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The impact of WTO accession on agricultural sector of Tajikistan

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Problem Statement

The agriculture sector in Tajikistan is important for economic growth and expanding of export potential, thus to improve country's balance of payment. The share of agriculture in the national GDP amounts to almost 20 percent. Transfer from the agricultural sector to the state budget in the form of tax revenue in 2009 was equal to 33 percent. The share of the agriculture sector in exports (via cotton, vegetables and fruits) was 30 percent in 2008 (AS, [Tajikistan in Figures, 2010](#)).

Tajikistan is part of multilateral free trade agreements within the CIS¹, Eurasian Economic Community, the Economic Cooperation Organization (ECO) and CAREC². The country also has bilateral trade agreements with most CIS countries and Pakistan, Afghanistan, Turkey, China and Iran. The main trading partners are Afghanistan, China, the European Union, Kazakhstan, Iran, the Russian Federation and Turkey.

Due to participation in regional trade agreements, such as the CIS free trade zone agreements and Eurasian Economic Community (EAEC) the share of duty-free imports is 80 percent of total imports. Many goods under the EAEC agreement come under preferential treatment and are untaxed (ADB, [CAREC countries, 2012](#)).

Assessing the level of import tariff protection in Tajikistan is complicated by the complex tariff system (ADB, [CAREC countries, 2012](#)). The simple average import tariff for all goods in Tajikistan with most favoured nations (MFN) were 8.4 percent for 2000-2004 and 7.9 percent for 2005-2012. For agriculture commodities, the simple averages were 10.5 and 11.4 percent respectively, for non-agricultural commodities the simple averages were 8.1 and 7.4 percent respectively (WTI, [Tajikistan: Trade at a glance, 2009/10](#)). Until January 2013, Tajikistan used mixed, specific and combined import tariffs. During 1999-2005, the simple un-weighted average import tariff was 7.5 percent, which had increased by 2.5 percent compared to 1995-1998. In 2005, the maximum tariff rate was 15 percent and custom fees levied on imports were 0.15 percent (ADB, [CAREC countries, 2012](#)). Export taxes were levied for two commodities – cotton

¹ CIS stands for Commonwealth of Independent States.

² CAREC stands for Central Asia Regional Economic Cooperation (CAREC) program, includes Afghanistan, Azerbaijan, the People's Republic of China, the Republic of Kazakhstan, the Kyrgyz Republic, Mongolia, Tajikistan, and Uzbekistan.

fiber (10 percent) and 3 percent for aluminum ([Laws of the Republic of Tajikistan on export tax for Cotton Fiber and Primary Aluminum](#)).

Tajikistan applied for WTO membership on the 29th of May 2001. After eleven years of negotiations, on 10th of December 2012 the General Council paved the way for Tajikistan's membership in the WTO by approving its accession package. Parliament (*Majlisi Milli*) of the Republic of Tajikistan, on the 9th of January 2013, ratified the accession and the country became a full-fledged member of the WTO on the 2nd of March 2013.

Tajikistan has committed to fully applying WTO provisions after the accession without any resources to transitional periods. As part of the accession, The weighted average “bound” tariffs for Tajikistan, based on agreement, is 8%, for agricultural 10.4 percent and for non-agricultural 7.6 percent. Tajikistan shifted its own tariffs to the *ad valorem* methodology under the WTO Harmonized System of classification.

The impacts of WTO accession on producers, consumers, state budget overall welfare change still have not been assessed. This paper is call to fill this research gap.

Objectives and research questions

The objective of the study is analysing the impact of Tajikistan WTO accession on agricultural sector of Tajikistan.

The research questions are:

a) How country's recent WTO accession will influence the agricultural sector of Tajikistan?

b) How consumers, producers and state budget will affect under country's WTO accession?

In this paper, all abovementioned research questions are tested under official and ten percent depreciated (experimental) exchange rates.

Methodological approach

The main research tool for the analysis is a **partial-equilibrium net trade model**.

The partial equilibrium model is AGRISIM. The Model builds on a GAMS interface and uses GAMS/CONOPT2 – a non-linear optimization package.

AGRISIM model includes 17 countries and the rest of the world (ROW). The 27 countries of the European Union are considered one region (EU). The difference between the World and the 17 specific countries and 1 region included in the model are represented by ROW. Commodities included into AGRISIM are 14³.

The initial supply, demand and income elasticities are taken from the SWOPSIM database. The new elasticity of supply is calculated using initial elasticity, bounds and weights around the initial elasticity.

In the Model two important exogenous factors are taken into account:

- Labour migrant remittances which lead Tajik national currency appreciation against the foreign exchange. Thus, one set of scenario run under 10 percent experimental depreciation of national currency against the foreign exchange;
- Population growth factor.

The latter included as a shift factor into the Model for all countries and region in order to reveal the global demand, supply and price changes.

The new elasticity of supply is calculated using initial elasticity, bounds and weights around the initial elasticity, commodity balances (domestic production, stock changes, net trade, feed use, seed use, waste, food demand, and statistical adjustment), total population in each country, producer prices, production quotas, subsidies (input, direct, general and single commodity transfer) and a multiplier for subsidies. While the new elasticities of demand and income is calculated using initial elasticities, bounds and weights around them, commodity balances and consumer prices.

The changes of consumers and producers welfare in scenario as a deviation from the base assumption are shown in Eq. 1 and Eq.2 respectively.

$$R_{i,r,sc}^C = -1 * \left[\frac{D_{i,r}^F}{\prod_j (p_{i,r}^C)^{\varepsilon_{ij,r}^s}} \right] * \left[\prod_j (P_{i,r,sc}^C)^{\varepsilon_{ij,r}^{DF}} \right] * \left[\frac{(1 + Sc_{i,r}^{\delta F})}{100} * \frac{1}{1 + \varepsilon_{i,r}^{DF}} \right] * \left[\frac{((P_{i,r,sc}^C)^{(1+\varepsilon_{i,r}^{DF}})) - ((P_{i,r,BA}^C)^{(1+\varepsilon_{i,r}^{DF}}))}{1000} \right] \quad \text{Eq.1}$$

³ Wheat, maize, coarse grain (oat, barley and rye), sugar, cotton, rice, soybean, oilseeds, beef, milk, pork, mutton and goat, poultry and eggs.

with: $\left[\frac{D_{i,r}^F}{\prod_j (P_{i,r}^C)^{\varepsilon_{ij,r}^F}} \right]$ = Calibration parameter of demand function for commodity i in region r ; $\left[\prod_j (P_{i,r,sc}^C)^{\varepsilon_{ij,r}^F} \right]$ = Own and cross price elasticity of consumer price in scenario for commodity i in region r ; $\left[\frac{(1+Sc_{i,r}^{\delta F})}{100} \right]$ = Shift of demand in scenario for commodity i in region r ; $1 + \varepsilon_{i,r}^F$ = Change in consumer surplus for commodity i in region r ; $P_{i,r,sc}^C$ = Consumer price in scenario for commodity i in region r ; $P_{i,r,by}^C$ = Consumer price in base year for commodity i in region r ;

$$R_{i,r,sc}^P = \left[\frac{S_{i,r,by}}{\prod_j (P_{i,r,by}^{IP} - P_{i,r,by}^{Quo})^{\varepsilon_{ij,r}^S}} \right] * \left[\prod_j (P_{i,r,sc}^{IP})^{\varepsilon_{ij,r}^S} \right] * \left[\frac{(1+Sc_{i,r}^{\delta S})}{100} \right]^{dt} * \left[\frac{P_{i,r,sc}^{IP}}{P_{i,r,by}^{IP}} \right] * \left[\frac{1}{1 + \varepsilon_{i,r}^S} \right] \quad \text{Eq.2}$$

$$* \left[\frac{((P_{i,r,sc}^{IP} - P_{i,r,sc}^{Quo})^{(1+\varepsilon_{i,r}^S)}) - ((P_{i,r,by}^{IP} - P_{i,r,by}^{Quo})^{(1+\varepsilon_{i,r}^S)})}{1000} \right]$$

with: $\left[\frac{S_{i,r,by}}{\prod_j (P_{i,r,by}^{IP} - P_{i,r,by}^{Quo})^{\varepsilon_{ij,r}^S}} \right]$ = Calibration parameter of supply function for commodity i in region r ; $\left[\prod_j (P_{i,r,sc}^{IP})^{\varepsilon_{ij,r}^S} \right]$ = Own and cross producer incentive price elasticity for commodity i in region r ; $\left[\frac{(1+Sc_{i,r}^{\delta S})}{100} \right]^{dt}$ = Shift of supply function in scenario for commodity i in region r ; $\left[\frac{P_{i,r,sc}^{IP}}{P_{i,r,by}^{IP}} \right]$ = Ratio of producer incentive price for commodity i and region r in scenario and base years; $1 + \varepsilon_{i,r}^S$ = Change in producer surplus for commodity i in region r ; $P_{i,r,sc}^{IP}$ = Producer incentive price in scenario for commodity i in region r ; $P_{i,r,by}^{IP}$ = Producer incentive price in base year for commodity i in region r ; $P_{i,r,sc}^{Quo}$ = Price of quota in scenario for commodity i in region r ; $P_{i,r,by}^{Quo}$ = Price of quota in base year for commodity i in region r .

Using the respective equations the model also calculates production, yields, seed and feed used, food demand, area allocated to each crop and/or number of livestock, waste, net trade, prices (reference country border price, border price, producer price, producer incentive price, retail price, quota rents, minimum farmgate price, transmission of border price into domestic market, farmgate price to producer incentive price, farmgate price to retail price), production quota, clearing of the market per level and overall

market, income and population growth as shift factors, producer and consumer surplus, budget and total effect of change in policy.

Simulated scenarios and results

“Basis for simulated scenarios”. Many studies are devoted to the impact of remittances on development of different sectors of an economy and on exchange rate changes in developing worlds (for instance see: Cox Edwards and Ureta, 2003; Woodruff and Zenteno, 2007; Fajnzylber and Lopez, 2008; Yang (2008); Adams and Page, 2004; Acosta et al. 2008; Acosta, Larrey and Mandelman, 2007; Lopez, Molina, and Bussolo, 2007; Mundaca 2005, Acosta et al. 2009; Amuedo-Dorantes and Pozo, 2004; Acosta, Larrey, and Mandelman, 2007; Larrey, Mandelman, and Acosta, 2008; Amuedo-Dorantes and Pozo, 2004, Rajan and Subramanian, 2005; Winters and Martins 2005; Lopez, Molina, and Bussolo, 2007.

Calculation of the set of exchange rates for Tajikistan clearly shows that the domestic currency during the last 6 years has appreciated against foreign currencies, due to the stable inflow of remittances, although the country has a trade deficit where imports exceed exports by 2.5-3 times. Thus, the model was run under the *official exchange rate* and under the 10 percent *depreciation (experimental) of exchange rate*. The latter enables examination of the effects of exchange rate changes on producers and consumers welfare changes.

Another important factor which was taken in this paper into account is population growth. Tajikistan faces rapid population growth due to its high birth rate. Population growth leads to demand increases and shifts the demand curve upward along the supply curve. In this case, if domestic demand increases owing to population growth, it will not necessarily entail domestic supply growth, so imports will increase. Taking into consideration that Tajikistan has limited land resources and stable population growth is in place, the welfare effect will be significant. Considering a population growth factor for all countries enables showing the impact of global demand change. Thus, for all countries, a population growth factor is considered in both exchange rates. For Rest of the World (ROW) countries, a weighted annual population growth is calculated. Such a shift

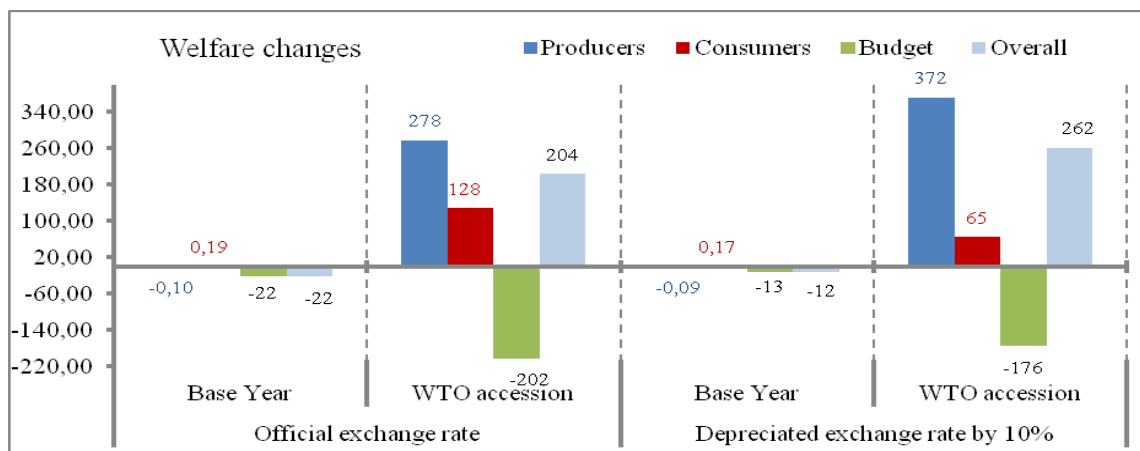
factor allows showing global population growth in supply and demand changes in Tajikistan. The project year being 2016 allows revealing the effect in the nearest future.

“Interpretation of the results”. WTO accession which assumes the liberalization scenario reveals the impact of applying bounded ad valorem tariffs of the WTO, on welfare change for all countries and region included into the Model.

“Welfare changes”. The Model reveal the changes on supply, demand, feed, producer, consumers, border and producer incentive price, yield changes, budget effect, nominal rate of protection changes, production activity levels, supports of producers, etc. In this paper due to limitation of its length will interpreted and discussed the changes on producers, consumers and overall welfare changes, and overall budget effect.

Theoretically, if the gains exceed the losses, the Kaldor-Hicks criterion will be met⁴. In general, should expect an improvement in the welfare of both producers and consumers, compared to the base year, under both official and depreciated exchange rates. The effect on producer gains is significantly higher under a depreciated exchange rate. A ten percent depreciation of the national currency in foreign exchange leads to an increase of producer gains up to 34 percent, compared to the same using the official exchange rate (**Figure 1**).

Figure A1. Welfare change



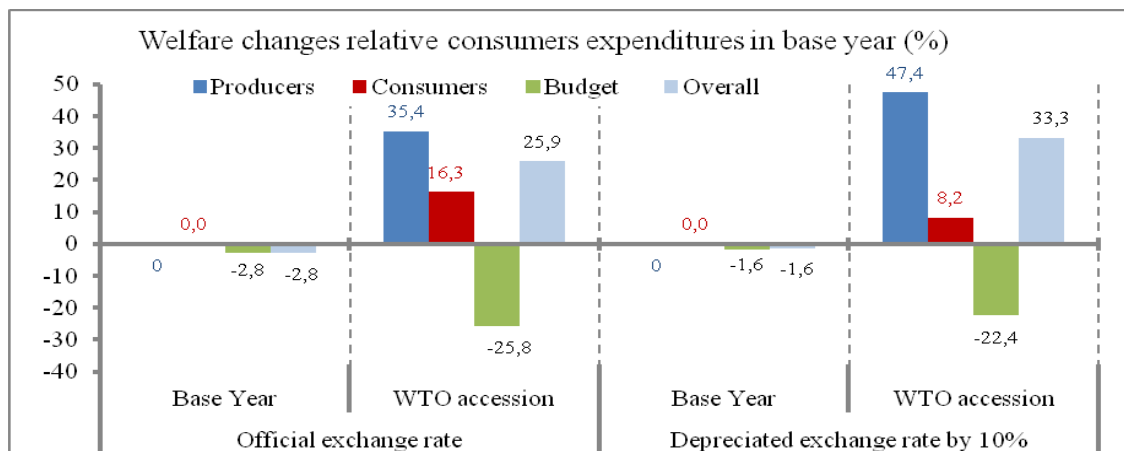
Source: own compilation based on AGRISIM simulation results

⁴ An outcome is efficient if the gain of gainers exceeds the loss of the losers; in welfare economics this is known as the Kaldor-Hicks criterion. Named after [Nicholas Kaldor](#) and [John Hicks](#), also known as Kaldor-Hicks efficiency.

The reverse situation can be expected in the case of consumers, i.e. their gains are higher under the official exchange rate, so that consumer gains are 2 times higher than in WTO accession scenario at the official exchange rate, rather than at a 10 percent depreciation of the TJS against foreign currencies. In WTO accession scenario, one should definitely and logically expect a loss to the budget under both exchange rates. Overall gains in WTO accession scenario are 28 percent higher under a depreciated exchange rate, than under the official exchange rate (**Figure 1**).

Welfare changes relative consumer's expenditure and relative to producer revenue in base year are reveal in figures 2 and 3 respectively. The budget loses, while producer, consumer and overall welfare gains compared to the base year. The losses of budget are less under a depreciated rather than the official exchange rate. The gain of producers and overall gain in liberalization scenarios under a depreciated exchange rate exceeds the same figure under the official exchange rate. The inverse case can be observed in the case of consumers, i.e. the percentage gain of consumers under the official exchange rate exceeds the same under a depreciated exchange rate (**Figure 2**).

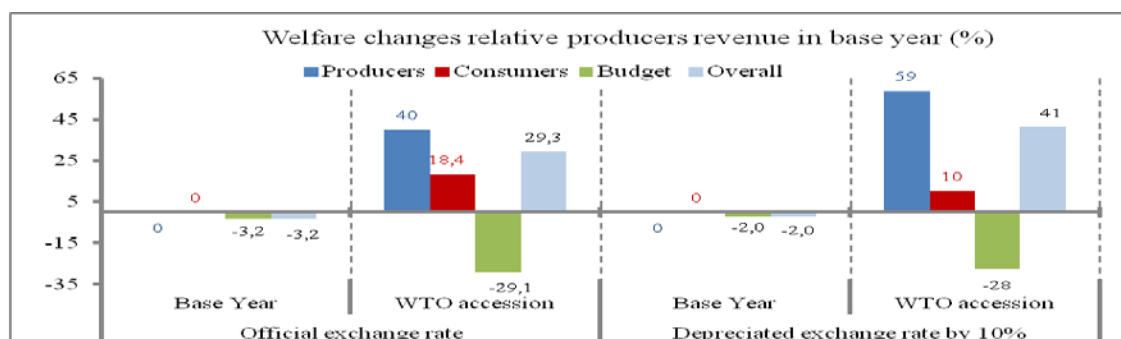
Figure A2. Welfare change relative to consumer expenditure in a base year



Source: own compilation based on AGRISIM simulation results

The budget will lose relative to producer revenue in the base year. Producer, consumer and overall welfare will improve and the improvement under a depreciated exchange rate exceeds the improvement under the official exchange rate (**Figure 3**).

Figure A3. Welfare changes relative to producer gross revenue in a base year



Source: own compilation based on AGRISIM simulation results

The simulated above scenarios further are allow the laying of the basis for policy implications.

Discussion

Turning back now to the research questions, discussion part will be based on state budget effects, producer, consumer and overall welfare changes under the influence of remittances, population growth, and WTO accession scenario.

Many studies have theoretically confirmed and empirically proved that as a result of the depreciation of a national currency, commodities produced in the country become relatively cheaper, and the other way around.

This study shows that, as a whole, remittances play an ambiguous role in the development of different sectors of economy. On the one hand, remittances can become a cause of growth of some sectors of the economy (transportation, trade, financing, etc.), while on the other hand, they are an obstacle to the development of some real sectors of the economy (manufacturing, agriculture, etc.). Poverty reduction, growth of the transport sector, the construction boom in the private sector, growth of the trade sector, an increase in aggregate demand, reduction of the level of unemployment tension in domestic labour markets, an increase in the paying capacity of the population, etc., are among the positive effects of labour migration and consequent remittances. The negative effects of labour migration and remittances are: the effect of foreign purchases (the excess of imports over exports), inflation, stagnation of some sectors of the economy and might the cause of

appearance of symptoms of Dutch Disease, the strengthening of the national currency, increasing consumer price indices, interest rate growth during the economic boom, etc.

What should be noted, in general, is an improvement in the welfare of both producers and consumers, in WTO accession scenario, compared to the base year, under both official and depreciated exchange rates.

This study has showed that the steady inflow of labour migrant remittances is cause for appreciation of the national currency, which results in increased domestic demand. The increase in consumption in the country is largely offset by imports, as domestic producers become less competitive compared to foreign producers, due to the strengthening of the national currency.

An experimental ten percent depreciation of the national currency in foreign exchange has shown that in WTO accession scenario compared to the base year, production of agricultural products increases while the increase is less under the official exchange rate.

The effect on producer gains is significantly higher under a depreciated exchange rate. A ten percent depreciation of the national currency in foreign exchange leads to an increase of producer gains up to 34 percent, compared to the same using the official exchange rate. The reverse situation can be expected in the case of consumers, i.e. their gains are higher under the official exchange rate, so that consumer gains are 2 times higher than in WTO accession scenario at the official exchange rate, rather than at a 10 percent depreciation of the TJS against foreign currencies.

One should definitely and logically expect a loss to the budget under both exchange rates. Although, it should be noted that the loss to the budget is 15 percent less, in WTO accession scenario, under a depreciated exchange rate than under the official. Overall gains in WTO accession scenario are 28 percent higher under a depreciated exchange rate, than under the official exchange rate.

The net trade situation for all commodities will be worse under the official exchange rate than a depreciated exchange rate. In other words, the net trade situation will remain unchanged or improve more under a depreciated exchange rate compared to the situation under the official exchange rate.

To conclude, producer gains exceed losses by consumers under a depreciated exchange rate. The effect of the country's accession to the WTO has a positive effect both on producers and consumers, with substantial losses to state budget. However, producer and consumer gains prevail over budget loss and therefore an overall gain will be ensured, thus Kaldor-Hicks criterion will met. The effect of producer and overall gains are more, losses by consumers and in the budget are less under a depreciated exchange rate. The depreciation of the national currency ensures an increase in producer and a decrease in consumer welfares. The overall effect is smaller in simulated scenarios under the official exchange rate.

Concluding remarks

“Conclusions”. Agriculture plays a significant role in the economic growth of Tajikistan. There is no implicit support of agricultural producers through concession on taxes and interest rates. In the first half of the 1990s, all prices were liberalized and many trade barriers were removed. Now Tajikistan is still among the countries with economies in transition. After 12 years of negotiations, the country, on 2 March 2013 became a full-fledged member of the WTO.

As a whole, the simulated scenarios allow assessment of the changes in supply and demand of agricultural products within the country, net trade status changes, producer and consumer price changes, state budget, producer and consumer effects of different policy option. Moreover, simulated scenarios enable respective conclusions, thereby the basis for policy-related recommendations, as well as propositions for further research.

“Policy Implication”. The government should avoid any taxation of agricultural sector, including the export tax (in case of cotton). These steps allow maximising producer's and consumer's welfare, will improve country's net trade situation and balance of payment (BoP). Elimination of any kind of intervention in the agricultural sector, especially in cotton sector, further, will lay the basis for expanding production, maximising export potential and minimising imports, thus, leading to an improvement of the country's balance of payment.

The government within the WTO agreement should finance expenditures for the provision of services such as research and development, training, inspection, infrastructure, public stockholding, and marketing and promotion. This step will allow increasing farmer income from agriculture and make them less vulnerable to economic downturn, remittances decrease and reduction of other sources of income.

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