

MOLDOVA AND EU LIBERALIZING TRADE: HOW MUCH FOR THE AGRO-INDUSTRIAL SECTOR TO SUFFER?

USING A COMPUTABLE GENERAL EQUILIBRIUM MODEL FOR ANALYZING THE IMPACT OF THE
ECONOMIC POLICIES RELEVANT FOR MOLDOVA'S EUROPEAN INTEGRATION

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ABOUT THE PROJECT

This document was developed as part of the project “Using Computable General Equilibrium Models (GCE) with Micro-Simulations to Analyze the Economy-Wide Impact of Economic Policies Relevant for Moldova’s European Integration”. The project was implemented by the Expert-Grup independent think-tank (Republic of Moldova) with the training and methodological support provided by the Kiel Institute for the World Economy (Germany). The financial support for this project was offered under the auspices of grant L9089, “The Policy Think Tank Bridging Initiative – Policy Research and Advocacy” of the Policy Association for an Open Society – PASOS funded by the Local Government and Public Service Reform Initiative of the Open Society Institute (LGI).

The main goal of this project was to create a platform for knowledge transfer from the Kiel Institute for World Economy (Germany) to the Expert-Grup think-tank (Moldova) on the use of Computable General Equilibrium (CGE) models and micro-simulations based on household data for economic policy analysis and for joint research using those analytic tools. This project addressed the limited capacity for professional quantitative analysis of economic policy in Moldova. By providing in-depth policy analysis and simulation, this project responded to the “Good Governance”, “Convergence with EU sectoral policies” and “Economic Integration” priorities identified in the Eastern Partnership component of the European Neighborhood Policy. The project is highly relevant also in light of priorities identified in the EU’s National Indicative Plan for the Republic of Moldova (Priority 1: Reform of the public administration and public finance management; Priority 3: Support in Poverty Reduction and Economic Growth). At the same time, this project addressed real policy issues that are currently discussed in Moldova as part of the larger agenda of country’s European integration.

In the framework of this project, Expert-Grup used its newly acquired skills for doing research on three examples of specific policy changes currently discussed in Moldova: 1) Impact of EU integration on the Moldovan agro-industrial sector; 2) Economic impact of liberalization of the visa regime with EU on Moldovan economy; and 3) Potential impact of a new Russia embargo against wine imports from Moldova. Results of the research will be used for conducting targeted policy advocacy, assisting in policy planning and raising awareness of the Moldovan government on these policy issues and of the EU policymaking community regarding Moldova’s needs.

Expert-Grup is grateful to Dr. Matthias Luecke, Dr. Manfred Wiebelt and Dr. Toman Omar Mahmoud from the Kiel Institute for the World Economy for the training provided on the CGE models and for their academic advice, suggestions and methodological support. Expert-Grup also would like to express its gratitude to the PASOS (Policy Association for an Open Society, www.pasos.org) and personally to Jeff Lovit, the PASOS executive director, and to the Local Government and Public Service Reform Initiative of the Open Society Institute (LGI) for the support provided to this project.

INTRODUCTION ON THE COMPUTABLE GENERAL EQUILIBRIUM MODELS

WHAT IS A CGE MODEL?

In theoretical and applied economic analysis the Computable General Equilibrium (CGE) models are represented by (usually very large) systems of linear and/or non-linear equations describing the behavior of economic systems varying from a household to national economy to global economy. This class of models is used for analyzing how policy changes and other economic shocks propagate through the economy. A CGE model basically shows how the economy moves from the initial equilibrium to the new one and what structural and quantitative changes accompany the shock.

There are many types of CGE models used in the applied economic analysis. The neoclassical models hinge on the traditional features of the Walrasian general equilibrium theory: firms maximize their profits, consumers maximize their utility, factors of production are fully employed, while equilibrium is achieved through changes in prices/wages. The CGE models built in the structuralist tradition allow for factors unemployment and for rigidities in wages/prices and make use of different assumptions about the macroeconomic balancing mechanisms. CGE models can be static (comparing only different equilibriums) or dynamic (showing how economy evolves towards the new equilibrium). While most of the CGE models deal only with the real part of the economy, some models may also include financial flows and monetary sector.

The CGE models are implemented based on the so-called Social Accounting Matrixes (SAM) for a given year. SAMs are comprehensive, economy-wide and detailed data sets, taking form of a square matrix describing real and monetary flows among different economic agents: activity sectors, commodities, households, enterprises, government and rest of the world. The level of disaggregation within the groups of economic agents – i.e. the number of accounts - depends on the statistical data available and purpose of analysis. In the SAM each account is represented by a row and a column, with the account's income appearing along the row and its expenditures along the column. The underlying principle applying in building a SAM is the equality involved by the double-entry accounting: for each account the total revenue (row-wise) equals its total expenditure (column-wise). To assemble a SAM it is typically necessary to combine information from many sources, such as national input-output accounts, household budget surveys, labor force surveys, fiscal and trade statistics.

A particular feature of the CGE models is that they explicitly recognize that changes affecting one part of the economy can have repercussions throughout the rest of the economy. They are particularly useful in capturing the indirect effects of a policy change on the entire economic system. CGE models are therefore very powerful analytical tools to influence policymaking. The range of issues suitable for a CGE-

based analysis is very large and includes structural adjustment, trade, fiscal, budgetary, agricultural, income redistribution, environmental and energy policies¹.

These models are widely used in many countries to understand and evaluate potential impact of policy but are absent in current policy discussion in Moldova. Using them will make for a quality shift in policy dialogue in Moldova. Most of the policy areas where CGE models would be particularly useful are directly related to Moldova's European integration policy. Such type of models would be particularly useful for applied economic analysis in Moldova, where the ambitious reform agenda demands professional ex-ante analysis of the policy changes. CGE model will provide necessary analytical support and alternative scenarios to feed public discussions with domestic and foreign partners on Moldovan economic policy. When combined with micro-simulations based on household data, CGE models will also give a sense of how the income distribution and poverty will change, which remains of crucial importance in Moldova.

FEATURES OF THE MOLDOVAN CGE MODEL

The CGE model developed for the purposed of this project is an extension of the IFPRI standard model that is fully documented in Lofgren et al. (2002). This model includes both structuralist and neoclassical features, including only the real economic flows, without considering the assets sector, inflation and banking sector. Considering the small size of the Moldovan economy any changes in the economic and trade relations with EU are normally expected to impact only Moldova. Therefore, the CGE has been built as a single country model assuming perfectly elastic demand for Moldova's exports and perfectly elastic supply of Moldova's imports.

The Moldovan CGE model is a comparative-static model, i.e. its use is limited to the analysis of the short- to medium-term effects of the policy and economic shocks. The model is therefore not suitable to analyse long-term dynamic effects arising, for instance, from the growths in the capital endowment. The database for the Moldovan CGE model is the Social Accounting Matrix (SAM) for 2008. The 2008 SAM combines information from input-output accounts, national income and product accounts, household budget surveys and labor force statistics provided by the National Bureau of Statistics. Some data have been taken from the fiscal statistics published by the Moldovan Ministry of Finance, while other data originate from the Balance of Payments compiled by the National Bank of Moldova. The 2008 GCE model for Moldova is based on very detailed SAM with 107 accounts, including:

- 37 activities (primary, manufacturing, and service sectors, with agriculture disaggregated into commercial enterprises versus small family farms with household consumption);
- 36 commodities;
- 3 accounts for transition costs (domestic, export and import);
- 6 factors of production: low-skilled, medium-skilled and high-skilled labour, capital, self-employment in agriculture and self-employment in other sectors;

¹ For a comprehensive overview of the use of CGE models see Devarajan and Robinsons, 2002.

- 8 household types: pensioners, urban-based public employees, rural-based public employees, small farmers, employed in big agricultural companies, others in big cities, other in small towns, other rural;
- 1 account for enterprises and 1 account for government;
- 8 accounts for different types of taxes;
- 4 trading partner regions: EU-27, Russia, other CIS countries, other countries.

In this model production is carried out under the assumption of perfect competition by sectors maximizing their profits, subject to a nested production function. For each activity, the top level of the production function is a Leontief function combining factors of production and intermediate inputs. At lower level, factors of production are combined according to a constant elasticity of substitution (CES) function, while the intermediate inputs are used in fixed proportions (Leontief function).

Aggregate domestic output is allocated by producers to exports and domestic sales based on the criteria of maximizing the profit with given prices, a given quantity of total output and imperfect transformability between domestic sales and exports. The degree to which output for domestic use can be transformed into export is given by a constant elasticity of transformation (CET) function. Exports to each trading partner region are similarly determined on the basis of a CET function that implies imperfect transformability between exports to the various regions. The model assumes a small price-taking economy. Domestic demand for a given good is the sum of demand for private consumption, government consumption, investment, and intermediate inputs. The optimal mix of imported and domestic goods is determined through cost minimisation via a CES aggregation function. Demand for imports from each trading partner region is similarly determined through a CES aggregation function for imports from the various regions.

The macro closure rules for the CGE model define the mechanisms by which the three macroeconomic balances are determined: (i) the current government balance; (ii) the current account balance, and (iii) the savings and investment balance. In this model the 'standard' closures have been used: governmental savings are fixed, while direct taxes are fixed; private savings are investment-driven such that the marginal propensity to save adjusts to a given level of investment; exchange rate is assumed flexible, while foreign savings fixed. Factor market closures determine the mechanisms that equilibrate the supply and demand of each factor of production. In our simulations we have experimented combinations of three types of factor market closures: (i) a factor is fully employed and mobile; (ii) a factor is fully employed and immobile; or (iii) a factor is mobile but may be unemployed.

This CGE model may be thought of as representing the optimal description of the Moldovan economy given the available data. This feature renders the 2008 Moldova CGE models appropriate as an easy-to-use tool to be used by various stakeholders in the economic policy analysis.

OVERVIEW OF THE MOLDOVAN AGRO-INDUSTRIAL SECTOR

In the context of the approaching negotiations on the EU-Moldova FTA there is a discussion emerging among the Moldovan policymakers on how to avert some potential negative economic impact, including how to best protect some sensible domestic sectors in case when imports from the EU are free of any tariff. Their main concerns are linked to the Moldovan agro-industrial sector. This chapter makes an analysis of the potential impact that the EU-Moldova DCFTA would bring upon the Moldovan economy through EU and Moldovan abolishing all trade barriers. We try to look at this impact through the Moldovan CGE model, but we firstly overview key features of the Moldovan economy to set up the background for the CGE analysis.

A SNAPSHOT OF THE MOLDOVAN AGRO-INDUSTRIAL SECTOR

Republic of Moldova meets perfect natural conditions for producing competitive agricultural and food products. The share of agricultural land is unusually high (about 75% of total land), and about ¾ of this land is represented by the highly-fertile types of black soil (*chernoziom*). The climate is mild and propitious for cultivating a wide variety of crops and animals, while the population has traditions and educational background appropriate for these occupations. However, nowadays this endowment does not seem to be fruitfully exploited².

The Moldovan agro-industrial sector is composed of the agricultural sector providing the raw materials and the processing industry using them for production of food, beverages, tobacco (some tiny sectors such as fishery, agricultural services and others using/providing small inputs/outputs from/to the agriculture or the processing industry have been neglected in this paper). Altogether, the agro-industrial sector is represented by 14 sub-sectors, including the agriculture and 13 branches from the processing industry. Within the latter, the winemaking industry holds about 17%, with the meat processing and dairy products following with 13% each. The tobacco processing industry is relatively small (6% of the industrial component of the agro-industrial sector), and declining.

Two decades ago the agro-industrial sector provided the bulk of the Moldovan output, but in the transition period its importance shrank dramatically. Only between 2002 and 2009 the share of the agro-industrial sector in total GDP has contracted from 29.7% to about 12.8% (Table 1). This is due both to the erratic growth of production inside the agro-industrial sector (Table 2), but also to the sounder growth of other industrial sectors, constructions and services.

In the recent decade, most of the processing sectors have achieved significant productivity gains. For instance, the labor productivity in the sub-sector of mineral water and refreshing beverages has grown almost four times between 2001 and 2008, with losses in productivity occurring in 2009 on the background of generalized economic crisis. In the same period of time, the productivity in the flour processing

² See more in Expert-Grup, 2010.

industry grew more than nine times! In other key industries – such as winemaking or tobacco processing – the productivity gains were not as stable or even were negative (Table 3).

TABLE 1. SHARE OF AGRO-INDUSTRIAL SECTOR IN MOLDOVAN GDP.

	2002	2003	2004	2005	2006	2007	2008	2009	2010
Agriculture	21.0	18.3	17.5	16.4	14.5	10.0	8.8	8.5	11.9
Food and beverages	8.5	8.6	7.4	6.4	5.1	4.5	4.4	4.2	4.8
Tobacco products	0.3	0.2	0.3	0.2	0.2	0.1	0.1	0.2	0.3
Total	29.7	27.1	25.2	23.0	19.8	14.6	13.3	12.9	170

Sources: National Bureau of Statistics of Moldova and Expert-Grup estimates;

TABLE 2. OUTPUT OF THE AGRO-INDUSTRIAL SECTOR, % CHANGE, 2001=100%.

	2002	2003	2004	2005	2006	2007	2008	2009
Agriculture	103	89	108	109	108	83	109	99
Meat processing	125	154	135	123	136	176	182	150
Vegetables and fruits processing	84	130	103	106	113	122	116	89
Dairy products	108	116	128	138	136	141	150	136
Flour and milling products	129	118	100	91	97	87	96	81
Fodder	151	116	71	79	81	76	87	152
Bakery products	106	123	138	141	150	167	182	171
Sugar production	122	80	85	96	108	54	95	35
Cacao, chocolate and confectionery products	148	152	144	163	163	190	206	191
Pasta and flour products	79	78	77	109	102	100	123	115
Distillated alcoholic beverages	78	86	91	104	67	52	55	44
Winemaking sector	120	157	173	178	91	65	81	64
Mineral water and refreshing beverages	132	166	173	212	242	311	272	251
Tobacco products	67	67	64	61	48	44	38	44

Sources: National Bureau of Statistics of Moldova and Expert-Grup estimates;

TABLE 3. LABOR PRODUCTIVITY INDEX IN SOME INDUSTRIES OF THE AGRO-INDUSTRIAL SECTOR, 2001=100%.

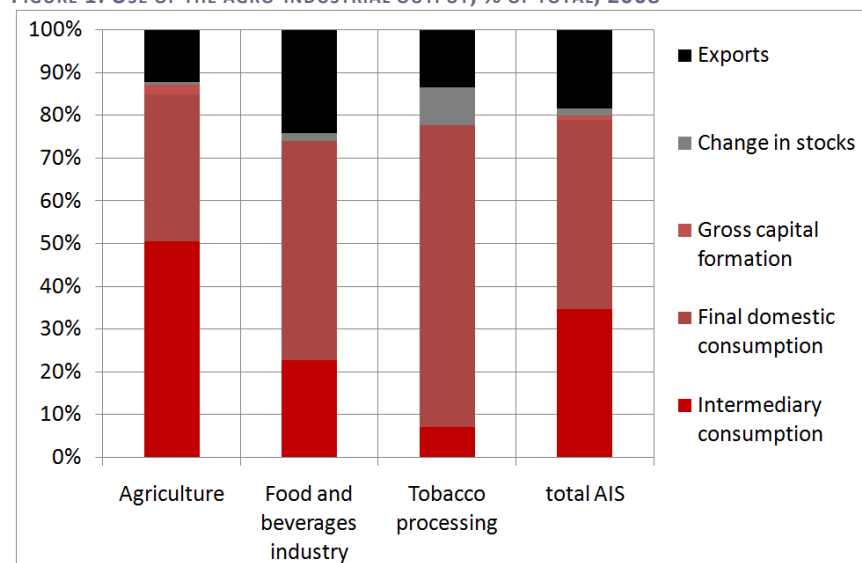
	2002	2003	2004	2005	2006	2007	2008	2009
Meat processing	109	128	110	115	124	149	157	130
Vegetables and fruits processing	90	156	114	130	153	207	202	181
Dairy products	107	106	103	122	121	119	137	141
Flour and milling products	127	165	179	196	167	397	918	833
Fodder	167	176	119	117	139	145	134	186
Bakery products	104	109	115	116	118	128	140	132
Sugar production	136	97	122	163	158	97	190	111
Cacao, chocolate and confectionery products	128	127	122	155	146	171	187	179
Distillated alcoholic beverages	88	93	90	108	80	71	81	76
Winemaking sector	110	126	127	125	82	79	104	95
Mineral water and refreshing beverages	165	172	183	205	328	419	411	390
Tobacco products	76	98	115	112	102	101	86	119

Sources: National Bureau of Statistics (NBS) of Republic of Moldova and Expert-Grup estimates;

The agro-industrial sector is significantly oriented to the external markets, even though there is no critical dependency. According to the National Accounts data, in 2008 the agricultural sector exported about 12.2% of its product, the food and beverages industry – about 24.1%, while tobacco processing – roughly 13.4% (Figure 1). The agro-industrial sector also depends to some extent on the imported inputs: agricultural producers import about 8.6% of the resources they use for production,

food and beverages industry – about 15.6%, with the tobacco industry being critically dependent on foreign supplies - 36%.

FIGURE 1. USE OF THE AGRO-INDUSTRIAL OUTPUT, % OF TOTAL, 2008



Sources: National Bureau of Statistics of Moldova and Expert-Grup estimates;

AGRO-INDUSTRIAL SECTOR: A HEAVILY PROTECTED ONE

As compared with other countries in the same geographic or income level groups, Moldova fares a relatively low level of trade protection. In 2008, its (weighted) mean customs tariff applied on manufactured products was only 2.69%, while on primary products – 2.06% (Table 4). Both indicators grew as compared with 2006 (from 1.88% and 1.37% accordingly), however this was the result of changing structure of imports rather than some significant changes in trade policy. Still, some domestic markets are heavily protected against international competition. Looking into the Law on customs tariff, it appears that the agro-industrial sector is the most protected one (Table 5).

TABLE 4. LEVEL OF WEIGHTED MEAN IMPORT TARIFFS APPLIED IN SOME COUNTRIES, AS OF 2008

	Manufactured products (%)	primary products (%)
South Caucasian	2.20	2.30
Balkans	2.80	3.00
Western CIS	5.10	2.00
Europe & Central Asia (developing only)	3.81	2.96
EU	1.72	0.44
Low income countries	9.85	7.96
Lower middle income countries	6.62	3.74
Central Asia and Mongolia	6.40	1.90
Moldova	2.69	2.06

Source: World Bank Development Indicators database;

**TABLE 5. MOLDOVAN ECONOMIC SECTORS MOST PROTECTED FROM INTERNATIONAL COMPETITION
(IMPORT DUTIES =>15% OR OTHER NON-AD-VALOREM PROTECTION)**

Tariff code	Description of the products	Protection measure
0101	live horses, asses, mules and hinnies, other than of pure breeds	15%
0106	other live animals	15%
0105	live poultry, that is to say, fowls of the species <i>gallus domesticus</i> , ducks, geese, turkeys and guinea fowls	20%
0201	meat of bovine animals, fresh or chilled	20%+200 euro/t
0202	meat of bovine animals, frozen	20%+150euro/t
0203	meat of swine, fresh, chilled or frozen	20%+200 euro/t
0204	meat of sheep or goats, fresh, chilled or frozen	10%+100 euro/t
0207	meat and edible offal, of the poultry of heading 0105, fresh, chilled or frozen	from 15%+100 euro/t to 20%+100 euro/t
0401	milk and cream, not concentrated nor containing added sugar or other sweetening matter	15%
0403	buttermilk, curdled milk and cream, yogurt, kephir and other fermented or acidified milk and cream, whether or not concentrated or containing added sugar or other sweetening matter or flavoured or containing added fruit, nuts or cocoa	15%
0405	butter and other fats and oils derived from milk; dairy spreads	from 15%+100 euro/t to 20%+100 euro/t
0407, 0408	eggs in shells and not	15%
0409	honey	15%
07	a big number of positions in the chapter 07 edible vegetables and certain roots and tubers	from 15% to 20%
08	a big number of positions in the chapter 08 edible fruit and nuts; peel of citrus fruit or melons	from 15% to 20% in the season
1008	buckwheat, millet and canary seed; other cereals	15%
1102-1104	a significant number of products of the milling industry; malt; starches; inulin; wheat gluten	15%
15	a big number of positions in the chapter 15 animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal or vegetable waxes	15%
1602	other prepared or preserved meat, meat offal or blood	some positions are taxed 20%
1701 91	cane or beet sugar and chemically pure sucrose, in solid form, containing added flavouring or colouring matter	10% within the quota of 6500 tones, out of which 5500 tones form EU, above the quota - 75%
1701 99	other cane or beet sugar and chemically pure sucrose, in solid form	
1702	other sugars, including chemically pure lactose, maltose, glucose and fructose, in solid form; sugar syrups not containing added flavouring or colouring matter; artificial honey, whether or not mixed with natural honey; caramel	10% within the quota of 1840 tones, out of which 640 tones form EU, above the quota - 75%
1806	cocoa and cocoa preparations	15%
2001	vegetables, fruit, nuts and other edible parts of plants, prepared or preserved by vinegar or acetic acid	20%
2002	tomatoes prepared or preserved otherwise than by vinegar or acetic acid	20%
200540	peas prepared or preserved otherwise than by vinegar or acetic acid, not frozen	25%
2008	fruit, nuts and other edible parts of plants, otherwise prepared or preserved, whether or not containing added sugar or other sweetening matter or spirit, not elsewhere specified or included	most positions are taxed 20% ad-valorem
2009	fruit juices (including grape must) and vegetable juices, unfermented and not containing added spirit, whether or not containing added sugar or other sweetening matter	15%
2203 00	beer made from malt	0,25 euro/l
2204	wine of fresh grapes, including fortified wines; grape must other than that of heading 2009	0,5 euro/l
2206	other fermented beverages (for example, cider, perry, mead); mixtures of fermented beverages and mixtures of fermented beverages and non-alcoholic beverages, not elsewhere specified or included	0,24 euro/l
2207	undenatured ethyl alcohol of an alcoholic strength by volume of 80 % vol or higher; ethyl alcohol and other spirits, denatured, of any strength	0,5 euro/l
2208	undenatured ethyl alcohol of an alcoholic strength by volume of 80 % vol or higher; ethyl alcohol and other spirits, denatured, of any strength	0,5 euro/l absolute alcohol
2402	cigars, cheroots, cigarillos and cigarettes, of tobacco or of tobacco substitutes	3 euro/1000 pieces

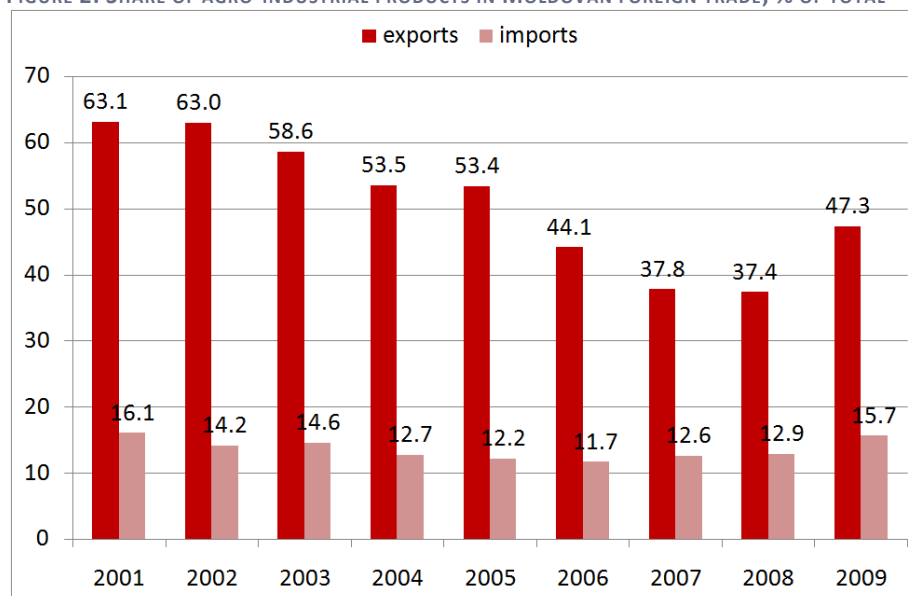
Source: Law of Republic of Moldova no. 1380 on customs tariff of November 20, 1997.

EU-MOLDOVA TRADE WITH THE PRODUCTS OF THE AGRO-INDUSTRIAL SECTOR

Trade with the agro-industrial products has an important even though declining share in the Moldovan trade. Back in 2001-2002 the exports of the agro-industrial sector represented almost two thirds of the Moldovan total exports. In 2007-2008 these had a share of only 37%. In 2009 their share climbed up again, mainly as result of non-agro-industrial exports declining more rapidly in the general context of

economic downturn. In structure of imports, the share of agro-industrial products contracted less spectacularly, from 16.1% in 2001 down to 12.9% in 2008 (Figure 2).

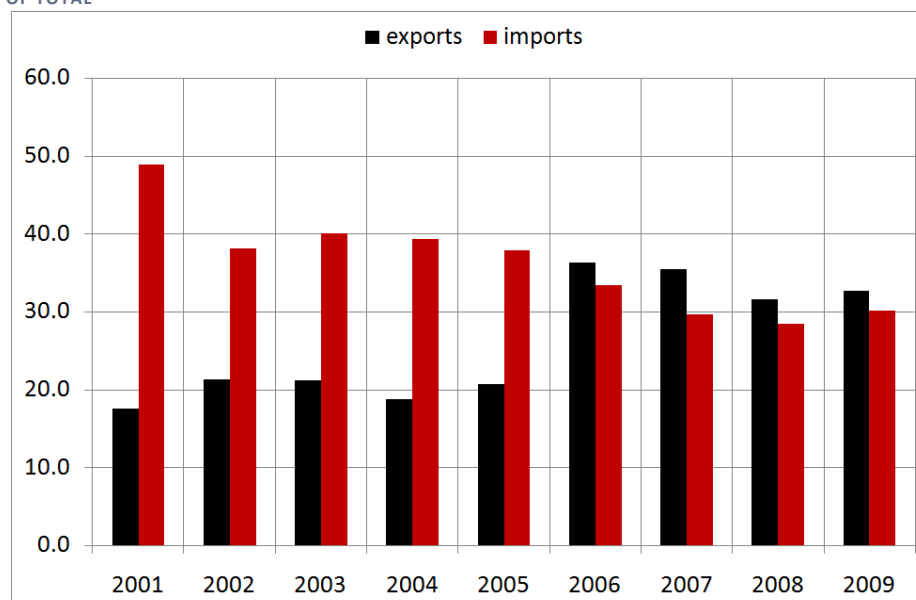
FIGURE 2. SHARE OF AGRO-INDUSTRIAL PRODUCTS IN MOLDOVAN FOREIGN TRADE, % OF TOTAL



Sources: National Bureau of Statistics of Moldova and Expert-Grup estimates;

EU-27 has a growing role as destination for Moldovan exports (Figure 3). In early- to mid-2000s the EU-27 received less than 20% of the agro-industrial exports from Moldova. Since 2006 its share went above 30% on the account of the exports to the CIS countries. As for imports of the agro-industrial exports, the EU has seen its quota steadily declining, from almost 50% in 2000-2001 to about 30% in 2007-2009.

FIGURE 3. SHARE OF EU-27 IN MOLDOVAN FOREIGN TRADE WITH AGRO-INDUSTRIAL PRODUCTS, % OF TOTAL



Sources: National Bureau of Statistics of Moldova and Expert-Grup estimates;

For some agro-industrial products, the EU-27 represents the main market outlet for Moldova, such as in case of products of the flour and milling industry, oleaginous fruits and seeds, cacao and cacao products, and various bakery and cereals-based products. EU represents important destination for edible fruits and nuts (29.3% of

total exports), cereals (47.6%), fats and oils of animal and vegetable origin (45.4%), preservations of fruits and vegetables (35.9%), alcoholic beverages (15.5%). However such Moldovan products as live animals, meat and meat products, milk and dairy products are absent on the European markets.

USING THE CGE MODEL TO SIMULATE IMPACT OF A FTA BETWEEN MOLDOVA AND EU ON MOLDOVAN AGRO-INDUSTRIAL SECTOR

DEFINING THE FTA-ASSOCIATED SCENARIOS

A genuine FTA between Moldova and European Union would involve abolishing all customs duties both on Moldovan and European side. Therefore, we have considered the following three scenarios to be simulated with the Moldovan CGE:

- i) ***EU allowing all Moldovan products to enter its market freely (dubbed EU_open)***; because most of the manufactured goods already enter EU market without any customs duties, the reduction in EU tariff will be beneficial mainly for the agricultural goods and food products. In result, Moldovan producers will get much higher prices for their production sold on the EU market. It is difficult to calculate exactly how much these prices will increase, but the magnitude can be gauged using the information on farm-gate prices for main agricultural products in some EU members geographically close to Moldova (Table 6). Our assumption is that the difference between the prices that Moldovan farmers get and the average price that EU farmers get can be entirely attributed to the EU tariff and non-tariff barriers to trade. Using the data in the Table 6 and other relevant information (such as the EU online customs tariffs database TARIC) we adopt the (conservative) estimate that once these barriers lifted, ***exports prices for Moldovan agro-industrial goods sent to EU market will increase on average by 20%***. This assumes that Moldovan producers already meet the relevant EU standards.

TABLE 6. FARM-GATE PRICES FOR BASIC AGRICULTURAL PRODUCTS IN SOME CENTRAL AND EASTERN EUROPEAN COUNTRIES, EURO/100 KG, IF NOT OTHERWISE SPECIFIED

	Milk	Wheat	Maize	Potatoes	Calves	Pigs	Sheep	Chickens	Eggs, euro/100 pieces
Estonia	25.5	13.0			102.7				
Bulgaria		11.7	11.4	19.4		113.1	111.4	92.3	6.3
Hungary	26.7	12.4	11.8	17.6	214.3	150.5	151.2	76.2	
Latvia		13.1		12.2	80.2	114.1	102.4		6.3
Lithuania	22.4	13.7	15.2	18.2	140.4	112.6	116.1	101.3	6.1
Poland	24.6	13.7	12.6	10.3	232.2		162.8	84.2	5.2
Romania	20.9	13.4	17.3	29.4	100.6	123.4	79.9	101.1	6.7
Slovakia	28.0	11.8	11.3	16.2	209.3	110.1	111.9	78.3	6.4
Moldova	20.3	8.1	8.0	12.8	80.4	132.9	63.0	112.9	4.4

Source: Eurostat, National Bureau of Statistics of Moldova and Expert-Grup calculations;

- ii) The second scenario is much simpler: ***Moldova introduces zero rate import tariffs on all imports from EU (RM_open)***.
- iii) The third scenario is a combination of the previous two scenarios: ***exports prices for Moldovan agro-industrial goods sent to EU market will increase on average by 20% and Moldovan introduces zero rate import tariffs on all imports from EU (ALL-open)***. Because the model used does not allow

modeling the existence of the transition periods, it is assumed that both policy changes take place at the same time.

As macroeconomic closure rules for our CGE model we adopted the following:

- Savings-Investment balance: savings are driven by investment;
- Rest of the World balance: exchange rate is flexible, foreign savings are fixed;
- Governmental balance: governmental savings adjust, direct taxes are fixed;

For the factor market closure we adopted the standard assumption that capital is fully employed and mobile across sectors. As for the labor factor, considering the current macroeconomic conditions in Moldova, we adopted the assumption that it is unemployed and mobile across sectors. These macroeconomic and factor market closure rules apply for all three scenarios.

RESULTS OF SIMULATIONS

After EU abolishes its trade barriers against imports from Moldova (first scenario), the total absorption and private consumption in Moldova increase by 1% and 2% accordingly. The government's share in absorption declines (as well as in case of the other two scenarios). Under this scenario, the national currency appreciates marginally and is accompanied by a rather modest exports growth.

Partly, this modest growth in exports is explained by the labor and capital flowing from some sectors (such as textiles and clothes) into the agro-industrial sectors, with an associated decline in level of production and exports of the former. For instance, the demand for labor from the part of the oil and fats production sector perks up more than 15%, from the fruits and vegetables processing industry – by 9%, while from the part of the large-scale agriculture – by almost 10%. The latter has particular implications, suggesting that this is a way of lifting the rural population from the self-subsistence agriculture (i.e. from poverty).

Imports grow a brisker pace than exports, mainly on the account of intermediate goods used in agro-industrial sector. Because it is assumed that there is labor unemployment, the GDP grows by 0.8% under this scenario.

TABLE 7. SIMULATION RESULTS: EVOLUTION OF MAIN MACROECONOMIC INDICATOR, % CHANGE FROM THE BASE RUN

	Base run	EU_open	RM_open	ALL_open
Total absorption	953.8	1.1	1.0	2.1
Private consumption	570.5	1.9	1.6	3.5
Exports	240.4	0.8	4.2	4.7
Imports	-564.9	1.3	1.8	3.0
GDP	629.2	0.8	1.5	2.2
Real exchange rate (negative sign indicates real appreciation of the domestic currency)		-0.3	-0.1	-0.2
Investment/GDP	34.0	-0.6	-0.5	-1
Private savings/GDP	17.2	-0.5	0.5	
Foreign savings/GDP	13.4	-0.3	-0.1	-0.4
Trade deficit/GDP	75.6	-1.1	-1.4	-2.4
Governmental savings/GDP	8.6	0.1	-0.9	-0.8
Import taxes/GDP	1.8	0.0	-1.2	-1.2

Source: authors' calculations based on Moldovan CGE model.

As it can be seen from the Table 8, among the agro-industrial branches the large-scale corporate agriculture is expected to increase significantly its output, while in the small-scale agriculture no changes happen. The production of oils and fats is likely to experience the strongest growth in production, followed by the production of fruits and vegetables and tobacco products. However, the growth in output is not likely to be accompanied a strong growth in domestic consumption. As result, this pattern of output growth is reflected only in the evolution of exports. Table 9 shows that for most of the products, growth of exports to EU associates with decline of exports to other destinations, but the net effect is still positive.

TABLE 8. AGRO-INDUSTRIAL SECTORS OUTPUT, % CHANGE FROM THE BASE RUN

	Base run	EU_open	RM_open	ALL_open
Corporate agriculture	63.7	8.9	4.3	13.2
Small scale agriculture	103.2	0.0	0.0	0.0
Fisheries	0.4	1.7	-7.4	-5.7
Meat and meat products	17.2	2.6	1.7	4.2
Fish and fish products	1.0	1.3	2.9	4.2
Fruits and vegetables	14.1	8.0	1.8	10.1
Oils and fats	15.4	14.5	1.8	16.8
Dairy products	14.0	1.6	1.4	3.0
Cereal products	2.8	5.0	1.4	6.6
Animal feed	1.0	3.8	1.7	5.5
Other food products	33.3	3.9	0.7	4.6
Beverages	44.0	4.4	1.1	5.6
Tobacco products	3.9	5.6	1.4	7.2

Source: authors' calculations based on Moldovan CGE model.

TABLE 9. EXPORTS OF AGRO-INDUSTRIAL PRODUCTS, % CHANGE FROM THE BASE RUN

	EU_open		RM_open		ALL_open	
	EU27	other regions	EU27	other regions	EU27	other regions
Agricultural products	34.9	-6.3	1.6	1.6	37.1	-4.8
Meat and meat products	35.2	-6.1	2.0	2.0	37.9	-4.2
Fish and fish products	-	0.5	-	4.8	-	5.4
Fruits and vegetables	43.8	-0.1	2.1	2.1	47.3	2.3
Oils and fats	48.2	2.9	2.0	2.0	51.6	5.3
Dairy products	-	0.9	-	1.4	-	2.4
Cereals	23.7	-14.1	1.8	1.8	26.1	-12.4
Animal fodder	19.2	-	1.4	-	20.9	-
Other food	42.9	-0.7	0.3	0.3	43.8	-0.1
Beverages	45.2	0.8	1.3	1.3	47.4	2.3
Tobacco products	51.5	5.2	1.1	1.1	53.7	6.7

Source: authors' calculations based on Moldovan CGE model.

Scenario no.2 means Moldova cutting its customs tariffs on imports from EU. Under this scenario, the governmental savings are expected to decline dramatically, by about 10%. Absorption and private consumption grow less than in the first case scenario, but the expected rise in GDP is almost twice higher, about 1.5%.

Interesting enough, under the second scenario both exports and imports rise more as compared with the first scenario. This is explained by the fact that in result of cutting import tariffs, light industry will attract even more factors of production and intermediary inputs than it presently does. In result of this, the production of textiles and clothes grows by 21% and 16% accordingly, while production of the agro-industrial sector will grow only modestly: from 0.7% in case of other food to 4.3% in case of the large-scale agriculture (while the tiny fishery industry is expected

to shrink by almost 8%). This is symmetrically reflected in the exports, with light industry amassing an even bigger share than in present, while agro-industrial sector adding some 1-2 percentage points.

TABLE 10. IMPORTS OF AGRO-INDUSTRIAL PRODUCTS, % CHANGE FROM THE BASE RUN

	EU_open		RM_open		ALL_open	
	EU27	other regions	EU27	other regions	EU27	other regions
Agricultural products	2.9	2.9	8.6	-0.4	11.5	2.2
Meat and meat products	2.4	2.4	2.2	1.2	4.5	3.6
Fish and fish products	1.9	1.9	1.2	1.2	3.1	3.1
Fruits and vegetables	0.3	0.3	1.1	1.1	1.3	1.3
Oils and fats	-2.0	-2.0	1.1	1.1	-1.0	-1.0
Dairy products	2.2	2.2	7.6	0.0	9.8	2.1
Cereals	4.8	4.8	2.0	0.9	6.9	5.8
Animal fodder	4.5	4.5	2.6	1.9	7.1	6.4
Other food	1.5	1.5	38.5	-7.7	40.4	-6.4
Beverages	1.4	1.4	19.5	-6.9	21.0	-5.7
Tobacco products	1.8	1.8	89.3	-0.5	92.5	1.1

Source: authors' calculations based on Moldovan CGE model.

In case of the third scenario most (but not all) of the variables represent the sum of the previous two scenarios. When both Moldova and EU cut their import tariffs, Moldovan GDP is expected to add 2.2%, exports will grow by 4.7%, while imports by 3.0%, suggesting that this is the most balanced scenario Moldova should aim for. The light industry will grow further, but most of the agro-industrial branches will experience modest to strong growth either. There are almost no agro-industrial branches experiencing dramatic falls; the tiny fishery industry is the only one likely to downshift. (Not the subject of this paper, but the production, exports and factors employment in the machinery production sector is also likely to decline). National currency will experience a marginal appreciation though, associated with higher inflows of the foreign currency.

The welfare impact under all scenarios seems to be positive, even though quite limited in magnitude (Table 11). The urban-based households will gain most of the economic benefits, while the rural ones will be relatively less happy even though better off in absolute terms. This growth in consumption will come on the account of declining propensity to save (which is largely an outcome of the selected macroeconomic closure rules).

TABLE 11. HOUSEHOLDS' CONSUMPTION EXPENDITURES, % CHANGE FROM THE BASE RUN

	BASE	EU_open	RM_open	ALL_open
Pensioners	85.6	2.4	2.0	4.4
Public employee in urban areas	90.8	2.3	2.2	4.3
Public employee in village	54.2	2.1	1.8	3.8
Smallholder	81.7	1.7	1.4	3.1
Professional farmer	36.7	1.6	1.3	2.9
Rest big cities	118.7	2.1	2.1	4.1
Rest towns	65.0	1.5	1.5	2.9
Rest villages	37.7	1.7	1.3	3.0

Source: authors' calculations based on Moldovan CGE model.

MAIN CONCLUSIONS

The analysis undertaken using the Moldovan CGE model brings about a number of relevant policy conclusions:

- Moldova meets perfect natural conditions and human capital to build a more solid agro-industrial sector than is presently the case. However, the potential of the sector is constrained, among the countless domestic factors, by the EU tariff and non-tariff barriers against imports of the food and agricultural products from Moldova. Meanwhile, the prices on the EU markets are quite attractive for the domestic producers, including for the corporate and individual farmers.
- Assuming that Moldova meets the EU standards (resources for the necessary investment can be brought by both international donors and private companies), getting market access will result into significant gains for the Moldovan economy; these gains will take form of significant increases in production, revenues and revenues for the producers, but also in positive structural changes across the economy. In particular, fewer resources will be devoted to the 'mammoth' light industry (textiles and clothes) and more to the agro-industrial sector. With global food prices getting higher, it would be strategically right for Moldova to allocate more resources for the production of competitive food.
- The policy discussions about the Moldovan agro-industrial sector being a 'sensible one' in result of opening economic borders to the imports from the EU seem to be largely groundless. In fact, as result of Moldova abolishing its customs tariffs on imports the economy will only gain via cheaper intermediary inputs entering the technological chains. Among others, this will result in lower domestic prices. As producers of food, the rural households would expect to lose in result of abolishing import tariffs. In fact, they are likely to be better off, including because the food has a high share in their consumption budgets.
- This Moldovan agro-industrial sector is likely to withstand the competition with the European producers and to find its niches on the European market. Rather than thinking on how to protect domestic producers, the government has to consider how to promote national exports to the EU market, the key element being adoption of EU sanitary, phytosanitary and veterinary standards.
- The government will lose some of its revenues derived from taxing the imports from EU. However, as result of opening trade with EU the taxable economic basis will get wider and in long term will compensate for the losses.
- When both Moldova and EU reduce reciprocally the import tariffs, the demand for labor and capital from the part of the food production industry and agriculture will increase. This has important political and social implications, as this will lift an important part of the rural population from the self-subsistence agriculture by offering alternative economic occupations and more sustainable sources of income.

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