

Agricultural Protection under the Floating Exchange Rate Regime the Case of Turkey¹

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1. Introduction

Objectives of the Turkish agricultural policy are set by annual programs and development plans of the State Planning Organization. These are: ensuring adequate levels of nutrition, raising yields and production, reducing the vulnerability of production to adverse weather conditions, raising levels of self-sufficiency, increasing agricultural incomes and improving income stability, increasing exports, and developing rural areas.

Domestic price supports and input subsidies were the major government interventions in the crop sector. The second largest subsidy was for fertilizers and credit. Import restrictions, high tariffs, and other taxes on import are used to augment these policies. Funds that were generated through imports of agricultural commodities, that is, extra-budgetary levies, were also used to subsidize exports (OECD, 1994).

The Turkish livestock sector has been supported by several policies. Recent livestock sector policies include (Koc et al, 2001): import restriction, veterinary service and animal disease control, subsidized heifer and lamb distribution, artificial insemination, export subsidies, input price subsidies and agricultural credit support.

The single most critical issue in the agricultural sector is the inefficient and costly system of agricultural support policies. These have not only manifestly failed to enhance productivity growth, but have been a heavy burden on consumers and taxpayers and a source of Turkey's macroeconomic problems. Support provided to agriculture is given in Table 1. Support through market price used to account the largest amount of the support to farmers. On the contrary, livestock received the least support until the recent years.

Abstract

Costly agricultural support policies are removed in an unstable macroeconomic environment. The impact of these changes on Nominal and Effective Protection Coefficient of wheat, sugar, orange, tomato, and milk are evaluated. Results indicate that import substitution crops are protected more; protection coefficients are positively correlated with the appreciation of the exchange rate, and financial crisis of 2001 pulled the coefficients down.

Résumé

Dans un environnement macro-économique instable, les politiques coûteuses de soutien sont rejetées. Ce travail évalue l'impact de ces changements sur le Coefficient de protection effective du blé, du sucre, de l'orange, de la tomate et du lait. Les résultats font ressortir que les cultures de substitution aux importations sont mieux protégées, les coefficients de protection sont en corrélation positive avec l'appréciation du taux de change, et la crise financière de 2001 a causé une baisse des coefficients.

Credit support originates mostly from the restructuring of the farmers loan to Agricultural Credit Cooperatives and the Ziraat Bank. Duty losses are borne by the State Economic Enterprises and put a burden on the treasury. However, no more duty losses are created. The overall support to agriculture in Turkey has been declining rapidly.

The Government of Turkey (GOT) has embarked on a structural adjustment

and stabilization program of historic dimensions. The strategy of this economic program is disinflating the Turkish economy, strengthening the fiscal accounts, reforming the structure of the Turkish economy as a condition for setting economic growth on a sustainable basis and moving Turkey closer to its goal of joining the European Union. The program's policies have been significantly strengthened, in response to the crisis of November 2002 and February 2001 that led to the float of the Turkish lira on February 22, 2001, including through increased emphasis on transparency, accountability, and good governance in both the private and public sectors (www.imf.org).

The Government of Turkey initiated the Agricultural Reform and Investment Program (ARIP) to support the strategic objectives. ARIP can be summarized in several elements. First, the Government phased out the unsustainable and distortionary system of subsidies for fertilizers, credit and price supports which disproportionately benefit large farmers, regressively tax consumers, to link prices to world market prices. The second initiative under the program is to privatize most state enterprises in agriculture to reduce government involvement in the marketing and processing of agricultural products. Third, the government will introduce a unified national program of direct income support (DIS) (WB, 2000). The reforms will assist the GOT in the accession to the EU by increasing the efficiency of the sector and the economy at large, thereby helping it meet one of the most basic pre-conditions set down by the EU: that the applicant states have economies that are efficient enough to be competitive in the unified market.

Public interventions in the agricultural and food economy are

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Table 1. *Support Payments (Million US \$)*

Types of Support	1999	2000	2001	2002	2003
1. Price Support	641.7	332.9	110.2	26.7	-
2. Input Subsidies	288.2	206.2	104.2	-	-
3. Price Premium	23.8	19.2	9.8	11.1	27.629
4. Compensation Payment	44.1	45.9	22.46	25	29.48
5. Agricultural Credit	1955.4	677.6	418.1	117.4	n.a.*
6. Deficiency Payment	268.6	285.2	238.1	145.1	214.380
7. Livestock Support	0.5	19.229	33.653	42.496	70.179
8. Direct Income Support	-	-	68.1	1158.9	1537.2
9. General Services	92.5	102.0	103.4	144.2	n.a.*
10. Duty Losses	3005.0	1929.8	1082.5	-	259.100
11. Export Subsidy	28.0	27.3	25.9	-	-
12. Farmer Transition	-	-	-	-	0.573
13. Fuel Subsidy	-	-	-	-	418.462
Total	6.348	3.645	2.216	1.671	2557
% of GDP	3,8	1,8	1,5	0,9	1,0
U.S Dollar Exchange Rate*	419540	626409	1228837	1511055	1509300

* not available
** Central Bank of Turkey, US \$ buying price in Mid June.
Source: R. Yeni and C.O. Dolekoglu (2003). *Agricultural policy processes and transfer to producers (in Turkish)*. Agricultural Economics Research Institute of Turkey. Publication No: 98. Ankara.

numerous and they have multiple impacts. It is difficult to assess those measures in such a macroeconomic environment. At this point, it is important to understand whether the protection in the Turkish agriculture has changed. The purpose, therefore, is to monitor policy reforms affecting the agricultural sector. First, protection coefficients are calculated. These coefficients then are compared with the exchange rate and the reform process.

2. Commodities

Five commodities are chosen to investigate the protection rate. Commodities are wheat, sugar, milk, orange, and tomato. These commodities are important in Turkish agriculture. Wheat is the most important agricultural commodity in Turkey, both politically and economically. Approximately 3.5 million farmers in Turkey produce wheat. Wheat is the staple food item for Turkish consumers, with a marketing ratio of 64 per cent.

Sugar beet is produced in 7200 settlement areas in 64 provinces. Approximately 300 thousand farmers are producing sugar beet on five million hectares of land in three to four-year rotation with cereals on a contract bases (Anonymous, 2000).

Livestock production in Turkey is not highly specialized. However, in recent years, producers form their unions seeking for a better production environment. Most of the 10 million tons of milk produced is consumed in households as milk, cheese, butter, and yogurt. Therefore, milk is highly important for the diet of the agricultural population as well as the urban families.

Production of fresh produce is widespread throughout Turkey in small-sized farms. Most farms grow fresh produce on their own

land, particularly in Mediterranean coastal regions. Total production area of citrus is about 86 thousand hectares. Of which, 54 thousand hectares are grown with orange orchards. The production of fruits and vegetables is about 30 million tons (SIS, 2003). Annual average fresh fruit and vegetable export value accounted for 1.4% of Turkey's total export value during the 2002-03 period. Trade data indicates that citrus accounts for 63% of fresh fruit export value and tomato for 40% of total fresh vegetable exports value (DTM, 2002; SIS, 2002).

3. Methods

This study is of an experimental nature. In order to measure the structure of incentives for various agricultural activities, and to produce a consistent, quantitative assessment of income transfers between agriculture and the rest of the economy, indicators must be comparable over time, across commodities. Further, they must be easy to measure and understand, and must accurately reflect the incentive structure of the underlying policy instruments.

Two indicators were selected: the rate of nominal protection (NPR), which measures the protection of a product resulting from its price being higher than the level which would prevail if the product was freely imported at the world price. It measures the impact of border measures as well as domestic market intervention measures influencing the price of the product on domestic markets (Tsakok, 1990; Valdez and Schaefer, 1995a and 1995b; Valdez, 1996; Togan et al., 2004).

The second is the rate of effective protection (EPR). The EPR reflects both the impact of public interventions on the market for the product and the impacts of public interventions on markets for the factors of production. One can easily understand that the incentives to produce resulting for instance from a high domestic price for the product will be dampened if the prices of the necessary factors of production are also high. As a result, it may be necessary to take factor market intervention into account when interpreting nominal protection rates. In that sense the EPR is more complete than the NPR (Tsakok, 1990; Valdez and Schaefer, 1995a and 1995b; Valdez, 1996).

Nominal Rate of Protection

The nominal protection rate (NPR) is defined as the ratio of the prevailing domestic price relative to the appropriate adjusted border price in the absence of intervention. Thus, the NPR is an equivalent tariff measure and does not necessarily coincide with the explicit tariff for the commodity in question.

The formula for the NPR for commodity i is as follows:

$$NPR_i = \frac{P_i^d - P_i^w E_0}{P_i^w E_0}$$

where P^d is the domestic price, P^w is the world price of commodity i and E_0 is the exchange rate.

While this calculation is relatively simple, it is very important to select accurate prices for the ratios, and it is essential to have a thorough understanding of the domestic markets where the prices are formed.

The results can be interpreted as follows: A positive NPR means the producer is receiving a higher price for the commodity than he would without intervention, and the consumer is paying more for the product. Positive protection is frequently associated with importables. A negative NPR signals that the producer is being discriminated against relative to the prevailing border prices. A zero NPR suggests that the structure of protection is neutral, i.e., producers face domestic prices comparable to border prices.

Effective Protection Rate

In most cases, trade policy extends beyond output prices and into input markets. The effective protection rate (EPR) indicator accounts for these additional interventions. The EPR measures how trade barriers on a product and its tradable inputs jointly affect value-added in a particular activity.

This indicator has the advantage of examining the resource allocation effect of a tariff structure. Previous work has shown that a single tariff (or NPR) implies different EPRs, depending on the level of taxation on imported inputs, and on the importance of those inputs in the production process. By including inputs, the EPR becomes a more precise instrument and, at the same time, more difficult to calculate. Inputs are often subject to both tariffs and quantitative restrictions. Distinguishing between product quality, and defining an appropriate border price for a direct price comparison, can be a problem. In addition, the exchange rate considerably affect the imported input prices. This study considers the principal purchased inputs including fertilizers, chemicals, seed, and the cost of operating farm machinery and equipment (Allaya and Petit, 2003).

Calculation of the EPR accounts for the difference between the value-added at domestic prices (intervention) and the value-added at world prices (without intervention), where value-added is defined as the value of output less the costs of intermediate inputs.

The formula for the EPR for commodity i is the following:

$$EPR_i = \frac{VA_i^d - VA_i^w E_0}{VA_i^w E_0}$$

where V^d and V^w value-added at domestic and world prices, and E_0 is the appropriate exchange rate.

Interpretation of the EPR is similar to the NPR. For positive EPRs, the returns earned through the activity with intervention are greater than those earned without intervention. For negative EPRs, the reverse is true. Finally, for EPRs equal to zero, the protection factor is neutral and the returns are the same.

Since EPRs are, in fact, NPRs that have been extended to include inputs, similar behavior between the two indicators can be expected under certain conditions. For example, if the inputs are a small proportion of the value of output, calculating the EPR is of little value. Although the EPR provides additional information, it also contains biases because of input substitution possibilities. In practice, however, these biases tend to be ignored because elastic-

ities of substitution are highly difficult to obtain. Nevertheless, an understanding of the direction of that bias can help to better assess the impacts of policies on production.

4. Data

Valdez and Schaeffer (1995a,b) determined the data needed in the analysis. The analysis begins with a broad overview of a given commodity's production and marketing chain. Each step of the chain is then analyzed with cost and price estimates.

Allaya and Petit (2003) stated that the next step is to focus on pricing instruments using the marketing chain as a sequential series of price points. Relevant domestic prices of both outputs and inputs are needed. The technological coefficients of converting inputs into output are required as well. Domestic prices should be acquired at the farmgate level. Direct payments received as subsidies, and such costs as taxes and payments to marketing boards, should be added to the prices paid and received directly for the inputs and outputs.

Costs of delivery of the commodity to the central market, and other related marketing costs, are important consideration. Internal transport and related costs can be substantial, and are often a source of implicit protection to producers of importables, and an implicit tax to the producers of exportables. Physical transformation of the raw product, i.e., wheat ground into flour, are also accountable costs. Thus, conversion factors must take into consideration such processes. Price subsidies and taxes may also apply to these processes, in addition to the direct costs incurred. Turkish Grain Board (TMO) (2003) provided the data on transportation and handling.

All tariffs, taxes, subsidies, port charges and other costs associated with either the importation or exportation of a commodity must be accounted for. This stage is usually the most difficult to properly incorporate, because most likely the government intervenes here.

Border prices, when converted to domestic currency from world prices, reflect the opportunity cost to the economy of producing the commodity and identified at this stage. This focus on the use of opportunity cost as a benchmark against which trade and price policy is assessed is the essence of the economic approach used in this study.

The identification of a proper exchange rate is also important. Thus, the calculations of the indicators utilized the same real exchange rate. In most cases this was the official exchange rate (TCMB, 2003).

A critical step in this analysis is the adjustment of prices. Three factors must be considered in selecting accurate, comparable prices for the calculation of the indicators. The first is whether the commodity is an exportable or importable. The second is the price prevailing at the true point of competition between the domestically-produced commodity and its overseas counterpart. The third is the point in the marketing chain at which the two prices are to be compared (Valdez, 2000; Allaya and Petit, 2003).

For exportables, the point of competition is normally the port. In this case, a comparable border price would be the f.o.b. price, minus all processing, marketing and transport costs incurred between

the farm and the port. Using an intermediate marketing point as the place of comparison, the costs of the marketing chain from the central marketing point to the port must be subtracted from the f.o.b. border price, and the costs incurred between farm and the central marketing point must be added to the farmgate price, in order to develop comparable prices. The net result is a border equivalent price that can be meaningfully compared to the domestic price.

For importables, the point of competition is frequently the processor. Again, using the central marketing point as the place of comparison, the transportation and other relevant marketing costs incurred to get the import to the processor must be added to the c.i.f. price. The costs are then subtracted from the central farm marketing point. In order to then ensure that the c.i.f. plus price does not overstate the price that the farmer could get, either the costs of handling incurred between farm and central marketing point must be subtracted from the c.i.f. plus, or border price, or the domestic price must be adjusted by adding those same costs to the farmgate price.

These adjustments provide an accurate comparison between the domestic price and the border price, as an efficiency benchmark. In other words, such adjustments translate, by various methods, actual prices into the prices farmers could have received if allowed to compete freely with the imports.

The border prices used in this study were obtained from the Ministry of Agriculture and Rural Affairs (MARA). MARA uses the same reference prices for its calculation of producer and consumer subsidy equivalents for the Organization for Economic Cooperation and Development (OECD, 2000).

Relevant information for policy decisions is readily available. Board of Research Planning and Coordination Council (APK) of the Ministry of Agriculture and Rural Affairs keeps records and carries out policy analyses to provide timely information to policy makers. Most data are obtained from APK of the Ministry of Agriculture and Rural Affairs (MARA, 2003).

5. Results

A summary of the protection indicators is presented in Table 2. Wheat, sugar, and milk are importable commodities. Importable commodities are protected through tariffs. In addition, wheat and sugar beet were under market price support scheme until 2001. Milk is supported through a milk price premium and, in addition, by high tariffs for processed milk products. Protection coefficients for importable commodities are positive, in that their prices are higher than the world prices. Orange and tomato are the two of the commodities that receive no market price support. Their prices are determined in the market.

Results indicate varying protection coefficients in general. Coefficients for all crops decreased until the year 2001. They increased thereafter. Fertiliser was subsidized in Turkey. Fertiliser subsidies were high; however, in recent years, fertilizer subsidies were removed. Chemicals are not subsidized. All the subsidies in Turkish agriculture were removed in 2002.

NPR at wholesale point varied from -12.98 % in 2001 to 38.96 % in 2003. The range of the EPR is from -6.15 % to 125.94 %.

Although there is a tariff in wheat import, wheat is imported through Internal Processing Regime and Free Trade Agreements (FTAs). In addition, seed is also imported and, there is no tax on imported seed. In reality, this tariff is not applied. However, there are port charges, storage and handling.

Sugar is the most protected sector. NPR at wholesale point varied from 5.60 % in 2001 to 115.11 % in 1999. The range of the EPR is between 13.44 % in 2001 to 396.24 % in 1999. The majority of the protection is a result of the price support system. The Turkish Parliament has passed a Sugar Law to facilitate privatization of the sugar industry and to reduce the government outlays. The new law establishes quotas for all sugar producers and will limit starch-based sugar production to a level below its existing installed capacity.

Livestock is protected through the border measures and milk premium. Protection is positive throughout the period examined. The NPR is the lowest in 1995 with 2.99 % and highest in 1997 with 35.67 %. The EPR and ERA have varied from 15.34 % to 82.60 % and 33.00% to 97.00 % respectively. Although milk prices were substantially low in late years of the period, producers have received positive protection.

The NPR for orange ranges from -55.09 % in 2001 to 6.60 in 2003 %. The EPR has varied from -62.26 % to 8.50 % for the same years. Protection rates are negative but increasing since 2001. Tomato is another exportable crop studied. As in orange, negative protection exists throughout 2001 and 2003. The range of the NPR is from -25.43 % in 2002 to 12.92 % in 1999. The EPR has varied from 7.15 % to 20.92 %.

Whether negative protection rate in 2001 is a result of the financial crisis or the liberalization of agriculture started in 2000 is a question. Border policy measures in these years are not substantial. Input subsidies and price support were removed in 2002. A direct income support mechanism was adopted in 2001 to compensate the income loss of farmers. However, Turkey experienced a financial crisis in 2000 and 2001. Therefore it is expected that the combined effects of this crisis with the liberalisation of agriculture have a considerable impact on the coefficients.

The comparison of real producers' prices and real border prices shows significant reductions of real prices received by producers, under the combined impacts of inflation and of the depreciation of local currencies with respect to the US dollar until 2001. The consumer price index increased until 2002. The real exchange rate depreciated until 2001, and appreciated throughout the period examined.

The financial crisis in 2001 is the main reason for the negative protection coefficient. Depreciation of the local currency with respect to US dollar pushed the protection coefficients down. Appreciation of the local currency in 2003 pulled the coefficients up again sharply except for sugar (Figure 1). This is most probably due to sugar law. It seems that prices are more responsive to the exchange rate changes. Coefficients for 2003 are unexpectedly high since all the subsidies and price support were removed. When comparing the CPI inflation and the coefficients, it is evident that the two variables are negatively related. Coefficients also seem to move together with the growth rate.

Table 2. *Protection Coefficients*

	1999	2000	2001	2002	2003
Wheat/importable					
NPR, Wholesale	37.02	15.19	-12.98	4.95	38.96
NPR, Collection point (farm)	42.06	17.13	-14.42	5.58	44.38
EPR	98.08	33.85	-6.15	31.85	125.94
Sugar/importable					
NPR, Wholesale	115.11	66.50	56	7.84	31.97
NPR, Collection point (farm)	169.45	99.77	6.53	9.08	38.38
EPR	396.24	197.00	13.44	17.02	76.63
Orange/exportable					
NPR, Wholesale	5.10	6.60	-55.09	-43.35	-17.56
NPR, Collection point (farm)	5.35	7.11	-58.74	-46.70	-19.07
EPR	5.32	8.15	-62.26	-49.90	-20.79
Tomato/exportable					
NPR, Wholesale	12.92	7.33	-22.43	-25.43	-12.91
NPR, Collection point (farm)	14.52	7.89	-24.73	-27.73	-13.83
EPR	20.92	9.07	-27.29	-30.37	-21.83
Milk/importable					
NPR, Wholesale	8.23	16.58	-21.00	-0,53	40.34
NPR, Collection point (farm)	13.22	17.31	-21.89	-0,56	42.39
EPR	23.23	30.99	-320.40	-246,76	-310.59
Rate of inflation (% , CPI)	65.0	32.7	88.6	30.8	13.9
Growth rate (%)	-6.0	6.2	-9.4	7.8	5.9
Exchange rate (\$/TL)	419540	624409	1228837	1511055	1509300

Source: Author's calculations

6. Conclusions

This is an experimental development of a monitoring system for economic policies affecting the agricultural and agri-food system at the national level. The findings may have some limitations in driving policy recommendation. However, analysis of the results is quite interesting. It raises fundamental questions on some strategic orientations of the policies affecting the agricultural and agri-food sector.

Protection policies are more pronounced in support of import substitution products: wheat, milk and sugar support levels are high both on product and factor markets. Export products such as oranges and tomatoes, are generally taxed, but sometimes slightly supported. Export products are often discriminated against notably but not only because of the overvaluation of the exchange rate. However, to test all these, the data series are not long enough and they could be future research area.

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Figure 1. *Nominal Protection Coefficients*