OILSEEDS MARKET IN TURKEY: THE IMPACT OF INTERNATIONAL PRICE AND ALTERNATIVE POLICIES ON SUPPLY, DEMAND AND SUBSTITUTE CROPS

Ali KOÇ
Iowa State University

John BEGHIN
Iowa State University

Frank FULLER
Iowa State University

Şafak AKSOY
Çanakkale Onsekiz Mart University

Türker DÖLEKOĞLU
Çukurova University

Aykut ŞENER
Agricultural Economics Research Institute

September 1999
Ankara

TABLE OF CONTENTS

LIST OF TABLES

Executive Summary

This research analyzes the effects of agricultural and foreign trade policies on the production and usage (crushing demand, crude oil demand, oil meal demand, and import demand) of oilseeds in Turkey. The effects of some policies applied to oilseeds and substitute crops and the effects of those policies related to substitute crops on the production and usage of oilseeds are also investigated.

Silinmiş: ¶

A simulation model of Turkey's oilseed sector, which is composed of several multi-crop, partial equilibrium models, was developed to analyze the effects of various policies on the production and usage of oilseeds. The simulation model provides baseline projections for oilseeds and their products for the next ten years (until 2008). In addition, the model can be used to calculate the absolute and proportional deviations from the baseline projections if alternative policies are put into operation.

Silinmiş: ¶

The econometric models, parameters, and elasticities presented in this study can be used for several other studies. The elasticities calculated from supply and demand models, which were developed to complete the simulation model, could be utilized to find answers to several questions. In the second chapter of the report, per capita annual oil consumption figures by income classes, which were calculated from the Household Expenditure Survey Results conducted by the State Institute of Statistics, are also presented. These consumption figures indicate that, as income level increases, per capita oil consumption is also likely to rise. This fact is relevant to the research findings presented below.

Silinmiş: ¶

The baseline projections demonstrate that, if the present policies for oilseeds and substitute crops are maintained, Turkey's imports (net trade) of oilseeds and products will continue to grow. Sunflower oil and soybean meal imports, in particular, will reach high levels by the end of the simulation period. The 1998 sunflower seed, soybean, and cottonseed imports, totaling 671 thousand metric tons (tmt), is expected to reach an average of 828 tmt over the last three years of the simulation period. The results also show that oilseeds imports at the end of the simulation period will be 1.23 times greater than the figure in 1998. In the last three years of the simulation period, the total import level of crude sunflower seed, soybean and cottonseed oils is expected to reach an annual average of 789 tmt. This figure represents a 135 percent increase over the calibration period. It is also estimated that soybean meal imports of 375 tmt in 1998 will reach an annual average of 985 tmt towards the end of the projection period. Provided that the projected results are realized, Turkey's expenditures for imports of oilseeds and products will exceed **$1.0 billion** at the end of the projection period.

Silinmiş: ¶

In the study, the effects of four different policy changes on the oilseeds market in Turkey were analyzed. The most important of these policy scenarios examines the effects of a reduction of tariffs for oilseed products on oilseed and crude oil imports. A second important policy scenario investigates the effects of a reduction in the producer prices of wheat and barley on oilseed supply. Assumptions for the scenarios and research results are presented in detail in Chapters 6 and7.

Silinmiş: ¶

The results of the first scenario suggest that reducing the import tariff rates for oilseeds and crude oils during the projection period to the levels applied in 1995 will result in substantial increases in sunflower seed, soybean and crude oil imports.

Silinmiş: ¶

The second scenario indicates that a 25 percent decrease in wheat and barley prices will result in a 3 percent reduction in wheat production after 2001, whereas barley, sunflower seed, and cottonseed production expands by 3, 3, and 3 percent, respectively. The results of this policy bring to the fore the fact that the price parity between wheat and barley is significant and that price increases or decreases which keep the parity at a fixed level will generate favorable conditions for barley. Under the price environment in the second scenario, cotton fiber production increases. This increase will be approximately one-third of the increase in cottonseed production.

Silinmiş: ¶

Silinmiş:

The elimination of the tariffs in corn imports will not cause any notable increase in soybean production but will seriously reduce corn production. According to the results of this scenario, a 19 per cent reduction in producer prices for corn will result in a 20 percent drop in corn production after the year of 2000 and a 27 percent decline by the end of the simulation period.

The results obtained from this study demonstrate that independent price changes related to wheat, barley, sunflower, corn, and cottonseed without respecting the price parities between these crops are important reasons for observed production fluctuations.

Silinmiş: ¶

Turkey's imports of oilseeds and products have been growing rapidly. One of the policy options that may retard this growth is to reduce the support prices for wheat and barley. Bearing in mind that Turkey has been importing substantial amounts of cotton in recent years, policies reducing wheat prices in real terms can be considered as an important option. This reduction in grain prices will not only provide an improvement in consumer welfare but also be an important reduction in feed costs for the dairy and meat sector.

Silinmiş: ¶

To offset the negative effects caused by a price reduction on grain producers' income, efforts should be concentrated on finding solutions which would improve productivity. Direct income support can be considered for small farms. In recent years the increase in productivity of field crops, and wheat in particular, has been very slow. In wheat farming, nation-wide surveys should be organized to investigate the production techniques and the effects of production inputs on yield levels. Feasible policies should also be introduced to eliminate those factors restricting productivity improvement in wheat, since wheat occupies more than 50 per cent of the land allocated to field crops.

Silinmiş: ¶

Considering the present capacity and capacity utilization rates in the oil industry in Turkey, importing oilseeds rather than crude oil and meal may be a rational option. To promote this option as more profitable for the crushing sector, as well as for the national economy, however, more detailed analyses on the margins and value added are needed. For such a policy option, import tariffs may be reduced for oilseeds while keeping them constant for crude oils. If such a policy is preferred, an intervention system should also be implemented in order to keep the effective producer prices of oilseeds from falling below those of the projected levels. For this purpose, a partial deficiency payment system can be considered (see Çakmak et al. 1998 for the economic effects of the deficiency payment system). Since there is neither an intervention price nor a system of deficiency payment for sunflower seeds, reductions made in import tariffs may adversely affect producer prices.

Silinmiş: ¶

Introduction

Turkey's oilseed (seeds, oil, and meal) imports have been growing very rapidly in recent years. Given expected growth in Turkish population, income, and livestock production, particularly in the poultry sector, it is projected that Turkey will meet and increasing share of its domestic oilseed product demand through imports if the current oilseed supply trend in Turkey does not change.

Oilseed production in Turkey consists primarily of sunflower seed, cottonseed, and soybeans. Sunflower seed and cottonseed are the main sources of domestic vegetable oil production. Turkish soybean output has declined from its peak of 250 thousand metric tons (tmt) reached in 1987. Recent statictics show that soybean production is currently around 40-50 tmt. Cotton production is continuing to expand along its recent historical growth trend, with output rising in conjuction with the enlargement of irrigated area in South Anatolia. However, it is expected that this increase in cotton production will slow in the future as area sown to cotton declines in other regions.

Historically, Turkey has been a net importer of raw vegetable oils, soybeans, and soybean meal. Its imports of soybean meal have been increasing along with the expansion of the domestic livestock sector. Since growth in meat consumption is directly linked to population and income growth, the demand for imported protein meals is expected to escalate in coming years. Rising oilseed product imports are not necessarily detrimental to Turkey's agricultural sector. Inasmuch as Turkey has a comparative disadvantage in oilseed production relative to countries in North and South America, oilseed imports free agricultural resources in Turkey for use in the production of crops which are better suited to Turkey's land and climate endowments.

If it is the desire of the Turkish government to retain a high degree of self-sufficiency in oilseed products, then output of the Turkish oilseed complex must increase. Given the lack of idle land available for cultivation, expansion of oilseed area is not a viable option for meeting the growing demand for oilseed products. Increasing the productivity of the oilseed sector is an alternative that shows more promise. Productivity can be enhanced by increasing spending on research to develop new, high-yielding oilseed varieties. In addition, programs that are directed at improving production techniques and popularizing oilseed substitutes might reduce the yawning gap between domestic oilseed product supply and demand. Given the production technology and current area devoted to oilseeds crops, area reallocation in Turkish agriculture seems necessary to sufficiently increase production.

Nevertheless, while there may be some close substitutes for particular types of vegetable oil, there are few good substitutes for protein feeds. Thus, as livestock output continues to grow, there will be a continued and increasing reliance on imports to meet domestic feed requirements. Consequently, if limiting import dependence is a desirable objective, there is an urgent need to set up a national oilseed policy in Turkey aimed at closing the rapidly increasing gap between domestic production and consumption of oilseeds, oil meals, and vegetable oils.

The primary objective of this project is to develop a policy simulation model of Turkey's oilseeds sector that is capable of evaluating the consequences of alternative oilseed policy options. The model can be linked to the Food and Agricultural Policy Research Institute's (FAPRI) current international oilseeds model through price interactions and trade. The model is designed to generate consistent long-term projections of Turkish production, consumption, prices, and trade of major oilseed crops, including sunflower seed, soybeans, and cottonseed. Specifically, the main objectives of the study are:

i) To evaluate the present structure of Turkish oilseed production, consumption, and processing in order to assess the recent trends, determine productivity shortfalls, and identify the areas of future growth.

- Silinmiş: Chapter 1¶ ... [1]
- Silinmiş: 1. Introduction ¶
- Silinmiş: ¶
- Silinmiş: O…s…of Turk ... [2]
- Silinmiş: ¶
- Silinmiş: s…consists … ... [3]
- Silinmiş: since 1987, when
- Silinmiş: .
- Silinmiş: it reached
- Silinmiş: was … 1987… ... [4]
- Silinmiş: s
- Silinmiş: keeping ... [5]
- Silinmiş: the
- Silinmiş: trend will not c ... [6]
- Silinmiş: ¶
- Silinmiş: and …¶ ... [7]
- Silinmiş: s
- Silinmiş: s…of ... [8]
- Silinmiş: ¶
- Silinmiş: This highlights ... [9]
- Silinmiş: through
- Silinmiş: increasing the ... [10]
- Silinmiş: cultivable
- Silinmiş: idle land avail ... [11]
- Silinmiş: under oilseeds
- Silinmiş: is not a viable
- Silinmiş: much of an
- Silinmiş: option. …One ... [12]
- Silinmiş: of the
- Silinmiş: solution may ... [13]
- Silinmiş: to find new hi ... [14]
- Silinmiş: Alternatively
- Silinmiş: or through
- Silinmiş: ed…ation…o ... [15]
- Silinmiş: get enough
- Silinmiş: ¶
- Silinmiş: ¶ ... [16]
- Silinmiş: one…of one ... [17]
- Silinmiş: a
- Silinmiş: hardly any
- Silinmiş: available
- Silinmiş: This …indica ... [18]
- Silinmiş: ¶
- Silinmiş:
- Silinmiş: main …ish… ... [19]
- Silinmiş: ¶
- Silinmiş: s
- Silinmiş: sectors

ii) To develop a policy simulation model incorporating technical constraints among selected oilseeds and products, market-specific characteristics of Turkish oilseeds sector, and relevant policy variables.

iii) To formulate and simulate selected policy and productivity scenarios in order to evaluate the impact of changes in important variables such as productivity, exchange rates, border measures etc. on the supply and demand conditions, price movements, trade volumes, and consumption patterns.

iv) To summarize the study results in a comprehensive report, which will be available to policy makers and economists.

The rest of this study is divided into seven chapters. The first chapter highlights recent agricultural and trades policies that have an impact on Turkey's oilseeds market. Chapter 2 provides historical data for oilseed supply and use and describes the crush demand equations used in the projection model. Chapter 3 estimates a system of demand equations for vegetable oil demand and provides a specification for oil supply and imports. Chapter 4, discusses the supply and demand for oilseed meal, and Chapter 5 explains the estimation of Turkey's domestic oilseed supply. Chapter 6 presents the model's baseline projections and Chapter 7 highlights the impact of alternative policies.

1. Oilseed Policies in Turkey

This chapter explains government policies applied in Turkey after 1980 in the oilseeds sector. The discussion focuses on producer price policies, intervention purchases and prices, input subsidies, and import policies.

1.1. Support Policies and Intervention Purchases

Intervention policies for agricultural crops have been in operation in Turkey since 1932. With few exceptions, the number of crops subject to intervention has increased steadily over time until 1994. The supports for agricultural crops have usually been in the form of intervention purchases, input price subsidies, and foreign trade regulations. Apart from these core support methods, covering almost all important agricultural crops, no support mechanism has been specifically designed for the oilseed market.

Sunflower seed production was supported mainly by the intervention price system in Turkey between 1970 and 1994. Before 1986 annual intervention prices for sunflower seed were declared by the government, usually after the actual sowing had taken place. In 1986, however, the price declaration was made in advance of the sowing season for sunflower seed, as well as for cereals, sugarbeets, cotton, and soybeans. Together with the early price announcement, a gradual increase in prices was given to farmers during the season. In 1988 and 1990, no price declaration was made by the government.

During the period from 1970 to 1994, Trakya Oilseeds Sales Cooperatives Union (TRAKYABIRLIK) and Karadeniz Oilseeds Sales Cooperatives Union (KARADENIZBIRLIK) were given the authority by the Ministry of Industry and Commerce (MINIC) to carry out the intervention purchases at a price determined and declared by the government. Loans from the Agricultural Bank of Turkey were used to finance the intervention purchases by the two unions. Together with the interest expenses incurred, the purchases generated substantial losses which were later on consolidated by the Turkish Treasury.

Silinmiş: s

Silinmiş: to make the study's results

Silinmiş: at the end of the study and make it

Silinmiş: ¶

Silinmiş: proposal

Silinmiş: F

Silinmiş: s

Silinmiş: ,

Silinmiş: ,

Silinmiş: the structure of simulation model (derivation of supply, demand and trade equation) and provide historical data for oilseeds supply and use.

Silinmiş: chapter

Silinmiş: Figure 1 shows the generic structure of the oilseeds simulation model.

Silinmiş: Bölüm Sonu

Silinmiş: ¶

Silinmiş: ¶

Silinmiş: ¶

Silinmiş: ¶

Silinmiş: ¶

Silinmiş: ARADENIZ

The intervention system based on the purchases by Agricultural Sales Cooperatives Unions was abolished as a result of new economic stability measures introduced in April 5, 1994. The crops that were subject to intervention were cereals, tobacco, sugarbeets, and poppys. Thus, oilseeds were left to the prevailing market conditions.

In the post-1994 period, the government pursued a slightly different system of support, offering the unions relatively low-cost credit for crop purchases from the growers. TRAKYABIRLIK and KARADENIZBIRLIK were again involved in sunflower seed purchases, in which the price was recommended by the MINIC and approved by the government. Because the price announcement was usually made at the time of harvest, farmers had no opportunity to use the government price in their decision making at the beginning of the growing season. The declared price was not an intervention price, but a purchase price used by the unions who were supported by government-controlled loans. In 1996, for example, TRAKYABIRLIK was given a loan of 4.6 trillion TL with 50 percent simple interest (Aksoy et al. 1997). The purchases during the harvest season were financed from the Support and Price Stabilization Fund (DFİF in Turkish), bank loans, the unions' own funds, and deductions made from growers by the unions in payment for input credits given to them during the crop growing season. There were, however, delays in payments to producers.

When the period between 1994 and 1998 is reviewed for all major crops which were subject to intervention purchases by related unions, it is observed that the share of the unions' own funds (including the deductions from growers) in total purchase value has consistently shrunk. The share of the Support and Price Stabilization Fund and bank loans, on the contrary, has grown considerably (Oyan, 1998). Quantities of sunflower seed purchased by TRAKYABIRLIK and KARADENIZBIRLIK relative to total annual production and real purchase prices by the beginning of the harvest season are summarized in Table 1.1.

Until 1993 the support mechanism for cotton had been more or less the same as that for sunflower, but three different cooperative unions were involved in government-supported purchases: TARIŞ, ÇUKOBIRLIK, and ANTBIRLIK. In 1993, the government introduced the system of deficiency payments, in which producers received the difference between the domestic market price and the target price. In order to be eligible to receive the deficiency payment, producers were obliged to submit their sales receipts taken either from the cooperative unions or the commodity exchanges. Payments were made through the Agricultural Bank of Turkey with funds transferred from the Turkish Treasury.

Table 1.1. Sunflower Seed Purchases and Purchase Prices Applied by the Unions

Years	TRAKYABİRLİK	KARADENİZBİRLİK	Opening Price	Support Rate
	Tons		TL	
1985	238792	57012	1.47	36.98
1986	345411	48919	1.39	41.95
1987	165629	32049	1.28	17.97
1988	212436	36935	1.29	21.68
1989	452099	70437	1.38	41.8
1990	273040	40473	1.19	36.46
1991	298967	28037	1.35	40.88

Silinmiş: ¶
Silinmiş: ¶
Silinmiş: ¶
Silinmiş: ¶
Silinmiş: This system was abolished in 1994, and, as in the case of sunflower seed, cotton was removed from the¶
Biçimlendirilmiş
Silinmiş: s

1992	588967	56729	1.39	67.97
1993	288174	38056	1.40	40.03
1994	92593	21584	1.51	15.43
1995	196499	42983	1.54	26.61
1996	230898	38477	1.70	34.54
1997	356793	39077	1.74	43.99
1998	392906	49893	1.69	51.49

Support Rate denotes the purchased quantity divided by the total production. Annual prices are deflated using the wholesale price index as 1968 the base period.

This system was abolished in 1994, and, as in the case of sunflower seed, cotton was removed from the supported crops list. The deficiency payment system for cotton was applied again in 1998. Cotton purchases by TARIŞ, ÇUKOBIRLIK, and ANTBIRLIK and real purchase prices are given in Table 1.2.

Silinmiş: ¶

Silinmiş: made through the Agricultural Bank of Turkey with funds transferred from the Turkish Treasury. This system was abolished in 1994, and, as in the case of sunflower seed, cotton was removed from the

Soybeans were also included in the supported crops list between 1978-1983 and in 1991. Soybean production in Çukurova Region was supported by a project under the administration of the Ministry of Agriculture and Rural Affairs in 1980, and the targeted yield levels were reached. The most important buyers of soybeans in Turkey have been the Çukurova Agricultural Sales Cooperatives Union (ÇUKOBIRLIK), animal feed factories, and edible oil and other food manufacturers. Soybean prices are announced annually by ÇUKOBIRLIK.

Silinmiş: ¶

Silinmiş:

Although the soybean production peaked with 250 thousand tons in 1987, the succeeding years have witnessed a steady decrease. The most important reasons for this reduction are the unfavorable price

Silinmiş: ¶

Table 1.2 Cotton Purchases and Purchase Prices Applied by the Unions

Silinmiş: ¶
¶
¶

Biçimlendirilmiş

Biçimlendirilmiş

Years	TARİŞ	Price	ÇUKOBİRLİK	Price	ANTBİRLİK	Price	SR
	Tons	TL	Tons	TL	Tons	TL	
1985	165881	2.43	147089	2.22	84001	2.43	48.20
1986	105582	2.36	16745	2.23	44285	2.36	28.90
1987	76381	2.05	3874	1.93	40908	2.05	21.90
1988	204476	3.04	188594	2.93	74087	3.04	42.90
1989	121531	3.32	105622	3.22	57411	3.32	29.00
1990	224135	3.01	148977	2.87	66765	3.01	44.40
1991	227787	3.15	237354	3.01	51116	3.15	49.90
1992	240645	3.11	497904	2.97	60246	3.11	52.40
1993	251237	2.02	129242	1.88	46749	2.02	49.50
1994	91487	3.97	34965	3.02	31295	3.50	19.50

1995	159383	3.42	83414	2.90	61806	3.42	26.00
1996	178008	3.40	48806	2.91			22.70
1997	170137	3.74	64420	3.21			20.50
1998	272513	2.99	208532	2.46			31.80

SR (Support Rate) denotes the purchased quantity divided by the total production. Annual prices are deflated using the wholesale price index as 1968 the base period.

parity between maize and soybean between 1987-1997 and rapid increases in maize yields in the Çukurova Region over time. In recent years, however, use of soybeans and soybean products in Turkey has been promoted by the American Soybean Association.

1.2. Input Price Subsidies

Agrochemicals: Growers' purchases of various agrochemicals and veterinary medicine have been subsidized 20 percent by the government from the Support and Price Stabilization Fund since 29 April 1987.

Fertilizers: Government promotions for the manufacturing and consumption of fertilizers dates back to 1961 in Turkey. The prices of major commercial fertilizers used in agriculture were held constant between 1963 and 1974. Although the prices were returned to free market levels in 1974, the government started to subsidize the use of fertilizers to protect farmers from their rapidly raising manufacturing costs stemming from the worldwide oil crisis. During the period between 1975 and 1979, apart from some minor fluctuations, price increases in domestically manufactured, as well as imported fertilizers, were offset by government subsidies to protect farmers against raising costs. After 1980, increases in the world fertilizer prices and manufacturing costs led the government to liberalize domestic prices but maintain the subsidies. Sharp price increases, however, quickly negated the effects of the subsidies.

Until 1986 all fertilizer deliveries had been performed by the Turkish Agricultural Equipment Organization (TZDK), except for those by the Turkish Sugar Factories Corporation (TŞFAŞ). TZDK bought domestically manufactured fertilizers at prices that were above world prices and sold them to farmers at prices below those prevailing on world markets. The losses incurred by TZDK were then taken on by the Turkish Treasury. After 1986, the Council of Ministers issued a decree and removed all restrictions on the imports and exports of commercial fertilizers, allowing domestic manufacturers to set their prices under free market conditions. In 1986, the procedure for subsidization was also altered. Under the new system, the subsidy levels to be given per kg for each kind of fertilizer were determined by the Monetary-Credit Coordination Committee (Para-Kredi Koordinasyon Kurulu), and fertilizer manufacturers and dealers, who had to sell to the farmers at subsidized prices, were entitled to receive restitution from the Agricultural Bank of Turkey upon the submission of their declarations. While the average subsidy level was around 19 percent of the fertilizer sale price, the financial burden of the subsidies was maintained by the Support and Price Stabilization Fund.

On 14 September 1994, the mechanism was reversed again, and support was given directly to farmers. Instead of the fixed amount per kg used previously, farmers were given rebates for all kinds of fertilizers by the Agricultural Bank of Turkey equal to 20 percent of the invoice total including the V.A.T. On 15 October 1994, the support rate was raised to 30 percent, which was valid for purchases on or after 14 September 1994, and a total of 27 different kinds of fertilizers were included in the support scheme.

A year later on 26 October 1995, the support level was raised further to 50 percent, based on the Decree of the Council of Ministers number 95/7422. The most important changes brought about by this regulation were that the rate of support was held the same for all kinds of fertilizers and that farmers would be entitled to receive the support after actually buying the fertilizer. The number of fertilizer varieties included in the support list was reduced to 19, and payments to growers were made for two-months periods, paid on the 10th day of the month following each period.

After 27 November 1997, the support levels were set again on a per-kg basis of amount purchased, and the subsidies were paid to fertilizer manufacturers, dealers, and importers. Since then the support levels have been reduced and presently fluctuate around 32-35 percent.

Seeds: To promote and extend the use of hybrid seeds by farmers, there has been a general support policy for seeds. The support has usually been given to seed breeding firms and dealers, but there is neither a producer payment nor a specific subsidy for oilseeds.

1.3. Foreign Trade Policies

Prior to 1980 there had been tight restrictions in the imports of agricultural commodities. With the introduction of the economic stability package on 24 January 1980, several commodities were included in the “liberated imports list” in order to construct a more transparent import regime. Some sensitive products such as wheat, milk powder, and vegetable oils, however, continued to be protected with import quotas. In 1984, the use of the liberated imports list and import quotas were terminated under a new foreign trade regime. Instead, gradual customs duties were introduced in line with Turkey’s obligations imposed by the GATT. During this period, regardless of the kind of the vegetable oil, imports were taxed with tariffs ranging between 10 to 200 U.S. dollars per ton.

In 1990, the foreign trade regime was further liberalized by abolishing the list of the goods requiring import permission. However, to protect the farmers from the fluctuations of world prices, the government maintained a set of specific rules for the imports of sensitive agricultural commodities: such as sunflower seed, wheat, barley, maize, sugar, and milk. One of the most notable rules was the requirement of a special permission from the government for the imports of sunflower seed and crude sunflower seed oil. In some years, importers were also required to buy equal values of sunflower seed or oil from TRAKYABIRLIK, the domestic cooperatives union.

To comply with the rules of the Customs Union Agreement signed with the EU, a new package of “Import Regime and Regulations” came into force on 1 January 1996. With the new regime, all taxes, which were assumed to be non-tariff barriers, were converted to customs duties (3 percent for oilseeds and 12 percent for vegetable oils).

Customs duties for imported vegetable oils were 12 percent until 21 September 1996, but then they were raised to 39 percent for sunflower seed oil only, the upper limit permitted by the GATT. The previously applied duty of 3 percent for imported sunflower seed was also raised to 29 percent. The main reason for the increase was to retain the high domestic purchase price of 35 000 TL/kg announced by the government and TRAKYABIRLIK in 1996. Thus, it was aimed to protect the farmers with a higher domestic price against lower-priced imports. However, this preventive measure proved to be ineffective until the end of the year, as the exporting countries in the Black Sea region retaliated by reducing their export prices. After the sunflower crop in these countries was completely sold, the prices rapidly increased by as much as 50 per cent in a month and neared those of TRAKYABIRLIK (Aksoy et al. 1997). Considering the marginal expansion of sunflower seed production in Turkey and low prices for Russian and Ukrainian sunlowerseed, imports are likely to continue to challenge domestic sunflower seed production in the near future.

In 1999, the government has allowed duty free-imports of certain amounts of sunflower seed or its oil equivalent by importers/crushers who are willing to purchase the equivalent amount of sunflower seed or oil from TRAKYABIRLIK. Having signed a Customs Union agreement with EU and free trade agreements with Romania and Hungary, the government has enabled duty free imports of sunflower seed oil from these countries. At present, the government applies 28.5 percent import duty for sunflower seed, 0 to 2 percent for sunflower seed meal, and 38 percent for crude sunflower seed oil. Import duties for sunflower seed and products in the last fifteen years are summarized in Table 1.3 and 1.4.

The case of cotton has been different than sunflower because it is basically grown for textile industry. Cotton was removed from the forbidden import commodities list in 1984. For a short period of time in 1986, a tax of 100 US dollar per ton for the "Housing Fund" was charged in cotton imports. Between 1984 and 1988 all taxes and duties restricting free trade were kept around 1 to 10 US dollars per ton. After 1988 any taxation related to the Housing Fund was terminated for unprocessed cotton imports, and a basic customs duty of 1 to 3 percent was applied instead. Customs duties for cottonseed and products are given in Table 1.5 and 1.6.

Table 1.3. Tariffs and Taxes in the Imports of Sunflower Seed and Meal

Year	Sunflower Seed (for Oil) (C.D.+ M.H.F.)		Sunflower Seed Meal (C.D.+ M.H.F.)	
	EU/ EFTA	Other Countries	EU/ EFTA	Other Countries
1985	30 (48)*	30 (48)*	0 (11)*+10$/ton	0 (11)*+10$/ton
1986	30 (50)*	30 (50)*	0 (13)*+1$/ton	0 (13)*+1$/ton
1987	30 (54)*	30 (54)*	0 (18)*+1$/ton	0 (18)*+1$/ton
1988 30.03.1988	30 (60)* E (3)*+30$/ton	30 (60)* E (3)*+30$/ton	0 (26)*+1$/ton	0 (26)*+1$/ton
1989 24.05.1989 15.09.1989	E(0)*+30$/ton	E (0)*+30$/ton	 0 (25)*+1$/ton E (3)*+1$/ton	 0 (25)*+1$/ton E (3)*+1$/ton
1990	E (3)*+30$/ton	E (3)*+30$/ton	E(3)*+1$/ton	E(3)*+1$/ton
1991	E (3)*+30$/ton	E (3)*+30$/ton	E(3)*+1$/ton	E(3)*+1$/ton

Silinmiş: ¶
Silinmiş: ¶
Silinmiş: Sayfa Sonu
Biçimlendirilmiş
Silinmiş: s
Silinmiş: O
Silinmiş: O
Silinmiş: O
Silinmiş: O
Silinmiş: O
Silinmiş: O
Silinmiş: O
Silinmiş: O
Silinmiş: O
Silinmiş: O
Silinmiş: O
Silinmiş: O

1992	E (3)*+80$/ton	E (3)*+80$/ton	E(3)*+1$/ton	E(3)*+1$/ton
1993	3 + 80$/ton	3 + 80$/ton	2+1$/ton	3+1$/ton
1994 08.11.1994	 3	 3	E	2
1995	3	3	E	2
1996	3	3	E	2
1997	29	29	0	2
1998	28.8	28.8	0	2
1999	28.5	28.5	0	2

C.D. stands for customs duty, M.H.F. for Mass Housing Fund
* denotes total protection provided by customs duties and all other taxes (i.e. municipality charge, port tax, stamp tax, the Support and Price Stabilization Fund etc.)
E stands for exemption from duty.
Source: Foreign Trade Secretariat.

Silinmiş: ¶

Silinmiş: ¶

Table 1.4. Tariffs and Taxes in the Imports of Sunflower Seed Oil

Biçimlendirilmiş

Silinmiş: s

Year	EU/ EFTA (C.D.+ M.H.F.)	Other Countrıes (C.D.+ M.H.F.)
28.12.1984 22.10.1985 26.12.1986	E + 1$/ton E +60$/ton E +70$/ton	E + 1$/ton E +60$/ton E +70$/ton
22.02.1986 07.06.1986	E +90$/ton E +120$/ton	E +90$/ton E +120$/ton
01.07.1987 18.11.1987	E +70$/ton E +10 $/ton	E +70$/ton E +10 $/ton
31.12.1988	E +10$/ton	E +10$/ton
19.10.1989 15.09.1989	E +60$/ton E +10$/ton	E +60$/ton E +10$/ton
17.01.1990	E (3)*+60$/ton	E (3)*+60$/ton
1991	E (3)*+60$/ton	E (3)*+60$/ton
22.09.1992	E (3)*+200$/ton	E (3)*+200$/ton
1993	3 + 200$/ton	3 + 200$/ton
1994	3 + 200$/ton	3 + 200$/ton
1995	3 + 60$/ton	3 + 60$/ton
1996	12	12
1997	38.8	38.8
1998	38.4	38.4
1999	38	38

C.D. stands for customs duty, M.H.F. for Mass Housing Fund.
* denotes total protection provided by customs duties and all other taxes (i.e. municipality charge, port tax, stamp tax, the Support and Price Stabilization Fund etc.).
E stands for exemption from duty.
Source: Foreign Trade Secretariat.

Silinmiş: ¶

Silinmiş: ¶

Table 1.5. Tariffs and Taxes in the Imports of Cottonseed and Meal

Year	Cottonseed (C.D.+ M.H.F.)		Cottonseed Meal (C.D.+ M.H.F.)	
	EU/ EFTA	Other Countrıes	EU/ EFTA	Other Countries
1985	30 (48)*	30 (48)*	0 (11)*+10$/ton	0 (11)*+10$/ton
1986	30 (50)*	30 (50)*	0 (13)*+1$/ton	0 (13)*+1$/ton
1987	30 (54)*	30 (54)*	0 (18)*+1$/ton	0 (18)*+1$/ton
1988	30 (60)*	30 (60)*	0 (26)*+1$/ton	0 (26)*+1$/ton
1989				
24.05.1989	E (0)*+4$/ton	E (0)*+4$/ton		
15.09.1989			E (3)*+1$/ton	E (3)*+1$/ton
1990	E (3)*+4$/ton	E (3)*+4$/ton	E(3)*+1$/ton	E(3)*+1$/ton
1991	E (3)*+4$/ton	E (3)*+4$/ton	E(3)*+1$/ton	E(3)*+1$/ton
1992	E (3)*+4$/ton	E (3)*+4$/ton	E(3)*+1$/ton	E(3)*+1$/ton
1993	3 + 4$/ton	3 + 4$/ton	2+1$/ton	3+1$/ton
1994	3 + 4$/ton	3 + 4$/ton	E	2
1995	3 + 4$/ton	3 + 4$/ton	E	2
1996	4	4	E	2
1997	4	4	0	2
1998	4	4	0	2
1999	4	4	0	2

C.D. stands for customs duty, M.H.F. for Mass Housing Fund.
* denotes total protection provided by customs duties and all other taxes (i.e. municipality charge, port tax, stamp tax, the Support and Price Stabilization Fund etc.).
E stands for exemption from duty.
Source: Foreign Trade Secretariat.

Silinmiş: ———Sayfa Sonu———
Biçimlendirilmiş
Silinmiş: EARS
Silinmiş: ı
Silinmiş: O
Silinmiş: O
Silinmiş: O
Silinmiş: O
Silinmiş: O
Silinmiş: O
Silinmiş: ¶
Silinmiş: ¶
Silinmiş: O
Silinmiş: O
Silinmiş: O
Silinmiş: O

Table 1.6. Tariffs and Taxes in the Imports of Cottonseed Oil

Year	EU/ EFTA (C.D.+ M.H.F.)	Other Countries (C.D.+ M.H.F.)
28.12.1984	E + 1$/ton	E + 1$/ton
22.10.1985	E +60$/ton	E +60$/ton
26.12.1986	E +70$/ton	E +70$/ton
22.02.1986	E +90$/ton	E +90$/ton
07.06.1986	E +120$/ton	E +120$/ton
01.07.1987	E +70$/ton	E +70$/ton
18.11.1987	E +10 $/ton	E +10 $/ton
31.12.1988	E +10$/ton	E +10$/ton
19.10.1989	E +60$/ton	E +60$/ton
15.09.1989	E +10$/ton	E +10$/ton
17.01.1990	E (3)*+60$/ton	E (3)*+60$/ton
1991	E (3)*+60$/ton	E (3)*+60$/ton
22.09.1992	E (3)*+60$/ton	E (3)*+60$/ton
1993	3 + 60$/ton	3 + 60$/ton
1994	3 + 60$/ton	3 + 60$/ton
1995	3 + 60$/ton	3 + 60$/ton
1996	12	12
1997	12	12
1998	12	12
1999	12	12

C.D. stands for customs duty, M.H.F. for Mass Housing Fund.
* denotes total protection provided by customs duties and all other taxes (i.e. municipality charge, port tax, stamp tax, the Support and Price Stabilization Fund etc.).
E stands for exemption from duty.
Source: Foreign Trade Secretariat.

As stagnating soybean production in Turkey falls short of meeting the growing domestic demand, soybean imports have increased substantially in the last few years (Aksoy and Şener, 1999). Increasing consumption of chicken meat, which has become more popular due to its price advantage relative to red meat, has boosted the demand for soybeans and soybean meal by the poultry industry. Being Turkey's largest soybean supplier, the U.S. has closely monitored this trend and has recently been promoting the consumption of soybeans and soybean products. The U.S. exports of soybeans and soy products to Turkey are supported by the GSM-102 export credit guarantees. In this context, the

Biçimlendirilmiş
Silinmiş: s
Silinmiş: ¶

American Soybean Association (ASA) uses television advertising, conferences and exhibitions, and technical assistance programs in Turkey (USDA, 1999).

Under the 1999 Import Regime, soybeans and soybean meal of EU origin are imported without duty, while other countries pay a 2 percent tariff. Crude soybean oil carries a 12 percent import tariff (Tables 1.7 and 1.8). Import tariffs for refined oils are even higher. At the moment, the tariff for refined soybean and cottonseed oils is 22 percent, whereas the duty is 50 percent for sunflower seed oil. The substantial import tariff differences between sunflower seed products and rival products (i.e. sunflower seed oil at 28.5 percent and cottonseed and soybean oils at 12 percent) have occasionally fueled allegations of smuggling and false declarations in vegetable oil imports.

A few remarks can also be made about Turkey's exports of oilseeds and oilseed products. Since Turkey is a net importer of major oilseeds, exports are almost non-existent. There are, however, notable amounts of refined sunflower seed oil exports. In 1997, Turkey exported 113,000 tons of refined sunflower oil to various countries. Perhaps the most important issue worth mentioning about exports is that the government allows firms to import duty free sunflower seed for the purpose of exporting the oil. However, the high cost of letters of guarantee required by the government prior to import licensing prompts complaints among exporters.

Table 1.7. Tariffs and Taxes in the Imports of Soybeans and Soybean Meal

Year	Soybeans (For Oil) (C.D.+ M.H.F.)		Soybean Meal (C.D.+ M.H.F.)	
	EU/ EFTA	Other Countries	EU/ EFTA	Other Countries
1985	E+4$/ton	30 (48)*	0(11)*+10$/ton	0(11)*+10$/ton
1986	E+4$/ton	30 (50)*	0 (13)*+1$/ton	0 (13)*+1$/ton
1987	E+4$/ton	30 (54)*	0 (18)*+1$/ton	0 (18)*+1$/ton
1988	E+4$/ton	30 (60)*	0 (26)*+1$/ton	0 (26)*+1$/ton
24.05.1989	E+4$/ton	E (0)*+4$/ton	E (3)*+1$/ton	E (3)*+1$/ton
1990	E (3)*+4$/ton	E (3)*+4$/ton	E(3)*+1$/ton	E(3)*+1$/ton
1991	E (3)*+4$/ton	E (3)*+4$/ton	E(3)*+1$/ton	E(3)*+1$/ton
1992	E (3)*+4$/ton	E (3)*+4$/ton	E(3)*+1$/ton	E(3)*+1$/ton
1993	3 + 4$/ton	3 + 4$/ton	2+1$/ton	3+1$/ton
1994	E	E	E	2
1995	E	E	E	2
1996	E	E	E	2
1997	0	0	0	2
1998	0	0	0	2
1999	0	0	0	2

C.D. stands for customs duty, M.H.F. for Mass Housing Fund.* denotes total protection provided by customs duties and all other taxes (i.e. municipality charge, port tax, stamp tax, the Support and Price Stabilization Fund etc.) E stands for exemption from duty.
Source: Foreign Trade Secretariat.

Table 1.8. Tariffs and Taxes in the Imports of Soybean Oil

Year	EU/ EFTA (C.D.+ M.H.F.)	Other Countries (C.D.+ M.H.F.)
28.12.1984 22.10.1985 26.12.1986	E +1$/ton E +60$/ton E +70$/ton	E +1$/ton E +60$/ton E +70$/ton
22.02.1986 07.06.1986	E +90$/ton E +120$/ton	E +90$/ton E +120$/ton
01.07.1987 18.11.1987	E +70$/ton E +10 $/ton	E +70$/ton E +10 $/ton
31.12.1988	E +10$/ton	E +10$/ton
19.10.1989 15.09.1989	E +60$/ton E +10$/ton	E +60$/ton E +10$/ton
17.01.1990	E (3)*+60$/ton	E (3)*+60$/ton
1991	E (3)*+60$/ton	E (3)*+60$/ton
22.09.1992	E (3)*+60$/ton	E (3)*+60$/ton
1993	3 + 60$/ton	3 + 60$/ton
1994	3 + 60$/ton	3 + 60$/ton
1995	3 + 60$/ton	3 + 60$/ton
1996	12	12
1997	12	12
1998	12	12
1999	12	12

C.D. stands for customs duty, M.H.F. for Mass Housing Fund.
* denotes total protection provided by customs duties and all other taxes (i.e. municipality charge, port tax, stamp tax, the Support and Price Stabilization Fund etc.).
E stands for exemption from duty.
Source: Foreign Trade Secretariat.

Biçimlendirilmiş

Silinmiş: s

Silinmiş: ¶

Biçimlendirilmiş

Silinmiş: ı

Biçimlendirilmiş

Silinmiş: ¶

Biçimlendirilmiş

Biçimlendirilmiş

Silinmiş: ¶

Silinmiş: A few remarks can also be made about Turkey's exports of oilseeds and oilseed products. Since Turkey is a net importer of major oilseeds, exports are almost non-existent. There are, however, notable amounts of refined sunflower seed oil exports. In 1997, Turkey exported 113,000 tons of refined sunflower oil to various countries. Perhaps the most important issue worth mentioning about exports is that the government allows firms to import duty free sunflower seed for the purpose of exporting the oil. However, the high cost of letters of

Silinmiş: credit

Silinmiş: guarantee required by the government prior to import licensing prompts complaints among exporters.¶

2. Oilseed Crush Demand and Imports

In this chapter, the data used for the oilseed crush model is explained, and then the crush demand model and parameters estimates are presented. This section also explains how oil and meal supplies are derived from the crush demand model. The chapter concludes with a brief discussion of the demand for imported oilseeds.

2.1 Oilseed Crush Demand Data

The data used in this study for the crush model were obtained from *Oil World Annual* (OWA). Crush demand data in the *Oilseed and Vegetable Oils Current Situation and Projection Report* (OSR) published by the Turkish Agricultural Economics Research Institute (AERI) (Aksoy and Şener, 1999) is given only for the last four years, so we are not able to use this data for estimation of an econometric model. The differences between the OWA and OSR data sets come from differences in the marketing year, conversion rates, and the assumed change in stocks. Table 2.1 compares the historical crush demand for sunflower seed, cottonseed, and soybeans as reported in OWA and the OSR. Table 2.1 shows that crush demand has increased substantially in recent years. The increase in crush is driven by the rapid growth in demand for oil and meal in Turkey. Because demand is strong and the domestic prices for oilseed products are well above international prices, processors are enticed to increase their oilseed crush to capture the opportunities for increased profit from meeting domestic demands for oilseed products.

2.2. Oilseed Crush

Production of oil and meal are determined by the quantity of oilseeds crushed. We assume that firms in Turkey's crushing sector select the optimal quantity of oilseeds to crush (Q_i^{PR}) to maximize profits (π), which are calculated in [2.1].

[2.1] $$\pi = Q_i^{PR}\left(P_i^O \gamma_i^O + P_i^m \gamma_i^m\right) - P_i^S - C_i\left(Q_i^{PR}\right)$$

In equation [2.1], P^m, P^O, and, P^S represent the price of i^{th} meal, oil, and oilseed, respectively. The γ^m and γ^O are the extraction rates for meal and raw oil for one unit of the i^{th} oilseed, and $C_i\left(Q_i^{PR}\right)$ is the non-material cost of crushing. We assume that $C_i\left(Q_i^{PR}\right)$ is increasing in Q_i^{PR} and that the marginal crushing cost, $C_i'\left(Q_i^{PR}\right)$, is positive and increasing over the relevant range of output. This latter assumption might be restrictive in the longer run, but in the short to medium run, crushers are likely to incur additional wage and maintenance costs that would cause average crushing costs to increase as output rises.

Table 2.1. Crushing Demand for Major Oilseeds

Year	World Oil Annual (October- September)			AERI (September-August)		
	Soybean	Cotton	Sunflower	Soybean	Cotton	Sunflower
1981/82		623	522			
1982/83	29	633	560			
1983/84	52	681	655			
1984/85	128	748	669			
1985/86	128	661	760			
1986/87	106	676	772			
1987/88	98	759	799			
1988/89	70	874	920			
1989/90	128	920	883			
1990/91	115	913	931			
1991/92	88	820	809			
1992/93	73	912	915			
1993/94	63	902	865			
1994/95	113	935	930	222	975	991
1995/96	118	1198	1150	206	1086	1201
1996/97	153	1200	1144	270	1274	1091
1997/98	200	1225	1170	271	1275	1212
1998/99				290	1080	1400

Differentiating [2.1] with respect to crush results in the following first-order condition.

[2.2] $$\left(P_i^O \gamma_i^O + P_i^m \gamma_i^m\right) = P_i^S + C_i'\left(Q_i^{PR}\right)$$

Equation [2.2] is the familiar profit maximizing condition that marginal revenue equal marginal cost. Dividing both sides of [2.2] by the price of oilseeds yields and expression for the crush margin $\left(R_i^S\right)$.

[2.3] $$R_i^S = \left[\frac{P_i^m.\gamma_i^m + P_i^O.\gamma_i^O}{P_i^S}\right] = \left(1+\frac{C_i'\left(Q_i^{PR}\right)}{P_i^S}\right)$$

Silinmiş:

Silinmiş:

Biçimlendirilmiş

Silinmiş: ¶

Silinmiş: ¶
non-material cost of crushing. We assume that $C_i\left(Q_i^{PR}\right)$ is increasing in Q_i^{PR} and that the marginal crushing cost, $C_i'\left(Q_i^{PR}\right)$, is positive and increasing over the relevant range of output. This latter assumption might be restrictive in the longer run, but in the short to medium run, crushers are likely to incur additional wage and maintenance costs that would cause average crushing costs to increase as output rises. ¶
¶

Silinmiş: ¶

Silinmiş: ¶

Silinmiş: ¶

The crush margin restates the first-order condition in a form that focuses on the marginal cost of crushing. As long as the crush margin exceeds 1.0, some positive amount of crush may be possible because marginal crushing costs can be positive. As the margin rises, higher levels of crush can be reached. A falling crush margin forces crushers to reduce costs, either by reducing output (in the short run) or by adopting more efficient technology (in the long run). Consequently, the optimal level of crush varies directly with the crush margin.

We assume that the behavior of oilseed crushers can be modeled by a Nerlovian partial adjustment process (Nerlove, 1958). As shown in equation [2.4], the quantity of oilseed i crushed in period t adjusts towards the optimal level (Q_i^*) by a fraction of the deviation in the previous period from the optimal output level.

[2.4] $$Q_{i,t}^{PR} - Q_{i,t-1}^{PR} = \beta\left(Q_i^* - Q_{i,t-1}^{PR}\right)$$

As discussed above, the optimal crush level is dependent on the crush margin, so the final form used to estimate the crush demand is given in [2.5]

[2.5] $$Q_{i,t}^{PR} = \alpha_0 + (1-\beta)Q_{i,t-1}^{PR} + \alpha_2 R_i^S$$

It can be seen from the Equation [2.3] that in order to calculate crush margin we need prices for oilseeds, oils, and meals. In the historical period, prices for cottonseed, cottonseed meal, and refined cotton oil are obtained from the Commodity Exchange in Adana (Adana CE). Since accurate domestic prices are not available for sunflower oil, sunflower meal, soybean oil, and soybean meal, we used international prices as proxies. The international prices of these commodities are converted into domestic wholesale prices by equation [2.6]

[2.6] $$P_i^{DP} = \left[P_i^W \cdot exr \cdot (1+t) + T\right]$$

In equation [2.6], P_i^{DP} is the proxy price at the domestic wholesale level for the i^{th} commodity, P_i^W is the Rotterdam price of the i^{th} commodity, *exr* is the exchange rate, and T is the transfer cost, which includes the cost of transportation, insurance, other customs costs, and handling costs of the *i*th commodity from the Rotterdam Port to the Turkish wholesale market. Information about the transfer cost on a per-metric-ton basis is provided in the Appendix.

In the forecast period, we use FAPRI projections for international sunflower oil and meal and soybean oil and meal prices in equation [2.6] to project sunflower and soybean product prices in Turkey. Cottonseed and cottonseed meal prices are linked indirectly to sunflower seed oil prices through the cottonseed oil price. First, the refined cottonseed oil price is specified as a function of sunflower oil price. Then, cottonseed and cottonseed meal prices are estimated as functions of the refined cotton oil price. Tables 2.2-2.4 display the estimation results for the cottonseed, cottonseed meal, and cottonseed oil price linkage equations

Equation [2.5] was used to estimate the crush demand for sunflower seed and cottonseed. Soybean crush demand, however, is specified as a function of the ratio of the soybean oil price and the soybean price. Initially, the crush margin was used as an explanatory variable in the soybean crush demand equation. Unfortunately, the crush margin did not perform well, and the simple price ratio was substituted for the crush margin. In Turkey the crushing industry has technology that is better suited to crushing sunflower seeds and cottonseeds rather than soybeans. The efficient recovery of both oil and meal may be less important in the soybean crush decision than simply the value of the oil. This may be one reason the crush margin does not work very well in soybean crush demand equation.

Estimation results for the crush equations are presented in the Tables 2.5 through 2.7. As can be seen from the tables, the signs of the explanatory variables are consistent with our expectations, and statistical tests confirm the forecasting performance of the estimated models. At the bottom of the tables, elasticities are given. The elasticity with respect to the crush margin for sunflower seeds

Table 2.2. Price Transmission Estimates from Sunflower Oil Price to Refined Cottonseed Oil Price

Independent\Dependent Variable	Ln (Refined Cottonseed Oil Price at Adana CE)
Constant	-5.68
	(-11.8)
Ln (Sunflower Oil Price at Wholesale Level)	**0.92**
	(29.4)
R^2	0.98
Adjusted R^2	0.98
F	864
D .W	1.52
Theil Forecast Statistics	
Bias	0.000
Variance	0.004
Co-variance	0.996
Regression	0.000
Disturbance	1.000

Silinmiş: ¶

Biçimlendirilmiş

Silinmiş: TB

Silinmiş: ¶

Table 2.3. Price Transmission Estimates from Cottonseed Oil Price to Cottonseed Price

Independent\Dependent Variable	Ln (Cottonseed Price at Adana CE)
Constant	-1.50
	(-3.7)
Ln (Refined Cotton Oil Price at Adana CE)	**0.98**
	(20.8)
R^2	0.98
Adjusted R^2	0.98
F	0.37
	(1.61)
D .W	0.16
Theil Forecast Statistics	
Bias	0.002
Variance	0.007
Co-variance	0.991
Regression	0.000
Disturbance	0.997

Silinmiş: ¶

Biçimlendirilmiş

Silinmiş: TB

Silinmiş: TB

Table 2.4. Price Transmission Estimates from Cottonseed Oil Price to Cottonseed Meal Price

Independent\Dependent Variable	Ln (Cottonseed Meal Price at Adana Commodity Exchange)
Constant	-0.39
	(-2.97)
Ln (Refined Cotton Oil Price at Adana CE)	**1.05**
	(55.0)
R^2	0.99
Adjusted R^2	0.99
F	3026
D .W	1.72
Theil Forecast Statistics	
Bias	0.000
Variance	0.001
Co-variance	0.998
Regression	0.000
Disturbance	1.000

Biçimlendirilmiş

Silinmiş: TB

Silinmiş: TB

Table 2.5. Crush Demand Model Estimates for Sunflower Seeds

Independent\Dependent Variable	Ln (Crush, Thousand Metric Tons)
Constant	**5.74**
	(34.3)
Crush (Q_{t-1})	**0.00056**
	(4.33)
Crush Margin	**0.558**
	(2.42)
R^2	0.86
Adjusted R^2	0.84
F	43.0
D .W	2.43
Theil Forecast Statistics	
Bias	0.000
Variance	0.049
Co-variance	0.950
Regression	0.000
Disturbance	1.000
Elasticity with respect to crush margin	**0.54**

Biçimlendirilmiş

Table 2.6. Crush Demand Model Estimates for Cottonseeds

Independent\Dependent Variable	Ln (Crush, Thousand Metric Tons)
Constant	0.44
	(0.57)
Ln (Crush [Q_{t-1}])	**0.918**
	(7.84)
Crush Margin	0.126
	(1.21)
R^2	0.84
Adjusted R^2	0.82
F	33.97
D .W	0.66
Theil Forecast Statistics	
Bias	0.000
Variance	0.044
Co-variance	0.956
Regression	0.000
Disturbance	1.000
Elasticity with respect to crush margin	
Short-run	0.15
Long-run	1.88

Biçimlendirilmiş

indicates that when the margin increases one percent, crush demand increases 0.54 percent. Holding the soy oil price unchanged, the soybean crush demand elasticity indicates that the crush demand for soybeans will decrease 0.85 and 1.18 percent, respectively, in the short and long run if the soybean price increases 1 percent. The cottonseed crush demand elasticity with respect to the crush margin shows that crush demand will increases 0.15 percent in the short run and 1.88 percent in the long run following a 1 percent increase in the crush margin. Though the long-run crush demand elasticity is significantly larger than 1, this long-run elasticity might be reasonable, considering that firms will have the ability to establish new crushing capacity in Turkey and to increase their capacity utilization rate.

Silinmiş: ¶

Equation [2.7] gives the total demand for the i^{th} oilseed or bean. It states that the total demand for the i^{th} oilseed or bean is the sum of the crush demand (Q^{PR}), seed demand for reproduction (Q^{T}), losses (Q^{K}), and other uses (Q^{D}).

Silinmiş: ¶

[2.7] $$Q_i^{TOP} = \left[Q_i^{PR} + Q_i^{T} + Q_i^{K} + Q_i^{D}\right]$$

Silinmiş: ¶

Table 2.7. Crush Demand Model Estimates for Soybeans

Silinmiş: Sayfa Sonu

Biçimlendirilmiş

Independent\Dependent Variable	Ln (Crush, Thousand Metric Tons)
Constant	4.23
	(7.29)
Ln (Crush [Q_{t-1}])	**0.28**
	(4.49)
Soybean Price / Soy Oil Price	*-1.64*
	(-1.84)
R^2	0.69
Adjusted R^2	0.64
F	14.16
D .W	1.16
Theil Forecast Statistics	
Bias	0.000
Variance	0.090
Co-variance	0.906
Regression	0.000
Disturbance	1.000
Elasticity with respect to price ratio	
Short-run	-0.85
Long-run	-1.18

Silinmiş: ¶

In this study, other use is assumed constant and equal to the average value over the last five years for sunflower seed and cottonseed. According to WOA, the average other use over the last 5 years has been 85 thousand metric tons (tmt) for cottonseed and 55 tmt for sunflower seed. The other use for soybeans is derived from the broiler supply projection. Soybeans constitute 10 percent of feed rations in the Turkish broiler sector.

2.3. Domestic Oilseed Supply

Silinmiş: ¶

Silinmiş: ¶

In this study, oilseed supply is obtained from the product of the sown area, calculated from a system of share equations, and yield. Historical sown area data are shown in Table 2.8, and oilseed production data are shown in Table 2.9. Calculation of soybean supply is an exception. Soybean area and yield responses are estimated using a Nerlovian supply framework. The specifications of the supply models and estimation results are given in the Chapter 5.

2.4. Stock Demand for Oilseeds.

Because stock data is only available for recent few years, we are not able to estimate an econometric model for stock demand. WOA has published stock data for last eight years. Consequently, we assume that stock demand for the oilseeds will continue at same quantity or trend as in recent years.

2.5. Oilseeds Import Demand

Once the stock demand is determined, we derive the import demand as the difference between total demand in equation [2.7] and domestic supply. This relationship is shown in equation [2.8].

[2.8] $$Q_{IMd,i}^{Seed} = Q_{Td,i}^{Seed} - Q_{Ds,i}^{Seed}$$

Table 2.10 displays oilseed import levels in recent years.

Silinmiş: ¶

Silinmiş: Sayfa Sonu

Silinmiş: ¶

Silinmiş: ¶

Silinmiş: ¶

Silinmiş: ¶

Silinmiş: ¶

Table 2.8. Oilseed Sown Area (Thousand Hectares)

Year	World Oil Annual (October- September)			AERI and SIS		
	Soybean	Cotton	Sunflower	Soybean	Cotton	Sunflower
1982/83	24	595	530			
1983/84	24	605	550			
1984/85	28	760	565			
1985/86	60	660	640			
1986/87	90	585	689			
1987/88	112	585	758			
1988/89	66	740	750			
1989/90	75	725	770			
1990/91	74	641	715			
1991/92	50	577	565			
1992/93	46	638	608			
1993/94	27	568	596			
1994/95	29	582	586			
1995/96	31	757	585	31.0	757	585
1996/97	21	744	575	20.5	744	575
1997/98	25	720	620	19.0	722	560

Silinmiş: ¶
Biçimlendirilmiş

Table 2.9. Oilseed Production in Turkey

Year	World Oil Annual (October- September)			AERI and SIS		
	Soybean	Cotton	Sunflower	Soybean	Cotton	Sunflower
1982/83	36	782	600			
1983/84	46	835	715			
1984/85	60	928	710			
1985/86	125	829	800			
1986/87	200	849	940			
1987/88	250	837	1100			
1988/89	60	920	1000			
1989/90	145	987	1100			
1990/91	130	977	860			
1991/92	90	930	620			
1992/93	85	960	950			
1993/94	63	892	815			
1994/95	65	956	740			
1995/96	75	1263	850	75(75)	1063(1287)	694(900)
1996/97	50	1259	670	50(50)	1259(1259)	550(780)
1997/98	55	1260	800	40(40)	1177(1177)	600(900)

Note: The numbers in the parenthesis is obtained from the State Institute of Statistic (SIS).

Biçimlendirilmiş

Biçimlendirilmiş

Table 2.10. Oilseed Imports

Year	World Oil Annual (October- September)			AERI (September-August)		
	Soybean	Cotton	Sunflower	Soybean	Cotton	Sunflower
1986/87	3	28	8			
1987/88	4	37	2			
1988/89	20	31	1			
1989/90	2	28	2			
1990/91	2	30	28			
1991/92	16	18	103			
1992/93	51	117	55			
1993/94	63	65	60			
1994/95	157	70	295	152	46	326
1995/96	104	21	464	130	24	507
1996/97	231	36	494	220	15	541
1997/98	240	51	380	231	98	612

3. Vegetable Oil Demand, Domestic Supply and Import

3. Vegetable Oil Demand, Domestic Supply and Import

This chapter provides a description of vegetable oil demand, supply, and import data. The demand data are used to estimate a demand system for vegetable oil consumption. The methods used in this study to calculate and project vegetable oil supply and imports are also briefly described.

3.1. Consumption and Data for Demand Estimation

In this section we compare data for annual per capita vegetable oil consumption in Turkey obtained from three different data sources. Per capita vegetable oil consumption from the OWA does not deviate significantly from AERI (Aksoy and Şener, 1999) or the State Institute of Statistics' (SIS) Household Consumption Expenditure Survey data. The differences between OWA and AERI data sets may be attributed to the greater number of commodities included in AERI data. Table 3.1 provides AERI consumption estimates for total vegetable oils, while Table 3.3 displays OWA and AERI consumption figures for major vegetable oils only. Because the household expenditure data presented in Table 3.2 isolates information on edible oils consumed at home, the differences in the per capita consumption between disappearance and food expenditure data may be attributed to institutional and away-from-home consumption. The comparability of the consumption data obtained from the AERI, OWA, and SIS data sets suggest that the OWA data in Table 3.4 is adequate to estimate an econometric model for oil consumption in Turkey.

3.2. Vegetable Oil Demand System Specification and Estimation

A conditional vegetable oil demand system is specified using the following Almost Ideal Demand System (AIDS) (Deaton and Muellbauer, 1980).

[3.1] $$W_i = \alpha_i + \sum_i \gamma_{ij} \ln(p_j) + \beta_i \ln\left(\frac{M}{P^*}\right)$$

In equation [3.1] W_i is the budget share of the i^{th} good, and p_j is the price of j^{th} good, M is the total group expenditure (major vegetable oils), and P^* is the Stone Price Index. The AIDS specification allows the researcher to impose or test the symmetry, homogeneity, and adding-up properties of demand systems. We impose all three properties on the system of equations using the following parameter restrictions.

Silinmiş: ¶

Silinmiş: ¶

Silinmiş: ¶

Silinmiş: ¶

Silinmiş: ¶

Biçimlendirilmiş

Table 3.1. Vegetable Oil Consumption in Turkey, 1995/96-1998/99

	1995/96	**1996/97**	**1997/98 (Estimated)**	**1998/99 (Projected)**
Refined Liquid Oil		**Kilograms per Person per Year**		
Sunflower Seed Oil	7.34	7.59	7.38	7.24
Soybean Oil	0.07	0.05	0.04	0.04
Cottonseed Oil	0.29	0.31	0.27	0.24
Maize Oil	0.48	0.65	0.75	0.78
Rape Seed Oil	-	-	0.05	0.10
Olive Oil	1.04	1.05	1.20	1.26
Total Liquid Oil	9.21	9.67	9.69	9.66
Margarine				
Yellow Fat	3.10	3.24	2.95	2.83
White Fat	1.39	1.34	1.21	1.02
Industry	2.18	2.59	3.03	2.87
Total Margarine	6.67	7.18	7.19	6.72
Total Oil	**15.89**	**16.85**	**16.88**	**16.38**

Source: Aksoy and Şener (1999)

Biçimlendirilmiş

Silinmiş: Calculated by AERI from SIS data.¶

Biçimlendirilmiş

Table 3.2. 1994 Household Vegetable Oil, Olive Oil, and Butter Consumption by Income Quintile

Income Quintile	**Q1**	**Q2**	**Q3**	**Q4**	**Q5**	**Q6**	**Q7**	**Q8**	**Q-sub**	**Total**
Kilograms per Person per Year										
Rural										
First Quintile	10.27	0.14	0.02	0.11	4.27	1.03	1.45	1.84	15.84	19.1
Second Quintile	10.46	0.06	0.02	0.09	3.75	1.00	1.03	2.09	15.39	18.5
Third Quintile	10.90	0.16	0.05	0.18	4.20	1.15	1.20	2.63	16.64	20.5
Fourth Quintile	11.12	0.09	0.08	0.12	3.85	1.22	1.36	2.23	16.48	20.1
Fifth Quintile	12.11	0.05	0.12	0.22	4.18	0.00	1.62	2.29	16.69	20.6
Average	**11.06**	**0.10**	**0.06**	**0.15**	**4.04**	**0.85**	**1.34**	**2.24**	**16.26**	**19.8**
Urban										
First Quintile	6.21	0.07	0.07	0.04	2.30	1.54	0.63	0.51	10.24	11.4
Second Quintile	7.30	0.04	0.20	0.09	2.52	1.69	0.91	0.78	11.83	13.5
Third Quintile	7.63	0.08	0.25	0.10	2.89	1.98	1.31	0.82	12.94	15.1
Fourth Quintile	7.86	0.03	0.39	0.04	2.67	1.82	1.37	1.24	12.82	15.4
Fifth Quintile	7.20	0.01	0.73	0.10	2.29	1.75	1.79	1.33	12.09	15.2
Average	**7.27**	**0.05**	**0.34**	**0.08**	**2.54**	**1.76**	**1.22**	**0.95**	**12.03**	**14.2**
Turkey										
First Quintile	8.42	0.10	0.04	0.06	3.40	1.20	1.02	1.33	13.22	15.6
Second Quintile	9.27	0.07	0.08	0.11	3.31	1.30	0.91	1.54	14.13	16.6
Third Quintile	8.86	0.11	0.16	0.13	3.33	1.41	1.36	1.59	14.01	17.0
Fourth Quintile	9.50	0.05	0.25	0.07	3.28	1.80	1.32	1.60	14.95	17.9
Fifth Quintile	9.05	0.03	0.48	0.17	2.94	1.54	1.69	1.68	14.21	17.6
Average	**9.05**	**0.07**	**0.21**	**0.11**	**3.24**	**1.46**	**1.28**	**1.56**	**14.14**	**17.0**

Source: The data is calculated from 1994 Household Consumption Expenditure Survey (SIS, 1997).

The Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8, and Q-sub indicates refined sunflower oil, refined cotton oil, refined corn oil, other refined vegetable oil, margarine for cooking, and margarine for breakfast, olive oil, butter, and total vegetable oils except olive oil, respectively.

Biçimlendirilmiş

Table 3.3. Domestic Disappearance of Major Vegetable Crude Oils

Year	Oil World Annual (Oct.-Sept.)			AERI (Sept.-Aug.)		
	Soybean	Cotton	Sunflower	Soybean	Cotton	Sunflower
			Thousand Tons			
1981/82	137.5	100.4	224.6			
1982/83	121.5	101.0	257.2			
1983/84	129.6	103.6	348.4			
1984/85	118.1	113.3	358.5			
1985/86	117.9	102.1	352.6			
1986/87	132.0	106.6	353.1			
1987/88	144.1	123.3	430.2			
1988/89	153.1	129.3	464.6			
1989/90	124.4	139.9	503.2			
1990/91	126.1	142.0	519.6			
1991/92	153.8	129.0	564.8			
1992/93	207.6	139.6	501.9			
1993/94	180.8	140.1	555.3			
1994/95	172.5	142.5	594.1			
1995/96	165.5	178.3	614.1	151	141	670
1996/97	229.5	183.8	609.8	194	164	698
1997/98	214.2	187.2	618.0	177	179	654
1998/99				169*	136*	663*

*Indicates the projected disappearance.

Table 3.4. Per Capita Disappearance (Refined Oil Equivalent) of Major Vegetable Oils

Year	Oil World Annual (October-September)					
	Soybean	Cotton	Sunflower	Total	Percentage of Sunflower	Percentage of Cotton
	Kilograms per Year					
1982	2.90	2.16	4.81	9.87	0.49	0.22
1983	1.94	2.16	5.70	9.81	0.58	0.22
1984	2.83	2.16	6.69	11.68	0.57	0.18
1985	2.34	2.17	6.91	11.42	0.61	0.19
1986	2.12	2.02	6.93	11.07	0.63	0.18
1987	2.95	2.08	6.65	11.68	0.57	0.18
1988	2.59	2.37	8.06	13.01	0.62	0.18
1989	2.58	2.38	8.35	13.30	0.63	0.18
1990	2.21	2.51	8.74	13.45	0.65	0.19
1991	2.25	2.49	8.93	13.67	0.65	0.18
1992	2.77	2.19	9.27	14.23	0.65	0.15
1993	3.39	2.35	8.22	13.96	0.59	0.17
1994	2.90	2.33	9.04	14.27	0.63	0.16
1995	2.78	2.49	9.47	14.73	0.64	0.17
1996	2.19	2.87	10.02	15.09	0.66	0.19
1997	2.66	2.83	8.95	14.45	0.62	0.20

Note: Conversion factors used for converting crude oil into refined oil. The conversion factors are 95 %, 97 and 97.5 % for sunflower oil, soybean oil, and cottonseed oil, respectively (Aksoy and Şener, 1999).

[3.2] $$\sum_i \alpha_i = 1, \quad \sum_i \beta_i = 0, \quad \sum_j \gamma_{ij} = 0, \quad \gamma_{ij} = \gamma_{ji}$$

The conditional expenditures and price elasticities of the AIDS are computed using following equations (Green and Altson, 1991):

Expenditure Elasticity:

[3.3] $$\eta_{i,c} = 1 + \frac{\beta_i}{W_i}$$

Biçimlendirilmiş

Biçimlendirilmiş

Silinmiş: (AERI, 1998)

Silinmiş: ¶

Silinmiş: ¶

Biçimlendirilmiş

Own-Price Elasticity

Biçimlendirilmiş

[3.4] $$\varepsilon_{ii,c} = -1 + \left[\left(\frac{\gamma_{ii}}{W_i}\right) - \beta_i\right]$$

Cross-Price Elasticity

Biçimlendirilmiş

[3.5] $$\varepsilon_{ij,c} = \left[\frac{\left(\gamma_{ij} - \beta_i \cdot W_j\right)}{W_i}\right]$$

As indicated in Chapter 2, the domestic retail and wholesale price series for sunflower and soybean oils are not available. Consequently, we employed the border prices of the commodities in the demand system estimation. The world price of the respective commodity is converted into the domestic port price using equation [2.6].

Silinmiş: ¶

A system of share equations based on equation [3.1] and subject to the restrictions in [3.2] is estimated using three-stage least squares (3SLS). The adding-up property of demand causes the error covariance matrix of system to be singular, so one of the expenditure share equations is dropped from the system to avoid singularity problems. The estimates are invariant of which equation is deleted from the system. Homogeneity is maintained by normalizing prices. The estimation results for the conditional demand system are shown in Table 3.5. Conditional expenditure, Marshallian, and Hicksian elasticities are calculated at the mean from the estimated parameters using equations [3.3]-[3.5] and the Slutsky equation (Deaton and Muellbauer, 1980). Marshallian elasticities are displayed in Table 3.6, and Hicksian elasticities are shown in Table 3.7.

Silinmiş: ¶

Since the per capita GDP and Stone price index are highly correlated, it is not possible to estimate the first-stage econometric equation; thus, to derive the unconditional elasticities, a first-stage oil demand model for major vegetable oils is developed using the following synthetic equation[1].

Biçimlendirilmiş

[3.6] $$\ln(M) = \alpha_0 + E\ln(y) - e\ln(P^*)$$

In equation [3.6], M is the per capita annual expenditure on vegetable oils, E is the income elasticity of vegetable oils, Y is the per capita real GDP (a proxy for per capita disposable income), and e is the own-price elasticity of vegetable oils. The unconditional expenditure and price elasticities are computed for individual oils using the conditional elasticities, first-stage parameters, and the following equations (Fan et al. 1995);

Silinmiş: ¶

[1] If the Stone price index for substitute commodity groups were available, we might be able to solve the multi-collinearity problem using the relative Stone price index.

Table 3.5. Parameter Estimates of Oil Demand System

Independent Variables	**Dependent Variable**		
	Share of Sunflower Oil	Share of Cottonseed Oil	Share of Soybean Oil*
Intercept	**0.559**	**0.251**	0.190
	(15.07)	**(7.42)**	
Ln (Group Expenditure / Stone Price Index)	**0.0075**	**-0.0062**	-0.0013
	(2.14)	**(-2.25)**	
Ln (Sunflower Oil Price / Soybean Oil Price)	0.059	-0.005	-0.054
	(0.80)	(-1.17)	
Ln (Cottonseed Oil Price / Soybean oil Price)	-0.050	0.054	-0.004
	(-1.17)	(1.05)	
First Differences of the [Ln (Group Expenditure / Stone Price Index)]	**-0.017**	0.0014	0.013
	(-4.07)	(0.44)	
First Differences of the [Ln (Sunflower Oil Price / Soybean Oil Price)]	**0.188**	-0.062	-0.0156
	(2.49)	(-1.41)	
First Differences of the [Ln (Cottonseed Oil Price / Soybean Oil Price)]	**-0.189**	*0.077*	0.112
	(-2.89)	*(1.89)*	
R	**0.82**	**0.84**	
D.W	**1.49**	**1.60**	

*Indicates parameters calculated from the adding-up restriction. In the parentheses t values are given.
Bold indicates that parameter is significant at 1 or 5 percent level.

Silinmiş: ——Sayfa Sonu——
Biçimlendirilmiş
Biçimlendirilmiş

Table 3.6. Conditional Marshallian Prices and Expenditure Elasticities

	Sunflower Oil	Cottonseed Oil	Soybean Oil	Expenditure	Share
Sunflower Oil	**-0.91**	-0.08	-0.02	1.01	0.62
Cottonseed Oil	-0.24	**-0.72**	-0.01	0.97	0.20
Soybean Oil	-0.04	-0.02	**-0.93**	0.99	0.18

Table 3.7. Conditional Hicksian Price Elasticities

	Sunflower Oil	Cottonseed Oil	Soybean Oil
Sunflower Oil	**-0.29**	0.12	0.17
Cottonseed Oil	0.36	**-0.53**	0.17
Soybean Oil	0.57	0.18	**-0.75**

Unconditional Expenditure Elasticity:

[3.7] $$\eta_{i,u} = \eta_{c,i} \cdot E$$

Unconditional Own-Price Elasticity:

[3.8] $$\varepsilon_{ii,u} = \varepsilon_{ii,c} + \eta_{i,c} W_i (1+e)$$

Unconditional Cross-Price Elasticity:

[3.9] $$\varepsilon_{ij,u} = \varepsilon_{ij,c} + \eta_{i,c} W_j (1+e)$$

We assume that the own-price and income elasticities of vegetable oils in equation [3.6] are -0.5 and 0.30, respectively. Unconditional Marshallian price and expenditure elasticities are displayed in Table 3.8. For comparison, oil demand price and income elasticities for Turkey obtained from several sources are shown in Table 3.9

3.3. Crude Oil Supply

The domestic crude oil supply during the simulation period is derived from the crush demand estimation using the appropriate extraction rate (see Appendix) as shown in equation [3.11].

[3.10] $$Q_{s,i}^{Oil} = Q_{d,i}^{PR} \gamma_i^O$$

Biçimlendirilmiş

Biçimlendirilmiş

Silinmiş: Sayfa Sonu

Silinmiş: ¶

Biçimlendirilmiş

Silinmiş: ¶

Silinmiş: ¶

Biçimlendirilmiş

Silinmiş: ¶

Silinmiş: ¶

Biçimlendirilmiş

Silinmiş: ¶

Silinmiş: ¶

Silinmiş: ¶

Biçimlendirilmiş

Silinmiş: ¶

Biçimlendirilmiş

Table 3.8. Unconditional Marshallian Prices and Expenditure Elasticities

	Sunflower Oil	Cottonseed Oil	Soybean Oil	Expenditure	$\sum\varepsilon + \eta$
Sunflower Oil	**-0.74**	-0.03	0.04	0.66	-0.07
Cottonseed Oil	-0.07	**-0.67**	0.04	0.63	-0.07
Soybean Oil	0.13	0.04	**-0.75**	0.64	+0.06

Note: first stage price and income elasticity is obtained from (Koç et al., 1998).
ε and η indicates price and income elasticities respectively. $\sum\varepsilon + \eta$ indicates the deviation from the homogeneity.

Table 3.9. Different Price and Income Elasticity of Oilseeds or Vegetable Oils.

Authors or Institutions	Own-Price	Income
Koç et al., 1998 (Cotton, Soybean, and Sunflower Oils)*	-0.72	0.65
FAO-WFM (Oils)	-0.30	0.60
FAO-WFM (Sunflower)	-0.85	1.04
FAO-WFM (Soybean)	-0.85	1.04
USDA (Soybean)	-0.42	
Çakmak (Sunflower)	-0.30	0.60
Çakmak (Soybean)	-0.30	0.60
Çakmak (Olive Oil)	-0.40	0.60
Kasnakoğlu Z. (Vegetable Oils)**		
-Urban	-0.09	0.16
-Rural	-0.21	0.39
-Turkey	-0.14	0.27

Source: Beghin (1997).
*It is refined oil equivalent and elasticities are calculated at the sample average over the period 1973 to 1996.
** It indicates that demand elasticities estimated from household consumption expenditure survey data.

Silinmiş: ——Sayfa Sonu——
Biçimlendirilmiş
Silinmiş: John C.

In equation [3.10], $Q^{Oil}_{s,i}$ is the supply of the i^{th} oil from the crush demand estimation of the i^{th} oilseed, and γ^{O}_{i} is the extraction rate for the i^{th} oil. Turkish production of major vegetable oils is displayed in Table 3.10

Silinmiş: ¶
¶

3.4 Crude Oil Import

Silinmiş: ¶

Because the international price is transmitted into the domestic market through a price transmission equation and stock demand is held constant at its average value, we clear the market for the i^{th} crude oil using the net import quantity. Net imports are calculated in equation [3.11] as the difference between total domestic demand and domestic supply. Table 3.11 provides Turkish import data for major vegetable oils since 1980.

Silinmiş: ¶

[3.11] $$Q^{Oil}_{IM,i} = Q^{Oil}_{d,i} - Q^{Oil}_{s,i}$$

Silinmiş: ¶

Silinmiş: ¶

Biçimlendirilmiş

Silinmiş: Sayfa Sonu

Table 3.10. Production of Major Vegetable Crude Oils

Year	Oil World Annual (Oct.-Sept.)			AERI (Sept.-Aug.)		
	Soybean	Cotton	Sunflower	Soybean	Cotton	Sunflower
1981/82		96.5	224.6			
1982/83	4.9	98.1	240.7			
1983/84	8.9	105.5	281.6			
1984/85	22.4	116.0	287.8			
1985/86	22.3	102.4	326.8			
1986/87	18.4	104.7	331.8			
1987/88	17.1	117.7	343.3			
1988/89	12.2	135.4	395.9			
1989/90	22.3	142.6	379.9			
1990/91	19.9	141.4	400.5			
1991/92	15.2	127.1	347.9			
1992/93	12.6	141.4	393.6			
1993/94	11.0	139.8	371.9			
1994/95	19.8	144.9	399.9			
1995/96	20.7	185.7	494.5	38	142	489
1996/97	26.6	186.0	491.9	50	166	447
1997/98	34.9	189.9	503.1	50	169	497
1998/99				54*	140*	576*

*Indicates the projected disappearance.

Silinmiş: ¶

Table 3.11. Imports of Major Vegetable Crude Oils

Year	Oil World Annual (Oct.-Sept.)			AERI (Sept.-Aug.)		
	Soybean	Cotton	Sunflower	Soybean	Cotton	Sunflower
1981/82	137.5	3.9				
1982/83	118.2	2.9	18.5			
1983/84	125.8	0.5	70.9			
1984/85	95.3		72.2			
1985/86	96.4	1.0	56.5			
1986/87	105.8	2.3	37.1			
1987/88	178.1	13.9	151.2			
1988/89	170.8	5.0	178.8			
1989/90	123.2	0.9	207.2			
1990/91	137.2	1.1	264.8			
1991/92	142.3	11.5	316.6			
1992/93	219.5	1.5	169.9			
1993/94	158.1	0.1	246.1			
1994/95	151.6	1.9	321.5			
1995/96	108.2	2.0	217.6	111	0	230
1996/97	158.2	2.5	193.5	153	0	227
1997/98	150.0	2.7	183.0	117	15	170
1998/99				125*	0*	130*

*Indicates the projected disappearance.

Silinmiş: ¶
Biçimlendirilmiş
Silinmiş: Sayfa Sonu

4. Oilseed Meal Supply, Demand and Trade

The demand for oilseed meal has been rising steadily over the last two decades in Turkey. This trend is readily apparent in the oilseed meal consumption data displayed in Table 4.1. The supply of oilseed meal is an important factor in the productivity growth and development of Turkey's livestock sector, and it will continue to be important to maintain an adequate supply of oilseed meal to meet the growing needs of Turkey's livestock producers. This chapter explains the methodology used in this study to derive the demand for oilseed meal from livestock supply estimates. The processes for calculating domestic meal supply from crush estimates and for projecting oilseed meal trade are also briefly discussed.

Table 4.1. Domestic Disappearance of Major Oilseed Meal

Year	Oil World Annual (Oct.-Sept.)			AERI (Sept.-Aug.)		
	Soybean	Cottonseed	Sunflower	Soybean	Cottonseed	Sunflower
1982/83	23.0	308.3	268.7			
1983/84	52.9	328.5	314.3			
1984/85	102.2	358.8	321.3			
1985/86	81.3	320.5	362.8			
1986/87	131.9	335.1	373.8			
1987/88	109.9	352.0	388.0			
1988/89	132.4	402.7	438.8			
1989/90	124.5	486.3	432.0			
1990/91	214.6	453.4	482.7			
1991/92	355.2	431.2	461.1			
1992/93	324.4	549.4	459.5			
1993/94	289.1	441.7	461.7			
1994/95	296.3	452.5	515.6			
1995/96	360.1	569.4	581.2	472	562	630
1996/97	425.3	593.6	565.0	573	686	558
1997/98	512.9	602.0	588.0	482	663	636

Silinmiş: ¶

Silinmiş: ¶

Biçimlendirilmiş

4.1. Soybean Meal Demand

Silinmiş: ¶

The broiler and egg sector are the primary users of soybean meal in Turkey; thus, we derive the soybean meal demand in the simulation period from the broiler and egg supply estimates. Meal demand projections are derived using estimates of the feed efficiency and soybean meal share of broiler rations. These parameters were obtained from the "Livestock Supply and Feed Demand in Turkey" (Yurdakul et al., 1999). These coefficients were inserted into equation [4.1] to calculate the projected demand for soybean meal in Turkey.

Silinmiş: ¶

[4.1] $$Q^{SK}_{d,t} = \left(Q^{Y}_{s,t} \cdot \lambda^{YEK}_{t} \cdot \rho^{SK}_{t}\right) + \left(Q^{B}_{s,t} \cdot \lambda^{BEK}_{t} \cdot \rho^{SK}_{t}\right)$$

Silinmiş: ¶

In equation [4.1], Q^{SK}_{d} is the soybean meal demand, the λ's are the feed efficiency coefficients, and the ρ's are the share of soybean meal in broiler and egg feeds. Q^{Y}_{s} is the egg supply and Q^{B}_{s} is the broiler supply. The feed efficiency coefficients are treated as constants in equation [4.1], but we allow the share of soybean meal in broiler and layer rations to change in accordance with feed prices and technical substitution relationships obtained from Yurdakul et al. (1999).

Biçimlendirilmiş

Silinmiş: ¶

4.2. Demand for Cottonseed and Sunflower Seed Meal

Silinmiş: ¶

The beef cattle, dairy, and sheep and goat sectors feed more cotton and sunflower meal than the poultry sector; consequently, we estimate demand for these meals from the beef, milk and mutton supply. Equation [4.2] is used for derive both cottonseed and sunflower seed meal demands. The feed efficiency coefficients and ration information were taken from the study by Yurdakul et al. (1999).

Silinmiş: ¶

[4.2] $$Q^{PK}_{d,t} = \left(Q^{Se}_{s,t} \cdot \lambda^{EEK}_{t} \cdot \rho^{PK}_{t}\right) + \left(Q^{Ke}_{s,t} \cdot \lambda^{KEK}_{t} \cdot \rho^{PK}_{t}\right) + \left(Q^{Sut}_{s,t} \cdot \lambda^{SEK}_{t} \cdot \rho^{PK}_{t}\right)$$

Silinmiş: ¶

In equation [4.2], Q^{Se}_{s} is the beef supply, Q^{Ke}_{s} is the mutton supply, and Q^{Sut}_{s} is the milk supply. The λ's are the feed efficiency coefficients, and the ρ's are the share of cottonseed meal or sunflower meal in beef cattle, dairy cow, dairy sheep, and fed sheep feed rations. As with the soybean meal demand equation, the feed efficiency coefficients are treated as constants in equation [4.2], but the share of oilseed meal in ruminant rations is allowed to change as relative feed prices fluctuate. Projections for the supply of livestock and poultry products needed to calculated oilseed meal demands are obtained from the Turkish Agricultural Policy Analysis Model (TAPAM) (Koç et al. 1998).

Silinmiş: ¶
Sayfa Sonu

4.3. Domestic Oilseeds Meal Supply

Silinmiş: ¶

Table 4.2 displays the domestic production of major oilseed meals in Turkey over the last two decades. In general, the domestic supplies of cottonseed meal and sunflower seed meal have kept pace with the growth in domestic consumption. The supply of soybean meal, however, has fallen increasingly short of the requirements by poultry and egg producers. These trends are reflected in the oilseed meal import levels shown in Table 4.3.

Silinmiş: ¶

This study derives the domestic supply of oilseed meal in the simulation period from the crush demand estimates for each oilseed. Equation [4.3] shows that the domestic supply of oilseed meal i $\left(Q^{K}_{s,i}\right)$ is the product of the crush demand $\left(Q^{PR}_{d,i}\right)$ and the meal extraction rate $\left(\gamma^{m}_{i}\right)$.

Silinmiş: ¶

Biçimlendirilmiş

[4.3] $$Q^{K}_{s,i} = Q^{PR}_{d,i} \cdot \gamma^{m}_{i}$$

Silinmiş: ¶

4.4. Import Supply of Oilseeds Meal

Silinmiş: ¶

As mentioned in Chapter 2, the international prices for oilseed meals are transmitted into the Turkish domestic market through price transmission equations. Moreover, stock demands for oilseed meals are assumed to remain constant at their average level over the last five years. Consequently, we project the net import quantity of the i^{th} oilseed meal $\left(Q^K_{IMs,i}\right)$ in equation [4.4] as the excess demand on the domestic market.

[4.4] $$Q^K_{IMs,i} = Q^K_{d,i} - Q^K_{s,i}$$

Silinmiş: ¶

Biçimlendirilmiş

Silinmiş: ——Sayfa Sonu——

Biçimlendirilmiş

Table 4.2. Production of Major Oilseed Meal

Year	Oil World Annual (Oct.-Sept.)			AERI (Sept.-Aug.)		
	Soybean	Cottonseed	Sunflower	Soybean	Cottonseed	Sunflower
1981/82		305.1	250.7			
1982/83	23.0	310.3	268.7			
1983/84	40.8	333.5	314.3			
1984/85	101.1	366.7	321.3			
1985/86	100.8	323.7	364.8			
1986/87	83.6	331.1	370.3			
1987/88	77.4	372.0	383.3			
1988/89	55.5	428.0	442.0			
1989/90	101.1	450.3	424.0			
1990/91	90.5	447.2	447.0			
1991/92	69.1	401.9	388.3			
1992/93	57.2	446.9	439.4			
1993/94	49.8	442.0	415.2			
1994/95	89.5	458.2	446.4			
1995/96	93.4	587.0	552.0	154	576	600
1996/97	120.8	588.0	549.1	202	675	545
1997/98	157.9	600.3	561.6	203	676	606

Table 4.3. Imports of Major Oilseed Meal

Year	Oil World Annual (Oct.-Sept.)			AERI (Sept.-Aug.)		
	Soybean	Cottonseed	Sunflower	Soybean	Cottonseed	Sunflower
1986/87	49.0	4.4	4.0			
1987/88	35.0	2.0	4.7			
1988/89	79.4		1.6			
1989/90	34.3	44.0	8.0			
1990/91	156.1	15.2	35.7			
1991/92	266.6	34.8	72.8			
1992/93	324.2	112.1	20.2			
1993/94	189.2	14.9	50.9			
1994/95	205.1	12.3	72.6			
1995/96	286.3		36.1	321	7	31
1996/97	343.2	16.5	25.1	375	24	27
1997/98	375.0	18.0	34.0	284	1	30

Biçimlendirilmiş

Silinmiş: ¶

5. Oilseed Domestic Supply Estimation

This study estimates the supply of oilseeds in terms of area and yield response. Cottonseed and sunflower seed areas were estimated as part of an crop area allocation model. The advantages of the area allocation model are that area substitution relationships among crops may be included and that theoretical restrictions derived from standard microeconomic theory can be imposed on the model. Soybean area was not included in the crop allocation model because its share of total cropped area in Turkey is extremely small. Moreover, soybean production is concentrated in the Çukurova region of Turkey, and expansion of soybean area in other regions of Turkey is limited because of the relative low yields. This chapter outlines the development and estimation of the area allocation model. The estimation results of a Nerlovian adaptive-expectations model for soybean area is also presented. Finally, equations used to estimate oilseed yields are discussed.

5.1. Field Crops Area Allocation Model

Following Barten and Vanloot (1996) and Holt (1998), the acreage allocation model is based on the assumption that a representative farmer makes decisions about which crops to grow in a manner similar to that of an investor determining the composition of an investment portfolio. In other words, the representative farmer maximizes the certainty equivalent (CE) profit subject to a total land constraint. Output price uncertainty and yield uncertainty are the important risk factors in agriculture.

Although Turkey's field crop production is diversified–including food grains, feed grains, industrial crops, oilseeds, tuber crops and others–five crops (wheat, barley, cotton, sunflower, lentils, and chickpeas) constitute approximately 85 percent of the total field crop area planted from 1993-97. The wheat and barley shares of total field crop area planted are about 52 and 18 percent, respectively. The shares for chickpeas, lentils, cotton, and sunflowers are 4.3, 3.8, 3.3, and 3.1 percent respectively. The annual average of total field crop area planted during the 1993-97 period is 18,664,000 hectares. The total field crop planted area during the 1970-80 period was almost constant (the annual average is 16,415,000 hectares), but it has increased since 1982, due to the decline in a follow land area. The increase of total field crop area was 13.7 percent from the 1975-79 to the 1993-1997 period. The change in planted area is largely the result of a research and extension project on the utilization of fallow areas initiated in 1982.

The acreage allocation system used in this study includes six major crops (MCR): wheat, barley, cotton, sunflower, lentils, and chickpeas. Maize, sugar beets, tobacco, potatoes, dry beans, rye, and oats are the primary crops included in the other crops (OC) category. The share of other crops accounts for 15 percent of total planted area. The area planted to maize includes both first-crop maize production and maize production after wheat. Time series statistics are not available that separate the area planted for maize into first and second crop plantings. Moreover, it is not reasonable to include maize in the supply system because first-crop maize production must be a substitute for wheat, while second crop maize must be a complement to wheat. Consequently, maize is not included in the supply system.

Sugar beets were also excluded from the supply system because producers are not able to shift from one crop to another in the short run. Area restrictions placed on sugar beet producers that are under contract with processing plants operated by state-owned companies and state-regulated cooperatives. As part of the contract, the processor prescribes the optimal crop rotation for the region, sowing sugar beets on a field once every three or four years. Crop rotations commonly include wheat and other cereals, pulses, fodder crops, and sunflowers. Tobacco is also produced under the state monopoly regulation, so producers are not free to produce more tobacco, even if they enjoy higher gross returns from tobacco production relative to other crops. Tobacco is not included in the supply system because of this regulation. Rye, oats, rice, potatoes and dry beans are largely produced in isolated regions rather than throughout Turkey. These commodities are not significant substitutes or complements for MCR.

Silinmiş: ¶

The main agricultural support measures for crops in Turkey are producer support prices and input subsidies (fertilizer, seed, low interest agricultural credit, etc.). In addition to these policies, import restrictions and export subsidies have been applied to MCR. On average, price supports constitute the largest part of agricultural support measures (Yildirim et al. 1998). The Soil Product Office (TMO) was delegated to purchase wheat, barley, and some others crops at a fixed minimum price (that is, a floor price). The TMO is also a price stabilizing institution because it carries a buffer stock in order to stabilize producer and consumer prices. The buffer stocks of wheat exceeded 25 percent of the production in 1990.

Silinmiş: ¶

The different state-operated Agricultural Sales Cooperatives and their Unions (ASCUs) make support purchases for cotton, sunflower, lentils, chickpeas and some others crops at support prices. The government (Council of Ministers) determines the support prices of these commodities. During the data period under consideration (1970-96), wheat, barley, sunflowers and cotton benefited in some years from producer support and subsidies for important inputs, such as for fertilizer. Lentils and chickpeas were also supported in some years by the TMO, but these commodities are primarily purchased and marketed by ASCUs . Currently, fertilizer support prices are in effect for all of the crops at the same rate. Among the MCR, producer support prices are now in effect only for wheat and barley. Beginning in 1993, cotton producers became eligible to receive a deficiency payment equal to the difference between the target price and their selling price.

Silinmiş: ¶
¶

The government announces crop support and purchase prices after or during the harvest time, thus it is logical to assume that producers make allocation decisions based on past input and output prices and marketing conditions. Although the support price is high relative to prices for substitute crops, producers also consider marketing conditions, such as terms of payment for their product. In some years, producers received their payments two to three months later than the delivery time because government purchasing agencies do not explain the exact terms of payment when the price is announced. This payment condition can also affect the producer's acreage allocation decision. Given this specific market information, the crop area allocation model is specified using the following short-run dynamic form:

[5.1] $$\upsilon_i = b_i + \nu_{i,t-1}\sum_{j=1}^{6} s_{ji} r^{e}_{j,t-1} + \Theta D + \Psi T + \Phi FL + \varepsilon_i$$

Silinmiş: ¶

Biçimlendirilmiş

for *i,j* = wheat, cotton, sunflowers, barley, lentils and chickpeas),

Silinmiş: ¶

In the equation [5.1] r^e is the gross-return of the j^{th} crop, and the dependent variable is the i^{th} crop's share of total MCR area. The dynamic term (ν_i) was added to this system as an explanatory variable that represents crop rotation. Also, the second lag of the own-share is included in both the lentil and chickpea equations. *D* is a dummy variable used in the wheat and sunflower equations (*D* = 1 after 1980) that takes into account the area use shift due to irrigation investments, other uses for wheat, and marketing conditions for sunflower producers. *T* is a time trend used in the cotton equation, and *FL* is a fallow land variable employed in the barley, lentils, and chickpea equations.

Maintaining symmetry restrictions, equation [5.1] was estimated using three-stage least squares. To avoid singularity in the system, the other crop (OC) share equation was dropped from the supply system. Homogeneity was not imposed because an estimate of gross-returns for the omitted equation (OC) was lacking, but all of the prices are deflated by wholesale price index (WPI). It is assumed that the dummy variable, time trend, and dynamic trend variables are proxies for the gross-returns of the excluded equation. One could compute a price index for the omitted crops with the appropriate aggregation assumption, but the primary objective of this study is to set a baseline projection. This task requires a commodity price projection for the baseline. Given the lack of the price projections for some of the commodities, such as tobacco, dry beans, and potatoes, the authors opted to forgo computing a price index for the excluded crops.

Using data published by the SIS (1998, 1996) for area planted to crops, yields, production, prices, and price indices, equation [5.1] was estimated, and the results are presented in Table 5.1. Most of the coefficients are significant at the 5 percent and 10 percent levels. The R^2 indicates that the model fit is adequate for each individual equation. The Durbin-Watson and Durbin (h) statistics indicate that there is no evidence of serial correlation. All of the own-return coefficients are significant, and they have the expected signs. Furthermore, most of the cross-return relationships between crops are the expected direction, and their respective coefficients are significant. The fallow land coefficient is negative, as we expected, because barley, lentils, and chickpeas are mostly grown in dry areas in rotation with other crops such as wheat. Farmers have reduced their fallow land by rotating crops mostly with lentils, chickpeas, and barley since 1982.

Silinmiş: ¶

As we expected, the coefficients on the second lag of the lentil and chickpea share also have negative signs because farmers do not plant lentils or chickpeas back-to-back in dry areas. The dummy variable has a negative sign in the wheat equation and a positive sign in the sunflower equation. The sign of the wheat dummy is consistent with what was expected because irrigated area has rapidly expanded since the 1980s, and non-farm use of land has also increased rapidly. Input-intensive crops such as cotton, vegetables, and fruits are more profitable in the irrigated area than wheat. As we mentioned above, wheat is produced throughout Turkey. The positive sign on the dummy variable in the sunflower share equation may be due to the marketing guarantee farmers receive from the state controlling institution.

Silinmiş: ¶

Price and scale elasticities can be calculated using the following formulae.

Silinmiş: ¶

Biçimlendirilmiş

[5.2] $$\varepsilon_{ij} = \frac{\partial a_i}{\partial P_j^e}\frac{P_j^e}{a_i} = r_j^e \frac{s_{ij}}{v_i}, \forall i, j$$ (price elasticity)

Silinmiş: ¶

Table 5.1. Parameter Estimates of the Area Planted Share of Crops, 1970 to 1996

	Share of Wheat	Share of Cotton	Share of Sunflowers	Share of Barley	Share of Lentils	Share of Chickpeas
Constant	0.24	0.040	0.013	0.14	0.053	0.019
	(6.4)*	(15.8)*	(4.1)*	(3.5)*	(5.5)*	(6.2)*
Own share [t-1]	0.59		0.37	0.37	0.85	1.07
	(8.5)*		(3.6)*	(2.2)*	(7.6)*	(11.0)*
Own share[t-2]					-0.40	-0.25
					(-5.5)*	(-2.7)*
Ln GR_w [t-1]	0.055	-0.015	-0.015	-0.032	0.001	-0.0019
	(4.4)*	(-3.9)*	(-4.2)*	(-3.8)*	(0.03)	(-0.8)
Ln GR_c[t-1]	-0.015	0.016	0.001	0.0001	-0.002	-0.0008
	(-3.9)*	(6.8)*	(0.7)	(0.02)	(-1.23	(-0.9)
Ln GR_s[t-1]	-0.015	0.0012	0.004	0.009	0.0003	0.0029
	(-4.2)*	(0.7)	(2.0)**	(3.0)*	(0.2)	(3.0)*
Ln GR_b[t-1]	-0.032	0.0001	0.009	0.029	-0.085	0.0001
	(-3.8)*	(0.02)	(3.0)*	(3.4)*	(-2.7)*	(0.03)
Ln GR_l[t-1]	0.0005	-0.0018	0.0003	-0.008	0.008	-0.0018
	(0.03)	(-1.2)	(0.2)	(-2.7)*	(3.2)*	(-1.9)**
Ln GR_{ch}[t-1]	-0.0019	-0.0008	0.003	0.0001	-0.0018	0.0044
	(-0.8)	(-0.9)	(3.0)*	(0.03)	(-1.9)**	(5.3)*
Time trend		-0.0005				
		(-6.8)*				
Fallow land				-0.00001	-0.00001	-0.000002
(1000 hectare)				(-2.4)*	(-5.5)*	(-6.7)*
Dummy	-0.021		0.007			
	(-6.73)*		(5.3)*			
Adjustment coefficient	0.41		0.63	0.63	0.55	0.18
DIAGNOSTIC						
R^2	0.89	0.81	0.78	0.68	0.95	0.99
D-W		2.03				
D(h)	0.33		0.42	0.18	0.13	0.55

The GR_w, GR_c, GR_s, GR_b, GR_l , and GR_{ch} indicate wheat, cotton, sunflower, barley, lentils and chickpeas respectively. The crops in the table account for 85 percent of the total planted field crops area.
In the parenthesis are t values. * and ** indicate that coefficient is significant at 5 percent and 10 percent level respectively

Silinmiş: Sayfa Sonu
Biçimlendirilmiş
Silinmiş: e
Biçimlendirilmiş
Silinmiş: a
Biçimlendirilmiş
Silinmiş: p
Biçimlendirilmiş
Silinmiş: s
Biçimlendirilmiş
Silinmiş:
Biçimlendirilmiş
Silinmiş: c
Biçimlendirilmiş
Silinmiş: ¶

[5.3] $$\eta_i = \frac{\partial a_i}{\partial a_{tot}} \frac{a_{tot}}{a_i} = \frac{b_i}{v_i}, i = 1,\ldots, n$$ (scale elasticity)

Biçimlendirilmiş

Silinmiş: ¶

Elasticities were calculated using the average values of variables over the last five years and are presented for significant parameters in Table 5.2. All of the own-price elasticities have the correct sign, and the cross-price elasticities have the expected signs. If we assume that yield is invariant to price changes, the respective supply elasticity is the own-price or cross-price elasticity for acreage. When the model is run for the policy simulation, it is possible to derive output elasticities with respect to prices or gross-returns of crops from the model. The supply response should be greater than the acreage elasticity (Sadoulet and Janvry, 1995). The dominance of small farms and varying climatic conditions across regions are the primary factors that may explain the inelastic acreage response elasticities for crops in Turkey. For example, in Turkey the small-scale farm's wheat production is mostly for consumption by the farm's residents (Bayaner, 1995). In the case of cotton and sunflowers, climatic conditions are very important in determining the maximum quantity of the area planted to these crops. In addition to these factors, asset fixity may also explain the observed inelasticity of supply in agriculture (Gürkan, 1979; Just, 1993).

Silinmiş: ¶

Except for the barley-sunflower and sunflower-barley cross elasticities, all of the cross elasticities have the expected sign. In recent years, barley planted area has substantially increased, particularly in sunflower growing regions (the European part of Turkey). The data from the SIS indicates that barley area planted in this region has increased from 25 thousand hectares during the 1980-82 period to 90,000 hectares during the 1995-97 period. This European part of Turkey boasts a 60 percent share of total sunflower planted area in recent years. In this region, barley planted area is approximately 25 percent of sunflower planted area in recent years, while the sunflower area has also expanded in this region. It is possible that some of the farmers in this sunflower growing region, at least in the last decade, rotate sunflowers with barley. If this is true, the complementary relationship is not surprising. It is also possible that this complementary rotation relationship exists in some other provinces.

Silinmiş: ¶

5.2 Soybean Area Estimation

Silinmiş: ¶

Like the other oilseeds and major crops, soybean supply is calculated as the product of area planted and yield. Consequently, we also specified an area and yield response model for soybeans. An adaptive-expectations supply model was used to determine soybean area, where the expected price in the current period is equal to the realized price in the previous period. The model was estimated using ordinary least squares, and the estimation results are shown in Table 5.3.

Silinmiş: ¶

Table 5.2. Long-Run Area Response Elasticity of Crops with Respect to Gross Returns

	Wheat	Cotton	Sunflowers	Barley	Lentils	Chickpeas
Wheat	**0.26**	-0.07	-0.07	-0.15	+	-
Cotton	-0.45	**0.47**	+	+	-	-
Sunflower	-0.75	+	**0.22**	0.47	+	0.15
Barley	-0.28	+	0.25	**0.25**	-0.07	+
Lentils	+	-	+	-0.41	**0.39**	-0.09
Chickpea	-	-	*0.38*	+	*-0.24*	**0.57**
Scale elasticity (sr)	*0.47*	*1.21**	*0.41*	*0.74*	*1.39*	0.43
Scale elasticity (lr)	1.16		0.65	1.18	2.53	2.39
Share 1	0.531	0.039	0.027	0.174	0.022	0.019
Share 2	0.515	0.033	0.031	0.186	0.038	0.043

Indicates scale elasticity. + and - indicates the direction of relationships between crops. Because the coefficients are not statistically significant, the cross-price elasticity for these crops are not presented. Note: Elasticities were calculated from the average of the last five-year sample. Share 1: average of sample periods, Share 2: average of last five years.

5.3 Fallow Land and Yield Estimation

Equation [5.1] included yield (gross-return = yield multiplied by producer price), total area planted to field crops, and fallow land area. To obtain the future values of these variables, we specified and estimated equations for total field crop planted area, fallow land, and yields. The yield equations are specified as a function of a time trend and dummy variable (rainfall and weather conditions). Total field crop planted area is specified as a function of its own-lag and fallow land. The fallow land equation is further specified as a function of its own-lag and a time trend variable. The yield equations were estimated using a log-linear form and ordinary least squares (OLS). The total field crop planted area and fallow land equations were estimated in a double-log form using OLS. The estimation results for the total area and fallow land equations are shown in Tables 5.4 and 5.5. Yield equation estimates are presented in Tables 5.6 – 5.11.

Silinmiş: O
Biçimlendirilmiş
Silinmiş: W
Silinmiş: T
Biçimlendirilmiş
Biçimlendirilmiş
Biçimlendirilmiş

Silinmiş: ¶
adaptive-expectations supply model was used to determine soybean area, where the expected price in the current period is equal to the realized price in the previous period. The model was estimated using ordinary least squares, and the estimation results are shown in Table 5.3. ¶
¶

Silinmiş: ¶
Silinmiş: ¶
Silinmiş: ¶

Biçimlendirilmiş

Table 5.3. Parameter Estimates of the Area Planted to Soybean, 1982 to 1997

Independent variables/Dependent variables	Ln (Area sown)
Constant	7.92
	(4.39)
Dependent variable [t-1]	0.28
	(1.75)
Ln (Soybean/Maize producer price ratio) [t-1])	0.47
	(2.7)
Dummy 1 (D= 1, for 1986 and 1987; price shock)	*0.82*
	(3.9)
DIAGNOSTIC	
R^2	0.86
Adjusted R^2	0.82
D.W	2.08
F	20.4
Theil (U)	0.55
Short-run elasticity with respect to price ratio	**0.47**
Long-run elasticity with respect to price ratio	**0.65**

Note: t-value in parentheses.

Table 5.4. Parameter Estimates of the Area Planted to Field Crops, 1976 to 1997

Independent variables / Dependent variables	Ln (Area Sown)
Constant	10.1
	(20.6)
Ln (Dependent variable[t-1])	0.000035
	(4.7)
Ln (Fallow Land)	-0.10
	(-2.5)
DIAGNOSTIC	
R^2	0.96
Adjusted R^2	0.95
D(h)	0.44
F	185.0
Theil (U)	0.77

Biçimlendirilmiş

Table 5.5. Parameter Estimates of the Fallow Land, 1976 to 1996

Independent variables/Dependent variables	Ln (Fallow Land)
Constant	5.47
	(2.37)
Ln (Dependent variable[t-1])	0.50
	(2.44)
Ln (Time trend)	-0.37
	(-2.18)
DIAGNOSTIC	
R^2	0.91
Adjusted R^2	0.90
D(h)	1.49
F	81.4
Theil (U)	0.80

Silinmiş: ¶
¶
Sayfa Sonu

Biçimlendirilmiş

Table 5.6. Parameter Estimates of the Soybean Yield, 1982 to 1997

Independent variables/Dependent variables	Ln (Yield)
Constant	4.03
	(13.9)
Dependent variable [t-1]	0.47
	(12.6)
Ln (Soybean producer price/WPI, [t-1])	0.25
	(3.29)
DIAGNOSTIC	
R^2	0.94
Adjusted R^2	0.92
D(h)	1.39
F	79.5
Theil (U)	0.34
Short-run own-price elasticity	**0.25**
Long-run own-price elasticity	**0.47**

Silinmiş: ¶
¶

Biçimlendirilmiş

Table 5.7. Parameter Estimates of the Wheat Yield, 1980 to 1997

Independent variables/Dependent variables	Ln (Yield)
Constant	7.52
	(275.7)
Time trend	0.0089
	(2.99)
Dummy (D=1, for 1989 and 1994)	-0.15
	(-3.72)
DIAGNOSTIC	0.89
R^2	0.57
Adjusted R^2	0.51
D.W	1.74
F	8.68
Theil (U)	0.44

Silinmiş: ¶
¶
¶
¶
Sayfa Sonu

Biçimlendirilmiş

Table 5.8. Parameter Estimates of the Cotton Yield, 1980 to 1997

Independent variables/Dependent variables	Ln (Yield)
Constant	6.58
	(207.9)
Time trend	0.0247
	(7.55)
DIAGNOSTIC	2.47
R^2	0.80
Adjusted R^2	0.79
D.W	2.07
F	56.95
Theil (U)	0.66

Silinmiş: ¶
¶
¶

Biçimlendirilmiş

Table 5.9. Parameter Estimates of the Sunflower Yield, 1980 to 1997

Independent variables/Dependent variables	Ln (Yield)
Constant	7.08
	(207.1)
Time trend	0.0166
	(4.38)
Dummy (D2=1, for 1989 ;drought)	-0.18
	(-3.33)
Dummy (D3=1, for 1990 and 1994:	0.15
	(2.22)
DIAGNOSTIC	1.66
R^2	0.72
Adjusted R^2	0.66
D.W	1.93
F	10.49
Theil (U)	0.42

Silinmiş: ¶

Silinmiş: ¶
¶
Sayfa Sonu

Biçimlendirilmiş

Table 5.10. Parameter Estimates of the Barley Yield, 1980 to 1997

Silinmiş: ¶
¶

Biçimlendirilmiş

Independent variables/Dependent variables	Ln (Yield)
Constant	7.58
	(291.3)
Time trend	0.0065
	(2.42)
Dummy (D2=1, for 1989:drought)	-0.46
	(-9.04)
DIAGNOSTIC	0.65
R^2	0.87
Adjusted R^2	0.85
D.W	1.81
F	42.26
Theil (U)	0.23

Silinmiş: ¶

Table 5.11. Parameter Estimates of the Chickpea Yield, 1980 to 1997

Silinmiş: ¶
Sayfa Sonu

Biçimlendirilmiş

Independent variables/Dependent variables	Ln (Yield)
Constant	7.03
	(152.6)
Time trend	-0.014
	(-2.94)
Dummy (D2=1, for 1989; drought)	-0.16
	(-1.78)
DIAGNOSTIC	-1.4
R^2	0.50
Adjusted R^2	0.42
D.W	1.59
F	6.4
Theil (U)	0.68

6. Macroeconomic Assumptions, International Prices, Oilseeds, Other Major Crops and Livestock Baseline Projections

This chapter presents the baseline assumptions and projections for exogenous variables such as population, the wholesale price index (WPI), consumer price index (CPI), per capita gross domestic product (GDP), exchange rate (Turkish Liras / U.S. Dollars), and international commodity price projections. These exogenous variables are placed in the model described in Chapters 2-5 to establish a set of baseline projections for oilseed supply and use in Turkey. In addition, the TAPAM model is used to establish a supply baseline for livestock and major crops. The first section briefly describes how the components of the oilseed model are connected and influenced by exogenous policy and macroeconomic variables. This is followed by a description of the macroeconomic assumptions. We conclude with a presentation of the baseline projections that will be used as a point of comparison for scenarios described in the following chapter.

Silinmiş: ¶

6.1 Model Linkages

Silinmiş: ¶

Figure 6.1 provides a basic sketch of the flow of information and connections between components in the simulation model employed in this study. The most influential set of exogenous variables are the macroeconomic and the international price price forecasts. The macroeconomic variables, such as the WPI, CPI, exchange rate, population, and per capita GDP influence the supply and demand equations through their impacts on real prices and income. Thus, the macroeconomic projections enter into each of the supply and demand components of the oilseed and TAPAM models. International price projections are used in some instances to project domestic prices through the price transmission equations described in Chapter 2. Through domestic prices, these international price projections are primary drivers in both supply and demand decisions. The second set of exogenous variable influencing the oilseed and TAPAM models are the domestic agricultural and food policies. These include the tariffs and other border measures that restrict Turkish trade in agricultural products. The primary agricultural policies included in the oilseed model are the import tariffs, which have a significant impact on both domestic supply and demand for oilseeds and oilseed products through their role in the link between domestic and international prices.

Silinmiş: ¶

Silinmiş: 45¶

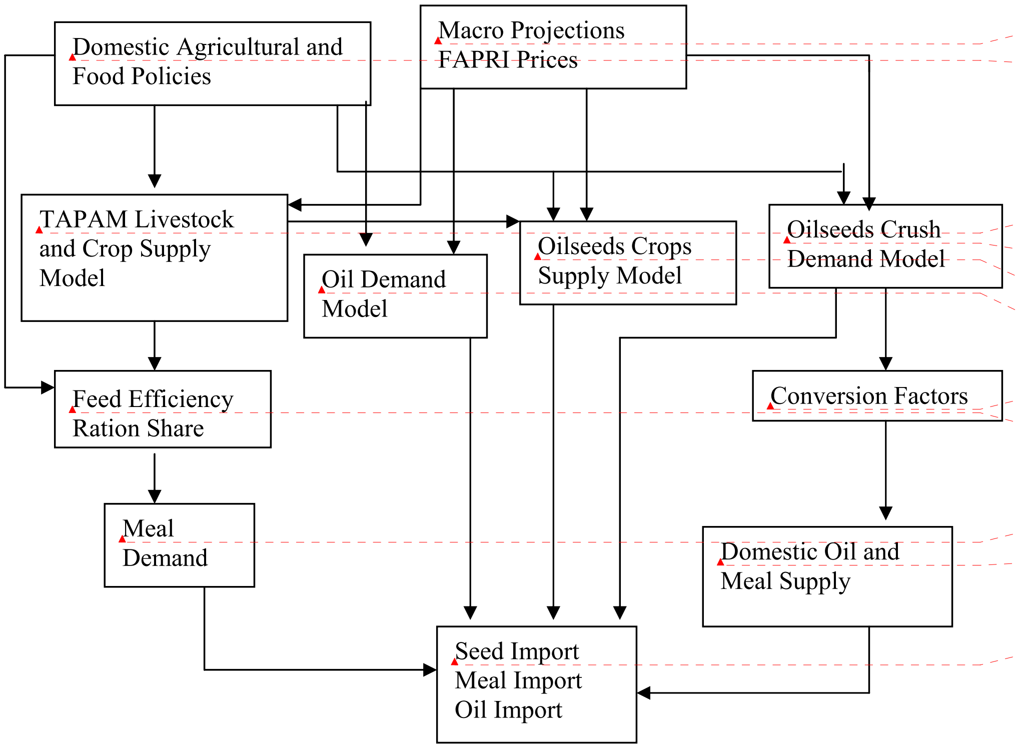

Figure 6.1. Oilseed Model Linkages and Information Flow

Given a set of macroeconomic and international price projections and agricultural policy variables, the crush demand model described in Chapter 2 determines the quantity of each oilseed required for domestic production of oil and oilseed meal. This demand for oilseeds is passed on to the market clearing identity that calculates oilseed imports. The supply of oilseeds is projected by the acreage allocation system and yield equations descibed in Chapter 5. Cottonseed and sunflower seed acreage is computed in the TAPAM model, which contains the acreage allocation system, and the soybean area is computed in the the oilseed supply component. These areas are combined with projected yields to determine domestic oilseed production in Turkey. Total oilseed supply is also sent to the market clearing identity, and the difference between the demand and supply for each oilseed determines the net import level.

As decribed in Chapter 3, the crush demand equations also determine oil and meal supply via the assumed extraction rates. These supplies are also forwarded to the market clearing identity to facilitate the calculation of oil and meal net imports. Oil demand is calculated from the demand system described in Chapter 3, and Turkey's net oil imports are equal to excess demand. Likewise oilseed meal demand is computed from the TAPAM livestock production levels using to the equations described in Chapter 4. Oil meal net imports are also defined as the excess demand for meal.

6.2 Macroeconomic Data and International Price Projections

Silinmiş: ¶

Macroeconomic variables (GDP, CPI, WPI, exchange rates) were obtained from the March 1999 WEFA report. Our baseline assumptions for annual population growth are 1.7, 1.5, 1.4, and 1.3 for the periods 1990-1997, 1997-2000, 2001-2005 and after 2005, respectively. Baseline international price projections were obtained from the Food and Agricultural Policy Research Institute's (FAPRI) 1999 *World Agricultural Outlook*. Baseline population, macroeconomic variables, and international price projections are given in Table 6.1.

Silinmiş: ¶

Biçimlendirilmiş

The domestic wholesale equivalent of international oilseed and oilseed product prices are presented in the Table 6.2. The formula for the transmitting international prices to domestic prices are given in Chapter 2. Transportation cost, insurance, handling, and other costs associated with moving oilseeds and oilseed products from Rotterdam to the domestic wholesale market are given in the Appendix. Relevant tariff rates for oilseed and products are given in Chapter 1. Wheat, barley, corn, and cotton prices are transmitted through price transmission equations. Estimated price transmission equations are not given in this report, but they are available in Koç et al. (1998). The estimated price transmission elasticities lie between 0.97 and 1.04. Statistical tests suggest that estimated elasticities are not statistically different from one. These elasticities confirm that domestic prices change proportionally with international prices.

Silinmiş: s

Silinmiş: ¶

6.3. Oilseeds Supply and Use Baseline Projections

Silinmiş: ¶

Tables 6.3 and 6.4 display the oilseed supply and use baseline projections. Other oilseed use was assumed to be 85 and 55 tmt, respectively, for cottonseed and sunflower seed, the average levels over the last five years. Other use for soybeans was estimated from the broiler supply model using a fullfat soybean share in broiler feed ration of 10 percent.

Silinmiş: s

Table 6.1. Population, Macroeconomic Variables and International Prices

Population and Macroeconomic Variables	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Population	63819	64776	65748	66668	67702	68548	69508	70481	71397	72325	73265
Percapita GDP (at 1987 price)	1869	1899	1984	2083	2187	2299	2414	2535	2661	2794	2934
						Percentage Change from Previous Year					
WPI (1968=100)	74.0	55.0	35.0	25.0	20.5	17.0	14.5	14.5	14.5	14.5	14.5
CPI (1968=100)	86.6	60.0	40.0	30.0	25.5	22.0	19.5	19.5	19.5	19.5	19.5
Exchange Rate (U.S. Dolar / TL)	71.7	59.1	38.4	28.3	23.7	20.1	17.6	17.6	17.6	17.6	17.6
International Prices						**U.S. Dollars Per Metric Tons**					
Sunflowerseeds (CIF Lower Rhine)	309	275	251	251	252	252	250	251	250	250	249
Sunflower Oil (CIF Rotterdam)	103	83	84	88	91	94	96	99	101	103	104
Sunflower Meal (CIF Northwest Europe)	730	609	584	579	566	550	535	532	526	529	534
Soybean (CIF Rotterdam)	258	230	215	218	223	226	227	231	233	237	238
Sobean Oil (CIF Rotterdam)	197	148	148	154	161	168	172	177	181	185	187
Soybean Meal (FOB Rotterdam)	633	571	566	564	555	543	533	532	529	533	540
Wheat (FOB, U. S Gulf)	143	121	135	142	146	150	155	159	163	164	165
Wheat (CIF Rotterdam)	168	142	159	167	172	176	183	187	191	192	194
Barley (FOB Pasicific Nortwest)	116	108	110	111	113	116	119	121	123	124	126
Barley (EU Intervention ECU/Tone)	137	140	142	143	143	144	144	144	144	145	145
Corn (CIF Rotterdam)	123	105	108	111	113	116	120	122	125	127	129
Corn (FOB U.S. Gulf)	109	94	97	99	101	104	107	109	111	113	115
Cotton Lint (CIF North Europe)	1591	1278	1231	1218	1280	1356	1419	1471	1521	1565	1604
Beef (AU Export)*	173	203	224	240	251	246	240	231	227	235	249
Lamb (AU Saleyard, AU Cent/Kg)**	172	177	184	191	199	206	213	220	227	235	242
Wool (AU AU Cent /Kg)**	341	289	257	238	227	221	219	219	221	224	228

*CIF Price at U.S. Port (U.S. Dollar per 100 kg), ** AU is the abbreviation for Australia.

Silinmiş: ¶
¶
<sp> Table 6.1 Population, Macroeconomic Variables and International Prices

Biçimlendirilmiş

Silinmiş: eh

Silinmiş: n

Biçimlendirilmiş

Silinmiş:

Silinmiş: of

Silinmiş: 45¶

Table 6.2 Domestic Prices Baseline Projections

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
International Prices at Domestic Wholesale Level						**U.S Dollars per Metric Tons**					
Coottonseed Oil (CIF Rotterdam)	837	760	743	740	731	720	710	707	703	705	709
Sunflowerseeds (CIF Lower Rheine)	432	387	356	357	358	358	356	356	355	355	354
Sunflower Oil (CIF Rotterdam)	1045	875	841	835	817	794	774	769	761	765	771
Sunflower Meal (CIF Northwest Europe)	139	118	120	123	126	130	132	134	136	139	140
Soybean (CIF Rotterdam)	292	264	249	252	257	260	261	265	267	271	272
Sobean Oil (CIF Rotterdam)	744	675	669	667	657	643	632	631	627	632	640
Soybean Meal (FOB Rotterdam)	237	187	186	193	200	206	211	216	220	224	226
						Thousand Turkish Liras Per Kg					
Producer Wheat Price	54	73	116	160	206	257	317	385	469	560	672
Producer Barley Price	39	57	82	108	137	171	207	250	301	361	435
Producer Corn Price	47	65	93	125	159	198	242	293	355	427	515
Producer Cotton Price	178	250	338	434	571	736	915	1127	1384	1690	2057
Cottonseed Price (at Adana CF)	36	47	61	76	90	104	117	135	155	180	211
Cottonseed Meal Price (at Adana CF)	33	44	58	73	87	101	115	134	155	181	213
Refined Cottonseed Oil (at Adana CF)	175	258	336	420	501	578	656	758	871	1017	1190

Biçimlendirilmiş
Biçimlendirilmiş
Silinmiş: 58
Biçimlendirilmiş
Silinmiş: TB
Silinmiş: TB
Silinmiş: TB
Silinmiş: ¶ ¶ ¶ ¶ ¶ ¶
Silinmiş: 45¶

Table 6.3. Oilseeds Supply and Use Baseline Projections

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2008	2008
Sunflower						Thousand Metric Tons					
Production	800	694	750	754	762	778	776	781	773	778	795
Crush	1170	1142	1161	1171	1165	1149	1129	1114	1104	1102	1109
Import	380	504	467	473	458	426	408	388	386	378	369
Cottonseed											
Production	1260	1150	1164	1243	1211	1218	1256	1246	1264	1246	1267
Crush	1225	1132	1153	1173	1193	1213	1232	1251	1269	1287	1304
Import	51	67	73	15	67	81	61	90	90	125	122
Soybean											
Production	55	65	70	68	69	70	70	70	71	71	72
Crush	200	220	234	235	231	225	219	216	213	211	211
Feed Use*	119	123	128	133	140	150	167	177	190	192	211
Import	240	279	292	300	302	305	316	323	332	332	350
Sunflower Oil											
Production	503	491	499	504	501	494	485	479	475	474	477
Crush	618	656	703	728	768	814	862	893	939	970	998
Import	183	165	204	224	266	320	376	414	465	496	521
Cottonseed Oil											
Production	190	175	179	182	185	188	191	194	197	199	202
Crush	187	191	200	205	213	223	233	240	250	258	266
Import	3	16	21	23	28	35	42	46	54	59	64
Soybean Oil											
Production	35	39	41	41	40	39	38	38	37	37	37
Crush	214	210	216	220	229	240	252	258	268	273	277
Import	150	171	175	179	189	201	213	220	230	236	240

Biçimlendirilmiş

Silinmiş: 59

Silinmiş: 45¶

*Broiler feed ration uses 10 percent fullfat soybean. To obtain seed imports, it is assumed that stock level is constant at the aveage in recent years
It is assumed t that other use for cottonseed and sunflowrerseed is 85 and 55 thousand tons, respectively (see Oil World Annual).

Silinmiş: ¶
¶
Bölüm Sonu

Table 6.4. Oilseed Meals Supply and Use Baseline Projections

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2008	2008
Sunflowerseed Meal					**Thousand Metric Tons**						
Production	562	548	557	562	559	551	542	535	530	529	532
Consumption	588	598	678	713	724	730	738	748	755	760	766
Import	34	49	121	151	164	179	196	213	225	231	234
Cottonseed Meal											
Production	600	555	565	575	585	594	604	613	622	631	639
Consumption	602	536	620	666	742	766	793	834	861	874	893
Import	18	-19	55	92	157	171	189	221	240	243	254
Soyabean Meal											
Production	158	174	185	186	182	178	173	170	168	167	167
Consumption	513	505	546	566	665	748	872	986	1079	1135	1243
Import	375	331	361	380	483	571	699	816	911	969	1076

Note: Stock change is ignored due to the lack of historical data. Stocks are assumed to be constant throughout the projection period.

Biçimlendirilmiş
Silinmiş: u
Biçimlendirilmiş
Silinmiş: 60
Silinmiş:
Silinmiş: 45¶

Baseline projections are calibrated to 1998 data, considering both the OWA and AERI data sets. The domestic supply of sunflower seeds is obtained from area and yield model estimated with SIS data. AERI domestic supply data for the last four marketing years are 30-40 percent below the SIS production record. Consequently, the original baseline production projection, which is consistent with SIS data, is proportionally adjusted by a factor of 0.75 in order to generate a more reliable baseline projection. The baseline projections from 1999 onward should be considered consistent with AERI data. Baseline projections for oilseed supply and use are given in the Table 6.3.

Given current agricultural policies in Turkey, the baseline macroeconomic projections, and international price projections from FAPRI, our baseline projections indicate that Turkey's net imports of the oilseeds, oils, and oilseed meals are expected to grow over the simulation period. The exception is sunflower seeds. It is expected that sunflower seed imports will drop slightly at the end of the simulation period, while sunflower oil imports increase significantly. The baseline projections for cottonseed and cottonseed oil call for lower import levels than other oilseeds and oilseed products.

Projections for sunflower oil imports exceed 300 thousand metric tons (tmt) after 2003, and they approach 521 tmt in 2008. This quantity is twice as great as the average import level over the last few years. The share of the Turkish sunflower oil imports account for 10 percent of total world trade in sunflower oil, but this share changes from year to year. By the end of the simulation period, Turkish sunflower oil imports may be large enough to have an impact on world prices, driving world prices higher. A higher world price for sunflower oil would dampen growth in Turkish sunflower oil imports, leaving the actual level somewhat lower than the baseline projection. Consequently, the sunflower oil import projections in Table 6.3 may be considered an upper limit. We were unable to use the FAPRI international oilseed model to simulate the international price response to the growth in Turkish sunflower oil prices because the sunflower oil price in the FAPRI system was linked to the price of soybean oil in the 1999 baseline. Alternatively, we considered using an estimate of the price flexibity in the sunflower oil sector to project the price response to growing Turkish sunflower oil imports. The price flexibility, however, does not consider simultaneous relationship between oil and seeds, or oil and meal. So, we did not pursue this avenue further

The baseline projections also indicate that soybean and soybean oil net imports will continue to grow rapidly. At the end of the simulation period, soybean and soybean oil imports will approach 350 and 240 tmt, respectively. Table 6.4 displays the oilseed meal supply, consumption, and imports. As we mentioned in previous chapters, domestic meal supply is derived from crush demand and meal consumption is derived from livestock supply estimates. These livestock supply projections are shown in Table 6.6. In the simulation period, we allow the share of major grain and protein feeds in livestock rations to change in accordance with price movements, given assumptions about the Morishima substitution elasticities.

Baseline projections indicate that oil meal demand will continue to increase, and due to the domestic supply shortage, oilseed meal imports will continue to grow substantially, particularly for soybean meal. It is expected that soybean meal imports will surpass 1 mmt by the end of the simulation period. The primary source of the growth in soybean meal imports is the rapid increase in the production of broilers and eggs. In addition to this, we allow the share of sunflower seed meal in poultry rations to drop to 10 percent after 2002, and it is assumed that the share of soybean meal rises to compensate for the lower sunflower meal share.

The baseline projections discussed above will provide a reference point for determining the impact of policy changes discussed in the next chapter. The first scenario considers the impacts on Turkey's oilseed market of returning import tariffs on oilseeds, crude oil, and meal to their 1995 levels. The second scenario examines the effects of reducing the tariff rate on the wheat and barley imports. This scenario implicitly analyzes the impact of lowering the support price of wheat and barley to the level of the world price. The third scenario in this report analyzes the impact of maintaining parity for the cotton, barley, and sunflower seed prices with the wheat price, holding the ratios at the 1998 levels. The final scenario considers liberalization of Turkish imports of corn and its impacts on corn and soybean production. In order to facilitate the discussion of the interaction between oilseeds and other field crops following a change in crop policies, we provide baseline projections for some major field crops in Table 6.5.

Silinmiş: 61

Biçimlendirilmiş

Table 6.5. Baseline Projections for Major Field Crops

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2008	2008
	Thousand Metric Tons										
Wheat Production	21000	18753	18359	18384	18489	18573	18629	18713	18800	18903	18970
Net Production	**15508**	**13667**	**13396**	**13430**	**13523**	**13600**	**13657**	**13734**	**13814**	**13905**	**13970**
Barley Production	9000	7795	7975	7859	7926	7969	8020	8015	8000	8116	8204
Net Production	**7031**	**6039**	**6179**	**6091**	**6143**	**6178**	**6219**	**6216**	**6205**	**6298**	**6371**
Corn Production	2300	2413	2371	2400	2455	2496	2516	2534	2557	2592	2622
Cotton Production	858	762	795	848	827	831	858	851	863	851	865

Note: To calculate net production for wheat, area harvested is assumed 90 percent of area cultuvated, loss is assumed 8 percent and seed use is assumed 200 Kg per hectare. To calculate net production for barley, area harvested is assumed 95 percent of area cultuvated, loss is assumed 9 percent and seed use is assumed 200 Kg per hectare.

Silinmiş: 63

Silinmiş: 45¶

Table 6.6 Livestock Product Baseline Projections

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2008	2008
Beef						**Thousand Metric Tons**					
Production	430	476	516	550	589	603	621	641	664	673	699
Consumption	480	527	566	633	690	736	798	847	909	954	1037
Net Import	50	51	50	83	100	133	177	206	245	281	338
Sheep Meat											
Production	260	277	288	304	313	316	319	319	319	320	320
Consumption	258	274	283	299	305	308	304	293	296	297	290
Net Sheep Meat Export	2	3	5	5	8	8	14	26	24	23	30
Broiler											
Production	600	620	645	669	702	753	839	889	953	966	1058
Consumption	588	612	637	662	694	746	832	882	946	958	
Net Exports	8	8	8	8	8	8	8	8	8	8	8
Egg											
Production	650	687	707	721	741	764	795	838	858	889	905
Consumption	650	687	707	721	741	764	795	838	858	889	905
Net Exports	0	0	0	0	0	0	0	0	0	0	0
Milk											
Production	6000	6238	6408	6524	6750	7009	7208	7568	7830	7975	8152
Consumption	6180	6382	6563	6670	6907	7150	7349	7674	7925	8050	8230
Net Import	180	144	155	146	157	142	142	106	95	75	78

Biçimlendirilmiş
Biçimlendirilmiş
Silinmiş: ¶
Silinmiş: ¶
Silinmiş: 64
Silinmiş: ¶
Silinmiş: ¶
Silinmiş: ¶
¶
Bölüm Sonu (Sürekli)
Silinmiş: 65

7. The Impact of Policy Changes on Oilseeds Supply and Use

In this chapter, the impact of four policy scenarios affecting the oilseed markets in Turkey are presented. The first scenario considers the impacts of reducing the tariff rates on oilseeds and crude oils. Over the last decade, the lowest level of border protection for oilseeds was applied in 1995. In that year, the tax collected for the Mass Housing Fund (MHF) was removed, and the remaining effective tariff was set at 3 percent for both crude vegetable oils and sunflower seed. The tariff rate on sunflower seed imports was changed from 3 to 12 percent in 1996. It was raised further in 1997 from 12 to 29 percent. After 1997, the sunflower seed tariff was reduced slightly from 29 to 28.8 percent in 1998, and from 28.8 to 28.5 percent in 1999. The tariff rate on crude vegetable oils (including sunflower seed, cottonseed, and soybean) was changed from 3 percent in 1995 to 12 percent in 1996, from 12 percent in 1996 to 38.8 percent in 1997, from 38.8 percent in 1997 to 38.4 percent in 1998, and from 38.4 percent in 1998 to 38 percent in 1999. These tariff rates are the upper bound allowed under the WTO agreements. In the oilseed tariff reduction scenario we assume that in 1999 the tariff rates on seeds and oils are returned to the levels existing in 1995, and they are held at that level throughout the simulation period.

Silinmiş: ¶

The second scenario measures the impact of reducing the import tariffs for wheat and barley on wheat, barley, cotton, and sunflower supplies. We assumed that the tariff reduction occurs in 1999. Currently, the tariff rate on wheat and barley imports is 50 percent, but it was 15 percent in 1995. In the scenario, we lowered the current rate to 15 percent for both wheat and barley. Summary tables containing the simulation results include changes in both crop supply and oilseed seed supply and use.

Silinmiş: ¶

The third scenario investigates the impacts of differential price changes among competing crops. In the baseline, barley, cotton, wheat, and sunflower prices follow international prices, which rise and fall at differential rates. In the scenario we maintain parity between cotton, barley, wheat, and sunflower seed prices. The wheat price changes in accordance with FAPRI international price projection via the price transmission equation, but cotton, barley, and sunflower seed prices maintain the same proportion with the wheat price that existed in 1998.

Silinmiş: ¶

The final scenario asks what would happen to corn and soybean production if the tariff on the corn imports is removed in 1999. Summary tables for the scenarios and important deviations from the baseline are given below.

Silinmiş: ¶

Scenario 1: Return of Tariffs on Oilseeds and Crude Oils Imports to 1995 Levels

Silinmiş: ¶

Tables 7.1 and 7.2 present the changes in domestic prices at the wholesale level due to the reduction in oilseed product tariff rates. Sunflower seed and sunflower oil prices decline 18 percent when tariffs are returned to the 1995 level. Soybean oil prices decline 8 percent, and cottonseed oil and meal prices decline 17 percent. Lower sunflower seed prices induce some Turkish producers to shift area out of sunflower production, causing sunflower seed output to decline 5 percent from 2000 onward. Lower sunflower seed prices lower input costs for oilseed processors. These cost savings are partially offset by the decline in sunflower oil prices; however, sunflower meal prices remain at the baseline levels, raising the crush demand for sunflower seeds by 2 percent in 1999, 4 percent in 2000, and 7 percent over the remainder of the projection period. The decline in production and rise in crush demand causes an increase in the import demand of sunflower seeds. Imports increase 5 percent above the baseline in 1999, 14 percent in 2001, and 30 percent by the end of simulation period. The biggest absolute impact of the scenario is on sunflower oil consumption and imports. Sunflower oil consumption rises by 24 percent above the baseline consumption level for the entire simulation period. The increase in domestic sunflower seed crush provides roughly 10-12 percent of the additional sunflower oil demanded by consumers. The remaining excess demand for sunflower oil is satisfied by imports, causing imports to rise as much as 88 percent over the baseline in the first year of the scenario.

Silinmiş: the

Biçimlendirilmiş

Silinmiş: 65

Turkish sunflower oil imports reach 727 tmt of in 2008, 206 tmt more than in the baseline, representing a 40 percent increase in imports.

Table 7.4 displays the scenario results for the cottonseed sector. Lower cottonseed oil prices boost domestic consumption of cottonseed oil by 12 to 13 percent above the baseline. The absolute change of the cottonseed oil consumption and imports is virtually the same, reflecting the fact a proportional change in all price components of the crush margin leaves processor incentives virtually unchanged. Cottonseed production and cottonseed crush both decline slightly, and imports rise to fill the gap between domestic supply and demand. Cottonseed oil imports rise between 24 and 33 tmt over the baseline level.

Silinmiş: ¶

Silinmiş: ¶

Silinmiş: 65

Table 7.1 The Impact of the Scenario 1 on Oilseed and Product Prices

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
International Prices at Domestic Wholesale Level					**U.S Dollar per Metric Tons**						
Sunflower seed (CIF Lower Rhine)	432	317	292	293	294	293	292	292	291	292	290
Baseline	432	387	356	357	358	358	356	356	355	355	354
Change	0	-70	-64	-64	-64	-64	-64	-64	-64	-64	-63
Percentage Change	**0**	**-18**	**-18**	**-18**	**-18**	**-18**	**-18**	**-18**	**-18**	**-18**	**-18**
Sunflower Oil (CIF Rotterdam)	1045	717	689	684	669	651	635	631	624	627	633
Baseline	1045	875	841	835	817	794	774	769	761	765	771
Change	0	-158	-152	-151	-147	-143	-139	-138	-137	-137	-139
Percentage Change	**0**	**-18**	**-18**	**-18**	**-18**	**-18**	**-18**	**-18**	**-18**	**-18**	**-18**
Soybean Oil (CIF Rotterdam)	744	623	618	616	607	595	584	583	580	584	591
Baseline	744	675	669	667	657	643	632	631	627	632	640
Change	0	-51	-51	-51	-50	-49	-48	-48	-48	-48	-49
Percentage Change	**0**	**-8**	**-8**	**-8**	**-8**	**-8**	**-8**	**-8**	**-8**	**-8**	**-8**
Cottonseed Oil (CIF Rotterdam)	837	702	686	683	675	665	656	653	650	651	654
Baseline	837	760	743	740	731	720	710	707	703	705	709
Change	0	-58	-57	-57	-56	-55	-54	-54	-54	-54	-54
Percentage Change	**0**	**-8**	**-8**	**-8**	**-8**	**-8**	**-8**	**-8**	**-8**	**-8**	**-8**

Silinmiş: Table 7.5 shows the impact of the tariff reduction on the soybean supply and use. Domestic soybean oil prices decline substantially and meal prices decline slightly in Turkey, reducing the profitability of ¶
Bölüm Sonu (Sonraki Sayfa)

Biçimlendirilmiş

Silinmiş: 67

Silinmiş: 45¶

Table 7.2 The Impact of the Scenario 1 on Cottonseed and Cottonseed Product Prices in Domestic Markets

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Domestic Wholesale Prices					**Thousand Turkish Liras Per Kg**						
Cotton Seed Price (at Adana CE)	36	39	51	63	75	87	98	113	130	151	176
Baseline	36	47	61	76	90	104	117	135	155	180	211
Change	0	-8	-10	-13	-15	-17	-19	-22	-25	-30	-35
Percentage Change	**0**	**-17**	**-17**	**-17**	**-16**	**-16**	**-16**	**-16**	**-16**	**-16**	**-16**
Cotton Meal (at Adana CE)	33	36	48	60	72	84	95	111	128	150	177
Baseline	33	44	58	73	87	101	115	134	155	181	213
Change	0	-8	-10	-13	-15	-17	-20	-23	-27	-31	-37
Percentage Change	**0**	**-17**	**-17**	**-17**	**-17**	**-17**	**-17**	**-17**	**-17**	**-17**	**-17**
Refined Cottonseed Oil (Adana CE)	175	215	280	350	417	482	546	631	726	847	991
Baseline	175	258	336	420	501	578	656	758	871	1017	1190
Change	0	-43	-56	-71	-84	-97	-110	-127	-146	-170	-199
Percentage Change	**0**	**-17**	**-17**	**-17**	**-17**	**-17**	**-17**	**-17**	**-17**	**-17**	**-17**

Silinmiş: ¶
Bölüm Sonu (Sonraki Sayfa)
Biçimlendirilmiş
Biçimlendirilmiş
Biçimlendirilmiş
Silinmiş: TB
Biçimlendirilmiş
Biçimlendirilmiş
Biçimlendirilmiş
Biçimlendirilmiş
Biçimlendirilmiş
Silinmiş: TB
Biçimlendirilmiş
Biçimlendirilmiş
Silinmiş: 68
Biçimlendirilmiş
Biçimlendirilmiş
Biçimlendirilmiş
Silinmiş: TB
Biçimlendirilmiş
Biçimlendirilmiş

Table 7.3. The Impact of the Scenario 1 on Sunflower Seed Supply and Use

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2008	2008
						Thousand Metric Tons					
Sunflower Seed Production	800	694	726	721	726	740	738	743	734	739	756
Baseline	800	694	750	754	762	778	776	781	773	778	795
Change	0	0	-24	-33	-36	-38	-38	-39	-39	-39	-39
Percentage Change	**0**	**0**	**-3**	**-4**	**-5**	**-5**	**-5**	**-5**	**-5**	**-5**	**-5**
Sunflower Seed Crush	1170	1166	1202	1225	1229	1219	1203	1191	1181	1180	1189
Baseline	1170	1142	1161	1171	1165	1149	1129	1114	1104	1102	1109
Change	0	24	41	54	64	70	74	76	77	79	80
Percentage Change	**0**	**2**	**4**	**5**	**5**	**6**	**7**	**7**	**7**	**7**	**7**
Sunflower Seed Import	380	527	531	560	558	533	520	503	502	496	489
Baseline	380	504	467	473	458	426	408	388	386	378	369
Change	0	24	65	87	100	108	112	115	116	118	119
Percentage Change	**0**	**5**	**14**	**18**	**22**	**25**	**28**	**30**	**30**	**31**	**32**
Sunflower Oil Production	503	501	517	527	529	524	517	512	508	507	511
Baseline	503	491	499	504	501	494	485	479	475	474	477
Change	0	10	18	23	27	30	32	33	33	34	34
Percentage Change	**0**	**2**	**4**	**5**	**5**	**6**	**7**	**7**	**7**	**7**	**7**
Sunflower Oil Consumption	618	812	871	903	952	1009	1069	1108	1165	1204	1239
Baseline	618	656	703	728	768	814	862	893	939	970	998
Change	0	156	169	175	184	195	207	215	226	234	241
Percentage Change	**0**	**24**	**24**	**24**	**24**	**24**	**24**	**24**	**24**	**24**	**24**
Sunflower Oil Import	183	310	354	376	423	485	552	596	657	696	727
Baseline	183	165	204	224	266	320	376	414	465	496	521
Change	0	145	151	151	157	165	175	182	193	200	206
Percentage Change	**0**	**88**	**74**	**67**	**59**	**52**	**47**	**44**	**41**	**40**	**40**

Silinmiş: ¶
Bölüm Sonu (Sonraki Sayfa)

Silinmiş:

Biçimlendirilmiş

Biçimlendirilmiş

Silinmiş: 69

Silinmiş: ¶
¶

Biçimlendirilmiş

Table 7.4 The Impact of the Scenario 1 on Cottonseed Supply and Use

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2008	2008
						Thousand Metric Tons					
Cottonseed Production	1260	1115	1155	1233	1202	1208	1247	1236	1255	1237	1258
Baseline	1260	1150	1164	1243	1211	1218	1256	1246	1264	1246	1267
Change	0	-34	-9	-9	-9	-10	-10	-10	-10	-10	-10
Percentage Change	**0.0**	**-3.0**	**-0.8**	**-0.8**	**-0.8**	**-0.8**	**-0.8**	**-0.8**	**-0.8**	**-0.8**	**-0.8**
Cottonseed Crush	1225	1131	1151	1194	1236	1277	1291	1304	1318	1331	1344
Baseline	1225	1132	1153	1197	1240	1282	1296	1310	1324	1338	1352
Change	0	-1	-2	-3	-4	-5	-5	-6	-7	-7	-8
Percentage Change	**0.0**	**-0.1**	**-0.2**	**-0.2**	**-0.3**	**-0.4**	**-0.4**	**-0.5**	**-0.5**	**-0.6**	**-0.6**
Cottonseed Import	51	100	80	46	119	154	129	153	148	179	172
Baseline	51	67	73	39	114	149	125	149	145	177	170
Change	0	34	7	7	6	5	4	4	3	2	2
Percentage Change	**0**	**50.2**	**10.0**	**16.8**	**5.1**	**3.4**	**3.5**	**2.4**	**2.0**	**1.3**	**1.0**
Cottonseed Oil Consumption	187	216	223	229	238	249	260	268	280	289	298
Baseline	187	191	200	205	213	223	233	240	250	258	266
Change	0	25	24	24	25	26	28	29	30	31	32
Percentage Change	**0**	**13**	**12**	**12**	**12**	**12**	**12**	**12**	**12**	**12**	**12**
Cottonseed Oil Import	3	40	45	44	47	51	60	66	76	83	89
Baseline	3	16	21	19	21	24	32	37	45	51	56
Change	0	25	24	25	26	27	28	29	31	32	33
Percentage Change	**0**	**158**	**112**	**128**	**123**	**113**	**90**	**80**	**69**	**63**	**59**

Silinmiş: 70

Silinmiş: 45¶

Table 7.5 shows the impact of the tariff reduction on the soybean supply and use. Domestic soybean oil prices decline substantially and meal prices decline slightly in Turkey, reducing the profitability of domestic soybean crushing operations. Consequently, soybean oil and meal production declines between 5 and 7 percent. A Lower soybean oil price prompts domestic consumption to increase 15 percent over the baseline level, causing imports to rise up to 45 tmt. Soybean meal consumption also grows slightly in response to the decline in prices. Meal imports rise 11 to 19 tmt over the baseline level.

Table 7.6 shows the changes in sunflower seed and cottonseed meal supply and use. Lower soybean and cottonseed meal prices spur a small increase in egg and milk production, which increases the demand for all three oilseed meals. Higher egg production increases the demand for soybean and sunflower seed meal, while increases in milk production raise the demand for cottonseed and sunflower seed meal. Because sunflower seed meal is found in both layer and dairy cattle rations, the change in sunflower seed meal is the largest of the three meals. Cottonseed meal consumption increases more than 2 percent relative to the baseline, while soybean meal use grows less than one percent. This reflects the relatively larger increase in milk production, as well as the decline in cottonseed meal prices relative to soybean meal and sunflower seed meal prices.

Table 7.7 indicates that Turkish farmers respond to the decline in sunflower seed and cottonseed prices by shifting area out of sunflower seed production and into wheat production. Barley area also declines because of the complementary relationship between barley and sunflower seed area described in Chapter 5. These changes result in a nearly a 2 percent rise in wheat output and a 2 percent decline in barley production. Since cottonseed prices are only marginally affected and the relationship between cotton and sunflower production is not significant, the decrease in the sunflower seed price does not significantly affect the cotton supply.

Scenario 2: The Impact of the Wheat and Barley Price Change on the Oilseeds Market

In this scenario, both wheat and barley tariffs are reduced to 15 percent, lowering domestic wheat and barley prices roughly 25 percent. Turkish producers respond to the price decline by reducing wheat production between 2 and 3 percent and expanding barley production approximately 2 to 3 percent (See Table 7.9). The seemingly perverse producer response to declining barley prices is largely the result of cross-price effects in sunflower production. The decline in the wheat price prompts Turkish producers to substitute sunflower seed for wheat, leading to an increase in sunflower area. As a consequence of the crop rotation patterns discussed in Chapter 5, barley area also increases. The decline in barley prices, however, dampens the growth in sunflower plantings. This is evident in the fact that cotton production increases by 13 percent while sunflower area only rises 3 percent.

Silinmiş: ¶
Bölüm Sonu (Sonraki Sayfa)

Silinmiş: ¶

Silinmiş: ¶

Silinmiş: ¶

Silinmiş: ¶

Silinmiş: ¶

Table 7.5 The Impact of the Scenario 1 on Soybean Oil Supply and Use

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2008	2008
						Thousand Metric Tons					
Soybean Oil Production	35	37	38	38	38	37	36	35	34	34	34
Baseline	35	39	41	41	40	39	38	38	37	37	37
Change	0	-2	-3	-3	-3	-3	-3	-3	-3	-3	-3
Percentage Change	**0**	**-5**	**-6**	**-7**	**-7**	**-7**	**-7**	**-8**	**-8**	**-8**	**-8**
Soybean Oil Consumption	214	241	248	253	264	276	290	297	308	315	320
Baseline	214	210	216	220	229	240	252	258	268	273	277
Change	0	31	32	33	35	36	38	39	41	42	42
Percentage Change	**0**	**15**	**15**	**15**	**15**	**15**	**15**	**15**	**15**	**15**	**15**
Soybean Oil Import	150	204	210	215	226	240	254	262	274	280	285
Baseline	150	171	175	179	189	201	213	220	230	236	240
Change	0	33	35	36	37	39	41	42	44	45	45
Percentage Change	**0**	**19**	**20**	**20**	**20**	**19**	**19**	**19**	**19**	**19**	**19**
Soybean Meal Production	158	165	173	173	170	165	161	158	155	154	154
Baseline	158	174	185	186	182	178	173	170	168	167	167
Change	0	-9	-12	-12	-13	-13	-13	-13	-13	-13	-13
Percentage Change	**0**	**-5**	**-6**	**-7**	**-7**	**-7**	**-7**	**-8**	**-8**	**-8**	**-8**
Soybean Meal Consumption	513	507	547	567	667	752	876	991	1084	1141	1249
Baseline	513	505	546	566	665	748	872	986	1079	1135	1243
Change	0	2	1	0	2	4	4	4	5	6	6
Percentage Change	**0.0**	**0.4**	**0.1**	**0.1**	**0.2**	**0.5**	**0.4**	**0.4**	**0.4**	**0.5**	**0.5**
Soybean Meal Import	375	342	374	393	497	588	715	833	928	987	1095
Baseline	375	331	361	380	483	571	699	816	911	969	1076
Change	0	11	12	13	14	17	16	17	18	19	19
Percentage Change	**0.00**	**3.3**	**3.4**	**3.3**	**30**	**2.9**	**2.4**	**2.1**	**1.9**	**1.9**	**1.7**

Silinmiş:
Biçimlendirilmiş
Silinmiş: 72

Table 7.6 The Impact of Scenario 1 on Sunflower Seed and Cottonseed Meal Supply and Use

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2008	2008
						Thousand Metric Tons					
Sunflower Seed Meal Production	562	560	577	588	590	585	577	572	567	567	571
Baseline	562	548	557	562	559	551	542	535	530	529	532
Change	0	11	20	26	31	34	36	37	37	38	38
Percentage Change	**0**	**2**	**4**	**5**	**5**	**6**	**7**	**7**	**7**	**7**	**7**
Sunflower Seed Consumption	588	624	703	736	747	753	761	771	778	783	789
Baseline	588	598	678	713	724	730	738	748	755	760	766
Change	0	26	25	23	23	23	23	23	23	23	24
Percentage Change	**0**	**4**	**4**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
Sunflower Meal Import	34	64	126	148	157	168	184	200	211	217	219
Baseline	34	49	121	151	164	179	196	213	225	231	234
Change	0	15	5	-3	-8	-11	-12	-13	-14	-14	-15
Percentage Change	**0**	**30**	**4**	**-2**	**-5**	**-6**	**-6**	**-6**	**-6**	**-6**	**-6**
Cottonseed Meal Production	600	554	564	585	606	626	633	639	646	652	659
Baseline	600	555	565	586	608	628	635	642	649	656	663
Change	0	0	-1	-1	-2	-2	-3	-3	-3	-4	-4
Percentage Change	**0.0**	**-0.1**	**-0.2**	**-0.2**	**-0.3**	**-0.4**	**-0.4**	**-0.5**	**-0.5**	**-0.6**	**-0.6**
Cottonseed Meal Consumption	602	555	637	682	758	784	811	851	880	892	912
Baseline	602	536	620	666	742	766	793	834	861	874	893
Change	0	19	18	15	17	19	18	18	18	19	19
Percentage Change	**0.0**	**3.5**	**2.8**	**2.3**	**2.2**	**2.4**	**2.3**	**2.1**	**2.1**	**2.1**	**2.1**
Cottonseed Meal Import	18	1	73	96	153	158	178	212	234	240	253
Baseline	18	-19	55	80	134	138	158	191	213	218	231
Change	0	19	18	17	18	21	21	21	21	22	23
Percentage Change	**0.0**	**-103.6**	**33.4**	**20.7**	**13.7**	**15.1**	**13.1**	**10.9**	**10.1**	**10.2**	**9.8**

Biçimlendirilmiş

Silinmiş: 73

Silinmiş: 45¶

Table 7.7. The Impact of the Scenario 1 on Wheat, Barley and Cotton Supply

Biçimlendirilmiş

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2008	2008
						Thousand Metric Tons					
Wheat Production	21000	18753	18497	18607	18765	18882	18959	19057	19154	19266	19339
Baseline	21000	18753	18359	18384	18489	18573	18629	18713	18800	18903	18970
Change	0	0	138	223	275	308	330	344	354	362	368
Percentage Change	**0.00**	**0.00**	**0.75**	**1.21**	**1.49**	**1.66**	**1.77**	**1.84**	**1.89**	**1.92**	**1.94**
Barley Production	9000	7795	7880	7728	7780	7818	7867	7860	7844	7960	8046
Baseline	9000	7795	7975	7859	7926	7969	8020	8015	8000	8116	8204
Change	0	0	-95	-132	-145	-151	-153	-155	-155	-156	-158
Percentage Change	**0.0**	**0.0**	**-1.2**	**-1.7**	**-1.8**	**-1.9**	**-1.9**	**-1.9**	**-1.9**	**-1.9**	**-1.9**
Cotton Production	858	762	789	842	821	825	851	844	857	844	859
Baseline	858	762	795	848	827	831	858	851	863	851	865
Change	0	0	-6	-6	-6	-7	-7	-7	-7	-7	-7
Percentage Change	**0.0**	**0.0**	**-0.8**	**-0.8**	**-0.8**	**-0.8**	**-0.8**	**-0.8**	**-0.8**	**-0.8**	**-0.8**

Silinmiş: 74

Silinmiş: ¶

The growth in oilseed output reduces the excess demand for sunflower seed and cottonseed imports. Sunflower seed imports decline nearly 25 tmt, representing a decrease of up to 7 percent relative to the baseline. Cottonseed imports fall much more dramatically, declining more than 160 tmt and making Turkey a net exporter of cottonseed for much of the projection period. The results of this scenario illustrate the importance of grain prices in determining cotton and sunflower production in Turkey.

Silinmiş: producers to substitute sunflower seed for wheat, leading to an increase in sunflower area. As a consequence of the crop rotation patterns discussed in Chapter 5, barley area also increases. The decline in barley prices, however, dampens the growth in sunflower plantings. This is evident in the fact that cotton production increases by 13 percent while sunflower area only rises 3 percent.¶
¶

Scenario 3: The Impact of the Price Adjustment of Major Crops on Oilseed Market

Silinmiş: ¶

Silinmiş: ¶

Scenario 3 explores further the importance of the relative price relationship between wheat, barley, cotton, and sunflower seed production in Turkey, by holding parity between these prices in proportion to their 1995 levels. Table 7.11 and 7.12 display the impacts of fixing the relative price relationship between these four crops on major crops prices and production. Wheat prices remain constant at the baseline levels, but maintaining the relative price relationship that existed between sunflower seed and wheat in 1995 implies that sunflower seed prices rise up to 36 percent above the baseline level. Barley prices, on the other hand, decline relative to the baseline, with the largest decreases in the first two years of the scenario. The raw cotton price also rises relative to the baseline, but the change is generally less than 20 percent.

The change in relative crop prices induces an increase in sunflower seed, cotton, and barley area. Cotton production displays the largest increases, rising between 5 and 9 percent for most of the simulation period. Despite larger price increases, sunflower seed production rises less than cotton, reaching 7 percent above the baseline in 2007. This is, in part, due to the decline in barley prices. As in the second scenario, barley production increases with the growth in sunflower production, rising up to 2.6 percent above the baseline by 2008. Both wheat and corn production declines more than 3 percent in some years. The decline in wheat production reflects the substitution relationship between sunflower seed and wheat. Likewise, the change in corn production is the result of the substitution relationship between corn and cotton. Koç et al., (1998) found that corn and cotton are substitute crops in Turkey, particularly in the Çukurova region.

Silinmiş: ¶

The increase in oilseed production prompts a decline in the demand for imported oilseeds. Sunflower seed imports fall up to 58 tmt. Cottonseed imports also decline dramatically, dropping between 60 and 110 tmt in all but the first two years of the scenario. The price changes induced by maintaining the parity with 1995 relative crop prices also impacts oilseed meal consumption. Both sunflower seed and soybean meal consumption decline slightly in response to lower barley prices. The imports of sunflower and soybean meal also decline as feed rations adjust to the new relative prices.

Silinmiş: ¶

Scenario 4: The Implications of the Removing of the Corn Import Tariff

Silinmiş: ¶

The final scenario considers the impact of removing the tariff on corn imports in 1999. Turkish imports of corn were taxed at a rate of 22.5 percent in 1998. As shown in the Table 7.15, the domestic producer price for corn declines 19 percent when the tariff is removed. Corn production declines 12 percent in 2000, 18.6 percent in 2001, and 27.3 percent at the end of simulation period. The absolute decline in Turkish corn production reaches more than 700 tmt by 2007. Soybean production increases 10 percent in 2000, 14 percent in 2002, and 15 percent over the rest of the projection period. The absolute increase in the soybean production is negligible if it is compared with the absolute decline in the corn production. These changes in production translate into changes in excess demand. Soybean imports fall 3 percent relative to the baseline, accounting for the rise in domestic production. Corn imports rise by more than the decline in production because the significantly lower price stimulates increased consumption of corn, as well as lower domestic production. The results of this scenario indicate that border measures for corn have a substantial impact on corn production and use in Turkey.

Silinmiş: ¶

Table 7.8 The Impact of the Scenario 2 on Producer Wheat and Barley Prices

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Producer Prices					**Thousand Turkish Liras Per Kg**						
Wheat Producer Price	54	55	88	121	155	194	239	290	354	423	507
Baseline	54	73	116	160	206	257	317	385	469	560	672
Change	0	-18	-28	-39	-50	-63	-78	-94	-115	-137	-165
Percentage Change	**0**	**-25**	**-25**	**-25**	**-25**	**-25**	**-25**	**-25**	**-25**	**-25**	**-25**
Barley Producer Price	39	52	73	97	123	153	186	224	270	324	390
Baseline	39	68	97	128	162	202	246	296	357	428	515
Change	0	-17	-24	-31	-39	-49	-60	-72	-87	-104	-125
Percentage Change	**0**	**-24**	**-24**	**-24**	**-24**	**-24**	**-24**	**-24**	**-24**	**-24**	**-24**

Table 7.9 The Impact of the Scenario 2 on Wheat and Barley Production

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
						Thousand Metric Tons					
Wheat Production	21000	18753	18136	18025	18046	18077	18098	18159	18229	18320	18377
Baseline	21000	18753	18359	18384	18489	18573	18629	18713	18800	18903	18970
Change	0	0	-223	-359	-443	-496	-531	-554	-570	-583	-593
Percentage Change	**0**	**0**	**-1**	**-2**	**-2**	**-3**	**-3**	**-3**	**-3**	**-3**	**-3**
Barley Production	9000	7795	8109	8044	8130	8181	8236	8232	8218	8336	8425
Baseline	9000	7795	7975	7859	7926	7969	8020	8015	8000	8116	8204
Change	0	0	134	185	204	212	215	217	218	220	222
Percentage Change	**0**	**0**	**2**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

Biçimlendirilmiş

Silinmiş: ¶
¶

Biçimlendirilmiş

Silinmiş: 77

Silinmiş: ¶

Silinmiş: 45¶

Table 7.10 The Impact of the Scenario 2 on Sunflower Seed and Cottonseed Supply and Import

Biçimlendirilmiş

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2008	2008
						Thousand Metric Tons					
Sunflowerseed Production	800	694	765	774	785	802	800	806	798	803	820
Baseline	800	694	750	754	762	778	776	781	773	778	795
Change	0	0	15	21	23	24	24	24	25	25	25
Percentage Change	**0**	**0**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
Sunflowerseed Import	380	504	452	452	435	402	384	364	361	354	345
Baseline	380	504	467	473	458	426	408	388	386	378	369
Change	0	0	-15	-21	-23	-24	-24	-24	-25	-25	-25
Percentage Change	**0**	**0**	**-3**	**-4**	**-5**	**-6**	**-6**	**-6**	**-6**	**-7**	**-7**
Cottonseed Production	1260	1115	1318	1399	1370	1378	1419	1409	1428	1411	1432
Baseline	1260	1115	1164	1243	1211	1218	1256	1246	1264	1246	1267
Change	0	0	154	156	159	161	162	163	164	164	164
Percentage Change	**0**	**0**	**13**	**13**	**13**	**13**	**13**	**13**	**13**	**13**	**13**
Cottonseed Import	51	101	-81	-117	-45	-11	-37	-14	-18	13	5
Baseline	51	101	73	39	114	149	125	149	145	177	170
Change	0	0	-154	-156	-159	-161	-162	-163	-164	-164	-164
Percentage Change	**0**	**0**	**-211**	**-400**	**-140**	**-108**	**-130**	**-109**	**-113**	**-93**	**-97**

Silinmiş: 78

Silinmiş: 45¶

Table 7.11 The Impact of the Scenario 3 on Producer Prices

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Producer Prices					**Thousand Turkish Liras Per Kg**						
Sunflower Seed Price	120	164	260	358	461	576	709	862	1051	1255	1506
Baseline	120	175	227	298	378	462	548	656	780	933	1107
Change	0	-11	33	60	83	114	161	206	272	323	398
Percentage Change	**0**	**-6**	**15**	**20**	**22**	**25**	**29**	**31**	**35**	**35**	**36**
Barley Price	39	53	85	117	150	188	231	281	343	409	491
Baseline	39	68	97	128	162	202	246	296	357	428	515
Change	0	-15	-12	-12	-12	-15	-15	-15	-14	-19	-24
Percentage Change	**0**	**-21**	**-13**	**-9**	**-7**	**-7**	**-6**	**-5**	**-4**	**-4**	**-5**
Raw Cotton Price	178	243	385	529	682	852	1049	1275	1555	1857	2227
Baseline	178	250	338	434	571	736	915	1127	1384	1690	2057
Change	0	-7	47	95	111	116	134	148	171	166	170
Percentage Change	**0**	**-3**	**14**	**22**	**19**	**16**	**15**	**13**	**12**	**10**	**8**

Biçimlendirilmiş

Silinmiş: 79

Silinmiş: 45¶

Table 7.12 The Impact of the Scenario 3 on Wheat, Barley, Corn and Cotton Production

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2008	2008
					Thousand Metric Tons						
Wheat Production	21000	18753	18640	18496	18383	18309	18273	18265	18282	18312	18354
Baseline	21000	18753	18359	18384	18489	18573	18629	18713	18800	18903	18970
Change	0	0	281	113	-107	-264	-356	-448	-518	-591	-617
Percentage Change	**0.0**	**0.0**	**1.5**	**0.6**	**-0.6**	**-1.4**	**-1.9**	**-2.4**	**-2.8**	**-3.1**	**-3.3**
Barley Production	9000	7795	7796	7782	7939	8041	8123	8155	8168	8317	8413
Baseline	9000	7795	7975	7859	7926	7969	8020	8015	8000	8116	8204
Change	0	0	-179	-78	13	71	102	140	168	201	209
Percentage Change	**0.0**	**0.0**	**-2.2**	**-1.0**	**0.2**	**0.9**	**1.3**	**1.8**	**2.1**	**2.5**	**2.6**
Corn Production	2300	2413	2379	2370	2388	2416	2438	2458	2487	2525	2563
Baseline	2300	2413	2371	2400	2455	2496	2516	2534	2557	2592	2622
Change	0	0	7	-30	-67	-80	-78	-75	-70	-67	-59
Percentage Change	**0.0**	**0.0**	**0.3**	**-1.3**	**-2.7**	**-3.2**	**-3.1**	**-3.0**	**-2.7**	**-2.6**	**-2.3**
Cotton Production	858	762	794	901	902	900	916	906	914	900	906
Baseline	858	762	795	848	827	831	858	851	863	851	865
Change	0	0	-1	52	75	68	59	55	51	49	41
Percentage Change	**0.0**	**0.0**	**-0.1**	**6.2**	**9.1**	**8.2**	**6.8**	**6.5**	**5.9**	**5.7**	**4.7**

Silinmiş: ¶
¶
¶
Bölüm Sonu (Sonraki Sayfa)

Biçimlendirilmiş

Silinmiş: 80

Table 7.13. The Impact of Scenario 3 on Sunflower Seed and Cottonseed Production and Import

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
						Thousand Metric Tons					
Sunflowerseed Production	800	694	693	728	766	800	806	822	821	835	853
Baseline	800	694	750	754	762	778	776	781	773	778	795
Change	0	0	-56	-25	4	22	30	40	48	57	58
Percentage Change	**0**	**0**	**-8**	**-3**	**1**	**3**	**4**	**5**	**6**	**7**	**7**
Sunflowerseed Import	380	504	523	498	454	404	378	348	338	322	311
Baseline	380	504	467	473	458	426	408	388	386	378	369
Change	0	0	56	25	-4	-22	-30	-40	-48	-57	-58
Percentage Change	**0**	**0**	**12**	**5**	**-1**	**-5**	**-7**	**-10**	**-12**	**-15**	**-16**
Cottonseed Production	1260	1115	1163	1319	1322	1318	1342	1327	1339	1318	1327
Baseline	1260	1115	1164	1243	1211	1218	1256	1246	1264	1246	1267
Change	0	0	-2	77	110	100	86	81	74	71	60
Percentage Change	**0**	**0**	**0**	**6**	**9**	**8**	**7**	**7**	**6**	**6**	**5**
Cottonseed Import	51	101	75	-38	3	49	39	68	71	106	110
Baseline	51	101	73	39	114	149	125	149	145	177	170
Change	0	0	2	-77	-110	-100	-86	-81	-74	-71	-60
Percentage Change	**0**	**0**	**2**	**-196**	**-97**	**-67**	**-69**	**-54**	**-51**	**-40**	**-35**

Biçimlendirilmiş
Biçimlendirilmiş
Silinmiş: 81
Silinmiş: 45¶

Table 7.14 The Impact of the Scenario 3 on Oilseed Meal Consumption and Import

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2008	2008
						Thousand Metric Tons					
Sunflowerseed Meal Consumption	588	601	665	695	706	711	718	728	735	740	745
Baseline	588	598	678	713	724	730	738	748	755	760	766
Change	0	4	-14	-18	-18	-19	-19	-20	-20	-20	-21
Percentage Change	**0**	**1**	**-2**	**-3**	**-3**	**-3**	**-3**	**-3**	**-3**	**-3**	**-3**
Sunflowerseed Meal Import	34	53	107	133	146	160	177	193	205	211	213
Baseline	34	49	121	151	164	179	196	213	225	231	234
Change	0	4	-14	-18	-18	-19	-19	-20	-20	-20	-21
Percentage Change	**0**	**7**	**-11**	**-12**	**-11**	**-10**	**-10**	**-9**	**-9**	**-9**	**-9**
Cottonseed Meal Consumption	602	534	621	668	745	768	796	837	865	877	897
Baseline	602	536	620	666	742	766	793	834	861	874	893
Change	0	-2	1	2	3	3	3	3	4	4	4
Percentage Change	**0.0**	**-0.4**	**0.2**	**0.3**	**0.4**	**0.3**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**
Cottonseed Meal Import	18	-20	56	82	137	140	161	195	216	221	234
Baseline	18	-19	55	80	134	138	158	191	213	218	231
Change	0	-2	1	2	3	3	3	3	4	4	4
Percentage Change	**0.0**	**10.3**	**2.3**	**2.6**	**2.1**	**1.9**	**2.0**	**1.8**	**1.8**	**1.6**	**1.6**
Soybean Meal Consumption	513	504	547	567	664	745	865	977	1066	1122	1228
Baseline	513	505	546	566	665	748	872	986	1079	1135	1243
Change	0	-1	0	0	-1	-4	-7	-10	-13	-13	-15
Percentage Change	**0.0**	**-0.2**	**0.0**	**0.1**	**-0.2**	**-0.5**	**-0.8**	**-1.0**	**-1.2**	**-1.2**	**-1.2**
Soybean Meal Import	375	330	362	381	482	567	691	806	898	956	1061
Baseline	375	331	361	380	483	571	699	816	911	969	1076
Change	0	-1	0	0	-1	-4	-7	-10	-13	-13	-15
Percentage Change	**0.0**	**-0.3**	**0.1**	**0.1**	**-0.2**	**-0.7**	**-1.1**	**-1.2**	**-1.4**	**-1.4**	**-1.4**

Biçimlendirilmiş

Silinmiş: 82

Silinmiş: 45¶

Table 7.15. The Impact of the Scenario 4 on Corn and Soybean Production and Import

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2008	2008
						Thousand Turkish Liras Per Kg					
Corn Producer Price	47	50	72	96	122	152	186	225	273	328	396
Baseline	47	61	89	118	151	188	230	278	337	406	490
Change	0	-12	-17	-23	-29	-36	-44	-53	-65	-78	-94
Percentage Change	**0**	**-19**	**-19**	**-19**	**-19**	**-19**	**-19**	**-19**	**-19**	**-19**	**-19**
						Thousand Metric Tons					
Corn Production	2300	2413	2084	1953	1909	1887	1871	1865	1871	1889	1907
Baseline	2300	2413	2371	2400	2455	2496	2516	2534	2557	2592	2622
Change	0	0	-288	-447	-547	-608	-645	-669	-687	-703	-716
Percentage Change	**0**	**0**	**-12**	**-19**	**-22**	**-24**	**-26**	**-26**	**-27**	**-27**	**-27**
Soybean Production	55	65	77	77	79	80	80	80	81	81	82
Baseline	55	65	70	68	69	70	70	70	71	71	72
Change	0	0	7	9	10	10	10	10	10	10	11
Percentage Change	**0**	**0**	**10**	**14**	**14**	**15**	**15**	**15**	**15**	**15**	**15**
Soybean Import	240	279	285	291	292	295	306	312	321	322	340
Baseline	240	279	292	300	302	305	316	323	332	332	350
Change	0	0	-7	-9	-10	-10	-10	-10	-10	-10	-11
Percentage Change	**0**	**0**	**-2**	**-3**	**-3**	**-3**	**-3**	**-3**	**-3**	**-3**	**-3**

Biçimlendirilmiş

Biçimlendirilmiş

Silinmiş: 83

Silinmiş: 45¶

Conclusions and Policy Implications

This study analyzes the impact of alternative tariff and price policies on the oilseeds market in Turkey. Moreover, this study provides quantitative information about the interaction between policies for substitute crops and oilseed production and trade. In order to determine the impact of these policies on the oilseed market, a simulation model was developed that consists of several multi-commodity, partial-equilibrium models. Econometric estimates for vegetable oil demand and crop allocation models are presented in the study. These parameters and elasticities are useful information that could be used in future studies.

Silinmiş: ¶

The simulation model was used to generate a ten-year baseline projection that captures the long-run trends in oilseed supply and utilization under current policies. These projections were used to evaluate the impacts of alternative policies on the oilseeds market. In the report, the results of the four alternative policy scenarios are presented, indicating both the percentage and absolute deviation from the baseline projection. Some important findings are derived from the policy simulations, and the policy implications based on these conclusions are presented below.

Silinmiş: ¶

First, the baseline projections suggest that under the current policies Turkey's net imports of oilseeds, vegetable oils, and oilseed meals will continue to grow rapidly. In particular, sunflower oil and soybean meal imports will approach substantially higher levels by the end of the simulation period. In 1998 total oilseed imports were 671 tmt. The average import level during the last three years of the simulation period is projected to exceed 828 tmt, implying a 23 percent growth in oilseed imports over the projection period. Likewise, average total oil imports (consisting of sunflower, soybean and cottonseed oil) approached 789 tmt in the last three years of the simulation period. This represents a 135 percent increase in oil imports over the 1998 level. Baseline projections for soybean meal show imports rising above 985 tmt by the end of the simulation period, nearly triple the 375 tmt imported in 1998. If the projected import levels are realized, the total import value of oilseeds, meals, and oils will exceed one billion U.S. dollars in the later years of the projection period.

Silinmiş: ¶

Silinmiş: the

Second, results from the policy scenarios indicated that recent changes in Turkish import tariffs for oilseeds and oilseed products provide substantial protection to oilseed producers in Turkey and limit imports. Perhaps the largest import constraints are in the vegetable oil market. Reducing the import tariff on sunflower oil to the 1995 level induced a 24 percent increase in Turkish consumption of sunflower seed oil. Imports rose more than 200 tmt by 2007. The impact on Turkish sunflower seed growers is small in comparison to the change in consumption. Converting the decline in sunflower seed output into oil equivalent indicates that the decrease in sunflower seed production in Turkey would account for less than 10 percent of the change in oil consumption. Thus, measured in terms of oil consumption and production, the recent increases in oilseed import tariffs appear to penalize Turkish consumers more than they protect producers.

Silinmiş: ¶

Third, commercial and price policies in markets for substitute crops (particularly wheat and barley) can have significant impacts on oilseed and oilseed product output in Turkey. Changes in the relative magnitudes of producer prices will cause Turkish producers to reallocate planted area between sunflower seed and wheat production. Moreover, a complementary relationship between sunflower seed and barley area created by crop rotation patterns can produce seemingly perverse changes in barley area. Policy makers should consider these interactions when they are crafting future changes in relative tariff rates and producer support prices.

Silinmiş: ¶

Fourth, we found that the substitution between corn and soybean production has more substantial impacts on corn production than on soybean output. As the corn price falls following a reduction in import tariffs, area is shifted out of corn production and into production of other crops, including soybeans. Unlike in the Midwestern United States where corn and soybeans are near perfect

Silinmiş: ¶

Silinmiş: the

substitutes in production, the corn price is not as significant a factor in the expansion of Turkish soybean production.

The baseline projections show that Turkish demand for oilseeds, oils, and meals will continue to grow rapidly. Unless current policies change, the import of these commodities will also continue to grow. Growing oilseed product imports may be a reflection of a comparative disadvantage in oilseed production in Turkey relative to other parts of the world. As imports increase, Turkish agricultural efficiency may improve if productive resources are shifted toward commodities, for which Turkey's land and climate are better suited. Distortionary trade policies, such as tariffs, that elevate domestic prices and promote domestic production decrease the overall welfare of Turkish consumers.

Nevertheless, there may be other considerations that cause policy makers to view a high degree of self-sufficiency in oilseed product output as a worthwhile social goal. In order to reduce the imports of oilseed products without greatly distorting trade, the productivity of the Turkish oilseed sector must be increased. Greater productivity in oilseed output can be achieved by investing in the development of high-yielding oilseed varieties that are suited to growing conditions in Turkey. Likewise, the promotion of better crop management and input utilization practices will also increase yields and potential profitability in the oilseed sector.

Improving the average quality of land planted to oilseed will also raise output per hectare. Reducing wheat and barley import tariffs may marginally expand oilseed area and the average quality of land planted to oilseeds, raising total oilseed output. As wheat and barley prices decline toward world levels, Turkish consumers will also benefit from the lower prices. More directly, investments in increasing the area subject to irrigation in oilseed-growing regions will have a substantial impact on yields.

Productivity in the oilseed product sector may be enhanced by investing in more modern crushing facilities and by more fully utilizing existing crushing capacity. Lowering the cost of crushing inputs will provide an incentive to increase domestic crushing. Decreasing or eliminating oilseed import tariffs will lower crushing costs.

As with any policy choice, the types of policies that are pursued should reflect the relative social costs and benefits of the outcomes. This study does not attempt to evaluate the normative value of any particular policy, rather we sought to provide quantitative impacts for a selected set of alternative polices. The information provided in this study is intended to provide policy makers and other researchers with an idea of the magnitudes of the trade-offs faced in altering the oilseed sector policy in Turkey.

References

Aksoy, Ş.; Azabağaoğlu, Ö.; Unakitan, G.; Gaytancioğlu, O. and Özdemir, G. 1997. Türkiye Bitkisel Yağ Raporu 1997. (Vegetable Oil Report For Turkey 1997) Bitkisel Yağ Sanayicileri Derneği Yayınları No: 3 (Turkish).

Aksoy, Ş. and Şener, A. 1999. Yağlı Tohumlar ve Bitkisel Yağlar Durum ve Tahmin: 1997/98. (Oilseed and Vegetable Oils Current Situation and Projection Report 1997/98) Tarımsal Ekonomi Araştırma Enstitüsü Yayın No:18, Ankara, Turkey (Turkish).

Barten, A.P., and C. Vanloot. 1996. Price Dynamics in Agriculture: An Exercise in Historical Econometrics. Econ. Modeling 13, 315-331.

Bayaner, A. 1995. Supply Response of Major Crops in Turkey. Mimeo, Department of Agricultural Economics and Management, University of Reading, England.

Beghin, J. C. 1997. Consultancy in Ankara for FAO Project TCP/TUR/4552 (Assistance for Agricultural Policy Reform in Turkey in Relation to EU and WTO Agreements), Rome: FAO.

Deaton, A. S. and J. Muellbauer. 1980. Economics and Consumer Behaviour. New York: Cambridge University Press.Food and Agricultural Policy Research Institute (FAPRI). 1999. World Agricultural Outlook. FAPRI Staff Report No. 2-99, Iowa State University.

Foreign Trade Secretariat. 1999. Written communication.

Fan, S., E.J. Wailes, G.L. Cramer., 1995. Household Demand in Rural China: A Two-Stage LES-AIDS Model. Amer. J. Agr. Econ, 77:54-62.

Green, R., J.M. Alston. 1991. Elasticities in AIDS Models: A Clarification and Extension. Amer. J. Agr. Econ, 73:874-75.

Gürkan, A. A. 1979. Theory of Supply Response and Supply Response in Traditional Agriculture: A Critical Review. Middle Eastern Technical University, Studies in Development 6 (24/25): 211-274, Ankara, Turkey.

Just, R. E. 1993. Discovering Production and Supply Relationships: Present Status and Future Opportunities. Rev. Marketing and Agr. Econ. 61 (1): 11-40.

Holt M.T. 1998. A Levels Version of the Barten-Vanloot Acreage Allocation Model. Working Paper, Department Agricultural and Resource Economics, North Carolina State University.

Koç, A. A., D. B. Smith, F. Fuller, and J. Fabiosa. 1998. Turkish Agricultural Policy Analysis Model (TAPAM), Center for Agricultural and Rural Development, Iowa State University, Technical Report 98-TR 42.

Nerlove, Marc. 1958. Adaptive Expectations and Cobweb Phenomena. Quart. J. Econ., (May): 227-240.

Oil World Annual. (Various Years) Hamburg, Germany: ISTA Meilke GmbH.

Oyan, O. (1998). Birliklere Dönük Destekleme. Dünya Gazetesi, 4 Aralık 1998 (Turkish).

Silinmiş: ¶
Silinmiş: Agricultural E ... [20]
Silinmiş: U
Biçimlendirilmiş ... [21]
Biçimlendirilmiş ... [22]
Silinmiş: ¶
Biçimlendirilmiş ... [23]
Biçimlendirilmiş ... [24]
Silinmiş: ¶
Biçimlendirilmiş ... [25]
Silinmiş: ¶
Silinmiş: ¶
Biçimlendirilmiş ... [26]
Silinmiş: ¶
Silinmiş: Bredahl, E. M ... [27]
Biçimlendirilmiş ... [28]
Silinmiş: ¶
Biçimlendirilmiş ... [29]
Silinmiş: ¶
Silinmiş: ¶ ... [30]
Biçimlendirilmiş ... [31]
Silinmiş: ¶
Biçimlendirilmiş ... [32]
Silinmiş: ¶ ... [33]
Biçimlendirilmiş ... [34]
Silinmiş: ¶
Silinmiş: ¶
Biçimlendirilmiş ... [35]
Silinmiş: ¶
Biçimlendirilmiş ... [36]
Silinmiş: ¶
Biçimlendirilmiş ... [37]
Silinmiş: ¶
Silinmiş: ¶ ... [38]
Silinmiş: Kasnakoğlu, Z ... [39]
Biçimlendirilmiş ... [40]
Silinmiş: ¶
Silinmiş: ¶
Biçimlendirilmiş ... [41]
Silinmiş: ¶
Silinmiş: Organization ... [42]
Silinmiş: ¶
Biçimlendirilmiş ... [43]
Silinmiş: ¶ ... [44]
Silinmiş: ¶ ... [45]
Biçimlendirilmiş ... [46]
Silinmiş: Ministry of ... [47]
Biçimlendirilmiş ... [48]

Sadoulet, E. And A. Janvry. 1995. Quantitative Development Policy Analysis. Baltimore, Maryland: The Johns Hopkins University Press.

State Institute of Statistics. 1998. The Summary of Agricultural Statistics. Ankara: State Institute of Statistics.1996. Statistics Indicators 1923-1995. Ankara: State Institute of Statistics.

1997. 1994 Household Consumption Expenditure Survey: Summary Result of 19 Selected Province Centers. Ankara: State Institute of Statistics.

USDA (1999). Turkey, Oilseeds and Products Annual Report 1999. Foreign Agricultural Service Attaché Report No. TU9010.

Yildirim, T., H. Furtan, and A. Güzel. 1998. A Theoretical and Empirical Analysis of Wheat Policy in Turkey. In World Agricultural Trade, edited by T. Yildirim, A. Schmitz, and W. H. Furtan. Boulder, Colorado: Westview Press.

Yurdakul, O., D. Smith, A. A. Koç, F. Fuller, H. Şengül, Ş. Akdemir, N. Ören, Ş. Aksoy, F. Yavuz, G. Saner, A. Akbay, İ. Yalçin. 1999. Livestock Supply and Feed Demand in Turkey: An Evaluation of the Current Situation and Alternative Policy Scenarios. Agricultural Economic Research Institute, Ankara, Turkey.

WEFA Group. 1999. World Economic Outlook. Second Quarter, March.

Biçimlendirilmiş

Silinmiş: ¶

Biçimlendirilmiş

Silinmiş: ¶
¶

Biçimlendirilmiş

Biçimlendirilmiş

Silinmiş: ¶

Biçimlendirilmiş

Biçimlendirilmiş

Silinmiş: ¶

Silinmiş: ¶

Silinmiş: u

Biçimlendirilmiş

Silinmiş: ¶

Silinmiş: ¶

Biçimlendirilmiş

Appendix

The Model Calibration Process

Each behavioral equation in the oilseed and TAPAM models have the general form shown in equation (A.1), where μ is an error term.

[A.1] $x = f(\bullet) + \mu$

In the historical period, the error term corresponds to the residual of the underlying regression equation. By adding the residual to the deterministic part of the equation, we can exactly replicate the historical value of the variable. In the projection period the error term is fixed according to one of the following rules.

Set equal to the value of the residual for the last historical observation

Set equal to the average value of the residuals over some historical period

Set equal to a general trend observed in the historical residual series

Although the expected value of the error term is assumed to be zero, setting the error term equal to zero in the projection period usually produces a shift in the data series that cannot be explained by economic factors. Consequently, the value of the residual in the first year of the projection period is generally determined by the rule that produces the most reasonable projection for that year. In most cases, the value of the error term is held constant throughout the projection period to allow year-to-year changes in the variable to be driven by economic factors. For some variables, the error term may contain a trend or ad hoc adjustments to create a more plausible projection. Once the baseline model has been calibrated, all adjustments are held fixed at the baseline levels when conducting policy analyses to prevent the error terms from driving the simulation results.

Data Used to Calculate Domestic Oilseed Product Prices from World Prices

Biçimlendirilmiş

Silinmiş: ¶

Biçimlendirilmiş

Silinmiş: ¶

Silinmiş: ¶

Silinmiş: ¶

Silinmiş: ¶

Silinmiş: ¶
Sayfa Sonu

Biçimlendirilmiş

Silinmiş: ¶

Table A1. Tariff for Oilseeds, Oils and Meals (at Beginning of January)

		Custom Clasification Number		**1996**	**1997**	**1998**	**1999**
Cotton	**Meal**		EU and EFTA	Free	0	0	0
			Other	2	2	2	2
	Seed	15171090		Free	0	0	0
				23.5	22	20.5	19
		12072090	EU and EFTA	Free	0	0	0
			Other	4	4	4	4
	Crude Oil	15122190		12	12	12	12
Soybean	**Seed**	12010090	EU and EFTA	Free	0	0	0
		12081000	Other	23	23	23	23
	Crude Oil	15071090		12	12	12	12
	Meal	21031000	EU and EFTA	Free	0	0	0
			Other	11.3	10.6	9.8	9.1
		23040000	EU and EFTA	Free	0	0	0
			Other	2	2	2	2
Sunflower	**Seed**	12060091	EU and EFTA	3	29	28.8	28.5
			Other	3	29	28.8	28.5
		12060099	EU and EFTA	3	29	28.8	28.5
			Others	3	29	28.8	28.5
	Crude Oil	15121110	EU and EFTA	12	24	24	23.7
			Other	12	24	24	23.7
		15121191	EU and EFTA	12	38.8	38.4	38
			Other	12	38.8	38.4	38
	Meal	23063000	EU and EFTA	Free	0	0	0
			Others	2	2	2	2

Source: Undersecretary of Foreign Trade

Table A2. Some Cost for Oilseeds Import from Rotterdam to Turkey

Silinmiş: c

	Cottonseed Oil	Soy Oil	Sunflower Seed	Sunflower Oil	Sunflower Meal
	U.S. dollars per metric ton				
Freight	25	25	25	25	25
Insurance	5	5	5	5	5
Handling at the Port	1.5	1.5	1.5	1.5	1.5
Indirect tax at custom (port authority, province etc)	1.8	1.6	0.7	1.6	0.1
Others (domestic transportation etc.)	2	2	2	2	2

Silinmiş: ¶
¶

Table A3. Conversion Factor for Oilseeds and Corn

	Cottonseed	Sunflower Seed	Soybean	Rapeseed	Corn
	Percent				
Oil	16.2	42.5	17.8	38.0	1.5
Meal	44.9	54.5	79.2	59.0	3.0

Source: World Oil Annual. Note: Corn meal includes 60 percent gluten.

Sayfa 7: [1] Silinmiş	FFULLER	01.10.1999 09:35:00

Chapter 1

Introduction

Sayfa 7: [2] Silinmiş	Preferred Customer	02.09.1999 05:25:00

O

Sayfa 7: [2] Silinmiş	Preferred Customer	02.09.1999 05:25:00

s

Sayfa 7: [2] Silinmiş	Preferred Customer	02.09.1999 05:25:00

of Turkey is

Sayfa 7: [2] Silinmiş	Preferred Customer	02.09.1999 05:26:00

s

Sayfa 7: [2] Silinmiş	Preferred Customer	02.09.1999 05:26:00

the

Sayfa 7: [2] Silinmiş	Preferred Customer	02.09.1999 05:29:00

growth

Sayfa 7: [2] Silinmiş	Preferred Customer	02.09.1999 05:29:00

growth

Sayfa 7: [2] Silinmiş	Preferred Customer	02.09.1999 05:29:00

growth in

Sayfa 7: [2] Silinmiş	Preferred Customer	02.09.1999 05:29:00

expected

Sayfa 7: [2] Silinmiş	Preferred Customer	02.09.1999 05:31:00

of oilseed production

Sayfa 7: [2] Silinmiş	Preferred Customer	02.09.1999 05:31:00

,Turkey will meet to its domestic demand at the increasing percentage by import supply .

Sayfa 7: [3] Silinmiş | **Preferred Customer** | **02.09.1999 05:31:00**

s

Sayfa 7: [3] Silinmiş | **Preferred Customer** | **02.09.1999 05:32:00**

consists

Sayfa 7: [3] Silinmiş | **Preferred Customer** | **02.09.1999 05:32:00**

crops.

Sayfa 7: [4] Silinmiş | **Preferred Customer** | **02.09.1999 05:34:00**

was

Sayfa 7: [4] Silinmiş | **Preferred Customer** | **02.09.1999 05:34:00**

1987

Sayfa 7: [4] Silinmiş | **Preferred Customer** | **02.09.1999 05:34:00**

s

Sayfa 7: [5] Silinmiş | **Preferred Customer** | **02.09.1999 05:36:00**

keeping

Sayfa 7: [5] Silinmiş | **Preferred Customer** | **02.09.1999 05:36:00**

s

Sayfa 7: [5] Silinmiş | **Preferred Customer** | **02.09.1999 05:37:00**

ing

Sayfa 7: [5] Silinmiş | **Preferred Customer** | **02.09.1999 05:37:00**

land

Sayfa 7: [5] Silinmiş | **Preferred Customer** | **02.09.1999 05:38:00**

,

Sayfa 7: [5] Silinmiş | **Preferred Customer** | **02.09.1999 05:38:00**

but

Sayfa 7: [5] Silinmiş | **Preferred Customer** | **02.09.1999 05:38:00**

I

Sayfa 7: [6] Silinmiş | **Preferred Customer** | **02.09.1999 05:39:00**

trend will not continue at the historical rate. Because, in the other regions, area sown to cotton has started to declining.

Sayfa 7: [7] Silinmiş | **Preferred Customer** | **02.09.1999 05:40:00**

and

Sayfa 7: [7] Silinmiş | **Preferred Customer** | **02.09.1999 05:40:00**

Sayfa 7: [8] Silinmiş | **Preferred Customer** | **02.09.1999 05:41:00**

s

Sayfa 7: [8] Silinmiş | **Preferred Customer** | **02.09.1999 05:41:00**

of

Sayfa 7: [9] Silinmiş | **FFULLER** | **17.12.1999 11:48:00**

This highlights the need to reduce Turkey's dependence upon oilseed product imports by

Sayfa 7: [10] Silinmiş | **FFULLER** | **17.12.1999 11:48:00**

increasing the productivity of the domestic oilseeds sector. However, given the lack of

Sayfa 7: [11] Silinmiş | **FFULLER** | **17.12.1999 11:47:00**

idle land available for cultivation, expansion of oilseed area

Sayfa 7: [12] Silinmiş | **FFULLER** | **17.12.1999 11:47:00**

option.

Sayfa 7: [12] Silinmiş | **FFULLER** | **17.12.1999 11:50:00**

One

Sayfa 7: [13] Silinmiş | **FFULLER** | **17.12.1999 11:50:00**

solution may be to develop new high-yielding varieties through increased spending on research

Sayfa 7: [14] Silinmiş | **Preferred Customer** | **02.09.1999 05:46:00**

to find new high yielding oilseed varieties

Sayfa 7: [15] Silinmiş | **FFULLER** | **17.12.1999 11:50:00**

ed

Sayfa 7: [15] Silinmiş	FFULLER	17.12.1999 11:51:00

ation

Sayfa 7: [15] Silinmiş	FFULLER	17.12.1999 11:51:00

of

Sayfa 7: [15] Silinmiş	FFULLER	17.12.1999 11:55:00

may

Sayfa 7: [15] Silinmiş	FFULLER	17.12.1999 11:51:00

ae

Sayfa 7: [16] Silinmiş	Preferred Customer	02.09.1999 05:50:00

Sayfa 7: [17] Silinmiş	Preferred Customer	02.09.1999 05:51:00

one

Sayfa 7: [17] Silinmiş	Preferred Customer	02.09.1999 05:51:00

of one

Sayfa 7: [18] Silinmiş	Preferred Customer	02.09.1999 05:53:00

This

Sayfa 7: [18] Silinmiş	Preferred Customer	02.09.1999 05:53:00

indicates

Sayfa 7: [18] Silinmiş	Preferred Customer	02.09.1999 05:53:00

the

Sayfa 7: [18] Silinmiş	Preferred Customer	02.09.1999 05:54:00

This situation also highlights

Sayfa 7: [18] Silinmiş	Preferred Customer	02.09.1999 05:54:00

for

Sayfa 7: [18] Silinmiş	Preferred Customer	02.09.1999 05:54:00

ting

Sayfa 7: [18] Silinmiş	Preferred Customer	02.09.1999 05:54:00

s

Sayfa 7: [19] Silinmiş	Preferred Customer	02.09.1999 05:55:00

main

Sayfa 7: [19] Silinmiş	Preferred Customer	02.09.1999 05:55:00

ish

Sayfa 7: [19] Silinmiş	Preferred Customer	02.09.1999 05:56:00

s

Sayfa 7: [19] Silinmiş	Preferred Customer	02.09.1999 05:57:00

will

Sayfa 7: [19] Silinmiş	Preferred Customer	02.09.1999 05:56:00

’s

Sayfa 7: [19] Silinmiş	Preferred Customer	02.09.1999 05:58:00

It will be setup to

Sayfa 7: [19] Silinmiş	Preferred Customer	02.09.1999 05:58:00

for

Sayfa 88: [20] Silinmiş	Şafak AKSOY	06.03.2000 14:06:00

Agricultural Economic Research Institute. 1998. Oilseed and Vegetable Oils Current Situation and Projection Report. Ankara, Turkey.

Sayfa 88: [21] Biçimlendirilmiş	gulten	21.03.2000 17:43:00

Biçimlendirilmiş

Sayfa 88: [22] Biçimlendirilmiş	gulten	21.03.2000 17:43:00

Biçimlendirilmiş

Sayfa 88: [23] Biçimlendirilmiş	Şafak AKSOY	07.03.2000 15:14:00

Biçimlendirilmiş

Sayfa 88: [24] Biçimlendirilmiş	gulten	21.03.2000 17:43:00

Biçimlendirilmiş

Sayfa 88: [25] Biçimlendirilmiş	gulten	21.03.2000 17:43:00

Biçimlendirilmiş

Sayfa 88: [26] Biçimlendirilmiş	ali	25.02.2000 17:49:00

Biçimlendirilmiş

Sayfa 88: [27] Silinmiş	ali	25.02.2000 17:50:00

Bredahl, E. M., W. H. Meyers, and K J. Collins. 1979. The Elasticity of Foreign Demand for U.S. Agricultural Products: The Importance of the Price Transmission Elasticity. Amer. J. Agr. Econ., (February):58-63.

Sayfa 88: [28] Biçimlendirilmiş **gulten** **21.03.2000 17:43:00**
Biçimlendirilmiş

Sayfa 88: [29] Biçimlendirilmiş **gulten** **21.03.2000 17:43:00**
Biçimlendirilmiş

Sayfa 88: [30] Silinmiş **ali** **25.02.2000 17:47:00**

Edgerton, D.L., 1997. Weak Separability and the Estimation of Elasticities in Multistage Demand System. Amer. J. Agr. Econ., 79:62-79.

Sayfa 88: [31] Biçimlendirilmiş **gulten** **21.03.2000 17:43:00**
Biçimlendirilmiş

Sayfa 88: [32] Biçimlendirilmiş **gulten** **21.03.2000 17:43:00**
Biçimlendirilmiş

Sayfa 88: [33] Silinmiş **gulten** **28.03.2000 12:08:00**

Sayfa 88: [33] Silinmiş **gulten** **21.03.2000 17:44:00**

Sayfa 88: [33] Silinmiş **gulten** **21.03.2000 17:44:00**

A

Sayfa 88: [34] Biçimlendirilmiş **gulten** **21.03.2000 17:43:00**
Biçimlendirilmiş

Sayfa 88: [35] Biçimlendirilmiş **gulten** **21.03.2000 17:43:00**
Biçimlendirilmiş

Sayfa 88: [36] Biçimlendirilmiş **gulten** **21.03.2000 17:43:00**
Biçimlendirilmiş

Sayfa 88: [37] Biçimlendirilmiş **gulten** **21.03.2000 17:43:00**
Biçimlendirilmiş

Sayfa 88: [38] Silinmiş **gulten** **21.03.2000 17:44:00**

Sayfa 88: [39] Silinmiş **ali** **25.02.2000 17:48:00**

Kasnakoğlu, Z. 1995. Anaysis and Projections of Domestic Fish Consumption, Turkey Fish Marketing Study, Ankara: Ministry of Agriculture and Rural Affairs.

Kesavan, T., Zuhair A. Hassan, Helen H. Jensen, and Stanley R. Johnson. 1993. Dynamic and Long-run Structure in U.S. Meat Demand. Can. J. Agr. Econ., 41:139-153.

Sayfa 88: [40] Biçimlendirilmiş **gulten** **21.03.2000 17:43:00**
Biçimlendirilmiş

Sayfa 88: [41] Biçimlendirilmiş **gulten** **21.03.2000 17:43:00**
Biçimlendirilmiş

Sayfa 88: [42] Silinmiş **ali** **25.02.2000 17:48:00**

Organization for Economic Cooperation and Development (OECD). 1994. Country

Agricultural Policy and Trade: Turkey County Report. Paris: OECD.

Sayfa 88: [43] Biçimlendirilmiş **gulten** **21.03.2000 17:43:00**
Biçimlendirilmiş

Sayfa 88: [44] Silinmiş **gulten** **28.03.2000 12:08:00**

Sayfa 88: [44] Silinmiş **gulten** **21.03.2000 17:45:00**

Sayfa 88: [45] Silinmiş **ali** **25.02.2000 17:48:00**

Moschini G., 1995. Units of Measurement and the Stone Index in Demand System

Estimation. Amer. J. Agr. Econ, 77:63-68.

Sayfa 88: [46] Biçimlendirilmiş **gulten** **21.03.2000 17:43:00**
Biçimlendirilmiş

Sayfa 88: [47] Silinmiş **ali** **25.02.2000 17:48:00**

Ministry of Agriculture and Rural Affairs. 1999. Data Series for Producer and Consumer Subsidy Equivalent Calculation (Software Record). Ankara.

Park, J.L., R.B. Holcomb, K.C. Raper, O. Capps, Jr. 1996. A Demand System Analysis of Food Commodities by U.S. Households Segmented by Income. Amer. J. Agr. Econ, 78:290-300.

Rickertsen, K. 1998. The Demand for Food and Beverages in Norway. Agr. Econ., 18:89-100.

Sayfa 88: [48] Biçimlendirilmiş **gulten** **21.03.2000 17:43:00**
Biçimlendirilmiş

Sayfa 88: [48] Biçimlendirilmiş **gulten** **21.03.2000 17:43:00**
Biçimlendirilmiş

Sayfa 88: [48] Biçimlendirilmiş **gulten** **21.03.2000 17:43:00**
Biçimlendirilmiş