Possible Effects of Set-Aside Removal and Severe Draught in the EU and Turkey[1]

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Abstract

This paper is aimed at analyzing the impacts of policy measures taken in the EU and in Turkey to cope with the decrease in cereals and oilseeds supply in both areas. Changes in the supply amount were found to have negligible effects on world prices and the removal of obligatory set-aside obviously seemed to be a partial solution for the problem of decreasing stocks and rising domestic prices. It the trade liberalization and how it was implemented were the main factors significantly affecting quantities and prices. In addition, the EU liberalization may substantially affect Turkey.

Keywords: Set-aside policy, draught, partial equilibrium trade model.

Résumé

Ce document vise à analyser les répercussions des décisions politiques prises par l'Union européenne et la Turquie pour faire face à la diminution des volumes de production des céréales et des oléagineux dans les deux zones. Les changements dans la quantité de ces produits ont une influence négligeable sur les prix du marché mondial et l'élimination du gel obligatoire des terres semble être une solution partielle aux problèmes de diminution des stocks et d'augmentation des prix sur le marché intérieur. De surcroît, la libéralisation au sein de l'UE pourrait affecter sensiblement la Turquie.

Mots-clés: *politique du gel des terres, sécheresse, modèle commercial d'équilibre partiel.*

1. Introduction

Since 2003, the rapid increase in world price of food commodities has put this price rise on the top of the agenda of worldwide policymakers. The most noticeable aspect of this rise was that almost all food crops as well as livestock products were affected by it. According to FAO (2008), the price increase in dairy products, oilseeds and grains was on the average about 80, 50 and 42 per cent respectively[2]. Another remarkable feature was that high international crops prices have been transmitted in varying degrees to final consumers of the domestic economies through the rise in retail prices of basic foods products (European Bank, 2008). While in Tanzania, 81 per cent of the change in international maize prices between 2003 and 2008 has been captured by local price changes, this rate was about 5 and 32 per cent respectively in Jakarta and Surabaya in Indonesia, and in Ghana and the Philippines this was about 50 per cent (Ivanic and Martin, 2008). The last remarkable aspect of this price rise was that food price increase was observed to have a direct impact on overall inflation and this impact had varied depending on the weight of food in the consumption basket[3]. For instance, in China, food price inflation was observed to contribute towards about 90 per cent of overall inflation, whereas it was about 20 per cent in India and in a range between 23 and 50 per cent in Latin America (Ivanic and Martin, 2008).

The recent increases in international prices of basic food products have attracted the attention of numerous stakeholders including farmers, consumers, policy makers, international institutions, the media and all people in low-income countries with low food security. Farmers are interested because higher crop prices create incentives for production, but higher feed prices create disincentives for producing livestock as well. Consumers and particularly poor people in lower-income countries are more concerned about their food security. Policy makers and international institutions focus on possible policy actions to set up in order to maintain food security for poor people, besides on research initiatives taken to reveal the factors driving the price increase. The impact of high food prices may vary across countries and population groups mostly depending on the countries' net trade status in food. Net food exporters may benefit from improved terms of trade, unless they ban exports to protect consumers. Net food importers, however, may struggle to attain food security in the country and most of the poor people in urban areas are included in this group. People in rural areas may adjust through wages and capital inflows (that can create new income opportunities), anyway, this requires an adjustment period until it reaches the poor and vulnerable (Ivanic and Martin, 2008)[4]. In addition, the effect of higher food prices is not only on food security and nutrition, but it also signif-

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[1] An earlier version of this paper was presented at the 2008 Annual Conference of the South Western Economics Association, Las Vegas, March 12- 15.
[2] The FAO food price index rose by nine 9 and 23 per cent on average in 2006 and 2007 respectively, compared to the previous year (FAO, 208).
[3] This impact was relatively high particularly in low income countries and lower income groups in developing-middle income countries.
[4] Because poor households are more responsive to changes in food prices-there is a real risk that large numbers of vulnerable people who had managed to escape absolute poverty in recent years will be unable to cope with the shock of rapidly rising food prices and will fall back into poverty.

icantly erodes the household purchasing power (IFPRI, 2008). Therefore, food security and nutrition of the poor seem to be at risk if they are not protected with counter policy measure. Ivanic and Martin (2008) and Son and Kakwani (2006) provided interesting analyses on the relationship between food prices and poverty in low-income countries. While the former employed both partial and general equilibrium frameworks to derive impacts, the latter measured poverty and estimated money metric utility function.

The literature emphasizes various factors as possible drivers of food commodity price increase. IFPRI (2007) identified adverse climate impact as one of the major supply-side factors which created shortfalls particularly in production of cereals and oilseeds during 2005-2007. Another supply-side factor was mentioned by FAO (2008) as the decreasing stock levels of cereals, since the high-price event in mid 1990s. According to Mitchell (2008), increasing energy costs, particularly of fuel, have also raised the cost of production and added to the production shortage. Finally, the trade-off and/or competition between oilseeds and grains areas, especially in the EU after the removal of set-aside policy and in some other countries after the rise in demand for bio-ethanol and bio-diesel, appeared as the other aspect to be taken into consideration on the supply side (European Bank, 2008). On the demand side, the literature reveals three factors driving the food price rise. First of all, the strong global economic growth in low-income but highly populated countries such as India and China has created a shift in food demand towards high-value food items and away from staple food (Collins, 2008). Secondly, the rise in bio-energy production, sourced by the rise in bio-energy demand, also added to pressure on feedstock price as they are used in production of bio-diesel and bio-ethanol. As last factor, Cohen (2006) also noted the impact of worldwide urbanization on the change in preferences in food demand and its possible contribution to food price rise. An extensive review of applied literature regarding bio-energy was provided in Rajogapal and Zilberman (2007) who grouped applied methodologies and related work under cost accounting models, micro-models of resource allocation and decision making, sector models, and general equilibrium models. Sector models evaluated outcomes of bio-fuel mandates at global and national level. Outcomes of policies to sequester carbon through agriculture were analyzed and grouped separately. They reclassified general equilibrium models into models that analyzed impact of bio-fuel and carbon targets on the national economy and models that emphasized international trade. The Rajogapal and Zilberman (2007) study can be extended to research related to the drivers of world food prices and impacts of increases on lower-income countries. Mitchell (2008) focused on the USA markets and provided an analysis of the factors behind food price rise, whereas Collins (2008) investigated the same issue in world markets. Both Mitchell (2008) and Collins followed the dynamics behind the actual food price data rather than price forecast.

In addition to the above factors, the FAO (2008) emphasized the significance of developments in the international financial markets as well in contributing to spot price volatility, by offering an expanding range of financial instruments for speculators to increase portfolio diversification (FAO, 2008). Moreover, many policy actions and measures were considered by international organizations and domestic economies to cope with food price rise and to maintain food security. These policies varied from the introduction of price controls to a reduction in import barriers and the imposition of export restrictions (Collins 2008; European Bank, 2008). However, caution should be given since export restrictions may create disincentive for farmers to invest in agriculture and domestic price controls may add to the disincentive, thus diverting resources away from the agricultural sector. Trade restrictions might push cartel formation and protectionism in smaller markets could be encouraged. Ivanic and Martin (2008) mention that this sort of protectionist policies may put the efforts in the WTO Doha Round in «reverse gear».

This study specifically evaluates impacts of two phenomena that might have put growing pressure on world food prices. The first phenomenon is represented by adverse climate conditions in the EU and Turkey, and the second one is the removal of set-aside policy in the EU. Next section provides the background information regarding the climate impacts and policy changes. Section three summarizes the applied methodology and introduces policy scenarios. Empirical analyses follow and, eventually, in section five, the paper draws conclusions with a particular focus on the outcomes in the EU and Turkey.

2. Background for the Study

In the second half of 2007, the effects of dry and unusually hot weather in spring, followed by adverse summer weather in Europe, forced the European Union to take measures in agricultural markets. At the beginning of the 2007/08 marketing year (July time), total stocks (private + intervention) were 13.2 million tons, far under the previous-year levels. This was due to the modest harvest in 2006/2007 and to significant withdrawals from the EU intervention stocks. In 2007, unfavourable weather conditions reduced the harvest and the overall EU production was estimated at 256 million tons, a reduction of 10 million tons or 3.5 percent with respect to the already modest 2006/2007 harvest. As a result, the EU would have needed more imports in 2007/2008 than in 2006/2007. Therefore, the European Union approved the removal of obligatory set-aside policy for autumn 2007 and spring 2008 sowings by the end of September 2007, and it suspended import duties on most of cereals from the end of December 2007 to July 2008. These changes came in response to the increasingly tight situation on the cereals market. In the EU-27, in 2006, a scarce harvest (265.5 million tons) led to a supply gap at the end of marketing year 2006/2007 with shrinking stocks and historically high cereal prices. The implementation of the new rate was expected to increase the 2008 cereal harvest by at least 10 million tons.

It was stated by the European Commission that the current area under obligatory set-aside amounted to 3.8 million hectares in the EU. If the set-aside rate was set to 0%, the effective return of land could be between 1.6 and 2.9 million hectares (IP/07/1402). On average, it seems likely that this area would bring around 10 million tons of grains onto the market. If the maximum amount of land can produce cereals in lieu of other crops especially oilseeds, this quantity seems to reach 17 million tons. As reminder, set-aside was introduced to limit production of cereals in the EU on a voluntary basis from the 1988/1989 production year. After the 1992 reform, it became obligatory to set aside an announced percentage of declared areas in order to be eligible for compensatory payments. In 2003, with a new implementation of set-aside, entitlements were allocated to farmers, thus giving the right to a payment if farmers were accompanied by eligible land put into set-aside. In 1999/2000, it was permanently established at 10%. In the new 12 Member States, the implementation of the Single Area Payment Scheme (SAPS) was preferred and farmers were exempted from the obligation of set-aside.

The European Union also agreed on suspending import duties on all cereals (except oats, buckwheat and millet) to end on 30 June 2008 (IP/07/1403). The decision was the second reaction to the exceptionally tight situation on cereals markets and the record price levels. Although the current levels of border protection for cereals were rather low, import duties were still applied for certain types of grains. According to the EU implementation, the duty was fixed on the basis of the difference between the effective EU intervention price for cereals including monthly increments, multiplied by 1.55 and a representative cif import price for cereals in Rotterdam. The resulting duty was currently set at 0 for durum wheat, high quality soft wheat, rye and sorghum. The duty for maize has fluctuated from a peak of €16.21 per tonne to 0 since 1 October 2007. Tariff rate quotas were introduced in 2003 on barley and low and medium quality wheat. For barley, annual tariff rate quota of 306,215 tons was opened with €16/tonne duty payable. A duty-free quota of 242,074 tonnes of maize was introduced in 2006 to all third countries.

As another precaution, the Commission Green Paper «Adapting to climate change in Europe» (June 2007), which calls for early and cost-effective adaptation action to reduce damage from climate change, required contribution from the CAP in promoting farming practices compatible with new climate conditions.

On the other side, Turkish agriculture was affected from dry weather and drought in a similar pattern as in the EU in 2007. In most of the fertile regions of Turkey, drought led to serious reduction in production of cereals and some fruits. The production of wheat and barley were expected to fall by around 20% to sweep the stocks away for the coming years. Similar decreases were experienced in oilseed production in the country. As a precaution, the Turkish administration decided to import certain amounts of cereals (import quotas were allocated for wheat, barley and maize) with zero tariff rates until the end of May 2008, when market conditions for cereals were appropriate.

In this study, the main objective is to analyze the impacts of decreasing supply in the two world's most important cereal markets, the EU and Turkey, on the world's major cereal producers and traders. To carry out analyses in an empirical framework, the ATPSM was used as introduced in details in the following section.

3. Methodology

Policy analyses were carried out by applying a partial equilibrium framework, namely the Agricultural Trade Policy Simulation Model[5] (ATPSM), which was jointly built by UNCTAD and FAO. The ATPSM is a multi-country and multi-commodity framework which analyzes the domestic and world market effects of trade policies in a comparative static fashion. The working principle of the ATPSM is such that trade policy and non policy-induced price shocks in the domestic market alter the domestic supply, demand, export and import amounts which result in excess demand and supply in the world market. The ATPSM derives a world market-clearing price which equals the global sum of net import changes to zero and this price feeds back into the commodity markets of each country to recalculate the impacts on domestic quantities.

The framework covers 153 countries and includes all larger economies in agricultural markets. With the exception of the 25-EU member states, all countries are explicitly covered and the EU is included as a group. There are 36 commodities considered in the model and the framework allows for creating particular country and commodity groups. The ATPSM has the capacity to model the effects of policy instruments such as out-of-quota and in-quota import tariffs, domestic farm support and export subsidies. The ATPSM is a synthetic model and its base period is the average of 1999-2001. The standard equation system for all countries for each commodity is presented through equations 1 to 14.

$$\hat{D}_{i,r} = \eta_{i,i,r}\left[\hat{P}_{w_i} + (1+\hat{t}_{c_{i,r}})\right] + \sum_{\substack{j=1 \\ j\neq i}}^{J} \eta_{i,j,r}\left[\hat{P}_{w_j} + (1+\hat{t}_{c_{j,r}})\right] \tag{1}$$

$$\hat{S}_{i,r} = \varepsilon_{i,i,r}\left[\hat{P}_{w_i} + (1+\hat{t}_{p_{i,r}})\right] + \sum_{\substack{j=1 \\ j\neq i}}^{J} \varepsilon_{i,j,r}\left[\hat{P}_{w_j} + (1+\hat{t}_{p_{j,r}})\right] \tag{2}$$

$$\Delta X = \gamma_{i,r}\Delta S_{i,r} \tag{3}$$

$$\Delta M_{i,r} = D_{i,r}\hat{D}_{i,r} - S_{i,r}\hat{S}_{i,r} + \Delta X_{i,r} \tag{4}$$

[5] See Peters and Vanzetti (2004); Ferrani (2004); Poonyth and Sharma (2003) for in-depth information.

$$\sum_{n=1}^{N}(\Delta X_n - \Delta M_n) = 0 \tag{5}$$

$$t_d = (Xt_x + Mt_m)/(M + X) \tag{6}$$

$$t_c = (Mt_m + S_d t_d)/D \tag{7}$$

$$t_s = (Xt_x + S_d t_d)/(S + t_p) \tag{8}$$

$$\Delta R = (P_w + \Delta P_w)[(X + \Delta X) - (M + \Delta M)] - P_w(X - M) \tag{9}$$

$$U = QP_w(t_{m2} - t_{m1}) \tag{10}$$

$$\Delta PS = \Delta P_s[S + 0,5(\Delta S)] + c\Delta U \tag{11}$$

$$\Delta CS = -\Delta P_c[D + 0,5(\Delta D)] \tag{12}$$

$$\Delta NGR = \Delta TR - \Delta ES - \Delta DS + (1 - c)\Delta U^{i} \tag{13}$$

$$\Delta W = \Delta PS + \Delta CS + \Delta NGR \tag{14}$$

Variable and parameter definitions:
^: relative change
Δ: absolute change
i, j: commodities indices
r: country index
ε: supply elasticity
η: demand elasticity
γ: ratio of exports to production
D: demand
M: imports
NGR: net government revenue
P_w: world price
Q: import quota
R: trade revenue
S: supply
S_d: quantity supplied to the domestic market
U: quota rent
X: exports
t_c: domestic consumption tariff
t_d: domestic market tariff
t_m: import tariff
t_{m1}: in-quota applied tariff
t_{m2}: out-of-quota applied tariff
t_p: domestic production tariff
t_x: export tariff

Domestic supply and demand are determined as a function of various prices and related elasticity measures, as indicated in equations 1 and 2. Exports in the ATPSM are maintained as a proportion of the supply (equation 3). Market clearance is shown in equation 4 that equalizes the sum of domestic production and imports to domestic consumption and exports. This equilibrium requires that in the world market the change in world excess supply is zero (equation 5).

Domestic prices are function of world market prices, border protection and/or domestic support measures, and transaction costs (such as wholesale and retail margins) are taken into account. All protection measures are expressed in tariff rate equivalents.

The countries in the ATPSM are often both importers and exporters of the same good. To accommodate this feature, composite tariffs for determining the domestic consumption and production price are estimated. In the first step, volumes are grouped under imports, exports and production supplied to the domestic market. A domestic market tariff is computed as weighed average of export and import tariff, and export and import amounts are used as weights (equation 6). Then, a consumption (domestic market) tariff is computed as the weighed average of the import tariff and the domestic market tariff, where the weights are imports and domestic supply (equation 7). Similarly, a supply (domestic market) tariff is computed as well, as the weighed average of the export tariff and the domestic market tariff, where the weights are exports and domestic supply plus the domestic support tariff (equation 8).

Given the volume responses in the ATPSM, the trade revenue and welfare effects can be computed. The trade revenue effect of the policy changes is computed for each country and each commodity by applying the equation 9. The welfare change has three components. The first two are the changes in producer surplus (equation 11) and consumer surplus (equation 12). These changes depend on the domestic market price changes and the relevant price response of domestic demand and supply. The change in the producer surplus is also dependent on the change in the received quota rent (equation 10). Rent accrues only if the importing country is applying the out-of-quota tariff rate. The capture rate, c, is the proportion of the rent captured by exporting producers as opposed to the proportion, 1-c, captured by the importing government. The change in the received quota rent is added to the producer surplus. The third part is the change in net government revenue, consisting of change in tariff revenue, change in export subsidy expenditure, change in domestic support expenditure and change in quota rent not received by exporters (equation 13). Finally, the total welfare effect is given in equation 14.

4. Policy Analysis

4.1. Scenarios

Two main policy scenarios were built on the basis of policy measures taken in the EU to cope with the effect of the tightening of cereal supply on domestic prices. One possible policy option is to remove the obligatory set-aside requirement. In this way, it is expected to remove the growing pressure on domestic cereal prices by boosting up the domestic production. Another possibility is the complete or partial removal of import tariffs and/or export subsidies. Hence, the rise in domestic supply of cereals may result in the fall in domestic prices. As third option, a combination of the two above-mentioned possibilities can be considered.

The expectation is such that if the set-aside area (3.8 million ha) fully returns back to the sector, then the effective return of land could be between 1.6 and 2.9 million hectares (IP/07/1402). However, if farmers decide to use the maximum amount of land possible to produce cereals, this would be at the expense of other crops, especially oilseeds (IP/07/1402). Therefore, the main difference between the two scenarios lies on the rate of set-aside area used for cereals and oilseeds. When it comes to changes in border policies in the EU, a more generic approach was used and either a partial or full liberalization was applied. Either only import/export tariffs/subsidies on cereals were changed or both applied together. In both main scenarios, different liberalization chances were applied as sub-scenarios.

Recent draught substantially affected the Turkish agricultural sector and, therefore, a significant fall in domestic supply of cereals and oilseeds is expected. Since Turkey currently does not have any direct supply management policy regarding cereals and oilseeds, the only option to increase supply in the short term is the removal of border policies. Border policy changes in Turkey were applied as it happened in the EU.

Policy scenarios were run in two different stages. In the first stage, the effect of returning land from set-aside in the EU and of draught in Turkey on domestic quantities were exogenously calculated, and different base equilibrium values were obtained for scenarios 1 and 2 respectively. In the second stage, alternative border policies were set up by applying the ATPSM, and outcomes were compared with base values.

Consequently, the two main and sub-policy scenarios can be presented as shown in Table 1.

Table 1 – *Policy Scenarios.*

Scenario 1

Base-run assumptions:

1. Full return from set-aside to cereals production (2.9 million ha) in the EU.
2. No return from set-aside to oilseeds production in the EU.
3. Import tariffs and export subsidies in place in the EU.
4. Other domestic support policies in place in the EU.
5. An average 16% loss of cereals production in TR because of the draught.
6. An average 10% loss of oilseeds production in TR because of the draught.
7. Trade and domestic support policies in place in TR.

	Base		Scenario 1a		Scenario 1b		Scenario 1c	
EU	*Import tariffs initial*	*Export subsidies initial*	*Import tariffs 50% fall*	*Export subsidies initial*	*Import tariffs 50% fall*	*Export subsidies 50% fall*	*Import tariffs initial*	*Export subsidies 50% fall*
Wheat	53.75	13.44	26.88	13.44	26.88	6.72	53.75	6.72
Barley	33.81	33.26	16.91	33.26	16.91	16.63	33.81	16.63
Maize	26.42	0.00	13.21	0.00	13.21	0.00	26.42	0.00
Oilseeds	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TR	*initial*	*initial*	*50% fall*	*initial*	*50% fall*	*50% fall*	*initial*	*50% fall*
Wheat	40.00	40.00	20.00	40.00	20.00	20.00	40.00	20.00
Barley	85.00	85.00	42.50	85.00	42.50	42.50	85.00	42.50
Oilseeds	6.80	0.00	3.40	0.00	3.40	0.00	6.80	0.00

In the first scenario, the maximum efficient return from set-aside, i.e. 2.9 million hectares, is assumed to be used for cereal production. This area is distributed among cereals with respect to each product's share in the total sown area of cereals, which is 53.93%, 31.04% and 14.81% for wheat, barley and maize, respectively. The effect on production is found by applying average yield figures for these products, which are 5.38, 4.36 and 7.80 t/ha, respectively. In the second scenario, 2.9 million hectares of set-aside area is distributed between oilseeds and cereals. The lowest amount of efficient return (1.6 million ha) is assumed to be used for cereal production and the remaining part (1.3 million ha.) is for oilseed production. Distribution of area is done using shares of each product in the total sown area of cereals and oilseeds (46.00, 26.47, 12.63 and 14.70% for wheat, barley, maize and oilseeds, respectively). The effect on production is calculated with the same methodology used in scenario 1. The average yield for oilseeds is assumed to be 3.79 t/ha. In both scenarios, the reduction in production of wheat, barley and oilseeds due to draught is assumed to be 11.7%, 22.3% and 9.3%, respectively. By using the behavioural relationships and elasticity information in the ATPSM, the changes in domestic supply both in the EU and in Turkey are transmitted on the domestic demand, exports and imports, and new equilibrium identities are obtained for wheat, barley, maize and oilseeds in both countries. Therefore, while the base-run data do not differ for Turkey between the two scenarios, they significantly differ for the EU.

Scenario 2

Base-run assumptions:

1. Partial return from set-aside to cereals production (1.6 million ha) in the EU.
2. Partial return from set-aside to oilseeds production (1.3 million ha) in the EU.
3. Import tariffs and export subsidies in place in the EU.
4. Other domestic support policies in place in the EU.
5. An average 16% loss of cereals production in TR because of the draught.
6. An average 10% loss of oilseeds production in TR because of the draught.
7. Trade and domestic support policies in place in TR.

	Base		Scenario 2a		Scenario 2b	
EU	*Import tariffs initial*	*Export subsidies initial*	*Import tariffs 100% fall*	*Export subsidies initial*	*Import tariffs 100% fall*	*Export subsidies 100% fall*
Wheat	53.75	13.44	0.00	13.44	0.00	0.00
Barley	33.81	33.26	0.00	33.26	0.00	0.00
Maize	26.42	0.00	0.00	0.00	0.00	0.00
Oilseeds	0.00	0.00	0.00	0.00	0.00	0.00
TR	*initial*	*initial*	*50% fall*	*initial*	*50% fall*	*50% fall*
Wheat	40.00	40.00	20.00	40.00	20.00	20.00
Barley	85.00	85.00	42.50	85.00	42.50	42.50
Oilseeds	6.80	0.00	3.40	0.00	3.40	0.00

Table 2 – *Results of Set-Aside Removal and Draught.*

	EU-With Set-Aside Policy (000 tonnes)				TR-Before Draught (000 tonnes)		
	Wheat	*Barley*	*Maize*	*Oilseeds*	*Wheat*	*Barley*	*Oilseeds*
Production	123,373	57,480	49,101	27,719	19,341	8,460	901
Consumption	126,441	52,031	51,233	47,942	19,700	8,238	1,406
Exports	5,246	6,069	1,034	1,675	977	338	37
Imports	8,315	620	3,166	22,098	1,336	116	546
	EU-Set-Aside Policy Removed (000tonnes) Scenario 1				**TR-After Draught (000 tonnes) Scenarios 1 & 2**		
	Wheat	*Barley*	*Maize*	*Oilseeds*	*Wheat*	*Barley*	*Oilseeds*
Production	131,794	61,397	52,452	27,719	17,079	6,573	817
Consumption	134,930	54,916	52,982	47,942	17,068	7,090	1,060
Exports	5,604	6,464	1,105	1,675	863	262	34
Imports	8,741	1,113	1,634	22,098	840	779	277
	Scenario 2						
	Wheat	*Barley*	*Maize*	*Oilseeds*			
Production	128,019	59,645	50,950	32,640			
Consumption	131,125	53,623	52,198	59,007			
Exports	5,444	6,298	1,073	2,208			
Imports	8,550	276	2,321	28,575			

Trade liberalization is more applied in a generic manner. Aside from removal of obligatory set-aside, domestic supply in both countries can be increased via three alternative sub-scenarios. The first option is a sole reduction in applied import tariffs. The second option is a sole reduction in export subsidies and the third one is a combination of the first two alternatives. The impact of each option actually depends on three factors: the country's exporter/importer nature; the ratio of imports/exports to domestic demand/supply; the initial level of tariffs/subsidies. All three alternatives were simulated in the first scenario, and the tariff removal together with the tariff and subsidy removal were simulated in the second scenario. Since returning set-aside land in the first scenario is assumed to be at the maximum possible level, the rise in domestic supply is expected to be higher than it would be in the second scenario; hence, partial rather than full trade liberalization is foreseen to be adequate in the first scenario. However, for the same reason, the full trade liberalization is expected to be sufficient enough to increase supply and reduce domestic prices in the second scenario. For Turkey, the same liberalization pattern was applied in each scenario.

Therefore, for Turkey, the two main scenarios do not include any difference. For the EU, main and sub-scenarios were aimed at finding a range to cover the minimum and maximum impacts on domestic and world market of set-aside removal and trade policy liberalization.

4.2. Results

The base year of ATPSM was upgraded to the average of 2002-2004 before simulations and behavioural parameters of Turkey were updated as well. Behavioural parameters regarding cereals and oilseeds in the EU and Turkey are given in appendix Table A1. In Table 2, changes in domestic quantities in the EU after the removal of obligatory set-aside policy and in domestic quantities in Turkey after the draught are presented for the two main scenarios. The presented figures for the scenarios in Table 2 form the base run results for scenario 1 and 2 respectively, to be compared later with sub-scenario outcomes.

Returning set-aside area is assumed to be used for cereal production in the first scenario; therefore, quantities regarding oilseeds do not change in the first scenario compared to the initial situation. In the second scenario, a smaller area is used for cereal production compared to the first scenario due to the increase in oilseed production on the area that returned from set-aside. For Turkey, the two scenarios do not differ in terms of draught effects on demand and supply with respect to the initial situation.

World price

An increase in the world prices is expected since the unilateral liberalization in the EU border policy and it can be considered the outcome of a possible excess in demand arising in the world market for the rising import demand or the falling export supply in the EU, or for both phenomena at the same time. Since tariff and subsidy reductions are applied together in the scenario 1b, the rise in world prices should be higher in scenario 1b compared to scenarios 1a and 1c in cereal markets. Base year tariffs in the EU are higher then subsidies except for barley, where initial tariff and subsidy rates are equal. Therefore, the rise in world prices in scenario 1a is expected to be higher than the prices scenario 1c for wheat and maize, and the opposite is expected for barley. The change in the world maize prices is quite low (about 1%), it could even be ignored, and this is due to the reduced amount of net international trade of maize in the EU and to the initial lower tariff and zero subsidies. The changes in the world wheat and barley prices are modest (nearly 4.8% and 5.4% respectively). In scenario 2, the full liberalization leads to higher rates of increase in world prices compared to scenario 1, and a even higher rate is expected in scenario 2b as it involves the fully removal of tariffs and subsidies. Therefore, the rise in world prices reaches almost 10% in barley and about 9.2% in wheat markets in scenario 2b. Increase in world maize prices is still quite low due to the reasons explained before. In scenario 2a, the change in the world barley price is negligible since the EU import from the world markets is very low. The EU does not apply any trade policy in oilseeds market, hence the negligible change in world oilseeds price (0.03%) is assumed to stem from cross price effects in the domestic market. Table 3 presents the changes in world prices in both scenarios.

Domestic price

After the unilateral trade liberalization, it is expected that two counteracting effects on prices may arise in the domestic market. First, there might be a negative impact due to reduction in tariffs and subsidies which would yield a rise in the domestic supply. Second, there might be a positive impact due to the increase in world prices. The net effect is expected to be negative; however, this depends on the initial net trade position of the country in the market experiencing the trade liberalization, the initial level of border policies, and on whether or not the liberalization occurred only in a single market of that country.

Table 3 – *Effects of Trade Liberalization on Prices.*

	Change in World Price (%)				
	Scenario 1a	*Scenario 1b*	*Scenario 1c*	*Scenario 2a*	*Scenario 2b*
Wheat	3.92	4.80	0.89	7.66	9.21
Barley	0.64	5.41	4.77	1.00	9.73
Maize	0.63	1.03	0.40	1.35	2.08
Oilseeds	0.03	0.03	0.03	0.03	0.03
	Change in Domestic Price (%)				
EU	*Scenario 1a*	*Scenario 1b*	*Scenario 1c*	*Scenario 2a*	*Scenario 2b*
Wheat	-6.80	-7.94	-0.97	-14.61	-17.39
Barley	0.64	-4.94	-5.52	-0.23	-11.34
Maize	-4.49	-4.18	0.40	-10.31	-9.67
Oilseeds	0.03	0.03	0.03	0.03	0.03
TR	*Scenario 1a*	*Scenario 1b*	*Scenario 1c*	*Scenario 2a*	*Scenario 2b*
Wheat	-3.03	-10.17	-6.78	0.45	-6.39
Barley	-15.96	-18.80	-2.01	-15.68	-15.48
Oilseeds	-5.46	-5.46	-5.46	-5.46	-5.46

Effects of the world price rise on domestic prices in the EU and Turkey are given in Table 3. In the EU in general, the net effect on domestic cereal prices is negative. Since initial export subsidy rates for wheat and maize are lower than import tariffs (it is zero for maize), the fall in prices in scenario 1c should be less relevant than it is in scenarios 1b and 1a. For the same reason, a stronger fall in wheat price is anticipated in scenario 1b compared to scenario 1a, and in maize market only a slight difference between scenarios 1a and 1b is also acceptable. In the EU, the impact of export subsidy removal (scenarios 1b and 1c) in the barley market on its domestic price is expected to be higher than its impact where tariffs are solely removed (scenario 1a). This result is expected given the EU is a net and large barley exporter. Impacts on domestic prices in the second scenario are expected to be stronger as the changes in world prices are more important with respect to the first scenario. For wheat, the fall in domestic price is of about 17.4% and 14.6% in scenarios 2a and 2b respectively, whereas it is of nearly 10% for maize in both scenarios. For barley, the sole removal of tariffs does not affect too much its domestic price; however, the removal of both subsidies and tariffs in scenario 2b significantly affects its domestic price because the EU is an important barley exporter. Not great change in the domestic oilseeds prices is expected.

The trade liberalization in Turkey is assumed to be implemented at the same rate in scenarios 1 and 2. Therefore, the differences between the two scenarios are the outcome of the changes in world prices. For cereals, the initial rates of export subsidy and import tariffs are the same, whereas for oilseeds there are only tariffs applied at the border that are quite low if compared to tariffs on cereals imports. Hence, the net trade position of Turkey before liberalization becomes important in determining the impact on domestic prices. In both scenarios, a decrease in domestic prices of cereals and oilseeds is experienced. The fall in domestic prices of wheat and barley in scenario 1b is expected to be greater than it is in scenarios 1c and 1a. This is due to the simultaneous liberalization in both subsidies and tariffs. For wheat, the impact in scenario 1c is greater than it is in 1a and for barley the opposite is true. The fact that Turkey is a net exporter/importer of wheat/barley after the draught causes this opposite effect. Moreover, the barley subsidy and tariff rates (both about 85%) are higher than wheat tariff and subsidy rates (both about 40%), thus resulting in a higher rate of change in the barley domestic price (about 18.8%) with respect to the one of wheat (10.1%). In the second scenario, a 50% reduction in subsidy and tariff together (scenario 2b) in the wheat market yields a fall in domestic prices being lower (about 6.4%) than the one in scenario 1b (about 10.2%). This might be surprising since the rise in world price is almost doubled in scenario 2b. However, this rise in world price might have offsetting impact on the negative effect of border policy reduction on domestic prices. In the barley market, the effect of world price rise on domestic price in scenarios 2a and 2b is almost the same (a fall of about 15.5%). In scenario 1c, the effect on barley domestic price is quite low if compared to scenario 1b: this phenomenon can be explained by Turkey being a net importer in this market and by the higher initial tariff and subsidy rate compared to wheat. For the same reason, the changing rate in the barley domestic price is quite high compared to the change in the wheat price. In oilseeds market, the application of tariffs is only trade policy set up and it is quite low (about 6.8%) if compared to other markets. Therefore, results regarding scenarios 1a, 1b, 2a and 2b are foreseen to be the same or slightly different from each other.

Domestic quantities and international trade

As expected, in all scenarios, the fall in domestic prices resulted in a fall/rise in domestic supply/demand both in the EU and in Turkey. In the EU, the fall in wheat production is about 8.6% (scenario 2b) and the lowest fall rate occurs in scenario 1c (about 0.4%). These results are consistent with the changes in prices. In the maize market, the biggest falls are experienced in scenarios 2b and 2c, depending on the changes in the domestic prices. An unexpected result is observed in scenario 2a in the barley market. Although there has been a decrease of about 0.2% in domestic price, an increase of about 2% was experienced. This might be caused by the cross price effects. For example, in the same scenario, the changes in domestic prices of wheat and maize are of about 14.6% and 10.3% respectively, whereas it is only about 0.2% in the barley market. In the oilseeds market, the negligible domestic price effects in all scenarios (about 0.03%) yields a negligible impact on production (about 0.01%) and consumption (nearly 0.02%). On the demand side, as expected and consistent with the price changes, the maximum rise in demand for wheat and maize was experienced in scenarios 2a and 2b. Again an un-

Table 4 – *Results of Trade Liberalization on Domestics Quantities.*

	Change in Production (%)				
EU	*Scenario 1a*	*Scenario 1b*	*Scenario 1c*	*Scenario 2a*	*Scenario 2b*
Wheat	-3.80	-4.17	-0.39	-7.68	-8.56
Barley	1.13	-0.73	-1.86	1.95	-1.77
Maize	-1.46	-0.95	0.51	-3.38	-2.35
Oilseeds	0.01	0.01	0.01	0.01	0.01
TR	*Scenario 1a*	*Scenario 1b*	*Scenario 1c*	*Scenario 2a*	*Scenario 2b*
Wheat	-1.18	-3.61	-2.43	-0.18	-2.51
Barley	-6.28	-6.76	-0.48	-6.31	-5.25
Oilseeds	-1.75	-1.75	-1.75	-1.75	-1.75
	Change in Consumption (%)				
EU	*Scenario 1a*	*Scenario 1b*	*Scenario 1c*	*Scenario 2a*	*Scenario 2b*
Wheat	4.47	4.65	0.17	9.01	9.47
Barley	-2.17	-0.08	2.25	-3.95	0.37
Maize	0.65	0.26	-0.39	1.60	0.81
Oilseeds	-0.02	-0.02	-0.02	-0.02	-0.02
TR	*Scenario 1a*	*Scenario 1b*	*Scenario 1c*	*Scenario 2a*	*Scenario 2b*
Wheat	-3.15	-0.84	2.32	-4.37	-1.18
Barley	3.85	3.16	-0.69	4.28	1.71
Oilseeds	4.98	4.98	4.98	4.98	4.98

expected result is observed in the barley market. In scenarios 1b and 2a, the fall in domestic prices resulted in a fall in demand. As before, we believe the higher rates of change in cross prices might cause this phenomenon in scenario 2a; however, in scenario 1b, changing rates of barley, maize and wheat domestic prices are close to each other but other cross prices (sorghum, rice) have to be checked out. In any case, the amount of change in barley consumption in scenario 1b is very low, nearly equal to zero.

In Turkey, the maximum fall in domestic supply of barley occurs in scenarios 1a, 1b and 2a, which is about 6.3% on the average, as expected the demand rise in these scenarios were at higher rates (about 3.6% on the average) than the ones in other scenarios. In the oilseeds market, in all scenarios, the 5.5% decrease in domestic prices caused a fall in domestic supply of about 1.8% and a rise in consumption of about 5%. An unexpected result is observed in the wheat market though. The fall in prices resulted in a fall in domestic demand except in scenario 1c. The cross price effect of barley on wheat demand causes this unexpected change. In Table 3, it is observed that the fall in domestic barley prices in all scenarios is stronger than the fall in wheat prices, with the exception of scenario 1c. It is also observed that the cross price elasticity of wheat demand with respect to barley price (-3.8%) is larger than its own price effect (3.4%).

International trade impacts of trade liberalization were compared with two different bases. In the first scenario, the assumption was that set-aside area is fully used for cereal production. In the second scenario, set-aside area is partially used for oilseeds and cereal production.

There was a decrease in the EU wheat exports in all sub-scenarios. The maximum amount of decrease was experienced in scenarios 2a and 2b (decreasing to about 5 million tons from around 5.4 million tons), which involves total removal of tariffs only (2a) and removal of tariffs and subsidies together (2b). The EU wheat imports increased as well in all scenarios compared to base scenarios. While in scenario 1c the increase was slight (only about 0.7 million tons), the increase was quite high in the other scenarios. In scenario 1c, since tariffs were left at their initial levels and subsidy removal might have caused an increase in domestic supply, the resulting impact on imports was quite low. In Turkey, wheat exports decreased in all scenarios. The maximum decrease was experienced in scenarios 1b and 2b, where both tariffs and subsidies were partially removed. This outcome was expected due to the subsidy's role in boosting up exports. Apart form scenarios 1a and 2a, there was an increase in wheat imports. Interestingly, removal of tariffs only does not result in an increase in imports. The significant fall in domestic demand in these scenarios might be the reason for this situation. When subsidy removal is applied together with tariff liberalization, imports of Turkey double (scenario 1c) or at least increase by one third. Table 5 presents the changes in trade quantities.

In the barley market, there was an increase in the EU exports in scenarios 1a and 2a. The removal of tariffs only seems to cause this rise since remaining export subsidies in the economy boost up exports to increase excess supply in the economy. When export subsidies were partially or fully removed (scenarios 1b, 1c, 2b), a decrease in exports was experienced. Barley imports of the EU declined in scenarios 1a, 1b and 2a, which seemed to be caused by the fall in domestic consumption. When the domestic demand for barley increased (scenarios 1c and 2b), effect of export subsidy removal on domestic supply in scenario 1c and 2b became insufficient and imports of barley rose. In Turkey, while a fall in exports was experienced in all scenarios, a rise in imports was experienced in all scenarios, except for scenario 1c. The fall in imports in scenario 1c might be explained with the fall in domestic demand (Table 5).

While the EU oilseeds exports do not change in both scenarios 1 and 2, imports slightly fall in both scenarios. As previously explained, in the EU oilseeds market, the main difference between the two base runs is based on the returning set-aside area: the latter area is fully used for cereal production in the first scenario, whereas it is partly used for oilseeds production in the second scenario. In addition, the EU has no border policy in the international trade of oilseeds. Given these facts and besides the slightest changes in the world and the EU price of oilseeds and resulting changes in domestic consumption and production amounts in the EU, the fall in imports is

Table 5 – *Effects of Trade Liberalization on International Trade.*

	Quantity of Exports (000 tonnes)				
EU	*Scenario 1a*	*Scenario 1b*	*Scenario 1c*	*Scenario 2a*	*Scenario 2b*
Wheat	5,392	5,371	5,582	5,026	4,978
Barley	8,369	6,436	6,363	9,305	6,187
Maize	1,088	1,094	1,110	1,037	1,048
Oilseeds	1,875	1,875	1,875	2,208	2,208
TR	*Scenario 1a*	*Scenario 1b*	*Scenario 1c*	*Scenario 2a*	*Scenario 2b*
Wheat	852	831	842	861	841
Barley	246	245	261	246	249
Oilseeds	33	33	33	33	33
	Quantity of Imports (000 tons)				
EU	*Scenario 1a*	*Scenario 1b*	*Scenario 1c*	*Scenario 2a*	*Scenario 2b*
Wheat	19,556	20,278	9,462	29,773	31,402
Barley	0	448	2,263	0	1,414
Maize	2,729	2,261	1,166	4,842	3,915
Oilseeds	22,085	22,080	22,080	28,558	28,558
TR	*Scenario 1a*	*Scenario 1b*	*Scenario 1c*	*Scenario 2a*	*Scenario 2b*
Wheat	494	1,284	1,630	125	1,047
Barley	1,448	1,430	760	1,480	1,302
Oilseeds	344	344	344	344	344

mostly caused by the relatively high rate of change in domestic production in comparison to changing rate in domestic consumption (although both are at a very small rate, Table 4). In Turkey, while exports in all scenarios remain almost constant, there is an increase in imports. Turkey applies a modest tariff rate on oilseeds imports and it is traditionally a net importer of oilseeds and, therefore, it has no subsidy policy for exports. In this case, the only reason for the rise in imports in all scenarios stands to be the removal of tariffs.

The EU is a net importer in maize; however, in the total supply, imports occupy quite a low share if compared to production. The EU regulates its maize imports with tariffs and it does not apply subsidies for exports. Hence, under both scenarios, only the sub-scenarios that involve liberalization in the import policy have an impact on international trade. In Tables 2 and 5, it can be observed that, under all scenarios, exports present a slight fall (at least 3.3%), while imports show a significant increase. This result appears to be the outcome of sole tariff removal and of excess demand rise in the EU maize market.

5. Conclusions

This paper aims at analyzing the impact of policy measures taken to cope with the supply crises in cereal markets both in the EU and Turkey, which resulted in an increase in domestic prices and deteriorated the consumer welfare. While the EU has chosen the removal of set-aside policy as first policy measure, partial or full liberalization of the trade regime was also under consideration as an alternative or complementary policy. For Turkey, trade liberalization to handle the fall in supply was considered to be the only policy option. Therefore, our paper aims at finding a range for domestic quantities in Turkey and in the EU by analyzing alternative policy options. However, results should be interpreted with caution since the drivers included in this analysis are just some of the numerous supply and demand factors that may affect world prices.

Removal of obligatory set-aside obviously seems to be a partial solution for the fall in the domestic supply (or falling stocks and rising domestic prices): either the set-aside area fully returns to cereals or it is shared between cereals and oilseeds. The important point is that the EU net trade position and amounts of all considered commodities do not significantly change in any of set-aside options. It is mainly the trade liberalization and how it is implemented that more significantly affect quantities and prices. In wheat and maize markets, as long as tariffs are fully or partially removed, domestic supply does not rise as much as it is likely to do. However, once it is accompanied with export subsidy removal, then the fall in domestic prices is at an extreme rate and domestic consumption increases at the cost of falling production. Here, the trade-off is not between employing tariff and subsidy instruments together or not, but rather it is between whether the liberalization should be partial or full. Obviously, if the EU becomes a very large net importer, then the pressure on the world market price would significantly increase the import bill. The EU should consider the other major world cereal markets as well. In the barley market, the opposite is true. Suddenly becoming a major exporter may substantially decrease the world price depending on the other major markets' position, which would at the same time boost up domestic prices. It seems that, since there is no trade policy intervention in the oilseeds market, the above-mentioned scenarios do not create significant changes in the EU, even if set-aside area partially returns to oilseeds production.

For Turkey, the story is a bit different. Currently, there is no supply management policy in place. Hence, world price changes are quite influential in Turkish commodity markets. Put in other way, the EU liberalization decision may substantially affect Turkey. In any case, Turkey cannot change its net importer position either in oilseeds or in barley markets. However, in wheat market, Turkey may switch from being a small net exporter to becoming a large net importer depending on the trade policy. Once export subsidy removal accompanies tariff liberalization, Turkey could definitely become a large net importer.

Our findings could change if other factors affecting world food prices were considered in the analysis. The net effect of drivers that cause simultaneous changes in supply and demand would be crucial in determining final impacts. If world prices increase more/less than the ones in the current analysis, impacts on both markets of the EU and Turkey would differ and, accordingly, changes in support policies would lead to the development of a more conservative or liberal agricultural sector.

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Appendix

Table a1 – *Behavioural Parameters.*

	Price Elasticity Matrix							
	Supply							
	EU				TR			
	Wheat	Barley	Maize	Oilseeds*	Wheat	Barley	Maize	Oilseeds*
Wheat	[illegible]	-0.003	[illegible]		0.340	[illegible]	-0.100	
Rice	-0.010	-0.010	-0.010		-0.001	-0.014	-0.010	
Barley	-0.020	0.400	-0.040		[illegible]	0.400	-0.122	
Maize	-0.020	0.009	0.400		-0.380	-0.040	0.400	
Sorghum	-0.020	-0.003	-0.020		0.000	-0.010	-0.010	
Oilseeds*				0.310				0.220
Oilseeds**				-0.020				[illegible]
Vegetable Oils				0.090				0.090
	Demand							
	EU				TR			
	Wheat	Barley	Maize	Oilseeds*	Wheat	Barley	Maize	Oilseeds*
Wheat	-0.400	0.171	0.040		-0.300	[illegible]	[illegible]	
Rice	-0.020	0.010	0.010		0.001	[illegible]	0.010	
Barley	0.040	-0.123	0.020		0.270	-0.234	0.060	
Maize	-0.020	0.042	-0.200		0.200	[illegible]	-0.250	
Sorghum	0.030	0.028	0.020		0.000	0.000	0.000	
Oilseeds*				-0.090				[illegible]
Oilseeds**				0.040				[illegible]
Vegetable Oils				[illegible]				[illegible]

* Temperate oilseeds.

** Tropical oilseeds.