Estimation of Producer's Assistance and Evaluation of Agricultural Policy for Olive Oil in Greece

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Abstract

This paper is an attempt to measure the annual income assistance to olive oil producers in Greece for the period 1988 - 1998. The well-known PSE/CSE method was used in the percentage form. Also, an evaluation of the effectiveness of the olive oil support policy was made. The main conclusions are that 1) The level of producer's income support is significant, 2) the policy for olive oil is efficient and meets its aims, 3) this policy is very costly for the taxpayers. With reference to policy implications, a change in the system of support to that of a new one in which the effectiveness in delivering additional income to producers is higher.

Keywords: *olive oil regime, Greece, producer subsidy equivalent, effective policy.*

Introduction

The agricultural policy in the form of commodity programs, such as support prices, production subsidies, consumption subsidies, etc, usually involves substantial income transfers, which assist both producers and consumers of agricultural products. In particular the Common Agricultural Policy (CAP) provides aid to producers, which is based on reference periods and the existing production control mechanism. The level of aid provided by these policies that support producers' income is measured by a single common methodology, the Producer Subsidy Equivalent (PSE) (OECD, 1987). Also policies, which interfere in the price formation process, whether they consist of domestic price support accompanied by border measures or border measures alone, have an impact on consumer prices. This impact has been measured by means of the Consumer Subsidy Equivalent (CSE) which is a reflection of the price support element of the PSE and which measures the implicit tax on consumers. Such assistance, namely assistance to producers and consumers, is provided by the Common Market Organization that operates the market of each agricultural product and comes from a wide range of different policy measures and received by producers and consumers through various channels, either directly or indirectly.

However, any intervention in a product market (by a set of policies) improves the welfare of society if it makes at least one person better off and no one worse

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off (V. Pareto's rule). But in practice every public policy can be resolved by making payments, which generally are not complete compensation for the losses felt, by some groups. From an economic efficiency point of view, a program has positive net benefits if the gainers could compensate the losers and still be better off (Kaldor-Hicks rule). Many times society may go out of its way to alter the distribution of income, sacrificing some economic efficiency in order to raise low - income living standards. In other words, a society will accept the fact that some income will leak out as it is transferred from the high to the low-income groups (Okum's leaky bucket theory).

Olive oil in the EU is one of the most heavily supported agricultural food commodities. The main characteristic of the CAP on olive oil is the establishment of high subsidies to both producers and consumers and low prices maintenance in the market. A set of market arrangements, such as price arrangements (production target price, intervention price, representative market price, and threshold price) and specific market instruments (import and export arrangements, storage, production aid and production refunds) governs the market organization of olive oil. Most of the assistance comes from price support policies, which generally take the form of a guarantee price, a set of price arrangements and specific market instruments, which offers significant income support, not only to producers but also to consumers.

Olive oil production is of special importance in certain regions of the Community where it often constitutes the major source of income for a large proportion of the population. In addition, olive oil is the major source of oils and fats for the majority of the population of these regions. Consequently, as olive oil is one of the most important food items for some countries where it is also widely consumed, it is heavily supported though the common agricultural policy. But, in real life, it is important to know both who gains and who loses from a program and if this program can be deemed successful.

The main purpose of this article is to estimate the efficiency of policy measures in the olive oil sector, using a combination of the Kaldor-Hicks rule together with the Okun's leaky bucket theory. To do so, the economic assistance to producers and consumers through the agricultural policies of the EU are used. The overall level of support to producers and consumers of olive oil is measured on the basis of the various support policies that affect both producer and consumer income in Greece. Also, is taken into account in calculation of the overall assistance the level of production, consumption and the changes in policy measures during this period.

The olive oil sector in the EU and Greece

Olive cultivation is widespread through the Mediterranean region and is important both to the rural economy and to the environmental balance of the producing regions. The EU has a total of approximately 2.240.000 producers consisting of 850.000 in Italy, 780.000 in Greece, 500.000 in Spain, 90.000 in Portugal and 20.000 in France. The EU is by far the largest olive oil producer and consumer in the world. The average world production is some 1.800.000 tones, of which tones 80% comes from the European Union (approx. 1.450.000 tones). Community consumption is around 1.350.000 tones annually, which comprises

77% of the world consumption. Therefore the EU is self-sufficient in olive oil. Greece and Spain being its main suppliers, while Italy, although an exporting producer, remains the principal purchaser. While olive oil consumption in the EU is concentrated in producer countries where it has always been a basic component of Mediterranean cooking. Consumption across the Community has been steadily on the increase, gradually becoming its value culinary habit amongst those who have learned to appreciate it. (European Commission, 1999). Despite the fact that the EU is self-sufficient in olive oil however does not prevent it from engaging in the international trading of the product. For example, imports during 1996/97 stood at around 150.000 tones while exports for the same period were 250.000 tones.

Greece is one of the main countries, which produces, consumes and exports olive oil, cultivating 122 millions trees which cover about 838.000 hectares of land. The average annual production of olive oil reaches about 330.000 tones, where domestic consumption is around of 200.000 tones, leaving Greece with a surplus about 100.000-130.000 tones of olive oil for export. Olive oil makes up about 11,5% of the total final agricultural production, which is marketed, both, canned and uncanned. The internal market absorbs 200.000 tones of which 70% is uncanned and 30% caned leaving almost 30% of production for export.

The framework of olive oil regime in the EU

The EU agricultural policy on olive oil is governed by a basic Regulation No. 136/66, which was revised in 1978 (Reg. No1562/78), amended by Regulation (EL) 3290/94 and last is reformed in 1998 (Reg. No 1638/98). There were two main factors, which influenced the formulation of the agricultural policy on olive oil in 1964-66: (a) The fact that the E.E.C was deficient in olive oil production, and (b) the fact that olive oil production was of specific significance to the economy of the poorer regions of the Community. The former (a) is not valid any more as the deficiency has been nullified due to the added production, a result of membership of Greece and later Spain and Portugal to the EU. The main characteristic of the olive oil regime is the establishment of high subsidies to producers and the maintenance of low prices to consumers. This arrangement is aimed at the promotion of the consumption of olive oil in the face of sharp competition from other vegetable oils.

Prior to each marketing year the following prices and specific market instruments are set:

- The production target price. This is the price considered desirable with the aim of providing a fair income for producers, having regard to the need to maintain the volume of Community production.
- The intervention price: This is the price at which the intervention agencies have to buy the quantities of standard-quality olive oil offered by producers.
- The representative market price. This is fixed at the production target price level less the production aid and the consumption aid.
- The threshold price. This is fixed at the production target price level less the production aid and a lump sum representing carriage and unloading costs of products from third countries.

Also, a number of specific market instruments were introduced such as an import levy; when the CIF price of olive oil imported from non-member countries is less than the threshold price, an export refund to make up the difference between the Community market price and the price at which the world market can absorb the quantities of olive oil available for export. Community olive oil is bought for storage at the intervention price by the intervention agencies in the last four months of the marketing year.

With the aim of helping producers attain a fair income, a fixed production aid is paid to them at the full amount of 1.350.000 tones, which is set as a Maximum Guaranteed Quantity (MGQ) for the Community of fifteen. Finally, a consumption aid scheme was imposed, which aimed at increasing the competitiveness of olive oil with regards to other vegetable oils produced from oilseed with funding also for measures to promote the consumption of olive oil. This aid was paid indirectly via the canning industry. In 1998 the Commission decided to make some changes in the olive oil regime. The main changes, which adopted are:

The Maximum Guaranteed Quantity is increased by 31.6% bringing the total amount to 1.777.261 tones, which is to be distributed among the producer countries. The specific aid for small producers and consumption aid is abolished. The system of intervention buying-in has been replaced by private storage systems involving the grant of a premium. Like the other reforms of the Common Agricultural Policy (CAP), these measures seek to make the sector more competitive by achieving a better balance between supply and demand. Their aim also is to improve the quality of olive oil. Key elements of the new arrangements, in addition, will be the simplification of the rules and more effective monitoring.

Measurement of Assistance

Agricultural assistance through the agricultural policy generally implies a subsidy to producers and tax on consumers. This assistance tends to encourage production and reduces consumption, leading to increased exports or to decreased imports. In some cases the assistance measures for producers assist consumers as well. Namely, sometimes support measures for a product includes measures that support consumers directly or indirectly. Producer and consumer income changed as a result of these kind of policies (OECD, 1987).

The effects of agricultural policies in terms of welfare analysis have been analysed in earlier papers by Johnson (1965) and Wallace (1962), Cardner (1983), Lianos and Rizopoulos (1988) among others. Also, more resent papers in the literature by Herruzo (1992), Dawson (1991), Hennessy (1997) have examined the various agricultural policies using different approaches.

Professor Josling (1973) developed a method of measuring producers' and consumers' assistance using the notion of Producer and Consumer Subsidy Equivalents (PSE/CSE), which was adopted by the OECD studies and others. This method has proved quite useful as a common yardstick with which to estimate and monitor the amount of support provided to the farming sector in industrial countries. It provides a relevant measure of the transfers from consumers and taxpayers, to producers, or producers and consumers resulting from the vari-

ous agricultural policies at a given point in time (Cahill and Legg 1989, Guyomard, etc, 1994).

The measurement of support to agriculture using the Producer and Consumer Subsidy Equivalent (PSE/CSE) method can be expressed in three ways:

- as the total value of assistance to the commodity produced or consumed
- as the total value of assistance per unit of the commodity produced or consumed
- As the total value of assistance given as a percentage of the adjusted producer (or consumer) value where the adjusted values are the value of output (or consumption) plus any direct net payments.

The PSE/CSE may be expressed in the following algebraic form:

$$\text{Total PSE} = Q(P_d - P_w) + D - L + B \quad (1)$$

$$\text{Per Unit PSE} = \text{Total PSE}/Q \quad (2)$$

$$\% \text{ PSE} = 100\ (\text{Total PSE})/Q(P_d) + D - L \quad (3)$$

$$\text{Total CSE} = -C\ (P_d - P_w) + G \quad (4)$$

$$\text{Per Unit CSE} = \text{Total CSE}/C \quad (5)$$

$$\% \text{ CSE} = 100\ (\text{Total CSE})/C(P_c) \quad (6)$$

Where: Q is the level of production, C is the level of consumption, P_d is the Domestic producer price, P_c is the Domestic consumer price, P_w is the Reference world price, D is the Direct payments, L is the producer levies and fees, B is the Budget payment to producers, G is the Budget payment to consumers.

In these expressions, the reference price may refer either to world price or to domestic price, in the case of two price systems. Implicit, budgetary payments refer to the various costs deducting measures from which farmer's benefit.

The advantage of the above mentioned method is the fact that it gives fairly simple and empirically manageable indicators of assistance so that its use is now extensive after its adoption by the OECD (OECD, 1987).

In this study this notion was adopted and PSEs and CSEs were calculated as closely as possible to the producer and consumer stages respectively. The calculations were depended on the availability of data relating to the volumes of production and consumption, and to the prices and assistance. Thus, in this study an attempt was made to capture only those measures of assistance that benefited or taxed both producers and consumers either directly or indirectly.

The support for agricultural production takes the form of direct or indirect benefits, which are closely related to the type and level of the support, granted. Very often, the assistance to producers from a support policy measure may be attributed to several sources, such as budget expenditure, domestic consumers and taxpayers, foreign producers, and foreign consumers. Thus, it is difficult to define the precise contribution of these various sources, and analysis of agricultural support costs is usually confined to those financed by a domestic source.

However, in many cases it warrants an investigation to decide that the imposed policies, which transfer incomes to various groups of people, are economically efficient. In other words, it is important to know if the money that all of so-

ciety pays to rise producers and everybody else income is economically efficient. Thus, we assume that policy makers have a welfare function, which includes social welfare weights for some groups of people, such as producers, consumers, taxpayers etc. Then, the general formula for determining the weighted benefits of some policy is:

$$NB = \sum_{i=1}^{m} w_i \Delta Y_i \tag{7}$$

Where *NB* refers to the weighted net benefits of the policy, *m* is the number of groups in society, ΔY_i refers to the income change, or gain or loss, of the *i*th group and w_i to some weight applied to this income change.

In the case of the agricultural policy for olive oil there are only two groups, producers gaining ΔY_p from the policy and the consumers gaining ΔY_c. The weight applied to the income of consumers is one, and that applied to producers is w_p. We can define this weight w_p as that required to make a policy efficient the modified net benefits by setting in (7) *NB=0*.

$$0 = NB = w_p \Delta Y_p + \Delta Y_c \tag{8}$$

In this case, according to the Kardor-Hicks economic efficiency test, the program passes an economic efficiency test if the weight required to make *NB=0* is less than one. Conversely, the program fails the Kardor-Hicks economic efficiency test, if the weight required to make *NB=0* is greater than one.

Equation (8) can be expressed in terms of the gains of producers by moving ΔY_c to the other side and dividing through by w_p:

$$\Delta Y_p = -\frac{\Delta Y_c}{w_p} \tag{9}$$

At the same time, it is known that if society transferred income to producers through a marginal change in any transfer policy, some income will leak out as it is transferred from society to producers. The expression for the rise in producer incomes would be:

$$\Delta Y_p = -(1-c)\Delta Y_c \tag{10}$$

where ***c*** is Okun's leaky bucket ratio and ***1-c*** is thus the loss of society's income that stays in the bucket and makes the producer better off (Okun, 1975). Okun's leaky bucket ratio, ***c***, takes values, which are depended on the dead weight loss. When the dead weight loss is zero ***c*** takes zero value. As the dead weight loss rise the leaky bucket coefficient increases and makes the results of the policy more inefficient (Gramlich, 1990).

Putting these two expressions of ΔY_p side by side shows how the two types of inefficiency can be compared. Equating (9) and (10) and canceling - ΔY_c gives:

$$w_p^* = \frac{1}{1-c} \tag{11}$$

where w_p^* is the required weight that makes the set of policies just as efficient as transfers in raising producers' incomes. If ***c*** is zero, w_p^* is one. As direct redistribution gets more inefficient, c increases, (1-c) falls and w_p^* rises. Society will pay a policy, which is more inefficient for the sake of raising the incomes of producers.

The difference between the two weights, w_p and w_p^* is the fact that w_p is based on the Kardor-Hicks rule while w_p^* is based on the Okunn's leaky bucket theory. Namely, the w_p shows the economic efficiency of the policy and is calculated from equation (9)

$$\Delta Y_p = -\frac{\Delta Y_c}{w_p} \qquad \Rightarrow \qquad w_p = \frac{\Delta Y_c}{\Delta Y_p} \qquad (12)$$

and the w_p^* shows the income transfer efficiency of the policy and is calculated from equation (11) where ***c*** represents the percentage of policy expenditure that never reaches to producers or to consumers.

Using the above relationships we can judge the efficiently of policies imposed on an agricultural product. When w_p is less than one the results of policies are economically efficient. When w_p is greater than one the results of policies are efficient but could be more efficient. Finally, when w_p is greater than w_p^* the results are inefficient.

Estimation period and data

The data used in this analysis cover the period 1988-1998 and were obtained from various sources such as the Greek Ministry of Agriculture, Eurostat and EU publications. This period was chosen because in this decade significant reforms took place in olive oil production sector policy by introducing subsidies for supporting not only producers but also indirectly supporting consumers through the processing facilities. During this period the EU has spent about two billion ECU per year on subsidies for the olive oil sector of which Greece received about 21%.

The level of production and consumption is considered on an annual basis expressed in kilograms. As producer price (P_d) for estimating the PSE, the intervention price was used, which is set annually by the olive oil regime. This stands as a constant price for all producers each year. As for the consumer price (P_c), the average market price was used which the consumer pays for olive oil. As a reference price (P_w) the world price was used. Other budget payments either directly or indirectly implicit are included in all payments in the form of positive or negative income transfer to producer and consumer alike. Such payments are in the form of production aid, consumption aid, and producer levies such as refunds to facilitate the promotion of the sale of olive oil via the canning industry (see APPENDIX).

The results and discussion

Table 1 shows the estimated annual PSE and CSE for the period 1988-1998. Results are expressed in percentage terms and show the changes in producer income support that comes from olive oil production and consumers incomes support spent on olive oil consumption. Thus no distinction has been made between the various categories of assistance in terms of their impact on such variables as production, consumption and trade. Accordingly, the level of assistance for the given commodity is positive for both producers and consumers. This means that the EU olive oil regime offers significant protection to this sector and also transfers income, directly and indirectly, to producers and consumers alike. However, the society cost incurred in achieving these levels of assistance can be much greater and it has to be considered in measuring the cost or efficiency of policies. Using the above assistance as a change of producer income we can estimate the parameters mentioned in the previous section.

Table 1. PSE and CSE for olive oil in Greece (1988-1998) (Percentages)

Year	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
PSE	18.5	25.2	42.5	33.3	45.6	48.5	53.0	49.0	29.9	41.5	53.2
CSE	29.3	18.0	7.0	18.6	1.6	4.3	6.2	4.0	6.6	6.2	6.5

Table 2 shows the values of c, (1-c), w_p, and w_p^*. The value of c is lower than one for all years, which means that there is a dead weight loss in each year in transferring income from society to producers.

Table 2. Values of specified parameters from policy measures of olive oil

Year	c	1-c	w_p	w_p^*
1988	0.38	0.62	0.47	1.62
1989	0.33	0.67	0.69	1.50
1990	0.02	0.98	0.67	1.02
1991	0.03	0.97	0.69	1.03
1992	0.11	0.89	0.97	1.13
1993	0.15	0.85	0.93	1.17
1994	0.09	0.91	0.90	1.09
1995	0.07	0.93	0.93	1.07
1996	0.16	0.84	0.87	1.19
1997	0.13	0.87	0.89	1.14
1998	0.11	0.89	0.88	1.13

The values of w_p are less than one in all years, as well. This means that the imposed policy increases producer income and passes the Kaldor-Hicks economic efficiency test. Thus, we can conclude that the results of policies on the olive oil sector in Greece are economically efficient. In other words these policies aimed at transfer of income from society to producers of olive oil can be deemed acceptable.

The values of w_p^* that are shown in the last column of table 2 are greater than one in all years. Since w_p^* is the required weight that makes the results of policy just as efficient as transfers in raising producer income, society pays an "expensive" policy for the sake of raising the incomes of the olive oil producers. In other words society's loss is greater than producers gains.

Conclusions and policy implications

In this paper an attempt was made 1) to provide a welfare analysis of the Greek olive oil sector under the EU olive oil regime, 2) to obtain estimates of assistance and 3) to evaluate the olive oil policy itself. The estimates have shown that olive oil is a heavily subsidised agricultural product, not only in Greece but all over the EU. Moreover, olive oil producers receive a significant amount of income directly or indirectly. During the period covered in this paper, the Greek olive oil producers were subsidised at the rate of forty per cent (40%) of the value of their production each year. This policy shows a special preference of policy makers for olive oil and it is justified by the nature of the product, its significance as a food item and its importance as source of income in specific regions of the EU.

The other finding of this paper is the judgment of this policy. It is clear that despite the success of the policy from the producers' side, society tolerates a very "expensive" program for olive oil.

The implementation of this policy involves some important implications for various groups in society. It is clear that olive oil producers benefit while consumer prices of olive oil are maintained at a low level as well. The major political disadvantage is that all transfers under this policy are paid by taxpayers and hence are more visible. Also, much of the transfers under this policy are wasted due to "deadweight losses" which never reach the domestic farmer. In other words, the effectiveness of this policy in delivering additional income to olive oil producers is very low.

Of course, the analysis presented in this paper does not suggest that we are postulating the existence of a central authority, single or collective, which formulates agricultural policy according to its own preferences. Policy-making involves consideration of the bargaining powers of various groups, social injustices that need to be corrected, short-run and long-run economic targets, regional peculiarities etc., so that policy decisions actually taken will tend to contribute to the long-run social equilibrium. The findings in this paper are simply *ex post* measurements reflecting the end results of the very complex decision - making process.

Notes

1. The PSE is defined as "payment that required to compensate farmers for the loss of income resulting from the removal of a given policy measure" The CSE "corresponds to the implicit tax on consumption resulting from a given policy measure (market price support element of the PSE) ant to any subsidies to consumption" It was agreed in 1998 to replace "subsidy equivalent" by "support estimate" in the names of the indicators, and to use the following nomenclature: Producer Support Estimate (PSE), Consumer Support Estimate (CSE), General Services Support Estimate (GSSE) and Total Support Estimate (TSE).

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Appendix

Data that used in this paper.

Year	Producer price P_d Dr/Kgr	Consumer price P_c Dr/Kgr	Reference price P_w Dr/Kgr	Producer Subsidy Ps Dr/Kgr	Consumer Subsidy Cs Dr/Kgr	Olive Oil production Q In 000 ton.	Olive Oil Consumption C In 000 ton	Quantity consumed and subsidized Cs Dr/Kgr
1988	336.9	298	385.7	111.18	128.12	295.3	238	71.4
1989	406.9	318	426.6	122.30	125.30	294.1	237	71.1
1990	563.5	440	589.8	145.60	135.85	292.9	238	218.0
1991	651.3	550	624.7	190.50	138.65	167.2	160	148.0
1992	575.9	970	549.0	235.80	142.60	395.0	190	57.0
1993	593.6	872	591.0	285.40	133.40	304.5	180	54.0
1994	666.7	1050	721.4	408.40	36.35	297.3	177	53.1
1995	794.8	1181	831.1	425.90	36.62	358.7	210	63.0
1996	1083.4	1750	1188.1	428.70	37.65	407.5	177	53.1
1997	852.8	1540	937.9	438.60	33.80	454.6	208	62.4
1998	665.1	1465	749.5	438.40	34.66	400.0	213	63.9

Source: Various Sources