



Measurement of definable policy effects and competitiveness for orange production in Çukurova Region

Çukurova bölgesi portakal üretimi için tanımlanabilir politika etkileri ve rekabet gücünün ölçülmesi

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ABSTRACT

This study aims to measure and identify the definable effects of agricultural policies and competitiveness of Turkish orange production system. In this context, orange production in Çukurova Region which has the capability of representing whole Turkey was examined. To demonstrate the net policy effects and competitiveness of the system, Policy Analysis Matrix was applied on orange production in Çukurova Region with the survey data based on 2009-2010 marketing period. To construct Policy Analysis Matrix, primarily the value of income, tradable inputs and domestic resources was identified in terms of social and private prices. Than to show the net effects of the policy decisions on orange production, efficiency coefficients such as domestic resource coefficient, nominal protection coefficient, effective protection coefficient and private cost coefficient were calculated. By the help of these ratios, information about market distortions, income transfers, comparative advantages and sector sensitivities were obtained via these ratios. From the results of the calculations, it was introduced that, private prices for orange production is negative and orange production is sustainable in terms of social profitability. In addition, according to the efficiency coefficients, the system was introduced as competitive.

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ÖZ

Bu araştırma, Türkiye portakal üretiminin rekabet edebilirliğini ve tanımlanabilir tarımsal politikaların etkilerini ölçmeyi ve tanımlamayı amaçlamaktadır. Bu kapsamda, Türkiye portakal üretimini yüksek düzeyde temsil edebilme yeteneğine sahip olan Çukurova Bölgesi'ndeki portakal üretimi incelenmiştir. Çukurova Bölgesi'ndeki portakal üretimine ilişkin net politika etkileri ve sistemin rekabet gücünü gösterebilmek için anket çalışmasıyla elde edilen 2009-2010 pazarlama dönemi verilerinden yararlanılarak bölge için Politika Analiz Matrisi oluşturulmuştur. Politika Analiz Matrisini oluşturabilmek için öncelikle gelirin ticareti yapılabilir girdilerin ve yurt içi kaynakların sosyal ve özel fiyatlar cinsinden değerleri tespit edilmiş, daha sonra portakal üretimindeki net etkileri görebilmek için yurt içi kaynak maliyet katsayısı, nominal koruma katsayısı, efektif koruma katsayısı ve özel maliyet katsayısı gibi verimlilik katsayıları hesaplanmıştır. Bu katsayılar yardımıyla piyasa çarpıklıkları, gelir transferleri, karşılaştırmalı üstünlükler ve sektör hassasiyetleri hakkında veriler elde edilmiştir. Hesaplamalar sonucunda, portakal üretiminde özel kârlılığın negatif olduğu ve sosyal karlılık açısından üretimin sürdürülebilirliği tespit edilmiştir. Ayrıca, verimlilik katsayıları yardımıyla Türkiye portakal üretiminin rekabet edebilir olduğu sonucuna varılmıştır.

1. Introduction

Citrus market effected intensively from the growth of the agricultural export markets, marketing efforts, exchange rates and trade liberalization depend on its dynamic structure. Besides, political decisions of the governmental and non-governmental institutions are affecting the citrus market remarkably.

As a result of the multilateral Uruguay Round negotiations, although many developed and developing countries decided to reduce their restraints on agricultural trade, many exporter countries are still affecting their agricultural markets with applying different levels and types of interventions. So many citrus exporter countries are also practicing such applications and affecting the fruit markets globally.

With the help of this study, it was aimed to identify various effects of trade and agriculture policies on orange production in Çukurova region, where the region has a strong representation capacity of Turkish orange production. Moreover, the structure and characteristics of orange production system in the region was also introduced.

In this context, this study aims to measure the definable policy effects and competitiveness of Turkish orange production by using Policy Analyses Matrix Approach. In this context, orange production in Çukurova region was examined.

Kapaj et al. (2010), evaluated comparative advantage of olive oil production in Albania using PAM approach and found that Albania has no comparative advantage on olive oil production compared with the EU countries. Ahmad and Martini (2000), analyzed effects of agricultural price policies on Pakistan agriculture by using PAM approach and calculated the protection degree of agriculture sector in Pakistan. Joubert and Scalkwyk (2000), measured the effects of definable policy effects on Valencia industry in Southern Africa with PAM approach. According to the study, they identified income, tradable and domestic inputs and profits in terms of social and private prices. As a result of the calculations, market failure, comparative advantage and market sensitivities were determined. Esmaeili (2008), analyzed competitiveness of shrimp farming in South Iran by using PAM approach. He calculated the private and social profits and found that social profits are bigger than private profits on shrimp farming in South Iran.

2. Materials and Methods

In this study, Policy Analyses Matrix (PAM) is used to measure definable policy effects and competitiveness of orange production in Çukurova Region-Turkey. In this context, primarily the value of income, tradable inputs and domestic resources was identified in terms of social and private prices. Than to show the net effects of the policies on orange production, efficiency coefficients as domestic resource coefficients, nominal protection coefficient, effective protection coefficient and private cost coefficients were calculated. By the help of these ratios, important results about market distortions, income transfers, comparative advantages and sector sensitivities were obtained. Data required to construct the model was obtained from the orange producers via questionnaires.

PAM approach is a two-dimensional calculation occurs from private and social profitability. Private profits indicate the current effects of government policies on producers and social profits indicate the efficiency of agricultural policies applied by governments in terms of community wealth. With PAM approach, input costs are dissociated as tradable inputs and domestic resources (Pearson et al. 2003) (Table 1).

Table 1. Policy analyses matrix

| | Input Costs | | | Profit |
|----------------|---------------|-----------------|--------------------|--------|
| | Total Revenue | Tradable Inputs | Domestic Resources | |
| Private Prices | A | B | C | D |
| Social Prices | E | F | G | H |
| Transfers | I | J | K | L |

Data required constructing PAM approach was obtained from survey methodology. Survey was applied in 20 settlements

of Adana and Mersin cities. Considering the number of whole orange producers in the region the survey was applied to 60 producers and 40 of them was decided to evaluate. In the process of identification the settlements, factors that effects input usage like soil structures, climatic differences and differences in production behaviors was considered. From the questionnaires, income, tradable inputs, domestic resources and profits was obtained in terms of private and social prices to use in PAM approach. Thus, coefficients could be calculated to introduce policy effects on orange production in Çukurova region.

3. Results

3.1. Orange production and policy effects

Citrus production has an important position in the world agricultural production and trade. About 25% of the 370 million tons world fruit and vegetable production consist of citrus fruit and among 70 million tons of world citrus fruit production, 63% is orange (UNCTAD 2010). After 1980's, situations such developments in packaging and transportation, increases on per capita income and shifting consumer preferences to healthy food has effected consumption and production of citrus fruit and citrus fruit juice positively. Increase on the production entailed price decreases by the time and producers started to lose their economic poverty globally. All these experiences enforced the governments apply some support policies to sustain the permanence of the citrus production. It is expected that government interventions will be on the agenda as long as the instability on producer prices continues.

Turkey is an important player in global citrus fruits market for many years. 1, 7 million tons of orange is producing in Turkey on 51,635 ha area with nearly 28,000 farms and orange production is almost 50% of 3,510,000 tons of citrus production. The main type of orange produced in Turkey is Novel type (Washington) which has a share of 80%. The size of the orange orchards is mainly (98%) under 100 da. which indicates that orange production is practicing on small scale lands (TÜİK 2010).

While citrus cultivation started at 1930's in Turkey, citrus fruit exportation increased after 1980's by the help of the trade liberalization and open economic regime. In this context, citrus fruits are the first and most important product group for the agricultural trade between the EU and Turkey (TEAE 2001). After 2000's, orientation to the new markets like Iraq and Russia, enhanced citrus exportation and minimized dependency on the EU market. In 2009, 23% of the Turkish citrus exportation is composed from orange with 272,000 tons. Turkey supplies 8% of the world citrus exportation and 4% of the world orange exportation. The most important orange export markets of Turkey are Russia and Iraq with the share of 60% and Ukraine, Iran, Romania and Georgia are the other important orange export markets (Koç et al. 2008).

Although no direct product supports policy application applying on citrus cultivation, production is encouraging with some other indirect support instruments like input support per da. for fuel, fertilizer and certificated nursery and export incentives and import.

The research area, Çukurova Region is located in the Mediterranean part of Turkey which is composed of two provinces, Adana and Mersin. Agriculture has a great importance for Çukurova Region in terms of contribution to

employment, foreign trade and input providing. Crop production is the main activity in Agricultural production of the Çukurova Region (Table 2).

Table 2. Structure of farms in Çukurova Region and Turkey

| Settlement | Number of Farms | Average Size of Farms (da.) | Number of Citrus Farms | Average Size of Citrus Farms (da.) |
|------------|-----------------|-----------------------------|------------------------|------------------------------------|
| Adana | 56,302 | 98 | 3,939 | 91 |
| Mersin | 71,022 | 53 | 19,772 | 14 |
| Turkey | 3,076,650 | 60 | 57,005 | 20 |

Pomiculture is one of the most important crop production activities with grain farming in Çukurova Region. In pomiculture activities, citrus fruits are the main product group with 70% share from the total production. Çukurova Region supplies 55% of the total citrus and 62% of the total orange production of Turkey. At all citrus produced in the region, 40% is formed by orange fruit (Çukurova Kalkınma Ajansı 2012).

3.2. PAM approach for orange production in Çukurova Region

The basic approach of PAM depends on the calculation of the production costs and gains per decare (da.) in terms of private and social prices. Thus private and social profits can be found. Private prices are the current prices in the market and indicate economic costs and all policy effects. The gross domestic production values per da. were calculated to obtain the gains in terms of private prices. To calculate the costs by private prices, input elements divided in two groups as tradable inputs and domestic resources (Table 3).

Table 3. Cost budget in terms of private prices for orange production

| Items | TL/da. |
|--|--------|
| 1. Tradable Inputs | 362 |
| 1.1. Fertilizer | 202 |
| 1.2. Agro-chemical | 160 |
| 2. Domestic Resources | 908 |
| 2.1. Labor Force | 233 |
| Fertilization | 64 |
| Irrigation | 46 |
| Disinfection | 46 |
| Maintenance | 77 |
| 2.2. Interest of Capital (Variable Costs x 0,0675) | 61 |
| 2.3. Water expenses | 15 |
| 2.4. Administrative Costs (Production Costs. x 0,03) | 37 |
| 2.5. Rental of Machinery | 302 |
| 2.6. Rental of Land | 200 |
| 2.7. Facility Cost | 60 |
| 3. Total of Production Expenses | 1,270 |
| 4. Total Revenue (3,00 ton x 0,407 TL/kg) | 1,221 |
| 5. Net Profit | -49 |

1 US dollar = 1,5 Turkish Lira

Social price is the price which occurs in the absence of market distortion practices and any governmental interventions. In this context, shadow prices of income and cost factors were calculated. For calculation of the shadow prices, world prices and the price without any governmental interventions was used. To calculate the social gains, FOB prices were used (Pearson et al. 2003) (Table 4).

Table 4. Cost budget in terms of social prices for orange production

| Items | TL/da. |
|---|--------|
| 1. Tradable Inputs | 366 |
| 1.1. Fertilizer | 206 |
| 1.2. Agro-chemical | 160 |
| 2. Domestic Resources | 991 |
| 2.1. Labor Force | 148 |
| Fertilization | 41 |
| Irrigation | 29 |
| Disinfection | 29 |
| Maintenance | 49 |
| 2.2. Interest of Capital (Variable Costs x 0,0675) | 56 |
| 2.3. Water expenses | 15 |
| 2.4. Administrative Costs (Production costs x 0,03) | 39 |
| 2.5. Rental of Machinery | 306 |
| 2.6. Rental of Land | 364 |
| 2.7. Facility Cost | 63 |
| 3. Total of Production Expenses | 1,357 |
| 4. Total Revenue (3,00 ton x 0,653 TL/kg) | 1,959 |
| 5. Net Profit | 602 |

1 US dollar = 1,5 Turkish Lira

The income and cost calculations by using private and social prices together were transferred to PAM and so various analyses were able to be done for policy effects on orange production. PAM formed by farm data and identified assumptions displays input and output values in terms of social and private prices. Moreover, by the help of the PAM, transfer expenses for orange production were determined (Table 5).

The effects of the governmental input and output transfer in Çukurova Region for orange production calculated as, 651 Turkish Lira (TL) per da. and so the cost of the agricultural policies applied by government to the community was executed.

By the help of the results obtained from PAM, efficiency coefficients were calculated and analyzed. The Nominal Protection Coefficient (NPC) for orange production was calculated as 0, 62. NPC less than 1 explains that the farm prices are less than the world prices and the government supports are not so high (Esmaeili 2008). The Effective Protection Coefficient (EPC) determined as 0, 54 and EPC less than 1 indicates that orange producers are under taxation indirectly (Stoforos et al. 1996). The domestic resource cost ratio (DRC) has identified as 0, 62. DRC less than 1 reflects that Turkey has a comparative advantage on orange production and this production activity is sustainable in terms of social profits (Stoforos et al. 1996). The Private Cost Ratio (PCR) represents how profitable is subjected production in terms of the private prices. PCR for orange production was calculated as 1, 05 and this means that this production activity is unprofitable in terms of private prices (Guba 2000).

To make the sensitivity analyzes for the PAM calculations, the effects of changes in sales, fertilizer prices, pesticide prices and capital prices in terms of social profitability and Domestic Resource Coefficient was calculated. The results displays that the orange production system is so sensitive for sales prices but for input prices it is not so sensitive.

Table 5. Policy analyses matrix for orange production in Çukurova Region (TL/da)

| | Total Revenue | Tradable Inputs | | | Domestic Resources | | | | | | | | Total Exp. | Profit |
|----------------|---------------|-----------------|--------------|-------|--------------------|---------------------|----------------|----------------|---------------------|----------------------|---------------|-------|------------|--------|
| | | Fertilizer | Disinfection | Total | Labor | Rental of Machinery | Rental of Land | Water expenses | Interest of Capital | Administrative Costs | Facility Cost | Total | | |
| Private Prices | A | B | | | | | | | | | | | B+C | D |
| | 1,221 | 202 | 160 | 362 | 233 | 302 | 200 | 15 | 61 | 37 | 60 | 908 | 1,270 | -49 |
| Social Prices | E | F | | | | | | | | | | | F+G | H |
| | 1,959 | 206 | 160 | 366 | 148 | 306 | 364 | 15 | 56 | 39 | 63 | 991 | 1,357 | 602 |
| Transfers | I | J | | | | | | | | | | | J+K | L |
| | -738 | -4 | 0 | -4 | 85 | -4 | -164 | 0 | 5 | -2 | -3 | -83 | -87 | -651 |

1 US dollar = 1,5 Turkish Lira

4. Discussions and Conclusions

The result of the PAM analysis indicated that orange production in Çukurova Region actualize under negative private profit (-49 TL/da.) conditions. The PCR also demonstrated this situation. Negative private profits can be explained by land rent and labor costs because farmers are usually compensating these costs in house.

In addition, the private prices lower than social prices result shows that direct or indirect transfers exist to the producers for this production system. In this situation orange production has a public cost. But if we consider that comparing with other production systems, product based supporting applications are not applying on orange production in Turkey this cost effect is limited. The net effects of agricultural policies on public for orange production in Turkey are 651 TL per da. This effect is more than 1,000 TL for some perennial plants like wheat.

The positive social profits indicated effective usage of limited resources and orange production can resume even in the absence of government interventions. Thus orange production is effecting very low from the government agricultural support applications. The results of NPC for orange production in Çukurova Region show that the domestic prices are 38% lower than the world prices. This situations indicates that producers are taxed indirectly and government affecting the market prices negatively. This indirect taxation is calculated as 46% by the help of EPC. As a result of the producer prices are lower than the world prices there is a competitive price mechanism for orange production in Turkey. The DRC under 1 also indicates this situation.

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