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POTENTIAL TRADE EFFECTS OF TARIFF LIBERALIZATION UNDER THE TRANSATLANTIC TRADE AND INVESTMENT PARTNERSHIP (TTIP) FOR THE EU AGRI-FOOD SECTOR*

Agnieszka Poczta-Wajda✉, Agnieszka Sapa

Uniwersytet Ekonomiczny w Poznaniu

Abstract. The aim of this article is to determine the potential trade effects of Transatlantic Trade and Investment Partnership (TTIP) for the EU agri-food sector. The *ex post* analysis covered the characteristics of agri-food trade between the EU and the US in the years 2004–2014 on the basis of statistical data from the database of the World Bank WITS. The *ex ante* evaluation was carried out using SMART – a partial equilibrium model. The results of the study indicate that although bilateral agri-food trade relations of the EU–US have relatively little importance, but it is significant at the individual industries level. TTIP agreement, which includes the reduction of tariff barriers to agri-food trade between the EU and the US, will contribute to boosting bilateral agri-food trade to a greater extent for the US. The creation of a free trade produces mostly creation effect, whereby it will be asymmetric – concentrated in a few product groups.

Keywords: agri-food trade, TTIP, SMART

INTRODUCTION

The EU-US negotiations regarding Transatlantic Trade and Investment Partnership (TTIP) have been underway since 2013. The purpose of TTIP is to promote investments and trade activities on both sides of the Atlantic, increase employment and competitiveness, and develop a common approach to the world trade rules. The implementation of TTIP is supposed to foster closer economic and investment ties between the EU and the US. There are three areas of negotiation (Parlament Europejski, 2015), i.e.: improvement of market access on a reciprocal basis; reduction of non-tariff barriers and increasing the compatibility of regulatory systems; and establishing rules for addressing common challenges and leveraging the opportunities of global trade. The successful completion of negotiations would mean creating the world's largest free trade area with planned projects that include the liberalization of agri-food trade between the key players of the global agri-food market. Although the EU and US play a lesser role in international agri-food

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✉dr Agnieszka Poczta-Wajda, Katedra Makroekonomii i Gospodarki Żywnościowej, Uniwersytet Ekonomiczny w Poznaniu, al. Niepodległości 10, 61-875 Poznań, Poland, e-mail: agnieszka.poczta@ue.poznan.pl

trade, their combined share still represents around 50% of the global sales volume (the EU and US shares are 40% and 10%, respectively)[1]. Compared to industrial goods, the EU-US bilateral relationships in the area of agri-food trade are relatively poor, and therefore could be strengthened with the agreement under negotiation.

The potential outcomes of TTIP are the subject of studies based on such tools as general and partial equilibrium models. Simulations are in progress to assess the welfare and trade effects within the EU and US economies or at the level of specific sectors and industries. Specific studies provide different results in function of the models and assumptions used, methods for non-tariff barriers estimation, scope of study and base year (Ecorys, 2009; Pelkmans et al., 2014; Beckman et al., 2015; Ecorys, 2016; Puccio, 2016). According to forecasts, the implementation of TTIP, depending on the adopted liberalization scenario (tariff liberalization only or extended with a reduction in non-tariff measures[2]), will translate into a long-term GDP growth at a rate of 0.1–0.3% (Fontagné et al., 2013) or 0.1–0.5% in the EU and 0.04–0.4% in the US (Francois et al., 2013). At the same time, these changes will be different in specific countries (Capadlo, 2014; Ecorys, 2016; World Trade Institute, 2016). According to other studies, the long-term growth of per capita GDP will be 2.12% in the EU and 2.68% in the US (Aichele et al., 2014). As regards commercial effects in bilateral EU-US relationships, an increase of general exports from the EU to the US, and from the US to the EU, is foreseen at a rate of 16–28% and 23–37%, respectively (depending on the adopted liberalization scenario, Francois et al., 2013)[3]. The results of a study by Ecorys (2016) also suggest that the export from the US to the EU will grow at a rate greater than, or comparable to, that of exports in the opposite direction. In turn, according to other estimations, these changes will attain a higher level of 49% and 52.5%, respectively (Fontagné et al., 2013). According to estimations by Bureau et al. (2014), the full duty reduction and the decrease of non-tariff measures by ¼ will result in a growth of the transatlantic market by 40% until 2025. In the agri-food sector, the forecasted trade evolution will also be asymmetric.

Study commissioned by the European Parliament suggest that the reduction of duties and non-tariff measures will result in a 56% increase in agri-food exports from the EU to the US and a 116% increase of imports from the US by 2025 (Bureau et al., 2014). Having in mind the pattern of bilateral trade between the EU and the US, the forecasted changes will represent only 8% and 15% of generated exports from the EU to the US and from the US to the EU, respectively. Changes in trade flows will translate into a decline of intra-EU exports by 2.1%. As another consequence, the agricultural added value will decrease by 0.5% in the EU and will increase by 0.4% in the US. According to other estimates (Fontagné et al., 2013), the bilateral agri-food trade flow will increase by around 150% (Josling and Tangermann, 2014). In turn, Francois et al. (2013) believe that the agri-food exports from the EU to the US and from the US to the EU will grow by 15–16% and 21–22%, respectively. According to a study by Beckman et al. (2015), agri-food exports from the EU to the US will decline by around 0.25% and the imports will grow by 0.5%. Meanwhile, agri-food exports from the US to the EU will grow by 2% and the imports will grow by 1%. Note that the forecasted consequences of the agreement will vary from one member country to another (Felbermayr et al., 2014) at the level of the economy and specific sectors. This is because the effects of TTIP are determined not only by the final form of the agreement but also by the GDP structure and trade flows of specific member countries, the level of foreign trade protectionism, the importance of trade with the US, and the complementarity/substitutability of bilateral trade flows.

The main purpose of this paper is an attempt to estimate the trade effects of the Transatlantic Trade and Investment Partnership for the EU agri-food sector. This study is focused only on the reduction of tariff barriers and the effects thereof on bilateral agri-food trade flows between the EU and the US. Thus, this paper does cover neither the liberalization of non-tariff measures nor the impact on intra-EU trade activities. The analysis was based on the SMART partial equilibrium model. The (ex ante) analysis of potential impact of

[1] If intra-EU trade flows were excluded, the significance of both partners in the global agri-food market would be comparable (with an approximate share of 10%).

[2] The importance of non-tariff measures in the EU-US agri-food trade and the effect of their reduction are discussed, e.g., in Ecorys (2009), Arita et al. (2015), Cororaton and Orden (2016).

[3] Depending on the trade liberalization level, the EU's general exports to third countries will grow by 3–6% while the exports to the US will grow by 5–8%.

establishing the transatlantic free trade zone was preceded by the (ex post) analysis of trade flows between the partners. The study relied on available statistical data from the World Bank's World Integrated Trade Solution (WITS) database. The analysis covers the 2004–2014 EU-US trade relationships regarding agri-food products classified within HS[4] Chapters 1 to 24 (Harmonized Commodity Description and Coding System).

VALUE AND STRUCTURE OF EU-US AGRI-FOOD TRADE

The European Union has been a major business partner on the global agri-food market for many years. As regards the EU's international trade, the agri-food trade volumes represent around 8% to 10% of exports and imports (Table 1)[5]. Note however that the importance of EU in the global agri-food market (40% approximately) resulted mainly from intra-EU trade flows. From 2004 to 2014, the yearly average share of intra-EU flows in the total EU agri-food trade volume was 75% in the case of exports and around 70% in the case of imports[6]. The European Union has been a net importer of agri-food products for many years. The EU's agri-food trade balance has been in surplus only since 2012, reaching nearly USD 10 billion in the last year considered (Table 2). Note however that throughout the analyzed period, the positive balance of agri-food trade was typical of intraregional agri-food trade flows. In that period, the EU imported more agri-food products from third countries than it exported to such countries. Also, since 2008, the exports have grown at a higher rate than imports. As a consequence, the EU's deficit in agri-food trade flows with third countries has reduced (Table 2).

As a part of EU's trade relationships with third countries, the agri-food trade with the US demonstrated a relatively stable positive balance (Table 2). At the beginning of the period considered, the US was the destination for more than 1/5 of agri-food exports from the EU to third countries. However, in subsequent years, the importance of US has been on a consistent decline to reach 13% in 2014 (Table 1). The reduction of the US share was also noticeable in imports (by 10% in 2004, 7% in 2009 and around 9% in 2014)[7]. In the recent years, the US market, both as the buyer of EU products and as the supplier of agri-food commodity[8] for EU consumers, has been superseded by third-country markets.

In the period considered, the EU-US exports were dominated by prepared foodstuffs (HS Chapters 16 to 24), representing around ¾ of all agri-food products imported to the US (Table 3). More than 1/5 of total agri-food exports from the EU to the US were products of animal or vegetable origin (HS Chapters 01 to 05 and 06 to 14). In the first group, beverages and spirits

[4] These are: 01 – live animals, 02 – meat and edible meat offal, 03 – fish and crustaceans, molluscs and other aquatic invertebrates, 04 – dairy produce; birds' eggs; natural honey; edible products of animal origin, not elsewhere specified or included, 05 – products of animal origin, not elsewhere specified or included, 06 – live trees and other plants; bulbs, roots and the like; cut flowers and ornamental foliage, 07 – edible vegetables and certain roots and tubers, 08 – edible fruit and nuts; peel of citrus fruit or melons, 09 – coffee, tea, maté and spices, 10 – cereals, 11 – products of the milling industry; malt; starches; insulin; wheat gluten, 12 – oil seeds and oleaginous fruits; miscellaneous grains, seeds and fruit; industrial or medicinal plants; straw and fodder, 13 – lac; gums, resins and other vegetable saps and extracts, 14 – vegetable plaiting materials; vegetable products not elsewhere specified or included, 15 – animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal or vegetable waxes, 16 – preparations of meat, of fish or of crustaceans, molluscs or other aquatic invertebrates, 17 – sugars and sugar confectionery, 18 – cocoa and cocoa preparations, 19 – preparations of cereals, flour, starch or milk; pastrycooks' products, 20 – preparations of vegetables, fruit, nuts or other parts of plants, 21 – miscellaneous edible preparations, 22 – beverages, spirits and vinegar, 23 – residues and waste from the food industries; prepared animal fodder, 24 – tobacco and manufactured tobacco substitutes.

[5] If only the trade flows between EU and third countries are considered, the importance of trade in agri-food products is adequately lower (with a share of 5–7%).

[6] Such a high share of trade flows between member countries is regarded as a symptom of the EU market's isolation from third countries. However, different conclusions can be drawn when analyzing the intensity of external imports per capita (Rowiński and Bułkowska, 2013).

[7] The US share in the EU's total agri-food trade flows reached adequately lower levels, i.e. 3–5% in the case of exports and 2–3% in the case of imports. In turn, as regards the EU's general trade relations with the US, the agri-food flows has a relatively small share, i.e. an average yearly level of 5% for the exports and 4.3% for the imports.

[8] For the EU, Brazil is a larger supplier of agri-food products. The EU does not represent a major market for US exporters either. The EU's share has been on a consistent decline as the Asian markets grew in attractiveness (Josling and Tangermann, 2014).

Table 1. Selected shares of agri-food trade of the EU in 2004–2014 (%)
Tabela 1. Wybrane udziały handlu rolno-żywnościowego UE w latach 2004–2014 (%)

Years Lata	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Share of agri-food trade in the EU total trade Udział handlu rolno-żywnościowego UE w jej handlu ogółem											
Export Eksport	8.1	8.0	7.7	7.9	8.4	9.6	9.0	9.3	9.5	9.8	9.8
Import	8.5	8.4	7.9	8.1	8.5	9.8	9.0	9.2	9.4	9.9	9.9
Share of intra agri-food trade in total agri-food trade of the EU Udział wewnętrznego handlu rolno-żywnościowego UE w jej handlu rolno-żywnościowym ogółem											
Export Eksport	76.9	77.0	76.5	76.9	76.7	77.4	75.5	74.8	73.7	73.6	73.1
Import	70.4	70.4	70.4	69.7	69.1	70.3	69.9	69.5	69.7	70.5	70.0
Share of the USA in extra agri-food trade of the EU Udział USA w zewnętrznym handlu rolno-żywnościowym UE											
Export Eksport	20.2	19.5	19.6	18.1	14.8	15.0	14.4	13.5	13.6	13.2	13.6
Import	10.0	9.1	8.6	8.2	8.0	6.9	7.7	7.6	7.5	8.8	8.9

Source: own calculations based on World Integrated Trade Solution, Comtrade Database.
Źródło: obliczenia własne na podstawie World Integrated Trade Solution, Comtrade Database.

(HS Chapter 22) were dominant[9] with an export value accounting for more than a half[10] of all agri-food commodities exported to the US. Another important product group exported from the EU to the US market were dairy products (HS Chapter 04), accounting for half of the exports of live animals and animal products (HS Chapters 01 to 05), with an average yearly share hovering at just above 5%. Similar EU export volumes were recorded for animal and vegetable fats and oils (HS Chapter 15), preparations of cereals (HS Chapter 19) and preparations of vegetables and fruits (HS Chapter 20). In the period under consideration, the above listed five product groups accounted for more than 70% of all agri-food exports to the US[11].

The EU's agri-food imports were dominated by products of vegetable origin (HS Chapters 06 to 14) and prepared foodstuffs (HS Chapters 16 to 24, Table 3). Fruits and nuts (HS Chapter 08) and oilseeds (HS Chapter 12) had the highest share in the first group, accounting for a total of nearly 40% of agri-food imports from the US to the EU from 2012 to 2014 (around 35% from 2004 to 2006). A negative trade balance of nearly USD 15 billion was recorded. Beverages and spirits (HS Chapter 22, 13.1% in the 2012–2014 period), and residue and industrial waste (HS Chapter 23, 8.5% respectively) were the most important products among foodstuffs[12]. As regards live animals and products of animal origin, live fish, molluscs and crustaceans (HS Chapter 03) played an important role with a nearly 8% share in imports from 2012 to 2014 (and a similar level in the 2004–2006

[9] The yearly average exports value in the 2012-2014 period was at around USD 10.5 billion. As the imports volume was low (USD 1.9 billion, approximately), this translated into a positive balance of more than USD 8.6 billion.

[10] In 2004–2006, that index reached a higher level of nearly 55%.

[11] That share decreased from 74% in the 2004–2006 period to 71% in the 2012–2016 period.

[12] In 2004–2006, these shares were at similar levels. In the 2012–2014 period, miscellaneous edible preparations (HS Chapter 21) had a share of 6% in agri-food imports, which is a 1 percentage point increase compared to the beginning of the period concerned (2004–2006).

Table 2. The EU trade with world and the USA in 2004–2014 (USD billion)
Tabela 2. Wymiana handlowa UE ze światem oraz USA w latach 2004–2014 (mld USD)

Years Lata	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Total agri-food trade of the EU Handel rolno-żywnościowy ogółem UE											
Export Eksport	297.3	319.1	348.8	415.0	488.5	432.8	458.0	548.3	538.3	587.7	592.5
Import	316.6	338.9	370.0	443.3	521.4	455.4	472.7	563.4	537.6	577.3	582.7
Balance Saldo	–19.3	–19.8	–21.2	–28.3	–32.9	–22.6	–14.8	–15.1	0.8	10.4	9.8
Intra agri-food trade of the EU Handel wewnętrzny rolno-żywnościowy UE											
Export Eksport	228.7	245.6	266.7	319.2	374.8	335.1	346.0	410.2	396.6	432.3	433.1
Import	222.7	238.5	260.3	309.0	360.5	320.0	330.3	391.6	374.7	407.1	407.7
Balance Saldo	5.9	7.1	6.4	10.3	14.2	15.1	15.7	18.6	21.9	25.2	25.4
Extra agri-food trade of the EU Handel zewnętrzny rolno-żywnościowy UE											
Export Eksport	68.6	73.5	82.1	95.8	113.7	97.7	112.0	138.1	141.7	155.4	159.3
Import	93.9	100.5	109.7	134.3	160.9	135.4	142.5	171.8	162.9	170.3	175.0
Balance Saldo	–25.2	–26.9	–27.5	–38.5	–47.2	–37.7	–30.5	–33.6	–21.2	–14.9	–15.7
Agri-food trade between the EU and the USA Handel rolno-żywnościowy UE z USA											
Export Eksport	13.8	14.3	16.1	17.4	16.8	14.6	16.1	18.7	19.2	20.4	21.7
Import	9.4	9.1	9.4	11.0	12.9	9.3	11.0	13.0	12.2	14.9	15.7
Balance Saldo	4.5	5.2	6.7	6.4	3.9	5.3	5.1	5.7	7.0	5.5	6.1

Source: own elaboration based on World Integrated Trade Solution, Comtrade Database.
Źródło: opracowanie własne na podstawie World Integrated Trade Solution, Comtrade Database.

period). The import of the commodity groups identified above to the EU accounted for around 68% of the US agri-food exports in the 2012–2014 period which means an increase by 4 percentage points from the beginning of the survey period.

Upon analysis, the structure of agri-food flows between the EU and US is found to be relatively stable and to involve complementary operations and inter-industry flows[13]. Trade flows with the US are of relatively low importance to the EU's agri-food trade. However, as the flows are focused only on selected commodity groups,

[13] This is confirmed in studies by Josling and Tangermann (2014) who also conclude that the low levels of intra-industry trade mean an opportunity for trade growth, provided that the barriers are reduced.

Table 3. Structure of agri-food trade between the EU and the USA in 2004–2006 and 2012–2014 according HS sections
Tabela 3. Struktura handlu rolno-żywnościowego UE z USA w latach 2004–2006 i 2012–2014 według działów HS

2004–2006					2012–2014				
Export (USD billion) Eksport (mld USD)	Share Udział (%)	Import (USA billion) (mld USD)	Share Udział (%)	Balance (USD billion) Saldo (mld USD)	Export (USD billion) Eksport (mld USD)	Share Udział (%)	Import (USA billion) (mld USD)	Share Udział (%)	Balance (USD billion) Saldo (mld USD)
Live animals; animal products (HS 01–05) Zwierzęta żywe; produkty pochodzenia zwierzęcego (HS 01–05)									
1.5	10.3	1.3	13.9	0.2	2.4	11.6	1.7	12.1	0.6
Vegetable products (HS 06-14) Produkty pochodzenia roślinnego (HS 06–14)									
1.6	10.5	4.3	45.8	–2.7	2.2	10.9	6.8	47.6	–4.6
Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal or vegetable waxes (HS 15) Tłuszcze i oleje pochodzenia zwierzęcego lub roślinnego oraz produkty ich rozkładu; gotowe tłuszcze jadalne; woski pochodzenia zwierzęcego lub roślinnego (HS 15)									
0.8	5.7	0.2	1.8	0.7	1.1	5.2	0.5	3.2	0.6
Prepared foodstuffs; beverages, spirits and vinegar; tobacco and manufactured tobacco substitutes (HS 16–24) Gotowe artykuły spożywcze; napoje bezalkoholowe, alkoholowe i ocet; tytoń i przemysłowe namiastki tytoniu (HS 16–24)									
10.8	73.5	3.6	38.5	7.3	14.8	72.3	5.3	37.1	9.5

Source: own calculations based on World Integrated Trade Solution, Comtrade Database.
Źródło: obliczenia własne na podstawie World Integrated Trade Solution, Comtrade Database.

the trade with the US plays a major role for specific agricultural or agri-food sectors. Such a commodity structure of bilateral trade flows is due to the fact that, on both sides of the Atlantic, agricultural activities take place in similar climate zones. As a consequence, substitutional agricultural raw materials and unprocessed foods are manufactured. Also, tariff and non-tariff barriers are used to compete on the global agri-food market.

POTENTIAL EFFECTS OF TARIFF LIBERALIZATION IN THE EU-US TRADE

Methodological assumptions

The SMART[14] partial equilibrium model was used to estimate the effects of liberalization. Partial equilibrium models, including SMART, are used to assess the effects of trade policies[15], in addition to general equilibrium models[16]. The SMART model used in this analysis

[14] As regards the relevant Polish literature, the results of SMART-based studies may be found in papers by Ambroziak and Kaliszuk (2009); Hagemejer et al. (2016).

[15] Note that these models demonstrate both advantages and disadvantages which determine the quality of results. Advantages of partial equilibrium models include the use of relatively easily available variables (e.g. trade flows, duty rates) and of a selected group of parameters (e.g. price elasticity of imports). Also, they allow for making estimations based on statistical data disaggregated at a relatively detailed level. However, their disadvantage is that the calculations are focused on single markets and are based on a predefined group of variables. As a consequence, the simulations are highly sensitive to erroneous estimations of model parameters. These models exclude the relationships with other markets, intra-sectoral dependencies (relationships between inputs and outputs or horizontal and vertical links). Also, they preclude the possibility of productive inputs flow between the sectors, and the substitutability of products.

[16] In addition to the computable equilibrium models listed above, econometric models, macroeconomic models and

is a part of the World Bank's WITS (World Integrated Trade Solutions) framework. It can be used to estimate the effects of changing duty rates in selected market products, as regards both the importer and all exporters. A maximum of 6 HS headings may be covered by the analysis. SMART, just as other similar models, is based on the Armington assumption[17]. In order to perform a simulation, exogenous parameters are used, such as price elasticity of export supply, price elasticity of import demand, and elasticity of import substitution between products originating from different countries. As the final outcome, the model allows to estimate the trade effect which includes the trade creation effect and the diversion effect. The first one means changes in exports resulting from the exporter's improved price competitiveness caused by the reduction in the trade partner's duty rates. The second one means changes in trade flows determined by the evolution of the relative price competitiveness of the exporters.

In this model, the trade creation effect is defined as the increase of demand (in country *j*) for the good *i* originating from country *k* as a result of a decrease or reduction of tariff and non-tariff barriers. In the model, that effect is described by the following equation (Khorana et al., 2009):

$$TC_{ijk} = \frac{M_{ijk} \cdot \mu \cdot \Delta t_{ijk}}{\left(1 + t_{ijk}\right) \cdot \left(1 - \frac{\mu}{\beta}\right)}$$

with: TC_{ijk} – trade creation effect in respect to good *i* imported from country *k* to country *j*; M_{ijk} – imports of good *i* to country *j* from country *k*; μ – price elasticity of import demand; t_{ijk} – duty on good *i* imported from country *k* by country *j*; β – price elasticity of export supply.

The trade diversion effect means the increase in share of imports of good *i* from country *k* in the total imports of country *j* as a result of a decrease or reduction of tariff and non-tariff barriers, at the expense of reducing the share of imports from the rest of the world *K* outside the preferential system. In the model, that effect is described by the following equation (Khorana et al., 2009):

$$TD_{ijk} = \frac{M_{ijk} \cdot M_{ijK}\left(\frac{1 + t_{ijk}^{1}}{1 + t_{ijk}^{0}} - 1\right)\lambda}{M_{ijk} + M_{ijK} + M_{ijK}\left(\frac{1 + t_{ijk}^{1}}{1 + t_{ijk}^{0}} - 1\right)\lambda}$$

with: TC_{ijk} – trade diversion effect in respect to good *i* imported from country *k* to country *j*; M_{ijk} – imports of good *i* to country *j* from country *k*; M_{ijK} – imports of good *i* to country *j* from the rest of the world *K*; t_{ijk} – duty on good *i* imported from country *k* by country *j* prior to changes in duty rates (0) and thereafter (1); λ – elasticity of import substitution.

The net effect (TE) is the sum of the creation and diversion effect, as described with the following equation:

$$TE_{ijk} = TC_{ijk} + TD_{ijk}$$

Two liberalization scenarios were covered by the simulation. The first one assumes a full reduction of duties for any group of agri-food commodities imported by the US (importer) from EU countries (exporter). In turn, the second scenario assumes the elimination of duties for agri-food commodities imported by the EU (importer) from the US (exporter). Note also that the simulation used the values of exogenous parameters saved in SMART from WITS. The price elasticity of supply and the price elasticity of import substitution were set at the level of 99 and 1.5, respectively. The liberalization scenarios covered agri-food products defined at the two-digit data disaggregation level of HS nomenclature. The starting level of trade flows and duties was that of 2014.

Simulation results

Although the tariff barriers in the EU-US trade have been consistently reduced throughout the years, they still exist, especially as regards agri-food products. In 2014, the average level of tariff protection[18] in respect to EU imports of agri-food commodities was 12.2%. In the US, the tariff protection level was lower and reached

probabilistic models etc. are also employed to forecast the effects of trade policy. For more information, see Poczta-Wajda and Sapa (2011); Pawlak (2015), for instance.

[17] This means there are several varieties of the same product, depending on the country of origin. Therefore, varieties of goods are similar goods rather than perfect substitutes. Also, there is a constant elasticity of substitution for the varieties of a specific product between various countries.

[18] The protectionism level is measured with the arithmetic mean of MFN rates.

around 5.1% (World Trade Profiles 2015)[19]. Note however that the duty rates vary from one group of imported products to another. The highest protection levels were applied to such good as tobacco, dairy products, sugar, meat products, products of the milling industry, vegetables and processed vegetables.

Based on the simulation performed with the use of SMART, it may be concluded that the full reduction of import tariffs by the US and the EU will translate into a boost of agri-food trade flows. According to forecasts, greater relative changes in exports of agri-food products will be recorded in the US[20]. The total increase in agri-food exports in the US and the EU was estimated at a level of 9.2% and 8.5%, respectively (Table 4 and 5). Note that in both cases the additional agri-food export flow is mainly driven by the creation effect. In the US, as well as in the EU, it represents an approximate share of 70% of the total expected trade effect[21]. Having in mind the relatively low importance of the EU-US trade flows, the estimated trade effect of tariff liberalization will translate into a slight increase in the EU's total (including extra- and intra-regional flows) and extra-regional agri-food trade flows. These changes will be around 0.2% of the total agri-food exports and imports, and around 0.78% and 0.61% of the extra-regional agri-food exports and imports, respectively (Tables 4 and 5)[22].

Note that the expected changes in agri-food trade flows vary from one commodity group to another. As regards live animals and products of animal origin, the highest increase (by more than 16%) will be recorded for dairy products, birds' eggs and honey (HS Chapter 04) exported from the EU to the US, with a total change of nearly 8.4% in export volumes covered by that Chapter (Table 4). For the US, the relative increase in value of the whole section I is supposed to be nearly 5 times higher (over 43%). The greatest changes are expected as regards exports of meat and edible offal (HS Chapter 02), and fish, crustaceans, molluscs or other aquatic invertebrates (HS Chapter 03), and are supposed to exceed the levels of 182% and 51%[23], respectively (Table 5). For the EU, the above changes are of relatively low importance in the respective total and extra-regional trade flows of products of animal origin (Tables 4 and 5). Meanwhile, when it comes to the EU's imports, the changes are estimated to be greater (0.34% for total EU imports and 1.5% for extra-regional imports).

As a part of Section II, which includes products of vegetable origin, the value of products of the milling industry (HS Chapter 11) exported from the US to the EU will grow by almost 40% (Table 5). The increase in vegetable exports (HS Chapter 07) from the EU to the US is estimated to reach a similar level. As regards fruits (HS Chapter 08) and products of the milling industry (HS Chapter 11, Table 4), the exports volume is expected to change by more than 10%. The estimated changes in trade flows represent only 0.09% and 0.1% of the EU's total exports and imports of products of vegetable origin, respectively, and 0.4% and 0.9% of extra-regional flows, respectively (Tables 4 and 5). The assumed liberalization of tariffs may contribute for both the EU and US to experience a similar relative increase in trade flows of products covered by Section III (Tables 4 and 5). At the same time, absolute changes will be more than 2.8 times higher for the corresponding US export flows. When it comes to both total and extra-regional trade flows of the EU, these changes will be of relatively low importance. However, the import volumes will be impacted to a greater extent (Tables 4 and 5).

The total simulated changes to exports of commodities covered by Section IV are 2.7 times higher for the EU than for the US (Tables 4 and 5), although the corresponding relative changes are at a similar level. The primary consequence of the tariff reduction as per the

[19] In the case of non-agricultural commodities, the rates were respectively lower, i.e. 4.2% for the EU and 3.2% for the US. The average level of protectionism was higher in the EU (5.3%) than in the US (3.5%).

[20] Greater effects for the US are also expected in other studies. See, for instance, Francois et al. (2013), Josling, Tangermann (2014), Bureau et al. (2014), Beckman et al. (2015).

[21] Note that the determinants of the value of the diversion effect include the price elasticity of import substitution. As mentioned earlier in this paper, the simulations were based on elasticity values from SMART/WITS. The use of another dataset will affect the results.

[22] Note however that the estimated changes differ from one member country to another as regards both the general agri-food trade and the flows of specific product groups. For instance, relatively smaller trade effects of the reduction of US tariffs will be experienced by such countries as Malta, Cyprus, Lithuania, Latvia or Estonia. The greatest positive changes in agri-food exports will be recorded in France, Germany and Italy.

[23] Due to relatively low absolute values of EU-US trade flows, the estimated variations in percentage terms should be interpreted with caution.

Table 4. Estimated changes in agri-food exports of the European Union as a result of tariff reduction by the United States (data base from 2014)
Tabela 4. Szacowane zmiany eksportu rolno-żywnościowego Unii Europejskiej w efekcie redukcji ceł przez USA (dane bazowe z 2014 roku)

HS	Avarage tariff Przeciętny poziom ceł (%)	Total trade effect (USD thousand) Łączny efekt handlowy (tys. USD)	Creation effect (USD thousand) Efekt kreacji (tys. USD)	Diversion effect (USD thousand) Efekt przesunięcia (tys. USD)	EU-USA total trade change Łączna zmiana eksportu UE do USA (%)	EU total export change Łączna zmiana eksportu UE (%)	EU total extra export change Łączna zmiana eksportu zewnętrznego UE (%)
1	2	3	4	5	6	7	8
Live animals; animal products – Zwierzęta żywe; produkty pochodzenia zwierzęcego							
1	0.5	393.2	184.8	208.5	0.1	0.00	0.02
2	1.7	3 159.6	3 104.2	55.4	1.0	0.01	0.03
3	0.5	11 613.7	9 187.3	2 426.4	2.9	0.05	0.24
4	12.7	163 832.8	125 859.7	37 973.0	16.1	0.28	1.12
5	0.4	477.8	215.1	262.7	0.5	0.01	0.04
1–5		179 477.0	138 551.0	40 926.0	8.4	0.11	0.53
Vegetable products – Produkty pochodzenia roślinnego							
6	3.4	14 476.8	8 958.9	5 518.0	7.0	0.09	0.54
7	8.5	46 205.6	35 529.6	10 676.0	40.3	0.18	1.20
8	4.6	10 019.2	8 013.3	2 005.9	11.9	0.03	0.19
9	0.3	5 965.8	5 264.4	701.4	1.7	0.05	0.24
10	1.6	4 523.4	1 645.1	2 878.3	3.8	0.02	0.04
11	3.8	29 197.8	22 561.8	6 636.0	13.7	0.37	0.91
12	0.3	2 730.1	2 034.6	695.5	1.3	0.02	0.07
13	1	2 545.3	1 269.2	1 276.0	0.8	0.12	0.28
14	1.5	40.5	12.6	27.8	0.5	0.03	0.24
6–14		115 704.5	85 289.5	30 415.0	7.1	0.08	0.35
Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal or vegetable waxes Tłuszcze i oleje pochodzenia zwierzęcego lub roślinnego oraz produkty ich rozkładu; gotowe tłuszcze jadalne; woski pochodzenia zwierzęcego lub roślinnego							
15	3.8	22 469.8	18 185.5	4 284.3	13.8	0.09	0.36
Prepared foodstuffs; beverages, spirits and vinegar; tobacco and manufactured tobacco substitutes Gotowe artykuły spożywcze; napoje bezalkoholowe, alkoholowe i ocet; tytoń i przemysłowe namiastki tytoniu							
16	3.2	40 376.6	31 620.8	8 755.8	18.8	0.23	1.96
17	6.4	86 791.7	58 527.4	28 264.2	30.0	0.68	3.14
18	3.3	68 963.7	37 795.2	31 168.4	12.6	0.27	1.03

Table 4 cont. – Tabela 4 cd.

1	2	3	4	5	6	7	8
19	5.5	122 318.4	90 915.3	31 403.1	12.1	0.31	0.91
20	10.5	65 905.3	30 187.9	35 717.4	14.7	0.23	1.07
21	5.6	103 190.1	40 668.7	62 521.4	12.6	0.33	1.04
22	1.8	20 071.9	11 550.8	8 521.0	0.3	0.03	0.06
23	0.8	22 731.9	14 063.2	8 668.7	8.5	0.08	0.40
24	204.2	386 957.0	337 008.4	49 948.6	409.8	1.99	6.70
16-24		917 306.6	652 337.9	264 968.7	8.6	0.33	1.07
1–24		1 234 958.0	894 363.9	340 594.1	8.5	0.21	0.78

Source: own elaboration based in SMART/WITS model.
Źródło: opracowanie własne przy użyciu modelu SMART/WITS.

Table 5. Estimated changes in agri-food exports of the United States as a result of tariff reduction by the European Union (data base from 2014)
Tabela 5. Szacunkowe zmiany eksportu rolno-żywnościowego USA w efekcie redukcji ceł przez Unię Europejską (dane bazowe z 2014 roku)

HS	Avarage tariff Przeciętny poziom ceł (%)	Total trade effect (USD thousand) Łączny efekt handlowy (tys. USD)	Creation effect (USD thousand) Efekt kreacji (tys. USD)	Diversion effect (USD thousand) Efekt przesunięcia (tys. USD	Total export change Łączna zmiana eksportu USA do UE (%)	EU total import change Łączna zmiana importu UE (%)	EU total extra import change Łączna zmiana importu zewnętrznego UE (%)
1	2	3	4	5	6	7	8
Live animals; animal products – Zwierzęta żywe; produkty pochodzenia zwierzęcego							
1	2.04	769.0	420.2	348.8	0.5	0.01	0.23
2	4.08	47 403.9	46 297.1	1 106.8	182.5	0.10	0.85
3	10.69	451 463.1	379 507.1	71 956.0	51.3	1.12	1.90
4	5.77	1 106.7	432.0	674.6	6.3	0.00	0.06
5	0.06	215.2	84.8	130.3	0.3	0.00	0.01
1–5		500 957.9	426 741.4	74 216.6	43.4	0.34	1.50
Vegetable products – Produkty pochodzenia roślinnego							
6	6.45	6 584.5	3 048.3	3 536.2	6.1	0.05	0.30
7	8.56	20 758.9	10 096.9	10 662.0	6.2	0.07	0.96
8	6.02	117 164.9	80 780.9	36 384.0	4.9	0.25	5.42
9	2.31	2 541.4	1 212.0	1 329.4	8.1	0.01	0.12
10	1.73	203.1	120.0	83.1	0.0	0.00	0.01

Table 5 cont. – Tabela 5 cd.

1	2	3	4	5	6	7	8
11	12.05	8 143.2	6 603.0	1 540.2	39.3	0.16	0.38
12	1.22	15 694.8	9 653.4	6 041.4	0.6	0.06	0.73
13	2.39	4 051.6	2 405.2	1 646.4	2.1	0.16	0.19
14	0.00	0.0	0.0	0.0	0.0	0.00	0.00
6–14		175 142.4	113 919.7	61 222.8	9.2	0.11	0.90
Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal or vegetable waxes Tłuszcze i oleje pochodzenia zwierzęcego lub roślinnego oraz produkty ich rozkładu; gotowe tłuszcze jadalne; woski pochodzenia zwierzęcego lub roślinnego							
15	5.54	63 343.7	40 931.1	22 412.7	12.7	0.20	0.56
Prepared foodstuffs; beverages, spirits and vinegar; tobacco and manufactured tobacco substitutes Gotowe artykuły spożywcze; napoje bezalkoholowe, alkoholowe i ocet; tytoń i przemysłowe namiastki tytoniu							
16	17.64	26 341.8	12 678.8	13 662.9	17.0	0.12	0.34
17	11.4	9 430.0	3 141.5	6 288.5	23.8	0.07	0.28
18	6.13	391.7	138.6	253.1	5.0	0.00	0.00
19	10.65	1 200.8	299.5	901.3	21.8	0.00	0.07
20	17.74	98 203.8	47 840.6	50 363.2	26.9	0.35	1.21
21	9.48	140 583.6	64 709.7	75 874.0	19.7	0.56	3.33
22	3.94	14 909.1	6 388.3	8 520.8	1.3	0.03	0.20
23	1.01	35 091.8	21 999.5	13 092.3	2.4	0.10	0.24
24	44.7	9 681.5	6 355.9	3 325.5	47.2	0.06	0.23
16–24		335 834.0	163 552.4	172 281.6	8.7	0.14	0.55
1–24		1 075 278.1	745 144.5	330 133.6	9.2	0.18	0.61

Source: own elaboration based in SMART/WITS model.
Źródło: opracowanie własne przy użyciu modelu SMART/WITS.

adopted scenario will be the more than fourfold growth in volumes of tobacco (HS Chapter 24) exported from the EU to the US. Also, relatively high changes (a 30% increase) are expected in the area of confectionery products (HS Chapter 17). The reduction of EU tariffs for agri-food imports from the US will involve an increase in tobacco exports from the US by nearly half (HS Chapter 24). Also, there will be an almost 27% increase in export volumes of processed fruit and vegetables (HS Chapter 20). The exports of sugar and sugar confectioneries (HS Chapter 17) and of preparations of cereals (HS Chapter 19) will grow by 22–24% (Table 5). As regards commodities covered by Section IV (unlike in the case of other goods), while the changes represent a higher share in the EU's total and extra-regional exports (Tables 4 and 5), their values remain low (only the share of extra-regional exports exceeds 1%, Tables 4 and 5).

SUMMARY

Based on the studies, it may be concluded that while the EU and US are the key players in the global agri-food market, their mutual trade relations in that area are of relatively low importance. Also, the US share in intra-EU agri-food trade flows has declined over the period considered. This is an indication that the US market (both as the buyer and as the supplier) is being superseded by third countries. However, it should be clearly

noted that bilateral relationships are of a relatively grater importance to specific industries or sectors, as confirmed by the commodity structure of the EU-US agri-food trade flows.

Signing the TTIP agreement, which includes reducing tariff barriers in the EU-US agri-food trade, could help boost the bilateral agro-food trade flows. According to simulations, the US will experience a greater total increase in agri-food exports than the EU. Also, the establishment of the free trade zone will mainly trigger an asymmetric trade creation effect (focused on several HS Chapters) for the EU-US agri-food flows. In the EU, the highest relative increases in export volumes are expected to be recorded for the tobacco, vegetables, sugar, confectionery products and dairy products. In the US, that group will include meats and offal, fish and crustaceans, products of the milling industry and tobacco. Therefore, TTIP means both an opportunity and a threat for the EU agri-food producers. Note also that the estimated changes in trade flows are of relatively low importance in the EU's total and extra-regional agri-food trade flows.

The liberalization scenarios used in this study envisage only the full reduction of tariff barriers. Note that, having in mind the existing relatively low level of customs protection of the agri-food market in the EU and the US, there will not be any significant improvement in the conditions of access to that area. However, the ultimate effects of establishing the EU-US free trade zone will be determined by the final wording of the agreement, including the tariff reduction level and the method for reducing non-tariff barriers.

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POTENCJALNE EFEKTY HANDLOWE LIBERALIZACJI TARYFOWEJ DLA SEKTORA ROLNO-ŻYWNOŚCIOWEGO UNII EUROPEJSKIEJ W RAMACH UMOWY O TRANSATLANTYCKIM PARTNERSTWIE HANDLOWYM I INWESTYCYJNYM (TTIP)

Streszczenie. Celem artykułu było określenie potencjalnych efektów handlowych zawarcia Umowy o Transatlantyckim Partnerstwie Handlowym i Inwestycyjnym (TTIP) dla sektora rolno-żywnościowego w UE. Analiza *ex post* objęła charakterystykę obrotów produktów rolno-żywnościowych UE z USA w latach 2004–2014 na podstawie danych statystycznych z bazy Banku Światowego WITS. Ocena *ex ante* przeprowadzona została z wykorzystaniem modelu równowagi cząstkowej SMART. W efekcie zrealizowanych badań stwierdzono, że chociaż bilateralne relacje handlowe UE–USA w zakresie produktów rolno-żywnościowych mają względnie niewielkie znaczenie, są istotne na poziomie poszczególnych branż. Umowa TTIP, obejmująca redukcję barier taryfowych w handlu rolno-żywnościowym UE–USA, przyczynić się może do pobudzenia wzajemnych obrotów rolno-żywnościowych w większym stopniu dla USA. Utworzenie strefy wolnego handlu wywoła głównie efekt kreacji, przy czym będzie on asymetryczny – skupiony w kilku grupach produktów.

Słowa kluczowe: handel rolno-żywnościowy, TTIP, SMART

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