A Foresight Study of European East-West Agrifood Trade Options

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Abstract

Taking a trade perspective with a focus on agrifood markets, the current foresight study employs a computable general equilibrium simulation model to quantify the implications of different future pathways of European East-West trade relations for the Commonwealth of Independent States (CIS), thereby providing insight on how best to orientate their political and trade strategies. Comparing with a baseline, two optimistic pathways explore greater market access, both within Europe ('Deep integration') and globally ('trade liberalisation'). In contrast, an isolationist 'trade bloc' pathway reflecting a deteriorating political situation between Russia and the West is also examined.

In the 'baseline', Deep and Comprehensive Free Trade Agreement (DCFTA) members realise market gains, whilst intra-CIS trade diversion effects are small. The 'deep integration' scenario ('liberalisation' scenario) generates significant relative benefits for DCFTA signatories' agrifood (non-agrifood) activities. In both of these trade reform narratives, the Eurasia Economic Union (EAEU) economic gains are biased in favour of Russia's energy sector resulting in greater import dependence on agrifood commodities from the EU. The isolationist trade narrative nurtures EAEU agrifood activity, although at the cost of its macroeconomic growth.

Key Words

trade; foresight study; East-West; CGE

1 Introduction

After the breakup of the Soviet Union, the Commonwealth of Independent States (CIS) was formed to maintain coordination and cooperation within the region. Trade was seen as a vital tool of continued stability, which paved the way for the creation of a free trade area (FTA) between CIS signatory members[1]. As a counterweight to Russian influence, the European Union inaugurated in 2009 the Eastern Partnership (EaP) under the auspices of its European Neighbourhood Policy (ENP).[2] In exchange for European Union (EU) funding, the ENP aims to provide stability beyond EU borders through institutional reform and regulatory convergence. In particular, the adoption of the EU *acquis* and market rules constitutes a key element of an EU Association Agreement (AA), whilst the specifics of bilateral trade arrangements within the AA fall under the remit of a Deep and Comprehensive Free Trade Agreement (DCFTA). The EU-Ukraine DCFTA (enforced in January 2016) and the DCFTAs with Georgia and Moldova (enforced in July 2016) encompass all trade-related areas (i.e., services, intellectual property rights, customs, public procurement, energy-related issues, competition etc.) and also tackle the so-called 'behind-the-border' measures through regulatory harmonisation with the EU *acquis*. As these three CIS countries already benefit from EU preferential market access through the EU Generalised System of Preferences (GSP), the principle trade led gains are expected to occur through the alignment of behind-the-border measures.

Against this background, in 2012, political tension arose between the EU and Russia as Ukraine sought to intensify ties through the ratification of an AA. EU-Russian relations deteriorated further as

[1] Armenia, Azerbaijan, Belarus, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan and Uzbekistan. Ukraine is an associate member, whilst Georgia withdrew in 2008 due to the Russia-Georgia conflict. In this paper, we keep the 'CIS' definition to describe this geographical cluster of countries.

[2] The ENP applies to the EU's closest neighbours on its eastern and southern borders, regionally divided into the EaP and a Euro-Mediterranean Partnership (EURO MED). The EaP currently includes Armenia, Azerbaijan, Belarus, Georgia, Moldova and Ukraine.

Ukraine fell into political crisis, which eventually culminated in the imposition of trade sanctions by Russia on imports of (*inter alia*) EU agrifood products. The import ban remains in place, whilst the Ukrainian crisis continues to cast a shadow over East-West integration. Furthermore, to counter rising EU influence, Russia launched the Eurasian Customs Union (ECU) in 2010 including signatory members Kazakhstan and Belarus, with a common customs tariff on all third country trade. In January 2015, the ECU was superseded by an enlarged Eurasia Economic Union (EAEU) including Armenia and Kyrgyzstan, with the aim of further extending regional market integration through the development of a single market for goods, services, capital, and labour. Notwithstanding, VINOKUROV (2017) notes that many hurdles remain including the many exemptions applied to the common external customs tariff structure and the elimination/harmonisation of non-tariffs measures.

Caught between two opposing trade factions – East and West – this paper conducts a quantitative foresight analysis to identify the trade-led economic implications which accompany a continuation of these opposing political visions. A key objective is to provide decision makers in CIS countries a trade perspective on how best to align their interests. Does the promise of further East-West co-operation through trade provide a win-win for CIS countries' economic performance? Taking the polar opposite, in what measure could the eventuality of a trade based 'cold war' between Russia and the West affect the economic performance of EAEU signatory members?

It is important to note that the agriculture sector accounts for an important share of employment and value added in the CIS regions (AGRICISTRADE, 2016a). Perhaps surprisingly, a cursory examination of previous empirical impact studies (see below) shows that these activities are typically subordinated to two or three aggregate sectors. Examining East-West agricultural trade data over the period 2013-2015 (Table 1), the EU runs a net trade surplus with the EAEU countries of €9.6 billion (largely due to trade with Russia), whilst inter EU-EAEU trade flows (€15.2 billion) exceed intra-EAEU trade (€7.1 billion). With the 'DCFTA' signatory countries (i.e., Ukraine, Georgia and Moldova), the EU runs a trade deficit of €2.6 billion, largely due to Ukraine's trade surplus with the EU. In fact, Table 1 clearly shows the importance of EU market access for the DCFTA signatories. More specifically, agricultural trade between the DCFTA members and the EU (€8 billion) is significantly higher than both intra-DCFTA region agricultural trade (€0.6 billion) and DCFTA member trade with its EAEU and Rest of the CIS (RoCIS) trade partners (€4.3 billion).

A common framework for the quantitative analysis of trade policy is the neoclassical computable general equilibrium (CGE) simulation model. The CGE model has a fully consistent macro-economic accounting structure recording industry and final demand transactions, full coverage of gross bilateral trade, and detailed price linkage equations including both domestic market support distortions and border protection data. Thus, CGE models not only yield insights on the impacts of border support reforms in a specific sector, but through the input-output linkages between activities, are ideally suited to examine the economy-wide repercussions of trade reform through the resulting competing uses of primary factor endowments.

Examples of *single-country* CGE applications are available for Armenia (JENSEN and TARR, 2012) and Ukraine (MOVCHAN and GIUCCI, 2011). Employing a similar benchmark year (2007 and 2008, respectively), both studies consider East-West trade options. For Ukraine, EU trade integration generates between 1.3% and 11.8% increases in GDP. The upper range of estimates is largely due to assumed 2.5% reductions in trade facilitating border costs and steady-state investment effects. Interestingly, trade integration with the Russian-led ECU is found to generate GDP losses for Ukraine. JENSEN and TARR (2012) pursue a similar scenario design approach for Armenia, with assumptions on trade facilitating border costs and EU product standards costs. The modelling includes steady-state investment effects and monopolistic type competition. The authors report a 1.2% GDP rise from an EU

Table 1. EU-CIS agrifood trade relations (2013-2015 average, billion US$)

	Importers:				
	EU	**DCFTA**	**EAEU**	**RoCIS**	**Rest of the World**
Exporters:					
EU	404.6	2.7	12.4	0.5	60.8
DCFTA	5.3	0.6	2.8	0.4	17.2
EAEU	2.8	1	7.1	2.1	18
RoCIS	0.1	0.1	0.8	0	0.8
Rest of the World	150	7.3	39.2	1.5	-

Source: UNCOMTRADE, agricultural products = HS01-24

DCFTA, whilst a CIS FTA generates negligible welfare impacts. Interestingly, 'agriculture, forestry and fishing' sector output changes -0.7% and 0.1% in each of the scenarios, respectively.

Elsewhere, the Global Trade Analysis Project (GTAP) database has become a *de facto* tool of analysis for *multi-region* CGE trade analysis. HARBUZYUK and LUTZ (2008), TOCHITSKAYA and VINHAS DE SOUZA (2009) and KNOBEL and CHOKAEV (2014), employing GTAP data benchmarked to 1995, 2004 and 2007, respectively, focus exclusively on tariff eliminations on EU-CIS, EU-Russia and EU-EAEU trade, respectively. Comparing with the benchmark data, real GDP percentage gains to all parties (particularly the EU) are limited, whilst HARBUZYUK and LUTZ (2008) report losses to the CIS regions and KNOBEL and CHOKAEV (2014) arrive at a similar result for Belarus. Under steady-state ('long-run') conditions, KNOBEL and CHOKAEV (2014) approximately double their reported welfare gains to Russia (2%), Kazakhstan (1.2%) and the EU (0.2%). KNOBEL and CHOKAEV (2014) also report output changes for Russian agriculture (one sector) and food activities (three sectors), where short run output reductions (less than 1%) from import substitution, are replaced by steady-state output increases of approximately 1% as increased Russian investor confidence results in capital accumulation which generates a competitive advantage in Russia.

With a focus on EU-Georgia trade, the multi-region CGE study by MALISZEWSKA ET AL. (2008) employs 2004 GTAP data, whilst also including oligopolistic competition to characterise manufacturing activities (including 'food, beverages and tobacco'). In contrast to previous studies, a business as usual 'baseline' is implemented capturing historical changes in Georgian and EU tariff preferences for the period 2004-2006, against which further scenarios are compared. A rich array of scenarios are contemplated, ranging from simple tariff eliminations to reductions in border costs, EU product standard costs and risk premiums in Georgia. The real GDP gains in Georgia range from approximately 1.1% for the simple EU-Georgia FTA to 7.5% under a deep integration scenario. The trade diversion impacts on third country CIS regions are negligible. In addition, food and beverage sector output falls (between -2% and -6.8%), whilst crops and livestock sectors generally witness expansions (0.4% to 6.8% in crops; -0.1% to 6.3% in livestock).

The current study also employs a multiregional CGE model to examine different trade options for the CIS countries. In contrast to the aforementioned literature, the coverage of agricultural and food activities is greatly extended with additional sector splits for fertilisers and feeds, whilst the modelling of agricultural factor and product markets more accurately reflects the rigidities inherent within these sectors (see Section 2.2). As a foresight study of future East-West relations, a further point of departure from previous work is the temporal focus on broad trade narratives consisting of simultaneous CIS region trade policy reforms rather than ex-ante/ex-post impact assessments of specific trade deals. To this end, considerable time was invested in designing and implementing a credible medium-term baseline as a point of comparison. This included numerous data update shocks to accommodate changes in trade flows, applied tariff rates and trade agreements. Moreover, as a large player on European and global agri-food markets, detailed EU agricultural policy developments were also explicitly modelled. Comparing with this baseline, the paper seeks to evaluate the net impacts arising from overlapping trade arrangements representing different visions of East-West co-operation, which were based on in depth discussions between a network of experts (AGRICISTRADE, 2016b) from across the CIS countries. In recognition of the importance of 'behind-the-border' protection noted above, a further important contribution of the current work which has been neglected in previous multi-region studies (with the exception of MALISZEWSKA ET AL., 2008) is the collection, aggregation and implementation of NTM estimates into the model database for all the relevant regions of the study.

The rest of this paper is structured as follows. Section 2 discusses the data and model framework, Section 3 describes the implementation of the scenarios. Section 4 presents the results whilst Section 5 concludes.

2 Data and Methodology

2.1 Data and Aggregation

Release 9 of the GTAP data (NARAYANAN ET AL., 2015) provides information on cost and demand structures, gross bilateral trade data, transport costs, and trade protection for 57 activities in 140 regions. A description of the chosen available GTAP regional

and commodity disaggregation for this study is provided in Table 2 and Figure 1, respectively. In addition, further sector splits in the GTAP data are performed to capture agricultural usage of animal feeds (WOLTJER, 2011) and fertilisers (VON LAMPE ET AL., 2014a) and first generation bio-fuel use of agricultural biomass with associated feedstock by-products (BANSE ET AL., 2008). Remaining non-agrifood activities are grouped into manufacturing and services composite sectors.

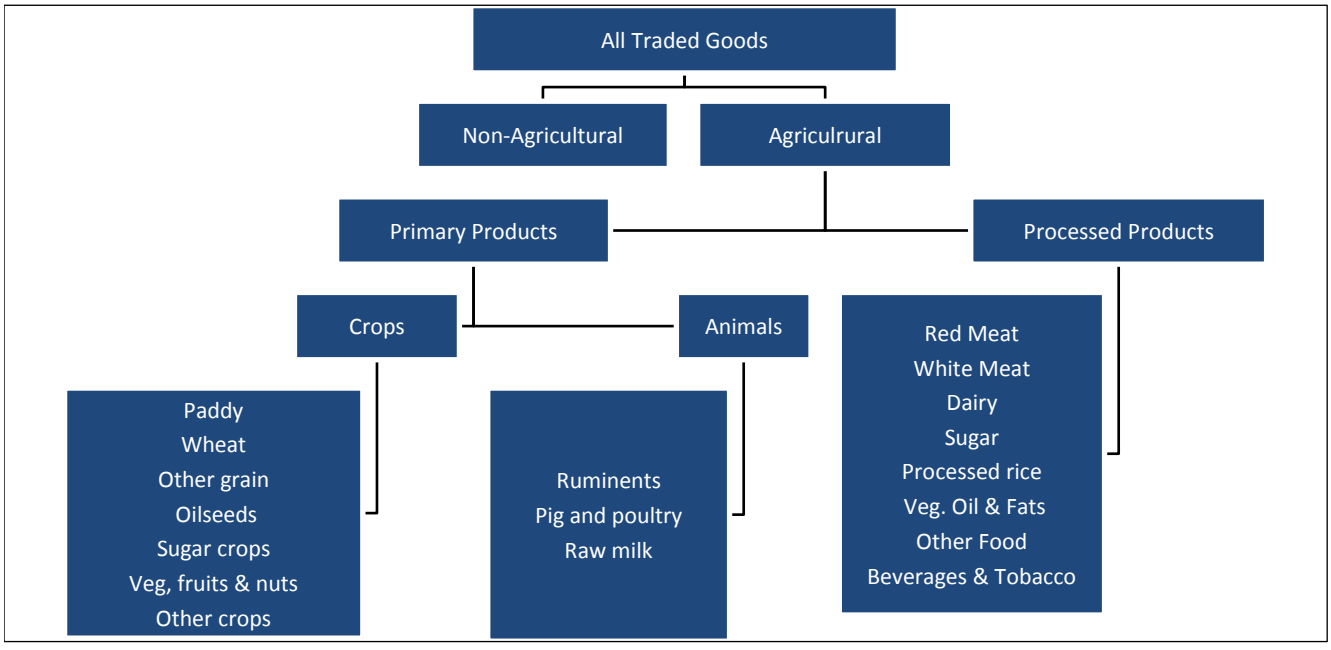
To incorporate a plausible representation of EU and CIS non-tariff measures (NTMs), World Bank *ad valorem* equivalent (AVE) NTMs by HS6 classification and country (KEE, NICITA and OLARREAGA, 2009) are aggregated to GTAP concordance and calibrated into the border support of the GTAP database (Table 3). Whilst the NTM AVE database includes a comprehensive coverage of commodities and trading partners, only Belarus, Kazakhstan, Moldova, Russia and Ukraine in the CIS region are available. There are no AVE NTM estimates for Armenia, Azerbaijan and Georgia, and many are lacking for Moldova, in which case NTMs are taken from the CIS aggregate region average. To match the GTAP concordance of sectors and regions, simple averages of available AVEs are calculated (trade weighted averages are contingent upon yearly trade flows and suffer from endogeneity i.e. low trade values are observed in the presence of high NTMs, and accordingly, the resulting NTM AVE is biased downwards).

Table 2. Regional aggregation

Commonwealth of Independent States (CIS)	**European Union (EU)**	**America and Oceania (AMOC)**	**Brazil-India-China (BIC)**	**Rest of the World (ROW)**
Russian Federation Kazakhstan Belarus Ukraine Armenia Azerbaijan Georgia Moldova Rest of CIS: r*est of former Soviet Union including Kyrgyzstan*	European Midwest (EMW): *Austria, Belgium, Germany, France, Luxembourg, Netherlands* European North (ENO): *Denmark, Finland, United Kingdom, Ireland, Sweden* European Central and East (ECE): *Bulgaria, Czech Republic, Croatia, Hungary, Poland, Romania, Slovakia, Slovenia* European Baltic (EBA): *Estonia, Lithuania, Latvia* European South (ESO): *Cyprus, Spain, Greece, Italy, Malta, Portugal*	USA and Canada Australia New Zealand Rest of Americas Rest of Oceania	Brazil India China	Japan Korea Rest of Asia Middle East and North Africa Turkey Rest of Africa Rest of the World

Source: own elaboration

Figure 1. Commodity classification



Source: own elaboration

Table 3. Non-tariff measure ad valorem equivalents (%)

	EU regions					CIS regions				
	EMW	**ENO**	**ECE**	**EBA**	**ESO**	**Russia**	**Kazakh.**	**Belarus**	**Ukraine**	**Moldova**
Paddy rice	61.9	42.9	48.3	34.9	24.4	43.2	39.8	41.5	41.5	41.5
Wheat	50.2	33.3	45.5	41.3	32.1	43.2	39.8	41.5	41.5	41.5
Grains	38.6	23.8	42.7	47.8	39.8	43.2	39.8	41.5	41.5	41.5
Oilseed	47.9	48.6	58.5	64.9	38.6	56.9	56.9	56.9	56.9	56.9
Raw sugar	4.1	2.7	70.7	92.1	27.2	18.6	18.6	18.6	18.6	18.6
Horticulture	47.4	46.0	39.4	35.3	45.5	42.6	37.0	28.1	39.5	39.5
Other crops	39.9	40.0	27.7	32.3	38.1	43.7	52.1	22.8	53.6	46.8
Ruminants	41.3	28.0	48.6	51.5	47.1	44.4	48.2	42.3	44.4	44.4
Pigs & poultry	31.1	36.7	36.2	34.9	36.6	33.6	47.2	35.5	36.9	36.9
Raw milk	88.5	56.1	49.5	65.4	96.0	84.1	88.9	81.5	84.8	84.8
Cattle meat	66.5	62.6	65.3	69.7	64.7	58.8	80.0	60.9	66.9	66.9
Other meat	51.8	48.0	43.2	53.9	51.6	39.8	53.8	45.9	45.6	45.6
Dairy	83.2	76.6	67.1	65.2	83.5	60.2	64.4	69.1	21.5	59.7
Sugar	39.5	43.9	23.7	32.3	41.5	43.0	41.1	34.4	45.3	40.9
Proc. rice	114.3	113.3	113.5	105.7	113.9	117.1	107.4	112.2	112.2	112.2
Crude veg. oil	79.6	75.7	68.6	77.6	86.0	89.4	85.1	76.8	76.8	76.8
Oilcake	11.7	5.8	33.4	0.0	12.4	79.6	32.4	32.4	48.1	48.1
Veg. oils & fats	75.3	73.5	60.8	28.6	67.4	46.5	61.7	90.4	78.8	62.6
Other food	58.0	55.2	48.3	46.9	60.4	50.9	46.8	38.4	39.5	128.9
Bev. & Tobacco	64.1	60.9	28.3	27.6	67.0	35.4	39.1	15.6	24.9	30.5
Feed	92.1	90.9	66.3	85.9	85.2	37.6	39.7	35.5	37.6	37.6
Fish	30.9	32.3	35.5	36.1	35.9	48.6	37.7	30.0	39.1	39.1
Forestry	44.6	40.8	38.4	61.4	48.7	48.6	37.7	30.0	39.1	39.1
Energy	67.5	67.5	57.2	114.0	67.5	143.9	68.5	90.7	104.0	90.7
Crude oil	122.7	122.7	122.7	122.7	122.7	135.9	135.9	135.9	135.9	135.9
Petroleum	30.3	30.3	24.9	36.4	30.3	47.4	39.8	43.8	44.1	43.8
Biodiesel	6.3	6.3	6.3	6.3	6.3	1.8	1.8	1.8	5.4	1.8
Bioethanol	1.1	1.1	1.2	0.8	1.1	0.1	0.1	1.8	5.4	1.8
DDGS	40.7	40.7	40.7	40.7	40.7	1.3	2.8	26.4	10.2	10.2
Electricity	67.5	67.5	57.2	114.0	67.5	143.9	68.5	90.7	104.0	90.7
Fertiliser	20.2	20.2	17.1	22.2	20.2	30.6	37.4	23.9	31.5	31.5
Manufacturing	48.0	46.9	30.8	40.5	48.5	45.7	44.9	40.5	45.5	48.7

Notes: DDGS (Distillers dried grains with solubles)
Simple averages based on KEE et al. (2009) ad valorem estimates for individual countries and hs 6-digit sectors. Missing aggregate values in the EU (CIS) region replaced by the mean EU28 (CIS) values in the same (if available) or a close sector (e.g. 'paddy rice' and 'wheat' in Ukraine is borrowed from the 'grains' mean AVE in the CIS region)
Source: own elaboration

2.2 Model Framework

This study uses the neoclassical recursive-dynamic multi-region CGE model, MAGNET (Modular Applied GeNeral Equilibrium Tool (WOLTJER ET AL., 2014). This class of model employs constrained optimisation to characterise agent behaviour (i.e., intermediate-, final- and investment demands), whilst the assumptions of homothetic separability and consistent aggregation permit a parsimonious 'nested' representation of flexible behaviour on the part of economic agents. Producers are assumed to operate under conditions of perfect competition and constant returns to scale, whilst a series of market clearing and accounting equations ensure that all markets clear and national-income, -expenditure and -output are equal. It is assumed that savings rates are a fixed share of changes in regional income, whilst investment to each region is allocated as a function of relative changes in regional rates of return. A neoclassical closure rule is assumed such that imbalances on the capital account (i.e., regional savings less investment) are compensated by the current account (exports minus imports).

Given its modular structure, the MAGNET model allows the user to switch on and off specific modules, subject to the requirements of the study at hand. In this study, the model includes a detailed land supply module based on bio-physical data from IMAGE

(EICKHOUT ET AL., 2009),[3] explicit modelling of the EU CAP and agricultural factor markets (BOULANGER and PHILIPPIDIS, 2015) and fiscal-neutral biofuel mandates (BANSE ET AL., 2008). In the model framework, border support is represented by an exogenous *ad valorem* variable and a price linkage equation. Following this convention, an additional price linkage equation is inserted into the model code to capture pre- and post-NTM prices. Subsequently, in a pre-simulation data preparation step, the benchmark database is recalibrated to accommodate the NTM *ad valorem* rates based on Table 3. This is facilitated through the altertax program (MALCOLM**,** 1998), which characterises all production and consumption nests as Cobb-Douglas to minimise the structural disturbances in the database. With the NTM distortion modelled on the import side, it is assumed that all rents accrue to the importer.[4]

3 Scenario Design

3.1 Baseline[5]

In the baseline, the world economy is projected over three discrete time periods: 2007-2015, 2015-2020 and 2020-2030. The 2015-2020 period is broadly consistent with the EU's Multiannual Financial Framework period 2014-2020, whilst the 2020 endpoint coincides with the conclusion of the ENP funding period. Annual estimates of developments in real GDP growth, productivity and population are from AGMEMOD (CHANTREUIL ET AL., 2012). For future projections shared socio-economic pathway 2 (SSP2) (VON LAMPE ET AL., 2014b) was chosen as it is widely accepted to be a pathway in which social, economic and technological trends do not shift markedly from historical patterns O'NEILL ET AL. (2017). The choice of starting benchmark year (2007) takes advantage of the detailed CAP payment calibration and baseline work of BOULANGER and PHILIPPIDIS (2015), whilst further secondary data sources were employed to faithfully update the structure of trade flows to the most recent year available, including consideration of the Russian import ban. In addition, first-generation EU biofuels blending rates are imposed, whilst the latest available GTAP time series agrifood trade data (2013) and applied tariff protection data are employed to update the 2007 database. In the case of the CIS regions, a continuation of agricultural support policies is assumed.[6]

Table 4 describes the additional trade policy shocks in the 2015-2020 and 2020-2030 periods to capture EU 'hub-and-spoke' DCFTA agreements with each of Georgia, Moldova and the Ukraine; and the EAEU trade bloc. The partial NTM removal shocks, calculated based on the estimates in Table 3, are implemented as exogenous changes in border protection rates. It should be noted that based on expert opinion (see also next Section), the degree of ambition in the NTM cuts is assumed to be lower for the EAEU bloc than for the DCFTAs. TARR (2016) notes, that since the initial inception of the ECU in 2010, NTMs remain a serious trade impediment, in large part owing to institutional and political intransigence within the EAEU bloc.

Table 4. Baseline assumptions shaping the DCFTA and EAEU agreements

Hub-and-spoke DCFTA-EU agreements	EAEU agreement
2015-2020	
Ukraine, Georgia and Moldova and the EU reduce bilateral tariffs to zero. Ukraine, Georgia and Moldova and the EU reduce bilateral NTMs by 10% of the NTM AVE wedge reported in Table 3.	Along with Belarus and Kazakhstan, Armenia establishes a common external tariff consistent with that of Russia.* Deeper intra-EAEU trade integration by reducing bilateral NTMs by 5% of the NTM AVE wedge reported in Table 3.
2020-2030	
Ukraine, Georgia and Moldova and the EU reduce bilateral NTMs by a further 15 percentage points (i.e., 25% of the NTM AVE wedge reported in Table 3).	Deeper intra-EAEU trade integration by reducing bilateral NTMs by a further 5 percentage points (i.e., 10% of the NTM AVE wedge reported in Table 3).

* Notes: Kyrgyzstan is not included in the EAEU since it is subsumed within the RoCIS region.
Source: own elaboration

[3] See also Section 4 of the supplementary material document.

[4] This assumption is returned in the final section of the paper.

[5] An exhaustive description of the baseline assumptions is provided in the supplementary material document (Sections 2, 3 and 5) which includes a detailed description of the modelling and associated shocks employed in the 2007-2015 update period.

[6] Discussion with consortium experts revealed that CIS region agricultural support policy choices were not deemed to be based on their contribution to improve the sector's competitiveness but largely to build on lobbying from stakeholders (whether it be the sector, traders or others). This generates uncertainty with regard to expectations of future agricultural support policies.

Table 5. Alternative future trade pathways (2015-2030)

Hub-and-spoke DCFTA agreements with the EU	EAEU agreement	WTO and other international agreements
'DEEPER INTEGRATION' (DI) 2015-2020		
Baseline tariff shocks plus: Ukraine, Georgia and Moldova and the EU intensify trade integration by reducing bilateral NTMs by 20% of the NTM AVE wedge reported in Table 3 (i.e., 10 percentage points higher than the baseline).	Baseline tariff shocks plus: Deeper intra-EAEU trade integration through bilateral NTM reduction by 7.5% of the NTM AVE wedge reported in Table 3 (i.e., 2.5 percentage points higher than the baseline).	Deeper trade integration between the EAEU and the EU through bilateral NTM reductions by 5% of the NTM AVE wedge reported in Table 3. 60% tariff cut on merchandise trade between the EU and EAEU by 2030. 50% tariff cut on merchandise trade between the EAEU and non-EU countries by 2030. One-third of these tariff cuts are implemented in 2015-2020 period.
'DEEPER INTEGRATION' (DI) 2020-2030		
Ukraine, Georgia and Moldova and the EU intensify trade integration by reducing bilateral NTMs by 35% of the NTM AVE wedge (i.e., 10 percentage points higher than the baseline).	Deeper intra-EAEU trade integration by reducing bilateral NTMs by 15% of the total NTM AVE wedge (i.e., 5 percentage points higher than the baseline).	Deeper trade integration between the EAEU and the EU by reducing bilateral NTMs by 10% of the total NTM AVE wedge (i.e., an additional 5 percentage points higher than in the 2015-2020 period). Two-thirds of the tariff cuts are implemented in the 2020-2030 period.
'LIBERALISATION' (LB) 2015-2020		
Same as Deeper Integration shocks for 2015-2020	Same as Deeper Integration shocks for 2015-2020	Same as Deeper Integration shocks for 2015-2020 plus: 50% decrease in worldwide tariffs on merchandise trade for all remaining third countries by 2030. One-third of the tariff cut is implemented in 2015-2020 period.
'LIBERALISATION' (LB) 2020-2030		
Same as Deeper Integration shocks for 2020-2030	Same as Deeper Integration shocks for 2020-2030	Same as Deeper Integration shocks for 2020-2030 plus: Two-thirds of the tariff cut is implemented in the 2020-2030 period.
'TRADE BLOCS' (TB) 2015-2020		
Same as baseline shocks for 2015-2020	Same as baseline shocks for 2015-2020	Increase 2015 EAEU import tariffs 50% by 2030. One-third of the tariff increase is implemented in 2015-2020 period.
'TRADE BLOCS' (TB) 2020-2030		
Same as baseline shocks for 2020-2030	Same as baseline shocks for 2020-2030	Two-thirds of the tariff increase is implemented in 2020-2030 period.

Source: own elaboration

3.2 Alternate Trade Scenarios

Under the auspices of the Horizon 2020 project AGRI CISTRADE (2016) in depth discussions with consortium experts led to the design and implementation of three explorative 'trade futures' (see Table 5 for detailed descriptions).[7] At the outset, a deliberate choice was made to construct future narratives covering each end of the political spectrum which would provide upper- and lower-bounds on possible outcomes of alternative trade pathways. Indeed, as the discussion in the introduction reveals, future trade scenarios are conditioned by EU-Russian political ties. Thus, it was decided to represent the optimistic narrative of greater engagement between the EU and Russia into a two layered approach of European deep trade integration, which is subsequently extended to multilateral liberalisation. Thus, the 'Deeper Integration' (DI) scenario envisages an optimistic world of improved bilateral relations and political stability leading to increased opportunities to trade, invest and exchange knowledge between the EU and the CIS. Thus, CIS members further align themselves with EU trade regulations. Similarly, import tariffs between the EU and the EAEU are reduced, effectively creating preferential access for each other to each other markets. The 'Liberalisation' (LB) scenario extends the DI scenario by further assuming a multilateral deal on tariff reductions.

[7] For further background on these trade futures, the reader is encouraged to consult Section 1 of the supplementary information document.

An alternative polar view reflected a future of disengagement between Russia and the West as a result of disagreements relating to (*inter alia*) global security (i.e., diplomacy with Syria, North Korea), allegations of influence peddling in EU political affairs, increased instability over the Russian annexation of Crimea, disagreements between the EU and Russia over energy policy etc. Consequently, the 'Trade Blocs' (TB) scenario reflects an isolationist approach to foreign trade policy. The result is that the Russian led EAEU and the EU drift apart, which in trade terms is manifested by rising EAEU tariff protectionism.

4 Results

4.1 Baseline 2015-2030

In accordance with the focus of this paper, results are presented for agrifood activities in the 'DCFTA' composite region; an EAEU composite region; a residual 'rest of the CIS' (RoCIS) region and the EU28. Additional insight is provided through a calculation of the isolated impact of sets of policy shocks (e.g., DCFTA and EAEU trade agreements).[8]

4.1.1 Production, Growth and Welfare (2015-2030)

Structural economy-wide productivity growth, a rising labour force and capital stock promote both agrifood and non agrifood production in all regions. The higher growth rate in non-food (vis-à-vis agrifood) activity is largely attributed to the real income effect. For example, in the DCFTA and EAEU regions, shrinking populations are assumed, whilst in the CIS region, macroeconomic growth is very high. In both cases, this generates rising income per capita which revises downwards the income elasticities of demand for agrifood products. Furthermore, assuming fixed capital-output ratios, particularly high macro-growth in DCFTA and CIS produces considerable capital accumulation. Thus, highly capital-intensive manufacturing and services benefit, which draws resources (i.e., labour) away from agrifood activities. In the EU28, slower rates of land productivity growth (vis-à-vis non EU regions) and continued rises in real incomes (Table 6) lead to supply- and demand-driven structural change such that real macro growth is approximately four times the rate of agrifood output growth over the period.

Aside from structural economic drivers, policy drivers also matter. In the DCFTA, the elimination of border support and partial removal of trade facilitation costs accounts for 14 percentage points of the 71 percent increase in macro growth (Table 6). In almost all agrifood sectors, with lower combined tariff and NTM border protection compared with the EU, the DCFTA deal is beneficial, notably in the vegetable oils and fats and sugar sectors. In two cases (i.e., ruminants, other meat), the isolated impact of the DCFTA trade shocks have a negative impact for the DCFTA region (not shown).[9] Importantly, the isolated impact of the DCFTA agreement does not impact on EAEU and remaining CIS regions' production, suggesting that existing trade integration between the CIS regions is relatively weak.

The isolated impact of establishing an EAEU through deeper integration (i.e., NTM reductions) on intra-bloc trade carries a much more muted real growth benefit of 0.7% in the EAEU region (Table 6), which indicates already low levels of trade intensity between signatory EAEU members. Furthermore, this benefit is skewed in favour of non-food trade (0.8%) and away from agrifood trade (-0.4%), which signals that non-food intra-EAEU trade ties are relatively stronger. As a result, primary factor resources are diverted away from agrifood activities.

In the EU28, the deepening of trade ties with three 'small' CIS partners has a very insignificant impact on market outcomes. Interestingly, the isolated impact of eliminating EU biofuel mandates in the 2020-2030 period is responsible for a reduction in EU28 oilseed production of 11.3% over the 2015-2030 period (results not shown), whilst corresponding oilseeds output falls for the DCFTA and EAEU regions are 8.7% and 2.7%, respectively (results not shown).

4.1.2 Baseline Real Trade Balances

The changes in the trade balances from the 2015 totals (Table 7) are reported in Table 8. Export trends are generally correlated with output changes, whilst increased import (and domestic) demand is fuelled by rising real incomes. In the case of the DCFTA region, there is a €989 million improvement in its agrifood trade balance. The largest improvements accrue in 'vegetables oils and fats', 'oilseeds' and 'cereals grains'

[8] This is based on the 'subtotal' facility employed by the GEMPACK model software (HARRISON, HORRIDGE and PEARSON, 2000).

[9] Although tariff protection between the EU and the Ukraine on 'other meat' products is comparable, the Ukraine is a significant net importer of EU 'other meat' products.

Table 6. Baseline production, growth and welfare (2015-2030)

	Production volumes by region			
	DCFTA signatories	**EAEU members**	**RoCIS countries**	**EU28 members**
I. Macro growth (%)	70.9	29.6	105.1	32.5
due to DCFTA trade shocks	*14.0*	*0.0*	*-0.1*	*0.0*
due to EAEU trade shocks	*0.8*	*0.7*	*0.1*	*0.0*
II. Welfare				
Per capita income (%)	55.9	32.0	91.4	25.9
Equivalent Variation (€millions)	37,346	288,164	79,634	2,951,755
due to DCFTA trade shocks	*7,982*	*-70*	*14*	*1,585*
due to EAEU trade shocks	*708*	*7521*	*338*	*3,458*
III. Agrifood (%)	17.4	8.3	24.0	8.1
due to DCFTA trade shocks	*9.3*	*-0.1*	*-0.1*	*0.0*
due to EAEU trade shocks	*0.1*	*-0.4*	*0.0*	*-0.1*
By sectors (%)				
grains	12.3	10.1	13.4	12.3
oilseeds	18.5	16.2	13.1	5.1
horticulture	4.0	2.1	13.8	5.4
ruminants	12.7	13.8	27.3	15.7
pigs & poultry	6.5	5.1	65.2	9.2
dairy	5.9	5.4	-3.9	5.9
sugar	32.7	10.3	25.6	3.0
red meat	4.4	5.8	5.8	10.1
white meat	-13.3	3.5	51.5	8.1
vegetable oils & fats	118.7	31.0	30.8	3.5
beverages & tobacco	28.8	11.7	58.6	9.5
IV. Non-Food (%)	57.5	25.9	81.0	25.1
due to DCFTA trade shocks	*15.7*	*0.0*	*0.0*	*0.0*
due to EAEU trade shocks	*0.6*	*0.8*	*-0.1*	*0.0*

Source: own elaboration

sectors, whilst deteriorations occur in 'milk/dairy', 'beverages and tobacco', both meat sectors, and 'horticulture'.

Further examination shows that in isolation, the DCFTA agreement improves the agrifood trade balance for the DCFTA signatories (€1,716 million), with notable contributions from vegetable oils and fats (€1,131 million) and dairy (€380 million) (not shown). The dairy result is motivated by lower NTM protection on Ukraine imports vis-à-vis the EU and despite an apparently higher NTM AVE for Ukrainian vegetable oils and fats, compared with the EU regions (Table 3), the Ukrainian export base to the EU is considerably larger such that partial NTM removal still benefits the DCFTA signatories' trade balance. In the DCFTA region non-food sectors, the net trade balance deteriorates €12,823 million, despite the improvement of €5,699 resulting from the DCFTA deal.

In the EAEU region, agrifood and non agrifood trade balances exhibit strong improvements, dominated by the trends in the Russian economy. With slower rates of projected growth in Russia, the current account balance improves as import demand slows. Focusing on the isolated impact of the EAEU agreement, the net impact of displacing established agrifood trade routes in favour of intra-EAEU-bloc trade generates both agrifood and non-food deteriorations of €825 million and €9,850 million, respectively (Table 8).

Rapid output and per capita income growth recorded in the RoCIS (Table 6) promotes dramatic rises in export and import volumes. The net result is that the agrifood trade balance deteriorates €6,370 million (especially in horticultural products (€2,287 million), ruminants (€1,402 million) and dairy (€547 million)), whilst in the non-food sector the trade balance improves significantly by €23,983 million.

Table 7. Trade balances for each of the regional groups in (2015 world prices, € millions)

	DCFTA signatories	EAEU members	RoCIS countries	EU28 members
Grains	2,033	2,703	-527	2,644
Oilseeds	1,352	41	-33	-7,712
Horticulture	67	-3,957	-501	-14,781
Ruminants	-9	-85	-59	505
Pig & poultry	-44	-155	11	705
Diary	295	6	-256	5,984
Sugar	-16	-1,064	-62	-2,215
Cattle meat	-4	-978	-65	964
Other meat	-330	-1,407	-77	2,709
Veg. oils & fats	646	-312	-170	-4,541
Bev. & tobacco	85	-1,586	-359	19,653
Agrifood	3,182	-8,953	-3,122	-2,411
Non-food	-26,610	61,353	15,458	218,694

Source: own elaboration

Table 8. Trade Balance volume changes 2015-2030 (2015 world prices, € millions)

	DCFTA signatories	EAEU members	RoCIS countries	EU28 members
Grains	437	636	-417	4,526
Oilseeds	115	-54	-22	862
Horticulture	-218	18	-2,287	290
Ruminants	20	-15	-1,402	1,314
Pigs & poultry	-16	22	-12	-131
Dairy	-40	505	-547	6,297
Sugar	149	232	-23	331
Red meat	-161	585	-239	3,061
White meat	-131	-26	-24	4,931
Vegetable oils & fats	1,536	1,136	-142	109
Beverages & tobacco	-301	244	-295	13,438
Agrifood	989	5,289	-6,370	47,403
due to DCFTA trade shocks	*1,716*	*69*	*21*	-1,723
due to EAEU trade shocks	*-28*	*-825*	*-15*	96
Non-Food	-12,823	58,220	23,983	599,676
due to DCFTA trade shocks	*5,699*	*-1,019*	*653*	-13,117
due to EAEU trade shocks	*671*	*-9,850*	*-358*	-4,259

Source: own elaboration

In the EU28 market price falls in agrifood products resulting from the structural demand and supply assumptions in the baseline, lead to greater price competitiveness and a sustained net-export improvement in agrifood products (€47,403 million) including beverages and tobacco (€13,438 million), red and white meat (€7,992 million), dairy (€6,297 million) and grains (€4,526 million).

4.2 Alternative Trade Futures (2015-2030)

This section examines the impacts of three different trade futures of Deeper Integration (DI), Liberalisation (LB) and Trade Blocs (TB). All results, unless otherwise stated, are deviations from the baseline scenario over the period 2015 to 2030.

4.2.1 Real Growth and Welfare (2015-2030)

In the DI and LB scenarios, deeper mutual NTM cuts generate further trade led macro growth gains for the DCFTA signatories (2.6% and 3.2%, respectively) (Table 9). With further multilateral tariffs cuts in the LB scenario, the larger trade opportunities for the DCFTA region result in even greater macro growth and per capita utility gains.

Similarly, with additional trade facilitation cost reductions on intra-EAEU trade and EAEU-EU trade

Table 9. Production, growth and welfare (% change) (2015-2030) vs. baseline

	DCFTA signatories			EAEU members		
	DI	**LB**	**TB**	**DI**	**LB**	**TB**
Grains	0.1	1.5	-0.3	-1.1	-1.6	0.3
Oilseeds	-1.2	-1.6	-0.7	-2.3	-2.8	2.2
Horticulture	-0.2	0.1	0.4	-4.1	-4.1	2.3
Ruminants	0.0	-1.3	0.1	-0.5	-0.6	0.9
Pig & poultry	-0.8	1.0	0.8	-5.1	-5.6	2.6
Dairy	1.4	-0.1	0.4	-3.0	-3.5	0.6
Sugar	3.8	-4.3	0.2	-3.8	-4.4	2.7
Cattle meat	0.9	-2.1	0.6	-2.8	-2.9	1.2
Other meat	-8.9	8.8	8.8	-18.6	-21.5	8.1
Veg. oils &fats	25.2	20.8	-1.0	2.0	-0.1	1.4
Bev. & tobacco	0.2	-0.4	1.2	-3.0	-3.2	1.2
Agrifood	1.3	0.9	0.6	-2.4	-2.9	0.3
Non-Food	2.5	3.4	0.8	-1.2	-1.2	-0.0
Real GDP (%)	2.6	3.2	0.9	6.1	6.0	-0.3
U* (%)	0.7	1.0	0.7	4.7	4.6	-0.7
	RoCIS countries			**EU28 members**		
	DI	**LB**	**TB**	**DI**	**LB**	**TB**
Grains	1.5	1.6	-0.6	-0.8	-0.1	0.1
Oilseeds	-0.8	-0.2	0.5	-1.9	-2.5	0.0
Horticulture	-0.6	-0.6	0.3	-0.6	-1.6	-0.1
Ruminants	-0.2	-0.1	0.1	-0.9	-3.1	0.0
Pig & poultry	-0.2	-0.8	0.0	-0.6	0.9	-0.1
Dairy	0.7	-0.2	-0.1	-1.0	1.5	-0.1
Sugar	-3.7	-3.6	10.2	-2.4	-7.6	0.0
Cattle meat	0.7	-4.1	-0.2	-1.0	-6.8	0.0
Other meat	2.5	-3.5	-0.6	-0.7	1.0	-0.1
Veg.oils & fats	1.6	2.1	-0.3	-4.4	-3.7	0.3
Bev. & tobacco	-2.5	-3.6	0.7	-0.9	0.1	0.0
Agrifood	-0.1	-0.6	0.1	-1.0	-0.3	0.0
Non-Food	0.8	0.9	0.1	0.3	0.3	0.0
Real GDP (%)	0.9	1.1	0.1	0.4	0.4	-0.0
U* (%)	-4.0	-3.9	0.1	1.0	1.2	-0.0

* Notes: This is defined as the percentage change in per capita utility in each region based on money metric 'regional household' income divided by the projected population.
Source: own elaboration

in both the DI and LB scenarios, the EAEU also exhibits improved macro growth (6.1% and 6.0%, respectively), although the trend in this trade bloc is dominated by the resulting structural change in the Russian economy. In both the DCFTA and EAEU regions, real growth is accompanied by improvements in real per capita income.

As expected, with its greater market access to the DCFTA and EAEU region markets, the EU28 also experiences trade led macro growth and per capita income gains in both scenarios. Compared with the DI scenario, additional market access from multilateral tariff reductions in the LB scenario bestow even further EU28 per capita real income improvements.

Real growth in the RoCIS region also improves slightly (0.9% and 1.1%, respectively) in response to the improving economic climate within the region, although its per capita real income falls under both scenarios (-4.0% and -3.9%, respectively). This observation reflects a weighted fall in relative factor prices (particularly in Azerbaijan)[10] arising from the

[10] The weighted index of primary factor prices falls almost 10% in Azerbaijan in both DI and LB scenarios.

structural pattern of value added usage across expanding and contracting economic activities.

In the TB scenario, macroeconomic growth in the EAEU is stifled (-0.3%). With the majority of merchandise trade between the CIS regions already facing a zero tariff, the rise in existing EAEU tariffs on third countries provides both the DCFTA and RoCIS regions with relatively improved market access to the EAEU. This improves their macroeconomic performance (0.9% and 0.1%, respectively) and per capita real incomes (0.7% and 0.1%, respectively) compared with the baseline. With reduced market access to the EAEU (especially Russia), the EU28 faces a negligible loss in macro growth and per capita incomes.

4.2.2 Production (2015-2030)

The greater opening of markets under the EU-DCFTA in the DI and LB scenarios brings unambiguous trade led gains for DCFTA region agrifood and non-agrifood production (Table 9). Within the agriculture and food sectors, there is a notable rise in 'vegetable oils and fats' production due to significant rises in Ukrainian exports to the EU (not shown). In the DI scenario, relative production also improves in dairy, sugar and, to a lesser extent, red meat sectors. On the other hand, there are further production deteriorations in 'white meat' as Ukrainian imports from the EU rise further.

Comparing with the DI scenario, in the DCFTA region, the LB scenario reveals a structural shift in primary resource usage toward non agrifood activity. This is partly due to the changing pattern of trade opportunities associated with (now) additional multilateral tariff reductions, but also as a result of even larger improvements in DCFTA per capita real incomes leading consumers to purchase relatively more non agrifood products. In the TB scenario, there are relative rises in DCFTA region agrifood (0.6%) and non agrifood (0.8%) activity, whilst relative production in 'other meat' increases nearly 9%. Further investigation reveals this is because of the relative rise in Russian imports of 'white meat' originating from Ukraine.

In the EAEU region, in both the DI and LB scenarios, agrifood and non-agrifood production contract, despite rises in real macro growth. As noted above, the rise in regional real income is largely driven by Russian oil exports, which rise in response to real income driven import rises in oil dependent regions. The effect of this is to exacerbate Russia's import dependency on non-oil commodities (see also Section 4.2.3). The import substitution effect reduces non-oil production in both Russia and (as a result) the EAEU composite region. On the other hand, relative output expansions in the two Russian sectors of oil and services (not shown) account for over 70% of capital factor usage in Russia. The resulting rise in the capital factor price increases its expected rate of return which leads to a significant investment increase in Russia (EAEU) of 13.7% and 13.1% (10.4% and 10.0%) in the DI and LB scenarios respectively (figures not shown). In the TB scenario, as expected, rising tariff protection encourages greater agrifood output in the EAEU region, although the (Russian led) investment effect reported above, is now absent, with the result that macro growth contracts slightly (see Table 9).

Turning the focus to the RoCIS region, deeper trade integration initiatives under the auspices of the DCFTA and EAEU agreements have an especially detrimental impact on relative agrifood output, although the apparent reallocation of available resources to non agrifood activities leads to an output volume improvement of approximately 1% in both DI and LB scenarios. In the TB scenario, the RoCIS has relatively improved market access to the EAEU region with the result that RoCIS output volume changes improve moderately, with the exception of sugar, where an increase of over 10% is recorded.[11]

For the EU28, under the DI scenario, the net impact of tariff reductions on EAEU-EU trade and additional NTM reductions with the DCFTA region is to further accelerate the baseline trend of economic restructuring toward non agrifood activities. In the LB scenario, additional multilateral market access provides EU producers in dairy, 'other meat' and beverages sectors with opportunities to expand, which slows the relative contraction of the EU agrifood industry when comparing with the DI scenario.

4.2.3 Real Trade Balances (2015-2030)

In the DCFTA region, deeper trade integration (DI and LB) generates very moderate trade balance improvements; largely due to 'vegetable oils and fats' exports from Ukraine (see Section 4.2.2 and Table 10), although greater trade openness toward the EU, rising real incomes and multilateral import tariff reductions (LB scenario) promote faster import growth in many agrifood and (composite) non agrifood activities.

In the EAEU region, Russian dominated import increases lead to trade deteriorations in the DI sce-

[11] Deeper inspection shows this is due to trade driven production increases in Azerbaijan.

Table 10. Trade balance volume changes in 2015 world prices (2015-2030, million euros) vs. baseline

	DCFTA signatories			EAEU members		
	DI	**LB**	**TB**	**DI**	**LB**	**TB**
Grains	10	59	-20	63	4	-79
Oilseeds	-37	-34	-18	-22	-7	17
Horticulture	-22	2	-2	-77	-54	90
Ruminants	-4	-7	-1	-4	-2	0
Pig & poultry	0	-3	-2	15	25	-1
Dairy	20	-22	7	-400	-527	35
Sugar	13	-39	0	-73	-83	88
Cattle meat	-28	-55	1	-412	-452	154
Other meat	-57	30	34	-1,536	-1,790	536
Veg.oils & fats	344	277	-20	-258	-301	227
Bev. & tobacco	-61	-66	27	-349	-360	138
Agrifood	38	2	47	-2,639	-3,224	372
Non-Food	-1,445	-981	-268	-61,775	-59,055	12,863
	RoCIS countries			**EU28 members**		
	DI	**LB**	**TB**	**DI**	**LB**	**TB**
Grains	27	28	-13	-230	-3	74
Oilseeds	3	3	-1	266	274	2
Horticulture	6	-4	-4	-18	-704	-51
Ruminants	10	4	-15	-42	299	8
Pig & poultry	3	0	-2	-53	-61	3
Dairy	15	26	-3	-537	3,065	-88
Sugar	-2	-1	7	-225	-1,035	8
Cattle meat	6	-23	-2	-263	-4,245	-9
Other meat	7	-3	-1	-30	1,924	-142
Veg.oils & fats	4	4	-1	-775	-773	49
Bev. & tobacco	16	6	5	-379	2,306	-70
Agrifood	107	44	-30	-3,669	1,824	209
Non-Food	1,384	1,492	4	-130,623	-189,680	-187

Source: own elaboration

nario, particularly in meat and dairy sectors. In the LB scenario, additional multilateral tariff reductions exacerbate further these negative trade balance trends. In the RoCIS region, the reallocation of (cheaper) primary factors into non-food production in the DI and LB scenarios generates an improvement in the non-food trade balance, whilst falling per capita incomes reported in Table 9, stifle import demands leading to trade balance improvements in most activities.

As expected, an isolationist (TB) EAEU policy of raising tariff barriers generates a trade balance improvement for the EAEU region. In the DCFTA and RoCIS regions, relatively improved market access to the EAEU benefits exports, although this is mitigated by increases in real incomes which promote greater internal demand and imports. In the DCFTA region, the agrifood trade balance improvement reflects improvements from 'white meat' (from Ukraine) and beverages and tobacco sectors.

Finally, in the EU28, the trade balance deteriorates in the DI and LB scenarios. On the one hand, the relative fall in agrifood production reduces exports, whilst increases in per capita incomes promote additional internal- and import demand, particularly in the non agrifood sectors. In the LB scenario, export driven market opportunities for EU28 dairy, 'other meat' and beverages and tobacco producers improve the trade balances by €3,065 million, €1,924 million and €2,306 million, respectively, with the result that the relative EU28 agrifood trade balance improves €1,824 million in this scenario. The impact of the TB scenario for the EU28 is negligible.

5 Conclusions and Discussion

With a focus on agriculture and food, this foresight study seeks to disentangle the trade led economic impacts arising from different future visions of East-West trade relations. The baseline reveals, not surprisingly, that structural supply-side (productivity growth, capital and labour stocks) and demand side (endowment income and population) drivers typically dominate agrifood market trends. In addition, a strong beneficial macroeconomic and agrifood market impact from trade policy changes is also observed. This is particularly pertinent when examining the hub-and-spoke Deep and Comprehensive Free Trade Agreements (DCFTAs) between Georgia, Moldova and Ukraine (largest economy in the 'DCFTA' region) and the European Union. Indeed, this result supports the advantageous agricultural trade position the DCFTA signatory member group currently holds with the EU (Table 1).

Comparisons with previous studies are complicated by different modelling assumptions, benchmark years, scenario designs. Notwithstanding, the baseline DCFTA region real GDP gains of 14% are at the upper limit of the (steady state) gains reported for Georgia (7.5%) and Ukraine (11.8%) in MALISZEWSKA ET AL. (2008) and MOVCHAN and GIUCCI (2011), respectively. Our higher estimates possibly reflect the combined impacts of dynamic investment, labour and real macro growth projections. On the other hand, the predicted baseline gains in DCFTA agricultural output in our study are at odds with results for Georgia's EU DCFTA agreement, reported by MALISZEWSKA ET AL. (2008). The reasons for this could be due to a different tariff profile, as well as a different configuration of the NTM trade policy shocks employed in their study. Importantly, trade integration in the collective of the Commonwealth of Independent States (CIS) is not found to be strong in our study, since neither the DCFTA nor Eurasia Economic Union (EAEU) trade agreements carry significant trade diversion effects.

In response to whether greater East-West cooperation provides a win-win for the CIS countries, the answer is mixed. On the one hand, the 'Deeper Integration' (DI) and 'Liberalisation' (LB) trade futures bring tangible macroeconomic gains to CIS regions. The DI scenario benefits agrifood activity further in Georgia, Moldova and Ukraine, whilst in the LB scenario, the relative gains in these same countries is targeted more toward the non agri-food sectors. Contextualising these results (particularly the DI scenario) in terms of current political events, this is a positive message for Ukraine (non-annexed part) and Georgia who are firmly on a path toward closer EU integration. In the case of Moldova, however, its commitment to intensified trade relations with the EU remains unclear in the wake of a general election victory of the pro-Russian Socialist party of the Republic of Moldova.

In the case of the EAEU countries, given the structure of NTM trade protection, the relative benefits from the DI and LB scenarios in terms of real GDP growth, are unbalanced; largely accruing to Russia's oil sector. Whilst this encourages greater Russian investment, it also renders Russia (and subsequently the EAEU region) more dependent on agrifood imports – an effect that is exacerbated with additional multilateral tariff reductions in the LB scenario. KNOBEL and CHOKAEV (2014) observe contracting short run agrifood activity in Russia under the formation of a free trade area with the EU, although their long run steady-state results reveal small agrifood output rises in Russia. It should, however, be noted that the authors only consider tariff shocks.

In contrast to the optimistic worlds posited under the DI and LB narratives, recent political developments in Western Europe and the United States toward populism, the current trade impasse between Russia and the West and reduced international cooperation on issues of trade and climate change, suggests that a return to greater protectionism consistent with the 'Trade Blocs' (TB) narrative remains a more likely possibility. This leads us to respond to the question of how this eventuality could impact on EAEU member countries. From an agri-food perspective, the TB scenario promotes production in the EAEU compared with the baseline, although in the absence of an investment effect, Russian (and EAEU) real GDP and per capita real incomes fall moderately. For EAEU members, the resulting increase in tariffs may be perceived as a necessary cost of Russian patronage. Indeed, as TARR (2016) notes, Belarus enjoys subsidised oil imports, whilst Armenia receives strategic protection from Azerbaijan on a border dispute as well as securing significant remittances from the Armenian diaspora residing in Russia. Kazakhstan, on the other hand, does not receive any obvious benefit (TARR, 2016), which suggests that such an eventuality could be resisted by this EAEU signatory member.

The results of this study are taken from a neoclassical CGE trade model, so the usual structural caveats apply (i.e., agents' behaviour is entirely de-

terministic, assumption of equilibrium market clearing, stylised representation of capital markets etc.). Furthermore, an area of potential improvement of this trade based study relates to the modelling of non-tariff measures (NTMs). In the current research, NTMs are assumed to generate rents to agents in the importing country. Further work could be directed at relaxing this admittedly restrictive assumption, with better consideration of the 'correct' allocation of rents to importers and exporters, whilst in those cases where non-tariff regulatory measures only generate costs at the border, an alternative efficiency loss modelling approach could also be included. Furthermore, in addition to these 'trade cost' effects, FUGAZZA and MAUR (2008) note that NTMs also exhibit supply effects (i.e., compliance costs to sell to specific export markets) and demand effects (e.g. consumer product labelling). A treatment of supply and demand effects is lacking in the current study, where the former could be represented through fixed costs associated with specific bilateral routes (MELITZ, 2003) and the latter by use of consumer taste shifters. An associated problem is the estimation of a 'plausible' price equivalent cost or benefit magnitudes to calibrate into the model, which also remains an avenue of further research

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Glossary

AA	Association Agreement
AGMEMOD	Agri-food projections of EU Member States
AMOC	America and Oceania
AVE	Ad-valorem Equivalent
BIC	Brazil, India and China
CAP	Common Agricultural Policy
CES	Constant Elasticity of Substitution
CGE	Computable General Equilibrium
CIS	Commonwealth of Independent States
DCFTA	Deep and Comprehensive Free Trade Agreement
DI	Deeper Integration scenario
EAEU	Eurasia Economic Union
EB	European Baltic
ECE	European Central and East
EMW	European Midwest
ENO	European North
ESO	European South
EU	European Union
EU27	27 Member States European Union
EU28	28 Member States European Union
EaP	Eastern Partnership
EAEU	Eurasia Economic Union
ECU	Eurasian Customs Union
ENP	European Neighbourhood Policy
EUROMED	Euro-Mediterranean Partnership
FTA	Free Trade Area
GDP	Gross Domestic Product
GSP	Generalised System of Preferences
GTAP	Global Trade Analysis Project
IMAGE	Integrated Model to Assess the Global Environment
LB	Liberalisation scenario
MAGNET	Modular Applied General Equilibrium Tool
NTM	Non-Tariff Measures
RoCIS	Rest of Commonwealth of Independent States
ROW	Rest of the World
SSP2	Share Socioeconomic Pathway 2
TB	Trade Blocs scenario
WTO	World Trade Organization