs received secondary attention. So, while in the first Guidelines of rural development programmes 2000-2006 [11] the attention was focused on *common questions*, now the Common Monitoring and Evaluation Framework (CMEF) [12] have developed an approach based on *common indicators*.

In 1999 the main references for evaluation were the MEANS collection [13] of guidelines used for all the structural funds. In 2005, with Council Reg. (EC) 1698/2005 it has been established that the ex-ante evaluation of the RDPs should be suitable for an appropriate monitoring through the use of a common set of indicators covering all Member States. To emphasise the importance these indicators were also included in annex VIII of C. Reg. 1974/2006 laying down detailed rules for the application of C. Reg. 1698/2005.

The main objective of such as approach is to assess how rural development programmes are contributing to Community priorities and to provide a

comprehensive source of data, for mid-term and ex-post evaluation of the 2007-13 programming period.

For us, it is very relevant that CMEF also asked to evaluate the economic impact of RDP.

In this work the approach used by the IRPET (Regional Institute for Economic Planning of Tuscany, the independent evaluator of Tuscany RDP) will be presented in assessing the economic CMEF impact indicators¹ linked to the Community priority to improve *the competitiveness of agriculture and forestry by supporting restructuring, development and innovation* (Art 4 C. Reg. 1698/2005).

The paper is organized as follows. In the second paragraph the approach followed by other Italian and Spanish regions in the ex ante assessment of economic impacts of RDP will be discussed. In third the RDP for Tuscany will be presented. After a synthetic description of measures considered in the analysis (par. 4) in paragraph 5 the simulation exercise carried out to assess their economic impacts is described in detail.

II THE APPROACH OF OTHER REGIONS

During 2007 in all the 88 European regions and state, involved in the RDP, an independent evaluator should implemented an ex-ante assessment of RDP impacts on the economic growth.

In the Rural Development Plan's evaluation of two Italian regions (*Veneto and Emilia Romagna*) [14] [15] [16] the methodology used to estimate the economic impacts of the new RDP follows a micro-macro approach, mixing different methodologies such as: use of forecast form macro economics models and macro behavior equations. The first step is the construction of a regional baseline scenario for value added and units of labour.

By assuming the same annual national average variation (-0,3%), estimated with MEG D ISMEA², [17] [18] for all Italian region. To define the net effect

¹ As mentioned in CMEF: Impact indicators refer to the benefits of the programme beyond the immediate effects on its direct beneficiaries both at level of the intervention but also more generally in the programme area. They are linked to the wider objectives of the programme.

² MEG ISMEA was developed by INEA in co-operation with the University of Verona. It is a dynamic multisettorial Computable General Equilibrium (CGE) models for the national economy (45 settors), focus on the agriculture and the agriculture industry (23+13 settors).

on value added deriving by RDP, a cross checking counterfactual analysis has been adopted, grounded on results from in itinere evaluation of the previous programming period, where a sample of beneficiary and non beneficiary farms were compared.

To consider the global effect on regional agriculture the increase of value added in the sample farm has been extended to an hypothetical number of new beneficiaries; the differential impact was then compared to the baseline estimated with the forecast of MEG D ISMEA. Table 2 shows the percentage variation of agricultural value added from the baseline scenario without RDP.

Table 2 Impact on value added of regionals RDPs

Percentage variation of value added in 2013

	Emilia Romagna	Veneto
Agricultural	2,2	3,2
Manuf. of food products, bevs, & tobacco	1,5	1,9

Source: Agriconsulting

In other Italian regions as *Piedmont*, a more careful approach has been adopted, assessing in a qualitative way the possible direct impact on the agricultural enterprises.

Also in the ex ante evaluation of some Spanish regions (we have analysed the Spain region in which the RDP was approved during 2007) as: *Navarra, Galicia, Catalunya, Castilla y Leon and Pais Vasco*, the economic impact indicator are seldom analysed. [19] [20] [21] [22].

The methodologies utilized relay on the adoptions of previous impact without using macro models.

The different methodologies utilized in the evaluation just mentioned, might appear far from reaching standards fixed by EU commission. Nevertheless they could be considered a good compromise in answering some CMEF questions. Their major limitations are in the assessment of only *direct* effects on agriculture, excluding indirect and induced effects that, via the circular flow of the regional economy, the supported program could induce. To assess these higher order effects a regional multi-sector model is needed. This is the most important feature of the REMI-IRPET model, used in the ex-ante evaluation for Tuscany, as will be shown in the next paragraph.

III. MODEL DESCRIPTION

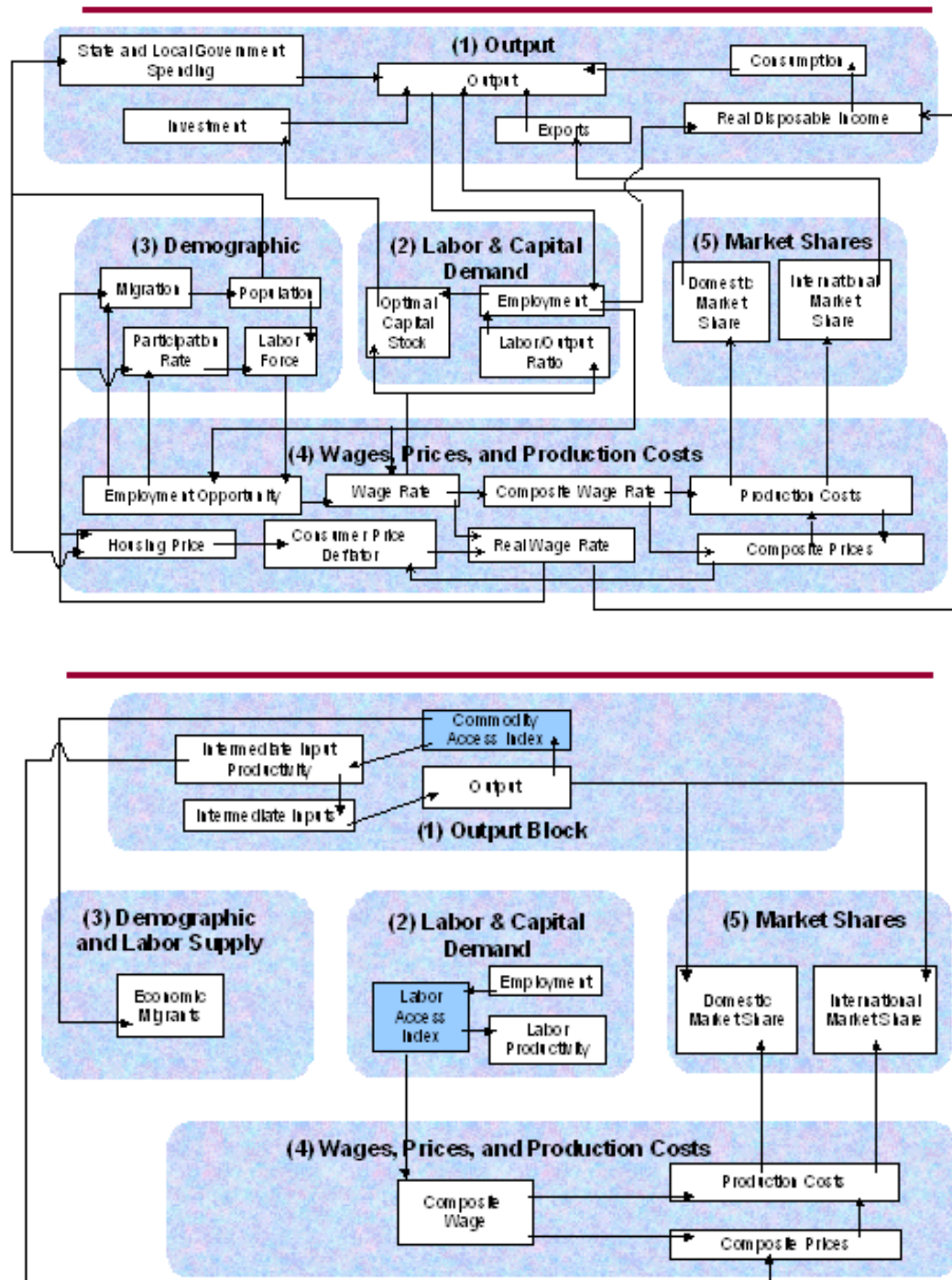
While the REMI-IRPET model comprises thousands of simultaneous equations, its structure is relatively straightforward. The exact number of equations varies depending on the extent of detail in the model. The overall structure of the model can be summarized in five major blocks:

1. Output
2. Labour and Capital Demand
3. Demographic
4. Wages, Prices and Productions Costs
5. Market Shares

The blocks and their key interactions are shown in Fig. 3.

A verbal description of the model by blocks and main equations most involved in the simulation are provided afterwards. (See [23] [24] for further theoretical and methodological details on the REMI model. As explained in those papers most of the model equations are econometrically estimated as the remaining parameters have been estimated through calibration. REMI-IRPET multiregional Italian model differs from the other REMI model implementations because both all regional I-O technical relationships and interregional trade coefficients have been estimated by IRPET (see [25] for technical details on IRPET I-O tables and REMI).

Fig. 3 Main relationships in remi-irpet model without neg (1a) and with neg (1b)



The first blocks (probably the key block) is mainly based on multiregional I-O relationships and on the following equations:

- i) The investments equation is based on optimal capital versus actual capital stock adjustment process. Optimal based on relative labour and capital intensity of production;
- ii) Household consumption is estimated by type of goods (durables, semi durables, non durables and services) and it is determined by real disposable per capita income allowing for Cobb Douglas substitutability among categories based on delivered prices. A transition matrix will transform type of goods into producers sectors
- iii) Government expenditure has been divided, according to SNA93, in two broad categories: divisible and indivisible public administration expenditure. The first, (education, social protection and health) are set upon demand equation based on age, composition and public balance constraints as for the indivisible (Law, Public Order and Safety, Defence *et alia*) the per capita amount has been used.
- iv) Intermediate input productivity is function of accessibility and it is one of the feature which allows to endogenise agglomeration economies according to NEG
- v) Interregional trade share are function of interregional demand, access to variety and relative delivered price
- vi) The REMI-IRPET model has endogenous domestic demand and relative prices for imports and relative export prices and exogenous world demand for exports
- vii) The ex post equilibrium condition of this block is that output by industry is all absorbed by demand at market prices each year

The second block analyses the production factors demand and it is based on the following equations:

- i) Employment depends on output, labour productivity (agglomeration effect endogenous), relative costs of capital and labour with Cobb-Douglas substitutability as new equipment is purchased
- ii) Capital stock is function of relative cost of capital, labour, and relative capital using economic activity, relative to baseline optimal for

the nation. Baseline optimal for the nation is calculated using actual capital stock in $t-1$ plus investment in the baseline divided by the adjustment speed

- iii) Endogenous labour productivity is related to access to labour (new economic geography formulation) and labour/capital substitution. This is the other way which allows to endogenize agglomeration economies.

In the third block a demographic model explains population natural growth. Important to note that international migration is treated as exogenous as interregional migration (competing with commuting) is function of relative real income and relative housing costs. The other important equation regards the participation rates, based on unemployment and real wage coefficients by aged gender cohorts

The main equations regarding prices and factors costs block are the following:

- i) Nominal wage rate is function of employment rate and current occupational demand, divided by expectation based on past demand
- ii) Composite price is equal to delivered prices (production costs + transportation from production location) divided by an access index that captures availability of variety.
- iii) Relative capital cost depends on baseline cost and changes in construction and machinery costs

How should REMI-IRPET react to a generic incentives Plan? The causality chains are mostly two. The first one is driven by the investment equation, indeed the incentives could act as a reduction of the capital services cost in the capital adjustment equation increasing demand for investments. This demand could also activate an additional flow of investments goods which could be fulfilled either by domestic production or import. In the medium run the additional investment demand will raise the K/L ratio with a positive impact on labour productivity and in turn a variation in production costs per unit of output.

IV TUSCANY RURAL DEVELOPMENT PLAN

The Rural Development Plan 2007-2013 [26] of the Tuscan Region is the local application of EC 1698/2005. Each Region, in Italy, has designed its own plan according to the National Strategy Plan (art.

11 (EC) No 1698/2005) and to the Community Strategic Guidelines (2006/144/CE). About 500 million of private investments have been added to public resources allotted to Tuscany (840 million of euro). Globally considered these resources are about 8% of value of yearly output of regional agriculture.

These resources will be allocated (art. 5 (EC) No 1698/2005) to three axes linked to three priority objectives: increasing competitiveness of the agricultural and forestry sector, environmental protection, and improving rural population quality of life.

A fourth axes of measures is built on transversal objectives related to the Leader approach.

The allocation of public resources among the Axes is left to the discretionary power of Local Managing Authority. Tuscany gave a priority importance to the Axis 1, related to the competitiveness improvement, and to the Axis 2, covering together about 80% of total resources

A characteristic of the Tuscan Plan is the high degree of delegation to local public bodies. The management of RDP is not centralised at the regional level but delegated to 10 provinces and, for some measures also to 20 Mountain Communities.

This characteristic highlights the utility to use a model, such as REMI-IRPET, able to estimate the impact at sub-regional level. In this analysis the economic impact of RDP was not estimated for all planned measures, but only for 5 of them.

Precisely for the evaluation of economic impact we have considered the following measures for the improvement of human capital:

- 113 Setting up of young farmers
- 112 Early retirement of farmers and farm workers and other measures aiming to incentives investments in production activities:
 - 121 Modernisation of agricultural holdings
 - 123 Adding value to agricultural and forestry products
 - 311 Diversification into non-agricultural activities

The last one was included in the Axis 3 and it was considered in the analysis for the importance that this activities hold in Tuscany.

All together the 5 measures cover more than 54% of the total amount of RDP resources and over 73% of the resources targeting the competitiveness of the agricultural and forestry sector.

The following is a short description of the previous measures.

Rejuvenate farmers with Transfer measures

A major weakness of Tuscan agriculture is the increasing ageing of farmer and farm workers. Tuscany is trying to re-qualify the human potential, reducing this negative pressure on competitiveness, supporting early retirement and the setting up of young farmer.

The setting up is related to farmers who decide to stop their agricultural activity for the purpose of transferring the holdings to other farmers, and farm workers who decide to stop all farm work definitively. Commitments for 2007-2013 are 8,2 million of euro plus 4,6 million of commitments from previous programming periods. In the model we have considered the total duration of early retirement support lasting 15 years.

The commitment for the measure 112 related to Setting up of young farmers (Art 20,a,ii/art. 22 Reg. (CE) 1698/05) is of 45 million of euro for a period of seven years.

Reduce of capital cost through investment incentives

The aim of these measures is to support agricultural holdings to improve their economic performance through better use of the production factors including the introduction of new technologies and innovation.

For 121 Measure (art. 20,b,i/art. 26 Council Reg. (EC) No 1698/2005), Tuscan authorities planned investments over 260 million euro. Compared with the previous programming period the total amount has increased more than 30 million of euro.

In 123 measure, *Adding value to agricultural and forestry products* (art. 20,b,iii/art 28 Council Reg. (EC) No 1698/05), beneficiaries are the agricultural and forestry products processing activities. The objective is to increase the value added of productions giving a priority to the transformation of raw material locally produced (Region Tuscany, 2007). Both

expenditures for material and immaterial investments are eligible.

Finally we have considered the 311 measure on *Diversification into non-agricultural activities* (Art. 52,a,i/art. 53 Council Reg. (EC) No 1698/05) that incentives the investments in non agricultural activities carried out by farms to increase the total farm income and to activate economic linkages with non agricultural economic operators (Regione

Toscana, 2007). The support shall be granted up to the maximum of 40% eligible costs as a non-repayable direct support. Tuscany planned an investments of 220 million of euro plus 2 million of transition payments deriving from the 2000-2006 period.

A summary of public resources allocated to different measures is presented in Table 4.

Table 4 The commitments utilised in the model

Value in Million of euro

Measures	Commitment 2007-2013		Commitments 2000-2007	Total
	Private	Public	Debts	
112 Setting up of young farmer		45,0		45,0
113 Early retirement		8,2	4,6	12,8
121 Modernisation	104,8	157,1	5,7	267,6
123 Adding value	50,0	116,7		166,7
311 Diversification	88,1	132,2	2,1	222,3
Total 5 measures	242,9	459,2	12,4	714,4
Total RDP	499,7	839,1	126,2	1.338,8
% Measure utilised	48,6	54,7	9,8	53,4

Source: Elaboration of IRPET on Region Tuscany data

The simulation

The simulation exercise carried out with the REMI-IRPET model can be divided in two parts. First a simulation scenario representing the direct effect of new RDP has been design for each single Tuscan Provinces over the planning period 2007-2013 at to 2020. Second, design scenario has introduce in the model in order to carry out the simulation.

The construction of the data needed for design the impact scenario could be divided in three steps.

First, the financing commitments for the previous programming period have been reallocated from 30 local public bodies to ten provinces. This allocation was possible thanks to the data of Agriconsulting evaluation 2000-2006 and Regional Paying Organisms data [27], [28], [29], [30]. The wide decentralisation applied by the Managing Authority has produced a non homogeneous organization of data unable to be directly used in the model. With this first step a new matrix of 70 rows (10 provinces

* 7 years) and 5 columns (related to the selected measures) was produced. Then it was transformed in a matrix of percentage shares of allocation among provinces and annuality.

In the second step the profile in the allocation of funds defined in the previous steps has been used to allocate new resources of the 2007-2013 planning period. However in 2007, some residual funding from RDP 2000-2006 will be spent and have to be taken into account in the simulation. In this step correction of abnormal shares in fund allocation caused by bad management or other mistakes during the last planning period were carried out This aspect was particularly relevant in the transfer payment measures. In the previous RDP the commitments setting up of young people was applied only during the first and second year, after which the support was stopped by UE for some alleged irregularity to be solved by Court of Justice of the European Communities. In the building of input data the commitment of 45 million was spread in a homogenous way among the ten provinces and

along seven years. On the contrary, for the early retirement measure, the previous provincial allocation which shows a more homogenous distribution along the seven years, has been considered.

Third to carry out the simulation the input data vector, was then translated in terms of model variables. The scenario has assumed a reduction in capital cost over the programming period, caused by incentive investments, for the three sectors affected by these measures such as agricultural (121 Measure), food processing (123 Measure), and agritourism, which is included in hotel and restaurant sectors (311 Measure).

This new investments will generate after the programming period a flow of gross investments (depreciations) which nonetheless will impact on the domestic and outside productions.

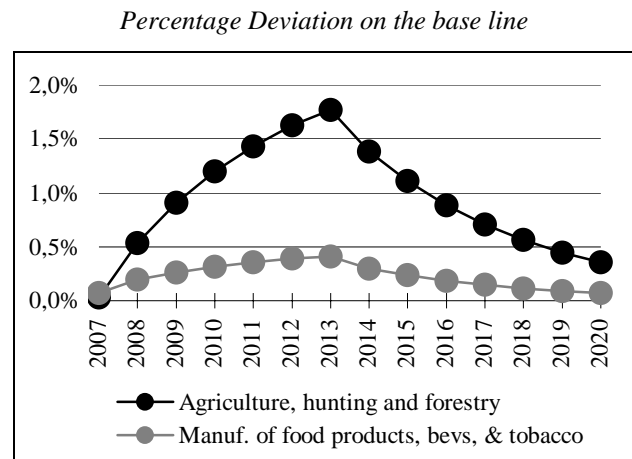
Moreover, rejuvenate of agricultural farmer should be pursued through incentives to early retirements with means, in term of REMI-IRPET model, an increase of pension bill for old farmers.

V RESULTS AND CONCLUSION

The impact on the sectors most involved in RDP by using REMI-IRPET model, could be considered significant not only at regional level (Fig. 5) but also in some provinces (Fig. 6).

The agricultural value added should increase up to 1,8% in 2013, with a gradual reduction until 2020. Also the value added of food processing industry will be positively affected, showing an increase by 0,2% in 2013. These effects are mainly driven by reduction of capital cost through public incentives. In the short run, even if very less pronounced, also transfer payments (pension for yearly retirements) will produce effects through increasing demand for consumptions. The time profile of the impact is also driven by the investments induced by incentives over the programming period and that will last up to 2020 by means flows of the related capital depreciations.

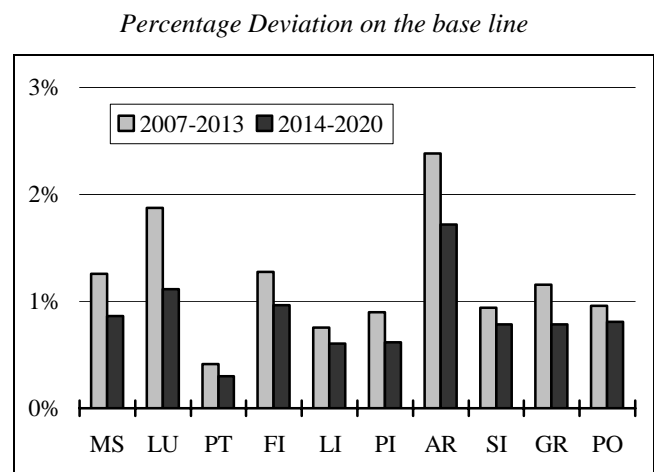
Fig. 5 Impact of rdp on agriculture and food processing industry value added



Source: REMI IRPET Model

The sub regional impact will vary across the regional territory rewarding the Arezzo and Lucca provinces.

Fig. 6 Agriculture value added



Source: REMI IRPET Model

Finally, the impact on regional GDP will be about 0,1% between 2007-2013, as the other economic variable will be positively affected by the plan. In particular the agricultural output will increase by 1.1% mainly driven by the external demand. As expected the RDP should raise the labour productivity.

Table 7 Economic indicators
Percentage Variation on the base without RDP

		Log Average 2007-2013	Log Average 2014-2020
GRP	Total GRP	0,071%	0,037%
	Value Added Agriculture, hunting and forestry	1,069%	0,777%
	Value Added Manuf. of food products, bevs, & tobacco	0,286%	0,163%
Employment	Total Employments	0,086%	0,042%
	Emp . Agriculture, hunting and forestry	0,960%	0,517%
	Emp. Manuf. of food products, bevs, & tobacco	0,213%	0,060%
Self Supply	Agriculture, hunting and forestry	1,126%	0,818%
	Manuf. of food products, bevs, & tobacco	0,300%	0,168%
Export	Agriculture, hunting and forestry	0,510%	0,261%
	Manuf. of food products, bevs, & tobacco	0,159%	0,046%
Output	Agriculture, hunting and forestry	1,081%	0,791%
	Manuf. of food products, bevs, & tobacco	0,285%	0,163%

Some relevant effects will also be produced in the sector produces investment goods and in the hotel and restaurant branch, (effect on the agritourism).

In conclusion, the simulation exercise carried out by using the REMI-IRPET model seem a good support to the decision of the Managing Authority by providing a consistent set of results in term of standard macro economic variables for the regional as a whole and the single provinces.

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