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Tax neutrality in determining farmers' incomes; an issue that needs to be resolved

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ABSTRACT: Net income from agricultural activities to calculate personal income tax can be determined either by different methods, but whatever method is used the aim should be to obtain the same result in all cases (neutrality). The aim of this study is twofold: on the one hand to analyze the neutrality of the OA method as compared to the SDA method. On the other hand to devise a method that provides the net income index that when applied would ensure the neutrality of the OA method. The results obtained confirm the lack of neutrality. Also it could be interesting to revise the methodology used by the Administration to fix the net income index.

KEYWORDS: Income tax, tax belligerence, tax policy, tax protectionism, farmers' incomes.

JEL classification: L51, Q14.

DOI: 10.7201/earn.2016.02.05.

La neutralidad impositiva en la determinación de los rendimientos de la actividad agraria. Una asignatura pendiente

RESUMEN: La determinación del rendimiento neto de la actividad agraria para el cálculo del Impuesto sobre la renta de las personas físicas puede realizarse por diferentes métodos, debiendo aspirar a obtener el mismo resultado en todos los casos (neutralidad). El objetivo de este trabajo es doble: por un lado analizar la neutralidad del régimen de EO frente al de EDS; por otro lado, desarrollar una metodología que permita obtener el índice de rendimiento neto que debería aplicarse en el régimen de EO para que este fuera neutral. Los resultados confirman la falta de neutralidad. Asimismo, sería interesante que la Administración revisara el procedimiento con el que fija los índices de rendimiento neto.

PALABRAS CLAVE: impuesto sobre la renta, política fiscal, beligerancia fiscal, proteccionismo fiscal, rendimientos agrarios.

Clasificación JEL: L51, Q14.

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1. Introduction

Calculating the income from agricultural activities for inclusion in personal income tax returns has been approached from different perspectives due to its importance in determining the amount of tax to be paid by farmers. Article 16 of Law 35/2006, which deals with personal income tax, enumerates the different methods of determining income from professional activities: Two modalities of Direct Assessment, Normal and Simplified (NDA and SDA), Objective Assessment (OA), and the supplementary Indirect Assessment.

The fact that there are different ways of reckoning this amount thus gives rise to different results, which means a different tax burden for farmers. And it is precisely here that the problem arises, since farmers' calculated income should be the same amount whatever the method used to arrive at it, as otherwise they could be considered as suffering an injustice under the principles of Justice and Financial Capacity of the General Tax Law. We must not forget that the aim should be to calculate the farmers' actual financial status and not a rough approximation.

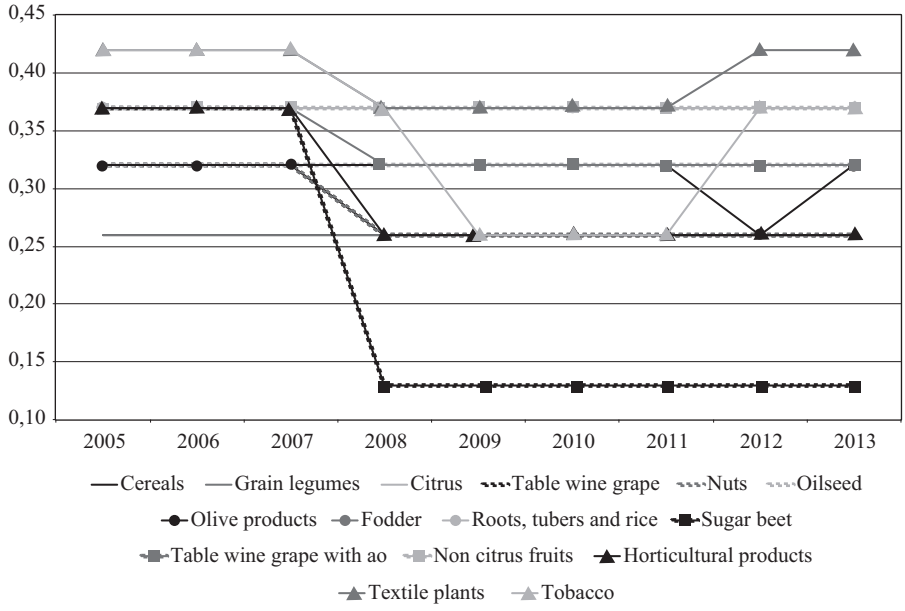
The only certain way of arriving at a farmer's actual income is by direct assessment, because it is obtained by calculating the difference between his earnings and the outgoings incurred in his activities. However, this involves the drawback for the farmer of having to comply with the requisites that the method demands, including the strict obligation of keeping detailed accounts of all financial transactions. In order to relieve farmers of having to comply with a large part of these formal requisites, the Objective Method of tax assessment was introduced. This avoids having to calculate the actual earnings obtained by farmers and instead arrives at an approximate figure by applying certain indices or modules to their total earnings. It would seem to be obvious that these indices or modules should be determined in such a way that the income calculated by their application should be as close as possible to the income calculated by the direct assessment method. Any difference between the results of both methods would bring to light a situation of lack of neutrality, which has been described in different terms in previous studies: e.g. *profits and losses,* Sabaté (1994 and 1995); *tax advantages and disadvantages*, Martín (2000); *fiscal neutrality, protectionism and belligerence*, Casquet and Gómez-Limón (2001), Juliá and Marí (2002 and 2003); Marí (2008).

The studies cited above have clearly shown that the OA method is by no means neutral, even though they do need to be updated as regards the following points:

- The latest study on vegetable crops is on the years leading up to 2003, since Marí's study of 2008 is only concerned with sheep production. And while the earnings indices used in the OA method have hardly changed in the intervening years (see Graph 1), there is no doubt that the structure of earnings and outgoings in agricultural holdings has indeed changed. According to the Bank of Spain (2015), while the prices farmers receive for their products have risen by 8 % between 2003 and 2013, the prices they have to pay for goods and services have gone up by 39.5 % in the same period.

GRAPH 1

Net Income Indices in force between 2005 and 2013



Source: Compiled by the authors from the Regulatory Orders applicable to the OA method between 2005 and 2013.

- The database used as a reference in the above studies was that of the Farm Accountancy Data Network, FADN (RECAN in Spanish), which, in spite of certain deficiencies, was regarded as being closest to the real situation in agriculture, as there was no other similar public database with the same amount of information, Juliá and del Campo (1993).

  However, Marí (2008) showed that the FADN data was not the closest approach to the real situation in agricultural holdings. Marí's study was based on three different databases, FADN and the Analysis of the Economy of Production Systems (AESP in Spanish), both of which are compiled by the Ministry of Agriculture, and a third one constructed by the author from data derived from a sample of holdings involved in sheep farming. The results obtained from the AESP data were similar to those obtained from the sheep farmers' data, while those obtained from the FADN data were significantly different.

  It has therefore become necessary to carry out new studies on neutrality in determining farmers' net income and apply the AESP data, which, in 2010 changed its name to *Studies of Costs in Agriculture*, and again in 2013, when it became known as *ECREA (Studies on Earnings and Costs in Agricultural Holdings)*. This information can now be found on the website of the Ministry of Agriculture, Food and the Environment.

The main objective of this study is thus to analyze the evolution of neutrality in determining farmers' net incomes between 2005 and 2013 for a wide range of crops in different Autonomous Communities, in doing which we will also be able to find any differences in neutrality between individual communities. We will also propose a method of calculating the net income index that will ensure the neutrality of the OA method, which can be used to adapt these indices to the changing situations in the agricultural sector.

2. Assessing farmer's net income

As we have pointed out above, there exist a number of different methods of determining the net income on agricultural activities. This section describes the application requisites and the functioning of the two principal methods used: Simplified Direct Assessment (SDA) and Objective Assessment (OA).

The SDA method will be applicable to farmers provided that:

- OA is not applicable to them in accordance with the relevant Orders.
- Total net earnings in the preceding year for all activities did not exceed €600,000.
- The taxpayer does not explicitly renounce this modality.
- None of the activities carried out is taxable by the normal modality.

The net earnings of this modality will be calculated in accordance with the regulations relating to Corporate Tax, which basically consists of the difference between computable earnings and deductible expenses, with the following provisos:

- Unjustified provisions and expenses will not be accepted and will be replaced by an amount equal to 5 % of positive net earnings. In the years 2005, 2006, 2008 and 2009 the applicable percentage was 10 %.
- Depreciation on fixed assets will be linear and in conformity with the relevant Simplified Depreciation Table (Order 27 March 1998 of the Ministry of Economy and Finance).

The OA method will be applicable provided that:

- The activity is specifically recognized by the Ministerial Order that regulates this regimen, published every year by the Finance Ministry. During the period of the present study the following Orders were issued:

- Order EHA/3902/2004, 29 November, for Financial Year 2005.
- Order EHA/3718/2005, 28 November, for Financial Year 2006.
- Order EHA/804/2007, 30 March, for Financial Year 2007.
- Order EHA/3462/2007, 26 November, for Financial Year 2008.
- Order EHA/3413/2008, 26 November, for Financial Year 2009.
- Order EHA/99/2010, 28 January, for Financial Year 2010.
- Order EHA/3063/2010, 25 November, for Financial Year 2011.
- Order EHA/3257/2011, 21 November, for Financial Year 2012.
- Order HAP/2549/2012, 28 November, for Financial Year 2013.

However, throughout the study period, additional Orders were issued that reduced the earnings indices on certain crops in certain geographical areas, usually municipal districts, due to the effects of exceptional circumstances.

- The farmer has not renounced the application of the OA method to his income tax declaration, nor the simplified VAT system, nor the special VAT regime for agriculture, stockbreeding and fishing (REAGP).
- The farmer has not incurred in any of the following causes for exclusion:

  - In the preceding financial year his total earnings have exceeded either of the following:

    - Annual total earnings of €450,000 for all his economic activities.
    - Annual total earnings of €300,000 from all agriculture, stock breeding and forestry activities susceptible for assessment by the OA method.

  - In the previous financial year the taxpayer has exceeded total purchases of €300,000 on goods and services related to all his economic activities, excluding the purchase of buildings.
  - Has carried out his economic activity totally or partially outside Spanish territory.
  - Has determined the net earnings of any economic activity by the direct assessment method in any of its modalities.

The net earnings of this modality are determined by applying in succession a series of indices to the farmer's total earnings (see Table 1), with the aim of adjusting the earnings obtained by this method to the specific characteristics of the farmer's activity, in order to come as close as possible to the actual earnings obtained by the holding in question.

TABLE 1

Scheme of the method of calculating the Objective Assessment Modality for agricultural activities

		Determinatin of Net Income by OA
Phase 1		Total income
		(Including subsidies and indemnities)
	(x)	Net income index
	(=)	Preliminary net income
Phase 2	(-)	Reductions (set every year)
	(-)	Depreciation on tangible and intangible assets
	(=)	Reduced net income
Phase 3	(x)	Correcting indices
		(According to activity and special circumstances)
	(=)	Net income by modules
Phase 4	(-)	General reduction of net income
	(-)	Reduction by law 19/1995: 25 % (young farmers)
	(-)	Extraordinary expenses
		Exceptional (fires, flooding, etc.)
	(=)	Net income from activity
Phase 5	(-)	Reduction for irregular earnings: 40 %
	(=)	Reduced net income

Source: Compiled by the authors from the Ministerial Orders relating to this method.

As regards the reductions to be applied to the preliminary net earnings, which are set each year, we would like to emphasize two that were implemented during the study period to comply with certain conditions:

- Reduction for the purchase of agricultural diesel fuel (35 %) applied in the years 2005, 2006, 2008 and 2009.
- Reduction for the purchase of fertilizers or plastics (15 %) applied in 2005, 2006, 2008 and 2009. However, in 2006 this was only applied from January 1 to June 30. In our calculations we assumed that these purchases were evenly distributed throughout the year and thus used 50 % of the annual figure.

Depreciation can be deducted as long as the specific depreciation table for this method is applied and the relevant successive Ministerial Orders are complied with.

The correcting indices to be applied to the reduced net earnings refer to:

- Exclusive use of means of production belonging to others in agricultural activities: an index of 0.75 will be applied when means of production belonging to others are exclusively used in agricultural activities, excluding land.
- Use of paid labour: when workers are engaged in exchange for salaries or wages, whose cost exceeds 10% of total earnings, a correcting index will be applicable which will vary according to the percentage cost of the workers in relation to the total earnings of the activity.
- This index will not be applied when the earnings from the activity have been reduced by reason of the application of the preceding index.
- For crops grown on rented land: an index of 0.90 will be applied when crops are partially or entirely grown on rented land.
- Ecological agricultural activities: an index of 0.95 will be applied when production complies with the legal requirements laid down by the relevant Autonomous Community for the production in question.
- In the case of a holding whose reduced net earnings do not exceed the sum of €9,447.91: a correcting index of 0.90 will be applied when the sum of reduced net earnings of all agricultural and stock breeding activities carried out by the farmer do not exceed the sum of €9,447.91 annually.

Unfortunately, due to the difficulty of finding the relevant information in the data base used, we were only able to consider the index for the use of salaried staff and that of holdings with total earnings of less than €9,447.91 per annum. The other reductions from the net earnings indices for exceptional circumstances mentioned above were only considered when all the holdings that made up the sample in the data base for the crop in question were located in the geographical region in which the reduction was applied. However, we do not believe that failing to apply the remaining indices had any considerable effect on the results of the study, due to they are not of general application. We must remember they are: exclusive use of means of production belonging to others, crops grown on rented land, and ecological agricultural activities.

Finally, a general reduction on earnings has to be applied; the quantity of this reduction varied throughout the study period, from 2 % in 2005 and 2006, 0 % in 2007, 3 % in 2008 and 5 % for the remaining years between 2009 and 2013.

On the other hand, it should be noted that the lump sum compensation received by farmers for being subject to the special VAT regime for agriculture, stock breeding and fishing (REAGP) is treated as taxable income. The percentages of compensation for this item during the study period are given in Table 2.

TABLE 2

Percentage of lump-sum compensation for belonging to special VAT regime for agriculture, stock breeding and fishing (REAGP). In percentage

	2005	2006	2007	2008	2009	2010	2011	2012	2013
Agricultural Activities	8	9	9	9	9	9	10	10	12
						10*		12**	

* In force from 1 June, 2010.

** In force from 1 September, 2012.

Source: Law 37/1992, 28 December, on the Value Added Tax; Law 4/2006, 29 March on the adaptation of the tax regime of steamship companies according to tonnage to new EU Directives on State Aid to Marine Transport and modification of the Economic and Fiscal Regime for the Canary Islands; Law 26/2009, 23 December, on the General State Budget for 2010; Royal Decree 20/2012, 13 July, on measures to guarantee budgetary stability and promote competitiveness.

In the case of financial years 2010 and 2012, in which the lump-sum compensation was modified, we opted to follow a linear criterion, so that the equivalent compensation was recalculated according to the number of months in which each of the rates was in force. For example, in 2010, when the change came into force on July 1, the equivalent rate applied is 9.5 %, while in 2012, when the rate came into force on September 1, the equivalent lump-sum compensation used is 10.67 %.

Similarly, it is also necessary to include as income any aid decoupled from production, since, as established by the tax regulations, they must be coupled to production when calculating net earnings in proportion to the income from each crop. Since, in the data base used, these aids are considered to be part of the holding's total income, and not as the income from separate crops, they should be included. For this, the following procedure was used: the amount of the aid not tied to production was calculated as a percentage of the holding's total earnings. This percentage was applied to the income derived from the crop under consideration, accepting that the result obtained constituted the nearest approximation to the value of the aid coupled to production.

An example of these calculations applied to hard rain fed wheat in Andalusia in 2013 is included in the Appendix 1.

3. Material and Methods

In order to carry out our analysis, we will use the so-called *Neutrality Index* (Juliá and Marí, 2002), which is obtained by dividing the earnings obtained by the OA method by those obtained by the SDA method, expressed as a percentage.

$$Neutrality\ Index = \frac{\text{Earnings obtained by the OA method}}{\text{Earnings obtained by the SDA method}}\ x\ 100 \qquad [1]$$

The indices over 100 will thus indicate that OA earnings are higher than SDA earnings, which will denote a situation of belligerence, and that the farmers who opt for the OA system will be at a fiscal disadvantage. On the other hand, indices lower than 100 will imply an advantageous situation, or protectionism, in the OA method, as a lower income will be declared than that obtained by SDA. A value of 100 will indicate a neutral situation, which, let us remember, should be the objective of the Tax Authority.

In the Appendix 1 we mentioned before, also we have included the neutrality index calculations.

In spite of what we have just pointed out, the agricultural sector as a whole is passing through a difficult situation and some farmers now suffer losses in running their holdings. Should negative results be obtained by both the OA and SDA methods, the neutrality index will be obtained by dividing SDA earnings by OA earnings, expressed as a percentage. In this situation no taxes will be due by either method, however the negative results will constitute a fiscal credit, which will be added to other earnings that make up taxable income, and if this is still negative, it can be compensated by any positive results obtained in the following four years.

$$Neutrality\ Index\ in\ case\ of\ losses = \frac{\text{Earnings obtained by the SDA method}}{\text{Earnings obtained by the OA method}}\ x\ 100 \quad [2]$$

If losses are obtained by only one of the methods, no neutrality index can be computed, as this result is not comparable with the others. However, when losses are thrown up by SDA but not by OA, this will show a clearly belligerent situation, since the farmer that uses OA when filling in his tax return will pay on the earnings obtained, when these are really negative, in which case he should have to pay nothing. In any case, we should remember that the choice of OA method is voluntary. The opposite case would show a situation of protectionism.

After obtaining the neutrality indices, the next step is to calculate the net earnings indices that would have made the OA method give a neutral result. For this we used a new technique that never has been used in this purpose. We used Microsoft Excel's Data Analysis SOLVER toolset, which can find an optimum (minimum or maximum) value for a formula in a cell, known as the *target cell*, subject to the constraints or limitations of the values of other formula cells on the spread sheet. This toolset uses a group of decision variable cells that participate in computing formulas in the target and constraint cells, and adjusts the values of decision variable cells to comply with the limitations of constraint cells and to produce the desired result in the target cell.

In our case, we define decision variable cells as those that contain government-approved net earnings indices. Our aim is to minimize the variability between the net earnings obtained from the methods under study, and the only constraint is that the taxable income calculated by both methods be the same. Variability is defined as the variance of the differences of net earnings by SDA and OA.

The only way that SOLVER can find an optimal solution for each crop type and comply with the conditions imposed is by allowing the net earnings indices to take values lower than 0. In other words, accepting negative earnings indices is the only mathematical possibility (unless the Tax Authority allows exceptional reductions) in the present configuration of the OA method that can achieve fiscal neutrality in crops that produce losses by the SDA method. Of course, these negative neutral indices do not make much sense, since the present regulations do not admit negative net earnings indices. However, we can use the proposed negative indices to analyze the existing lack of neutrality.

The model used is that of the goal programming model, in which the aim is to minimize the sum of the squares of the negative and positive deviation variables.

The information used was provided in a publication of the Ministry for Agriculture, Food and The Environment entitled *An Analysis of the Economy and Systems of Production* between 2005 and 2009, *Studies of Agricultural Costs* between 2010 and 2012, and *ECREA: Studies on Costs and Earnings in Agricultural Holdings* in 2013.

The economic information contained in this database was obtained from the information supplied by the holdings in the sample and varies from year to year according to the farmers that responded to the request for information. However, a minimum of four holdings was established per crop and Autonomous Community for the results to be accepted as valid and included in the analysis. As regards surface area, if we compare the surface covered by the sample for each crop with respect to the total surface of each one, obtained from The Survey on Surfaces and Earnings carried out by the Ministry of Agriculture, Food and The Environment for 2013, we find that on average the data base does not even cover 1 % of the total surface, although there are inter-crop differences: from 0.24 % of the surface for oranges up to 1.69 % for watermelons. In our case, we selected for the study the crops from those available in each Autonomous Community for which we were in possession of information for the entire period of the study and which are listed by Autonomous Communities in Table 3.

TABLE 3

Crops considered in the study by Autonomous Community

	Andalucía	Aragón	Castilla-La Mancha	Castilla y León	Extremadura	Murcia	Valencia
Garlic			X				
Apricots						X	
Artichokes						X	
Alfalfa		X		X			
Cotton	X						
Rainfed Almonds		X					
Celery							X
Rice	X				X		
Rainfed Oats			X	X			
Broccoli						X	
Pumpkins	X						
Irrigated Barley		X	X	X			
Rainfed Barley		X	X	X			
Onions			X				X
Rainfed Rye				X			
Greenhouse Strawberries	X						
Irrigated Sunflowers				X			
Rainfed Sunflowers	X	X	X	X			
Rainfed Dry Peas				X			
Lettuce			X			X	X
Lemons						X	
Irrigated Grain Corn		X	X	X	X		
Mandarin Oranges							X
Apples		X					
Peaches		X				X	X
Melons	X		X				
Oranges	X					X	
Nectarines		X				X	
Rainfed Olives for Oil		X	X		X		
Early Potatoes							X
Early Greenhouse Potatoes							X
Mid Season Potatoes				X			
Cucumbers	X						
Pears		X					
Peppers	X						

TABLE 3 (cont.)

Crops considered in the study by Autonomous Community

	Andalucía	Aragón	Castilla-La Mancha	Castilla y León	Extremadura	Murcia	Valencia
Greenhouse Peppers						X	X
Sugar Beet	X			X			
Watermelons	X					X	X
Virginia Tobacco					X		
Tomatoes	X					X	X
Industrial Tomatoes					X		
Irrigated Soft Wheat		X					
Rainfed Soft Wheat		X	X	X	X		
Irrigated Hard Wheat		X					
Rainfed Hard Wheat	X	X					
Wine Grapes		X					
Irrigated Wine Grapes			X				
Rainfed Wine Grapes			X				

Source: Own elaboration.

4. Results and discussion

In the Appendix 2 we give the results of the neutrality index for all the crops included in the study by Autonomous Communities for the period 2005 to 2013 (Tables 4 to 10). When the index value shows "Losses", this means that the SDA method calculated a loss and the OA method a profit, which can be interpreted as a clear case of belligerence. Cases in which the neutrality index was obtained from negative net earnings by both methods are indicated by a superscript. Finally, the case in which profits were obtained by SDA and losses by OA; this case normally occurs as a result of the reduction of the net earnings index due to exceptional circumstances that make the initial net earnings inferior to the depreciation on assets that must be subtracted from it.

We also calculated the net earnings indices that would make the OA method neutral for each crop in each year of the study period and Autonomous Community. These values were compared with the earnings indices calculated by the regulations in force at the time. However, to make the results more easily understandable, we only give the mean values of both indices for the whole period and grouped by crop type: vegetables, cereals, and fruit growing. These results can be seen in the Appendix 3 (Tables 11 to 13).

Finally it is of interest to point out that of a total of 764 net earnings calculated throughout the period of the study, 72 (9.42 %) are negative. In these cases the belligerence of the OA method is clear, since the losses are obtained on applying the SDA method, while profits are obtained when OA is applied. Also we find 23 cases, or 3.01 % of the total, in which losses were obtained by both methods. If the figures are examined for individual Autonomous Communities, certain differences become apparent (see Table 14), even though it is difficult to draw relevant conclusions. The worst results occurred in Andalucía, Castilla y León, Murcia and the Community of Valencia, in which more than 10 % of the holdings suffered losses. On the other hand, in Aragón, Castilla La Mancha and Extremadura fewer than 10 % of the holdings suffered losses. It is notable that the crops that entailed losses were mostly forestry and vegetable products, but were not often cereals; this was influenced by the main crops are produced in the different Autonomous Communities, and the results obtained for each one.

TABLE 14

Losses obtained by SDA and SDA and OA on total calculated earnings by Autonomous Community

	Calculated earnings	Losses in SDA	% SDA loss/total	SDA and OA Losses	% SDA and OA loss/total	Losses in OA	% OA losses/total
Andalucía	117	14	11.97	5	4.27	4	3.42
Aragón	144	3	2.08	4	2.78	3	2.08
Castilla-La Mancha	114	3	2.63	3	2.63	1	0.88
Castilla y León	122	13	10.66	5	4.10	8	6.56
Extremadura	54	4	7.41	0	0.00	1	1.85
Murcia	99	16	16.16	2	2.02	1	1.01
Valencia	114	19	16.67	4	3.51	1	0.88
Total	**764**	**72**	**9.42**	**23**	**3.01**	**19**	**2.49**

Source: Own elaboration.

When we analyze the crops in two or more Communities for which we have information, we can conclude that in spite of the differences in certain values of the neutrality index for individual crops, these differences disappear when analysis is made in an aggregate level. Thus, when the OA method is belligerent, it is so in all the Autonomous Communities. And this also happens when it is protectionist. However, we did find certain differences in the following crops: rain fed sunflowers, lettuces, melons and watermelons. These differences can be seen in Table 15.

TABLE 15

Differences between Crop Neutrality Indices in Autonomous Communities

	Rainfed sunflowers								
	2005	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
Andalucía	17.52	79.46	62.82	45.60	78.38	72.91	67.84	145.36	Losses
Aragón	Losses OA*	46.82	7,963.16	382.14	267.64	51.95	3,950.88	59.70	Losses
Castilla-La Mancha	39.90	26.93	43.76	237.11	188.52	42.31	56.52	735.12	56.11
Castilla y León	43.27	Losses	72.43	589.66	259.72	67.84	93.55	229.28	716.13
	Lettuce								
	2005	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
Castilla-La Mancha	154.69	98.33	83.32	48.90	54.47	73.17	42.93		
Murcia	105.75	88.00	75.02	66.21	151.67	244.07	Losses	118.17	78.16
Valencia	106.35	Losses	571.64	Losses	Losses	Losses	Losses	Losses	
	Melon								
	2005	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
Andalucía	Losses OA*	33.65	212.92	Losses	Losses OA*	70.01	9.75	52.16	81.69
Castilla La Mancha	137.34	116.75	485.24	59.44	Losses	118.01	92.96	91.38	478.97
	Watermelon								
	2005	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
Andalucía	96.71	43.18	Losses	Losses	256.60	106.31	81.51	Losses	Losses
Murcia	196.93	58.87	61.36	37.92	66.72	45.29	32.17	61.07	55.72
Valencia	275.80	95.48	Losses	4,692.87	Losses	Losses	Losses	Losses	130.75

* Profits in SDA and Losses in OA (reduction of net earnings index for exceptional circumstances).

Source: Own elaboration.

In view of these results, we can say that a protectionist situation can be found in the great majority of crops since in general terms they show indexes lower tan 75 %. Those classified as belligerent are cases in which average indices are above 125 % (Table 16), while reasonably neutral are the cases that obtained a tax neutrality index of between 75 % and 125 % (Table 17).

TABLE 16

Crops with highly belligerent Neutrality Indices

Classification	Autonomous community	Crops
Highly belligerent (Indices over 125)	Andalucía	Cotton, rice, watermelons and sweet oranges.
	Aragón	Rainfed sunflowers.
	Castilla-La Mancha	Melons.
	Castilla y León	Oats.
	Extremadura	Rice and Virginia tobacco.
	Región de Murcia	Artichokes and broccoli.
	Comunidad Valenciana	Celery, iceberg lettuce and watermelons.

Source: Own elaboration.

TABLE 17

Crops with reasonable Neutrality Indices

Classification	Autonomous community	Crops
Reasonable neutrality indices (between 125 and 75)	Aragón	Pears.
	Castilla-La Mancha	Irrigated maize.
	Castilla y León	Irrigated alfalfa.
	Región de Murcia	Apricots.
	Comunidad Valenciana	Mandarins and oranges.

Source: Own elaboration.

As regards the different treatments of crops between the Autonomous Communities, no great differences can be established, apart from pointing out that in Andalusia and Valencia four crops show a belligerent situation, as compared to the remaining Communities in which there are only one or two crops in this situation. This appears to be due to the crops analysed in each Community and not to the different treatment of the Communities.

5. Concluding remarks

The results of the present study show the difficulty to fix an index in the OA method that allows calculating the real earnings of producers. It seems that the Administration accepts in general lower contributions. This is possibly due to the fact that the activity is subject to largely uncertain factors that are not under the farmers' control (pests, severe weather, etc.).

If we look at each crop individually in each year, we can see that setting a single permanent index for the whole of Spain does not seem to be viable. Although we have found that in terms of aggregate belligerence or protectionism we did not find differences between the communities, the individual values did indeed have important differences. That is to say, even though the earnings index for a crop could be protectionist for being less than 100, the observed values (all less than 100) do show important differences, as for example in the case of rainfed oats, which in 2012 presents a neutrality index in Aragon of 87.63 % and in Castilla La Mancha of 59.1 %. The same could be said for the neutrality index obtained for any crop in any Community for any year. Another example is that of onions in Castilla La Mancha, where in 2008 their neutrality index is 91.83 % and is 46.84 % in 2010.

It seems evident that the structure of income and expenses of the holdings varies from year to year and also varies between the different Communities. Fixing net earnings indices for each crop would undoubtedly contribute to achieving the same neutrality treatment or lack of neutrality of the OA method. And the same would happen if different net earnings indices were to be fixed for each Autonomous Community.

Although we are aware of the difficulty of fixing previous assignations, we think that the Administration could apply some methods, as the method used in the present study, to determine the index that would make the method neutral, based, for example, on the information supplied by the ECREA data base. Using some calculation approach it would be possible to calculate these indices every year in order to adapt to the real situation of the different crops and Communities. SOLVER complement calculator, implemented on an extended spread sheet, could be an example of this. Of course, the information on income and expenses would have to available to the Administration to determine the net earnings index before the date on which income tax returns have to be presented. This procedure would not really be so strange, since it is quite a common occurrence for the net earnings index to be altered by the Administration during the tax year in which it is to be applied, or even in the following, should there be extraordinary circumstances.

And if, as appears to be happening at the present time, applying the OA regime were to be protectionist, the restriction on the equality of net earnings would only have to be substituted in the two regimes by the required difference.

Establishing earnings indices annually for each crop and Autonomous Community would allow the Administration to adjust tax contributions to whatever objectives they deemed fit, the treatment received by the farmers would be equal, regardless of the crops they produced or their location, while belligerence would certainly be eliminated when applying the OA method.

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Appendix 1

Net earnings OA and SDA calculation methods, and the neutrality index of hard rainfed wheat in Andalusia in 2013

	Normal Direct Assessment (NDA)	
(1)	*Output in Cereals Technical and Economic Orientation*	57,531.34 €
(2)	*Subsidies in Cereals Technical and Economic Orientation*	25,976.60 €
(3)	*Subsidies in Cereals Technical and Economic Orientation corrected by crop subsidies* ***(3)-(7)***	25,976.60 €
(4)	*% Subsidies in Cereals Technical and Economic Orientation corrected by crop subsidies over Output in Cereals Technical and Economic Orientation* ***(3)/(1)***	45.15 %
(5)	Income from products	30,525.33 €
(6)	Aid coupled to production ***(5)x(4)***	13,782.82 €
(7)	Crop subsidies	- €
(8)	Compensation and others	130.24 €
(9)	**Total income** ***(5)+(6)+(7)+(8)***	44,438.39 €
	Deductible Expenses	
(10)	Seeds and Plants	3,883.72 €
(11)	Fertilizers	7,154.66 €
(12)	Plant protection products	2,984.52 €
(13)	Other supplies	1,278.44 €
(14)	Contract work	3,212.06 €
(15)	Fuels and lubricants	3,901.68 €
(16)	Repair and replacement parts	1,499.99 €
(17)	Wage labor	152.69 €
(18)	Social charges	1,176.14 €
(19)	Insurance equity capital	270.46 €
(20)	Interests and financial expenses	- €
(21)	Rental fee	4,966.55 €
(22)	Taxes	360.28 €
(23)	Building maintenance and improvements	606.78 €
(24)	Other overheads	615.77 €
(25)	Depreciation	3,574.34 €
(26)	**Net income (nda)** ***(9)-(10)-(11)-…-(25)***	**8,800.31 €**
	SDA	
(27)	% over positive difference	5 %
(28)	Deduction ***(26)x(27)***	440.02 €
(29)	**Net income (SDA)** ***(26)-(28)***	**8,360,29 €**

Appendix 1 (cont.)

Net earnings OA and SDA calculation methods, and the neutrality index of hard rainfed wheat in Andalusia in 2013

	OA	
(9)	**Total income**	44,438.39 €
(30)	Flat rate compensation (Agricultural activities)	12.00 %
(31)	**Total Income including flat rate compensation** ***(9)x(1+(31))***	49,770.99 €
(32)	Net Income Index	0.26
(33)	**Preliminary Net Income** ***(31)x(32)***	12,940.46 €
(34)	Reduction: agricultural diesel purchase (35 %) (Not applying 2013)	
(35)	Reduction: Fertilizers and plastics purchase (15 %) (Not applying 2013)	
(36)	Reduction: Amortisation in tangible and intangible assets	3,574.34 €
(37)	Reduced Net Income (RNI) ***(33)-(34)-(35)-(36)***	9,366.12 €
(38)	Index 2, wage labor1	1
(39)	Index 7, farm with RNI ≤9,447.91 €	0.9
(40)	**Net Income by Modules** ***(37)x(38)+(37)x(39)***	8,429.51 €
(41)	General reduction of net income	5 %
(42)	**Net Income from Activity (OA)** ***(40)x(1-(41))***	**8,008.03 €**
	*__Personal costs__ ***(17)/(9)***	**0.34 %**
(43)	**Neutrality Index OA/SDA** ***(42)/(29)***	**95.79 %**

Appendix 2

Results of the neutrality index for all the crops included in the study by Autonomous Communities for the period 2005 to 2013

TABLE 4

Neutrality Indices for the Autonomous Community of Andalucía

Tax Neutrality Index	2005	2006	2007	2008	2009	2010	2011	2012	2013
Cotton	131.82	35.81	85.94	1,227.80	304.64	207.74	137.98	135.55	163.36
Rice	140.54	620.24	192.59	143.37	102.07	192.66	197.46	405.11	Losses
Pumpkins	10.81	38.89	87.23	51.10	31.81	Losses	1,955.41*	47.06	54.09
Greenhouse Strawberries	70.92	156.80	142.42	56.72	43.33	95.79	43.04	139.70	Losses
Rainfed Sunflowers	17.52	79.46	62.82	45.60	78.38	72.91	67.84	145.36	Losses
Melons	Losses OA**	33.65	212.92	Losses	Losses OA**	70.01	9.75	52.16	81.69
Oranges	75.49	27.96	299.28	83.50	37.30	49.92	Losses	813.71*	Losses
Cucumbers	15.09	42.71	88.72	41.63	26.03	64.35	25.80	51.40	50.49
Peppers	16.38	62.08	94.66	70.10	46.41	50.27	35.41	59.12	55.76
Sugar Beet	99.70	160.86	Losses	3,261.22	52.36	Losses	48.69	32.69	46.64
Watermelons	96.71*	43.18	Losses	Losses	256.60*	106.31	81.51*	Losses	Losses
Tomatoes	Losses OA**	61.38	98.18	29.02	38.49	71.48	28.40	116.92	105.76
Rainfed Hard Wheat	Losses OA**	57.24	48.77	42.98	67.70	Losses	74.55	635.44*	95.79

* Losses in SDA and OA.

** Profits in SDA and Losses in OA (reduction of net earnings index for exceptional circumstances).

Source: Own elaboration.

TABLE 5

Neutrality Indices for the Autonomous Community of Aragón

Tax Neutrality Index	2005	2006	2007	2008	2009	2010	2011	2012	2013
Alfalfa	51.39	62.41	57.78	54.78	59.48	67.42	60.23	63.69	60.42
Rainfed Almonds	36.18	35.42	54.63	16.36	22.16	38.06	45.81	33.51	34.83
Irrigated Barley	6.24	38.39	39.22	40.30	54.37	45.01	50.99	49.25	50.48
Rainfed Barley	Losses OA**	39.14	33.13	37.58	38.49	38.32	44.07	87.63	41.58
Rainfed Sunflowers	Losses OA**	46.82	7,963.16*	382.14*	267.64*	51.95	3,950.88*	59.70	Losses
Irrigated Grain Corn	13.84	39.51	45.54	55.78	47.79	44.74	45.87	47.19	58.53
Apples	86.84	66.87	54.69	69.36	81.01	84.69	83.60	145.84	72.58
Peaches	130.02	58.40	61.37	57.72	120.04	162.98	11.37	79.91	82.29
Nectarines	75.49	45.66	59.13	79.10	87.54	74.19	9.90	57.82	60.06
Rainfed Olives for Oil	33.42	36.28	38.58	27.77	15.48	61.80	66.96	Losses	30.59
Pears	77.87	73.26	57.97	66.45	86.93	70.98	97.50	98.82	76.14
Irrigated Soft Wheat	3.80	40.20	39.60	39.20	35.46	39.29	47.68	47.03	44.68
Rainfed Soft Wheat	3.52	31.10	30.70	33.22	38.60	32.43	39.19	61.61	39.51
Irrigated Hard Wheat	1.52	32.03	40.37	38.19	43.40	49.59	45.23	77.25	45.18
Rainfed Hard Wheat	Losses OA**	32.42	33.97	102.55	60.28	86.03	63.26	Losses	38.92
Wine Grapes with Certificate of Origin	52.95	53.88	67.20	62.14	64.45	89.32	280.44	18.29	79.04

* Losses in SDA and OA.

** Profits in SDA and Losses in OA (reduction of net earnings index for exceptional circumstances).

Source: Own elaboration.

TABLE 6

Neutrality Indices for the Autonomous Community of Castilla-La Mancha

Tax Neutrality Index	2005	2006	2007	2008	2009	2010	2011	2012	2013
Garlic	67.67	68.25	73.24	117.98	48.43	44.87	44.98	66.12	260.64
Rainfed Oats	15.09	56.35	68.18	66.24	Losses	Losses	62.32	1,259.86*	55.82
Irrigated Barley	19.58	60.06	63.94	83.35	76.96	56.88	49.79	53.21	77.87
Rainfed Barley	Losses OA**	44.47	39.35	54.27	127.93	49.99	43.02	59.10	60.08
Onions	77.81	68.86	81.99	91.83	58.06	46.84	45.53		67.33
Rainfed Sunflowers	39.90	26.93	43.76	237.11*	188.52*	42.31	56.52	735.12	56.11
Lettuce	154.69	98.33	83.32	48.90	54.47	73.17	42.93		
Irrigated Grain Corn	23.67	78.08	73.74	124.43	105.62	49.23	60.89	71.61	61.61
Melons	137.34	116.75	485.24	59.44	Losses	118.01	92.96	91.38	478.97
Rainfed Olives for Oil	37.10	42.31	40.47	48.62	7.98	43.33	58.01	55.03	53.28
Rainfed Soft Wheat	13.35	53.66	48.65	70.21	77.24	48.34	52.04	50.42	55.91
Irrigated Wine Grapes	51.52	49.90	52.52	40.92	41.88	44.22	88.21	48.29	55.54
Rainfed Wine Grapes	51.64	59.10	76.25	51.58	56.56	75.15	43.55	38.69	41.37

* Losses in SDA and OA.

** Profits in SDA and Losses in OA (reduction of net earnings index for exceptional circumstances).

Source: Own elaboration.

TABLE 7

Neutrality Indices for the Autonomous Community of Castilla y León

Tax Neutrality Index	2005	2006	2007	2008	2009	2010	2011	2012	2013
Irrigated Alfalfa	60.11	61.35	75.32	54.85	83.63	68.35	79.25	70.18	116.73
Rainfed Oats	Losses OA**	Losses OA**	62.31	16.01	108.81*	54.08	84.09	143.10	261.03
Irrigated Barley	6.93	35.46	41.87	41.58	Losses OA**	67.48	119.13	82.10	Losses
Rainfed Barley	Losses OA**	38.85	39.27	41.83	-94.93	47.78	101.51	74.76	147.21
Rainfed Rye	123.48*	30.90	66.89	96.31	Losses OA**	46.38	74.16	Losses	Losses
Irrigated Sunflowers	7,999.06*	86.35	Losses	101.04	Losses	66.66	62.37	64.82	Losses
Rainfed Sunflowers	43.27	Losses	72.43	589.66	259.72	67.84	93.55	229.28	716.13
Rainfed Dry Peas	Losses OA**	122.08*	1.577.13	327.34	3.968.34*	Losses	Losses	Losses	Losses
Irrigated Grain Corn	20.20	41.86	38.61	64.33	16.99	47.87	69.71	94.79	1,007.76
Mid-season Potatoes	355.57	74.94	105.12	106.22	Losses	66.96	Losses	114.15	116.88
Sugar Beet	69.45	87.68	86.37	20.59	17.79	28.26	33.24	75.54	95.05
Rainfed Soft Wheat	Losses OA**	34.03	35.99	35.34	Losses OA**	42.48	56.13	55.50	91.78
Wine Grapes with Cert. O. Valladolid	45.29	51.40	48.64	38.92	47.05	45.58	65.48		
Wine Grapes with Cert. O. Zamora	30.28	58.36	57.09	42.92	43.81	67.26	65.48		

* Losses in SDA and OA.

** Profits in SDA and Losses in OA (reduction of net earnings index for exceptional circumstances).

Source: Own elaboration.

TABLE 8

Neutrality Indices for the Autonomous Community of Extremadura

Tax Neutrality Index	2005	2006	2007	2008	2009	2010	2011	2012	2013
Irrigated Rice	96.03	111.30	90.20	82.69	257.54	1,569.49	Losses	Losses	376.56
Irrigated Grain Corn	54.00	72.84	65.08	241.54	114.66	84.24	137.90	59.73	657.19
Rainfed Olives for Oil	28.75	29.47	38.49	58.28	15.67	78.76	45.61	47.73	47.69
Virginia Tobacco	165.61	127.77	219.86	164.62	71.22	94.86	174.01	977.33	62.24
Industrial Tomatoes	114.92	573.93	108.96	75.80	88.84	129.72	122.46	117.74	88.79
Rainfed Soft Wheat	149.52	Losses	79.92	82.50	Losses	74.51	56.68	27.77	135.75

Source: Own elaboration.

TABLE 9

Neutrality Indices for the Autonomous Community of Murcia

Tax Neutrality Index	2005	2006	2007	2008	2009	2010	2011	2012	2013
Apricots	517.00*	Losses	61.66	87.03	52.45	127.28	74.46	78.66	65.55
Artichokes	469.62	53.35	79.21	Losses	Losses	Losses	Losses	Losses	Losses
Broccoli	86.83	74.53	100.83	Losses	192.39	82.66	Losses	Losses	108.05
Lettuce	105.75	88.00	75.02	66.21	151.67	244.07	Losses	118.17	78.16
Lemons	Losses	961.301	32.69	27.49	69.60	27.13	Losses	138.13	68.12
Peaches	Losses	146.05	61.66	63.47	54.67	82.85	Losses OA**	78.70	62.96
Oranges	66.09	34.11	252.45	38.60	49.83	27.04	386.64	246.13	62.45
Nectarines	Losses	120.66	61.66	59.18	60.31	67.83	5.88	91.83	69.85
Greenhouse Peppers	29.80	29.23	56.69	29.14	Losses	56.66	19.88	51.14	48.89
Watermelon	196.93	58.87	61.36	37.92	66.72	45.29	32.17	61.07	55.72
Greenhouse Tomatoes	69.40	61.42	67.39	27.36	43.04	36.53	23.24	39.49	62.73

* Losses in SDA and OA.

** Profits in SDA and Losses in OA (reduction of net earnings index for exceptional circumstances).

Source: Own elaboration.

TABLE 10

Neutrality Indices for the Autonomous Community of Valencia

Tax Neutrality Index	2005	2006	2007	2008	2009	2010	2011	2012	2013
Celery	52.36	128.14	50.08	Losses	60.86	7.83	28.81	146.41	110.65
Onions	106.35	Losses	571.64	Losses	Losses	Losses	Losses	Losses	0.00
Iceberg Lettuce	397.431	Losses	Losses	46.43	182.92	74.16	78.48	98.09	57.57
Alicante Greenhouse Peppers	96.23	Losses	Losses	118.41	93.72	82.07*	11.59	75.58	69.43
Valencia Greenhouse Peppers	1.87	31.35	297.71	110.54	59.30	69.71	105.56	186.86	58.66
Alicante Watermelon	70.99	53.76	49.20	64.52	34.31	53.81	54.24	64.01	55.42
Valencia Watermelon	44.72	54.06	52.62	58.64	66.92	51.94	81.14	223.27	61.07
Tomatoes	169.14	225.51	83.42	63.45	Losses	30.03	46.84	79.59	60.89
Mandarin Oranges	63.74	65.49	60.51	38.66	88.80	6.22	49.26	97.54	Losses
Oranges	275.80	95.48	Losses	4.692.87	Losses	Losses	Losses	Losses	130.75
Early Rainfed Potatoes	80.49	58.36	Losses	21.97	174.36*	35.37*	Losses OA**		
Early Greenhouse Potatoes	54.42	52.94	54.69	23.60	36.66	7.36	26.32	53.41	51.45
Peaches	52.36	128.14	50.08	Losses	60.86	7.83	28.81	146.41	110.65

* Losses in SDA and OA.

** Profits in SDA and Losses in OA (reduction of net earnings index for exceptional circumstances).

Source: Own elaboration.

Appendix 3

Net earnings indices that would make the OA method neutral for each crop in each year of the study period (2005-2013) and Autonomous Community

TABLE 11

Neutral Earnings Indices for Vegetable Crops

		Andalucía	Castilla-La Mancha	Castilla y León	Extremadura	Murcia	Valencia
Garlic	Neutral Index		0.41				
	Applied Index		0.29				
Artichoke	Neutral Index					0.02	
	Applied Index					0.29	
Celery	Neutral Index						0.11
	Applied Index						0.27
Broccoli	Neutral Index					0.22	
	Applied Index					0.29	
Pumpkin	Neutral Index	0.35					
	Applied Index	0.25					
Onions	Neutral Index		0.40				0.39
	Applied Index		0.29				0.27
Greenhouse Strawberries	Neutral Index	0.25					
	Applied Index	0.25					
Lettuce	Neutral Index		0.37			0.27	-0.05
	Applied Index		0.29			0.29	0.27

TABLE 11 (cont.)

Neutral Earnings Indices for Vegetable Crops

		Andalucía	Castilla-La Mancha	Castilla y León	Extremadura	Murcia	Valencia
Melons	Neutral Index	0.32	0.21				
	Applied Index	0.25	0.29				
Rainfed Potatoes	Neutral Index						0.54
	Applied Index						0.36
Greenhouse Potatoes	Neutral Index						0.58
	Applied Index						0.36
Mid-season Potatoes	Neutral Index			0.27			
	Applied Index			0.36			
Cucumbers	Neutral Index	0.44					
	Applied Index	0.25					
Peppers	Neutral Index	0.37					
	Applied Index	0.25					
Greenhouse Peppers	Neutral Index					0.45	0.39
	Applied Index					0.29	0.27
Watermelon	Neutral Index	0.17				0.50	0.30
	Applied Index	0.25				0.29	0.27
Tomatoes	Neutral Index	0.32				0.56	0.59
	Applied Index	0.24				0.28	0.26
Industrial Tomatoes	Neutral Index				0.24		
	Applied Index				0.27		

Source: Own elaboration.

TABLE 12

Neutral Earnings Indices for Cereal Crops

		Aragón	Andalucía	Castilla-La Mancha	Castilla y León	Extremadura
Alfalfa	Neutral Index	0.57			0.50	
	Applied Index	0.37			0.37	
Cotton	Neutral Index		0.26			
	Applied Index		0.29			
Rice	Neutral Index		0.19			0.15
	Applied Index		0.37			0.37
Rainfed Oats	Neutral Index			0.26	0.32	
	Applied Index			0.24	0.24	
Irrigated Barley	Neutral Index	0.49		0.38	0.34	
	Applied Index	0.24		0.24	0.24	
Cebada secano	Neutral Index	0.46		0.41	0.35	
	Applied Index	0.24		0.24	0.24	
Rainfed Rye	Neutral Index				0.23	
	Applied Index				0.24	
Girasol regadío	Neutral Index				0.24	
	Applied Index				0.32	
Rainfed Sunflowers	Neutral Index	0.19	0.38	0.40	0.29	
	Applied Index	0.30	0.31	0.32	0.32	
Rainfed Dry Peas	Neutral Index				-0.04	
	Applied Index				0.25	

TABLE 12 (cont.)

Neutral Earnings Indices for Cereal Crops

		Aragón	Andalucía	Castilla-La Mancha	Castilla y León	Extremadura
Irrigated grain Corn	Neutral Index	0.50		0.34	0.41	0.25
	Applied Index	0.24		0.24	0.24	0.25
Sugar Beet	Neutral Index		0.17		0.36	
	Applied Index		0.21		0.21	
Virginia Tobacco	Neutral Index					0.26
	Applied Index					0.33
Irrigated Soft Wheat	Neutral Index	0.52				
	Applied Index	0.24				
Rainfed Soft Wheat	Neutral Index	0.57		0.22	0.42	0.20
	Applied Index	0.24		0.24	0.24	0.23
Irrigated Hard Wheat	Neutral Index	0.49				
	Applied Index	0.24				
Rainfed Hard Wheat	Neutral Index	0.32	0.23			
	Applied Index	0.24	0.22			

Source: Own elaboration.

TABLE 13

Neutral Earnings Indices for fruit-growing

		Andalucía	Aragón	Castilla-La Mancha	Castilla y León	Extremadura	Murcia	Valencia
Apricots	Neutral Index						0.36	
	Applied Index						0.37	
Rainfed Almonds	Neutral Index		0.56					
	Applied Index		0.28					
Lemons	Neutral Index						0.12	
	Applied Index						0.23	
Mandarin Oranges	Neutral Index							0.22
	Applied Index							0.23
Apples	Neutral Index		0.45					
	Applied Index		0.37					
Peaches	Neutral Index		0.42				0.42	0.26
	Applied Index		0.34				0.34	0.31
Oranges	Neutral Index	0.20						0.32
	Applied Index							0.23
Nectarines	Neutral Index		0.55				0.40	
	Applied Index		0.34				0.34	
Rainfed Olives for Oil	Neutral Index		0.57	0.51		0.49		
	Applied Index		0.30	0.29		0.29		
Pears	Neutral Index		0.46					
	Applied Index		0.37					

TABLE 13 (cont.)

Neutral Earnings Indices for fruit-growing

		Andalucía	Aragón	Castilla-La Mancha	Castilla y León	Extremadura	Murcia	Valencia
Wine Grapes	Neutral Index		0.48					
	Applied Index		0.33					
Irrigated Wine Grapes	Neutral Index			0.47				
	Applied Index			0.28				
Rainfed Wine Grapes	Neutral Index			0.22				
	Applied Index			0.28				
Valladolid Wine Grapes	Neutral Index				0.60			
	Applied Index				0.34			

Source: Own elaboration.