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**CAN UNILATERAL CANCELLATION OF TARIFFS INCREASE
THE COUNTRY'S ECONOMIC GROWTH?
EXAMPLE WITH THE EU AND UKRAINE**

The article presents various simulated scenarios that allow one to assess the impact on the economy of unilateral tariff cuts in the Ukrainian economy. The real situation in trade relations between the EU and Ukraine is described from 2014 to 2018. The main results obtained as a result of the quantitative assessment of the gains received by Ukraine from the unilateral abolition of the EU are 1.02% of GDP growth under the normal trade scenario and 1.17% growth GDP in accordance with the expanded trading scenario. The results of the full implementation of the FTA show a GDP growth of 0.53% in the normal trading scenario.

Keywords: foreign trade; impact analysis; linear multiplier model; Ukraine; European Union; free trade agreement.

JEL Classifications: C67, F13, F14, F17.

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**ЧИ МОЖЕ ОДНОСТОРОННЯ ВІДМІНА ТАРИФІВ
ЗБІЛЬШИТИ ЕКОНОМІЧНЕ ЗРОСТАННЯ КРАЇНИ?
ПРИКЛАД З ЄС І УКРАЇНОЮ**

У статті представлено різні модельовані сценарії, що дозволяють оцінити вплив на економіку одностороннього зниження тарифів в українській економіці. Описано реальну ситуацію в торгових відносинах між ЄС і Україною за 2014-2018 роки. Основні результати, отримані в результаті кількісного оцінювання вигравів, отриманих Україною від одностороннього скасування ЄС тарифів, складають 1.02% зростання ВВП за нормальним сценарієм торгівлі і 1,17% зростання ВВП відповідно за розширеним торговим сценарієм. Результати повної реалізації Угоди про вільну торгівлю показують зростання ВВП на 0,53% за нормальним сценарієм торгівлі.

Ключові слова: зовнішня торгівля; аналіз впливу; модель лінійного мультиплікатора; Україна; Європейський Союз; угода про вільну торгівлю.

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**МОЖЕТ ЛИ ОДНОСТОРОННЯ ОТМЕНА ТАРИФОВ
УВЕЛИЧИТЬ ЭКОНОМИЧЕСКИЙ РОСТ СТРАНЫ?
ПРИМЕР С ЕС И УКРАИНОЙ**

В статье представлены различные моделируемые сценарии, позволяющие оценить влияние на экономику одностороннего снижения тарифов в украинской экономике. Описана реальная ситуация в торговых отношениях между ЕС и Украиной за 2014-2018 годы. Основные результаты, полученные в результате количественной оценки выигрышей, полученных Украиной от односторонней отмены ЕС тарифов, составляют 1.02% роста ВВП по нормальному сценарию торговли и 1,17% роста ВВП в

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соответствии с расширенным торговым сценарием. Результаты полной реализации Соглашения о свободной торговле показывают рост ВВП на 0,53% по нормальному сценарию торговли.

Ключевые слова: внешняя торговля, анализ влияния, модель линейного мультипликатора, Украина, Европейский Союз, соглашение о свободной торговле.

Introduction. Since the independence of Ukraine in 1991, the country has passed through an extensive transformation in its economy from a planning type economy to a market economy. In recognition of the country's efforts, Ukraine became a member of the World Trade Organization (WTO) on 16 May 2008. Immediately after its WTO accession, Ukraine began negotiations on the Deep and Comprehensive Free Trade Agreements (DCFTA) with the European Union (EU). Twenty-one rounds of negotiations were held before an agreement was reached in November 2011 and ratified by experts in the spring of 2012. However, the official signing of the agreement was delayed due to "politically-motivated justice in Ukraine" and thus did not occur until November 2013 at the Eastern European Partnership summit in Vilnius. However, former Ukrainian president, Victor Yanukovich, rejected the agreement alleging economic pressure from Russia. This rejection led to popular protests that resulted in bringing down the full Ukrainian government and its president at the end of February 2014. Between then and the election of a new president on 25 May, Ukraine lived in uncertain times with Crimea being occupied by Russia, the rise of separatist movements in Donetsk and Luhansk, which was also fuelled by Russia, and the threat of direct Russian intervention in the rest of Ukraine. Newly elected President Petro Poroshenko turned back to the integration with the EU policy. As a result, the Association Agreement (AA), which included Deep and Comprehensive Free Trade Agreement (DCFTA), between Ukraine and the EU were ratified simultaneously by the parliaments of both sides on 16 September 16 2014.

Nevertheless, due to the geopolitical pressure exerted by Russia, the implementation of the DCFTA was delayed until January 2016. Instead, Ukraine was offered the possibility to enjoy the unilateral abolishment of import tariffs by the EU until January 2016 equivalent to the first year of DCFTA. With this offer, the EU opened its markets for Ukrainian producers of goods included in the DCFTA while Ukraine retained its tariffs. Therefore, the main focus of the current research is to analyse the effects of this temporary measure on the Ukrainian economy.

The main purpose of the paper is to evaluate short-term economic outcomes of the unilateral abolishment of import tariffs by the EU on Ukraine as a beginning of the implementation of the DCFTA (Scenario 2). In the framework of these four scenarios are two scenarios that include the abolishment by the EU of unilateral import tariffs (Scenario 2 and 4), one scenario that includes the bilateral abolishment of tariffs between the EU and Ukraine (Scenario 3 that simulate situation started from January 2016) and one scenario that simulates the loss experienced by the Ukrainian economy due to the uncollected import tariffs that resulted from the DCFTA application (Scenario 1). The methodology used for this evaluation is the linear multipliers model, which focuses on short-term effects. The present paper is structured as follows. Background details are presented in the current section. Subsequent sections

include an overview of the extant literature; discussions on the methodology, the database and the simulations; a general overview of the study, including its limitations, and conclusions.

Literature overview. In the trade relationships between the EU and Ukraine, the EU ranks number one as an export and import destination, whereas Ukraine is ranked 24 among the major trade partners of the EU. Accordingly, it is not surprising that the EU and Ukraine show an interest in establishing a regional free trade area in the form of the DCFTA.

To evaluate possible short- and long-term outcomes of the FTA, several studies have been published on the topic as the country is situated geographically close to the EU, see in P. Brenton and J. Whalley (1999); M. Emerson et al. (2006); ECORYS and CASE (2007a), (2007b); J. Francois and M. Manchin (2009); M. Maliszewska et al. (2009); S. Von Cramon-Taubadel et al. (2010); M. Frey and Z. Olekseyuk-Viber (2011); V. Movchan and V. Shportyuk (2011); O. Nekhay et al. (2012); M. Frey and Z. Olekseyuk (2014). However, there are no known studies that assessed the situation after the EU unilaterally abolished its tariffs. Thus, the current research fills this gap.

Among the studies published to date on the current issue, the majority use the computable general equilibrium (CGE) models to conduct a general economic impact analysis or the gravity models of different type Shepotylo (2010) or the partial equilibrium model to conduct a separate sector analysis, as in case of O. Nekhay et al. (2012), where the impact of the FTA on the agricultural sector is analysed. The exception to this rule is the work of S. Von Cramon-Taubadel et al. (2010). In this work, the Global Trade Analysis Project 7 (GTAP) static comparative CGE model is used to analyse the effects of the FTA between the EU and Ukraine on the agricultural sector. To accomplish this, several scenarios are examined and the general finding is that a 50% reduction in tariffs would bring moderate benefits for the EU and Ukraine that would vary from one agricultural sector to other. A comparison of the results from different studies is difficult due to the varied nature and underlying assumptions of the different models. For example, M. Maliszewska et al. (2009), used a standard CGE model for modelling tariffs and a gravity model approach that allows taking into account non-tariff barriers (NTBs) on trade to model FTA between Russia, Armenia, Azerbaijan, Georgia, Ukraine on one side and the EU on the other side. They found that Ukraine would benefit from both simple and deep FTAs (1.73% and 5.83% increase in welfare, respectively). ECORYS and CASE (2007a, 2007b), also used a CGE model to model the outcomes of Ukrainians accession to the WTO and the establishment of extended and limited FTAs with the EU. Both short- and long-term impacts of FTAs are evaluated. For all scenarios, the increase in welfare was found to range between 5.28% (in the case of an extended FTA in the long term) and 1.21% (in the case of a limited FTA in the short term).

I. Francois and M. Manchin (2009), conducted a study using a GTAP-based CGE model while taking into account the NTB. The difference between their study and other studies is that their study found that a FTA between the EU and Ukraine negatively impacts Ukraine in terms of real income in all three scenarios and has a positive impact only in terms of GDP growth in the case of a full FTA scenario, with an increase in the GDP of 0.68%, and in the case of the first partial FTA scenario, with an increase in the GDP of 0.04%. In the case of the second partial FTA scenario,

the GDP declines by 1.46%. V. Movchan and V. Shportyuk (2011), modelled two possible but opposing developments of Ukrainian trade integration policies. One involved a FTA with the EU and other comprises Ukraine membership in the Custom Union of Russia, Belarus and Kazakhstan in which the CGE model was used. According to their findings, in the case of an FTA with the EU, the total welfare of Ukraine increases by 1.3% in the short term and 4.6% in the long term, whereas in the case of Ukrainers integration into the Custom Union, the loss of aggregated welfare for Ukraine is 0.5% in the short term and 3.7% in the long term. M. Frey and Z. Olekseyuk (2014), provided the most current published study using a CGE model. However, in contrast to the previously mentioned studies, the effect of the elimination of income received from tariffs by Ukraine is analysed assuming unilateral abolishment of tariffs by Ukraine. The three proposed scenarios analyse different ways to compensate for the elimination of tariffs and its impacts on the country's economy. The outcomes of the study by M. Frey and Z. Olekseyuk (2014), indicate almost no effect over the real GDP in all scenarios, whereas the welfare effects vary significantly from one scenario to another, ranging from -0.09% to 0.69% depending on the underlying assumptions of the scenario.

The model. This study applies the methodology of the linear multipliers models to analyse the effects of the EU unilateral tariff reductions on the Ukrainian economy. The multiplier theory was initiated by R. Stone (1962); and G. Pyatt and J. Round (1979), and was subsequently developed in works such as J. Defourney and E. Thorbecke (1984). The methods herein are based on information from the inverse matrices derived from the models of W. Leontief (1941), and A. Ghosh (1958), as applied to the SAM with respect to the ability of an expanding sector to increase demand or costs, respectively.

Following M. Cardenete et al. (2010), we begin with a brief explanation of these models, as an extension of the Leontief Model. A square $n \times n$ matrix is considered wherein each row and each column represent an economic account (productive sectors, consumers, government, capital, etc.) that satisfies the accounting equations of the economy (total income equals total expenditure). Each Y_{ij} component of the matrix represents the bilateral flow between account i and account j . Each row of the SAM reflects the total income that row i receives from column j , whereas each column shows the total income of column j and how it is distributed among the different i rows. The average expenditure coefficients - $a_{ij} = Y_{ij} / Y_j$, $i, j = 1 \dots n$ - show the payments made to account i for every income unit of j . From this definition, it is possible to obtain:

$$Y_i = \sum_{j=1}^n (Y_{ij} / Y_j) Y_j = \sum_{j=1}^m a_{ij} Y_j + \sum_{j=m+1}^{m+k} a_{ij} Y_j, \quad n = m + k \quad (1)$$

Indexes m and k represent the division of the SAM accounts into endogenous and exogenous accounts, which then leads to the division of the $n \times n$ matrix into four submatrices: A_{mm} , A_{mk} , A_{km} , and A_{kk} . Y_m and Y_k denote the total income of the endogenous and exogenous accounts, respectively. Thus, it is possible to determine the value of Y_m from $Y_m = A_{mm} Y_m + A_{mk} Y_k$. Then, following the same procedure as with the Leontief equation, calculate the extended multipliers matrix from $Y_m = (I - A_{mm})^{-1} Z$, where Z is the vector of exogenous accounts ($A_{mk} Y_k$) and $M = (I - A_{mm})^{-1}$ is the extended multipliers matrix in the SAM. These multipliers can be interpreted as the input

requirements by unit increases of expenditure or income, depending on whether columns or rows are considered, in an account, as in the inverse Leontief matrix, which reflects the relation between production, factor income, income distribution and final demand. It is important to note that the selection of m (i.e., the decision regarding which accounts are endogenous) usually depends on the type of analysis undertaken as it determines which accounts (exogenous) explain the variations in income of other accounts (endogenous). If changes in the vector of exogenous accounts are denoted as dZ , changes in the income of the endogenous accounts are expressed as:

$$dY_m = MdZ = Md(A_{mk}Y_k) = MA_{mk}dY_k \quad (2)$$

The j^{th} column in M indicates the total income generated in each of the endogenous accounts when a unit of income flows from an exogenous institution towards endogenous account i .

In the simulation, the new vector is obtained by subtracting from vector Z all injections of income from the reduction in tariffs corresponding to imports from the European Union to Ukraine via the tariff account, and on the other hand, by adding all injections of income from the reduction in tariffs corresponding to exports from the European Union to Ukraine by the different branches of activity affected by this reduction.

Database: Social Accounting Matrix for Ukraine 2008. Social Accounting Matrices (SAMs) are meant to represent the whole set of transactions conducted in an economy throughout a specific period of time. It is an important database organised as a double-entry table that gathers the economic and social information concerning the transactions conducted between and among all the economic agents. SAMs are crucial databases for quantitative models (e.g., SAM linear models and CGE models). In addition to their statistical content, SAMs are a useful tool for evaluating policy interventions in national or regional frameworks.

The use of Social Accounting Matrices was first introduced by R. Stone (1962), when he published a SAM for the United Kingdom. However, given their usefulness to show the intersectoral relations and income distribution of an economy, the first SAMs were elaborated with the purpose of starting poverty reduction programmes in developed countries.

A SAM enlarges the information contained in Input-Output tables because, in addition to including that information, it integrates all flows between the value added and the final demand. Therefore, a SAM reflects the circular flow of income in an economy. In a SAM, each account is represented by a row and a corresponding column. By convention, rows show sources of income and columns show the corresponding expenditures. All the values in the cells are monetary flows. Therefore, each nonzero value of a cell reflects a transaction or a cash flow between accounts. As income must equal expenditure for each account, the vector of column sums (expenditures) must equal the vector of row sums (incomes).

The SAM structure is flexible and can take different forms depending on the scope of the study. Moreover, the number of accounts can vary, and they may be more or less disaggregated. The disaggregation and the order of the different accounts

depend on the model that will be built with the SAM and its implementation, with greater emphasis on those accounts that will be analysed. In this work, the Social Accounting Matrix for Ukraine for the year 2008 Movcjan and Shportyuk (2011) is used. Although the FTA simulation is with data from 2013 European Commission (2014), it is scientifically proven that the economic structure of a country does not suffer variations in five years, and for this reason, the European System of Accounts establishes a guideline for regions to provide a SAM every five years. The SAM accounts are divided into 38 activities and commodities branches and 7 accounts that correspond to the institutional sectors, considering the model endogenous accounts (activities, commodities, productive factors such as labour and capital, households and tariffs) and exogenous accounts (government, gross capital formation, and rest of the world). The structure of the SAM accounts is presented in Table 1.

Table 1. Macro Social Accounting Matrix for Ukraine in 2008. Millions of Euros, authors from Movcjan and Shportyuk (2011)

Receipts \ Payments	Activities	Commodities	GOS, mixed income	Compensation of employees	Households	Tariffs	Government	Capital account, change inventories and ROW	Total
Activities	0.0	301439.2	4719.8	0.0	0.0	50.1	1509.4	0.0	307718.6
Commodities	191611.6	0.0	0.0	0.0	76179.4	702.0	21149.5	92606.8	382249.4
GOS, mixed income	51594.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	51594.5
Compensation of employees	60505.0	0.0	0.0	0.0	0.0	0.0	0.0	2452.1	62957.1
Households	0.0	0.0	45577.8	62957.1	0.0	747.0	22504.2	0.0	131786.1
Tariffs	128.8	406.0	41.7	0.0	1017.7	0.0	0.0	0.0	1594.1
Government	3878.8	12231.3	1255.2	0.0	30658.2	0.0	0.0	0.0	48023.5
Capital account, change inventories and ROW	0.0	68172.9	0.0	0.0	23930.8	94.9	2860.3	10565.1	105624.0
Total	307718.6	382249.4	51594.5	62957.1	131786.1	1594.1	48023.5	105624.0	1091547.3

Simulations and results. Using the information available regarding the amount of imports and exports from the European Union to Ukraine European Commission (2014) and the information regarding the reductions of tariffs due to the EU-Ukraine DCFTA (Institute for Economic Research and Policy Consulting 2014), four scenarios are created based on the agreement signed between the EU and Ukraine.

Scenarios. It is first necessary to note that the scenarios focus on only Ukraine and do not take into account effects produced in the EU. The numeration of the scenarios is done by the order of elaboration and calculations. Regarding the importance of scenarios, the scenario 2 is a most important because directly responding to the objectives of the paper. Scenario 3 describes real situation after January 2016 when DCFTA is fully implemented by both parts (the EU and Ukraine). And scenario 4 is an extension of the scenario 2 with the assumption of 25% increase in trade between

the EU and Ukraine. The scenario 1 is an intermediate one and represents intermediate stage for calculation of scenario 3.

- Scenario 1: Is an intermediate scenario that does not correspond to any possible real situation. In this scenario the EU and Ukraine abolish import tariffs for bilateral trade. The impact of this action on the Ukrainian economy is analysed as a result of the reduction in the income of the Ukrainian government from import tariffs. However the gains obtained by exporters as a result of tariffs abolishment in the EU are not taken into account. The Ukrainian government actualises no direct gains as a result of the abolishment of tariffs in the EU.

This hypothetical scenario is used to calculate the loss to the Ukrainian economy when the import tariff for goods from the EU is eliminated. Methodologically, tariffs considered as an endogenous account in the model, and thus, they have an impact on the total amount of government loss based on data obtained from the Institute for Economic Research and Policy Consulting (2014).

- Scenario 2: Key scenario responding to the objective of the paper and represents real situation of 2015. The EU unilaterally abolishes import tariffs in bilateral trade. The impact on the Ukrainian economy is analysed taking into account only the gains obtained by Ukrainian exporters. This scenario corresponds to April 2014-December 31st 2015 situation in the trade relationships between the EU and Ukraine. Based on data from the Institute for Economic Research and Policy Consulting (2014), the sectoral accounts that are affected by a reduction in EU tariffs were analysed.

- Scenario 3: Since Ukraine and the EU agreed to fully implement the DCFTA from 1 January 2016 this scenario simulates a current situation. In this scenario the net losses of government from the tariffs abolishment and gains obtained by the exporters are taken into account at the same time. Methodologically it represents a sum of net impact caused by scenarios 1 and 2 when the two are simultaneously implemented. The results indicate that the sectoral accounts impacted in Scenarios 1 and 2 are impacted in this scenario at the same time.

This scenario simulates the current situation initiated at the 1st of January 2016 when the DCFTA entered into force and tariffs were removed bilaterally by the EU and Ukraine.

- Scenario 4: This scenario includes the impact caused by Scenario 2 when trade is increased by 25% (European Union Delegation to Ukraine Trade and Economic Section 2014). In this scenario, the situation when tariffs are unilaterally abolished in bilateral trade and a 25% increase in Ukrainian exports to the EU is simulated. Although the real trade and GDP data from 2014-2015 in Ukraine shows decline in trade with the EU and decline in GDP the relevance of the scenario consists in suggesting that increase in trade would bring GDP growth to the country. The simulation for this scenario is as follows: the same accounts impacted in Scenario 2 are impacted here, but with an increase of 25%.

Results. The simulations are conducted using a series of macroeconomic indicators, and their impact on total output, total income gross domestic product (GDP) are analysed.

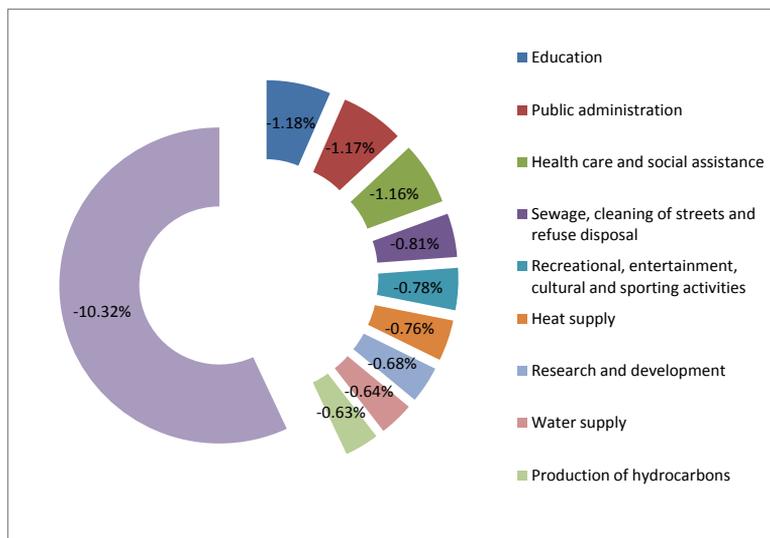


Figure 1. Total impact in GDP. Scenario 1: The EU and Ukraine abolish import tariffs in bilateral trade, authors'

The total effects on the GDP in Scenario 1 are presented in Figure 1. The results for impacts on the Ukrainian economy as a result of a reduction in income of the Ukrainian government from import tariffs are presented in here. In this case, the loss in the aggregate effect on the GDP when tariffs were subtracted is 536.31 million Euros, which is approximately 0.5% of the total GDP. With respect to the highest negative percentage of change is realised by the public services accounts, the first three being education, public administration and health care and social assistance. These will be reduced when the Ukrainian government experiences loss due to a reduction of tariffs.

In Figure 2, the impact analysis for Scenario 2 is developed. In this case, the impact on the Ukrainian economy is analysed taking into account only the gains obtained by Ukrainian exporters. It is noted that the increase in sector output when the export tariffs are abolished is approximately 1,117 million Euros, which is approximately a 1% growth in the GDP. According to the simulation results, the highest impacts are experienced in sectors such as agriculture, mining of coal and peat, production of hydrocarbons, metallurgy and the processing of metals. As all of these are important sectors in the Ukrainian economy, it is logical to expect that they would benefit from the free trade with the EU. When comparing these data with the statistical information of the contribution to the GDP by sectors of the Ukrainian economy (Table 2), the agricultural production ranks 4rd or 5th, depending on year and classification, mining ranks 6th or 7th and the transformation industry, which includes the production of hydrocarbons, metallurgy and metal processing, ranks 1st. In other words, although the agricultural industry is the greatest beneficiary of the FTA, it ranks 4th as a contributor to Ukraine's GDP. Thus, it can be conclude that the sectors that benefit from the FTA are EU export oriented.

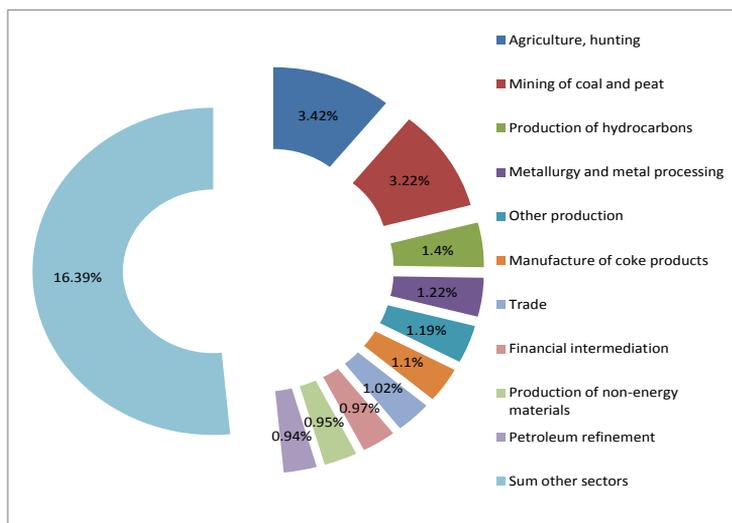


Figure 2. Total impact in GDP. Scenario 2: The EU abolishes import tariffs unilaterally in bilateral trade, authors'

Table 2. Contribution of different sectors to GDP of Ukraine. Current prices in Millions of Euros and ranking, authors from statistic information

	Year	Output	Ranking
Transformation industry	2008	97729.8	1
	2012	94511.9	1
Other types of economic activities	2008	46467.7	2
	2012	49004.0	2
Trade; repairation of cars. domestic appliances and personal use items	2008	31220.8	3
	2012	36224.2	3
Transportation and communication services	2008	22405.4	4
	2012	25313.1	5
Agriculture, hunting & forestry	2008	20293.5	5
	2012	25826.7	4
Mining Industry	2008	11904.0	7
	2012	14228.8	6
Production & distribution of gas, water & electricity	2008	10101.5	8
	2012	13919.2	7
Construction sector	2008	15260.2	6
	2012	12720.9	8
Education	2008	8085.8	9
	2012	10247.1	9
Medical care and social aid	2008	5968.5	10
	2012	7814.9	10

As evidenced from Table 2, the importance of the various sectors has remained unchanged from 2008 to 2012. The only exception is the construction sector, which moves from 6th place in 2008 to 8th in 2012 due to the economic crisis.

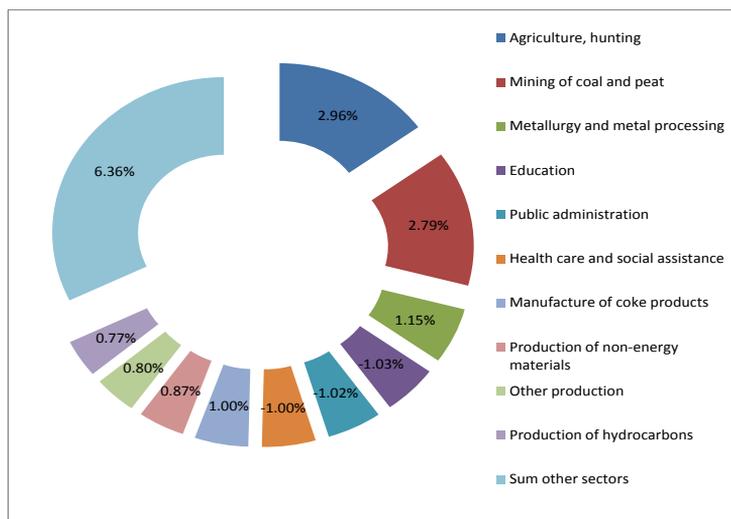


Figure 3. Total impact in GDP. Scenario 3: Bilateral abolishment of tariffs in the EU-Ukraine trade, authors'

The net impact on the GDP of the EU-Ukraine DCFTA is presented in Figure 3, where the impact analysis for Scenario 3 is developed. In this case, it is observed that the net impact is a gain in the aggregate impact on the GDP of approximately 581 million Euros, approximately 0.5% of Ukrainian GDP. It is noted that the highest gain is observed in the agricultural sector and the highest loss is related to the education sector. This scenario is a logical continuation (fusion) of Scenarios 1 and 2. Based on the initial assumption, this scenario does not consider any compensation measures for the governmental loss due to uncollected import duties, of which the most negatively affected four sectors are education (-1.03%), public administration (-1.02%), health care and social assistance (-1.00%), and research and development (-0.53%). Because the model used in the current study is linear, it does not take into account the increase in taxes collected that occurs as a result of the increase in business activity, which is, in turn, due to the increase in trade with the EU as a result of the DCFTA. However, this increase in taxes collected could cover part of the loss in governmental income. The main beneficiaries in this scenario are agriculture (+2.96%), mining of coal and peat (+2.79%), processing of metallurgy and metal (+1.15%) and manufacturing of coke products (+1.00%).

In Figure 4, the results of the impact caused by Scenario 4 are presented. As previously discussed, the same assumptions applied to Scenario 2 are applied to Scenario 4. However, Scenario 4 also incorporates a 25% increase in trade. The aggregate impact of this scenario is an increase in the Ukrainian GDP of approximately 1,280 million Euros, which corresponds to nearly 1.2% of the GDP. Due to the structure of

the Ukrainian economy, the highest positive impact is produced in the primary sectors of fishery, forestry and agriculture.

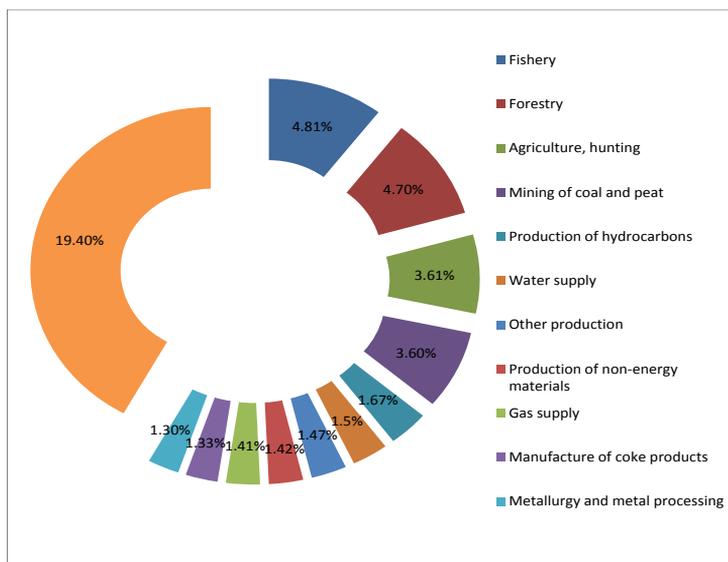


Figure 4. Total impact in GDP. Scenario 4: Impact caused by Scenario 2 when trade increase by 25%, authors'

Among these three, agriculture is by far the most important. Although fishery comprises a small sector of the economy, it can have high export potential for fresh water fish given that import duties in the EU are zeroed after the signing of the DCFTA. Forestry is not an important sector in Ukraine due to the low forest cover in the country, but still can be important for the Western Ukraine where Carpathian Mountains are densely covered by forest. Thus, it is concluded that the agricultural sector is the main beneficiary of the increase in trade between the EU and Ukraine as a result of the DCFTA.

Discussion. With an intent to analyse the possible outcomes of DCFTA and, more concretely, the current state of trade relationships between the EU and Ukraine, four simulated scenarios were presented. Of the four scenarios, the first accounted for government loss from uncollected import duties and the effect of that loss on the country's GDP. The second scenario reflected the current situation when the EU unilaterally abolished import tariffs for Ukrainian products, whereas the third reflected the short-term outcomes of the full implementation of the DCFTA. The final simulation reflected the current situation with an additional increase of 25% in trade. Among the four proposed scenarios, Scenarios 2 and 4 represented a novelty of this study as they were not considered in any previously published works. Only the results of Scenario 3 (+0.53% of GDP) can be compared with other studies, and they were found to be consistent with the findings of previous studies in that they reported a low impact of FTA on the Ukrainian GDP that varied from -1.46% to +0.68% of the GDP depending on the study and scenario assumption Francois and Manchin

(2009). Generally, comparisons between and among studies is difficult due to the use of different models as the different models comprise different modelling assumptions and input data.

Thus, the present study confirms that trade liberalisation by itself between the EU and Ukraine does not cause a significant increase in the growth of the GDP in a short run. Rather, the limited increase occurs because, according to Haydutskiy (2013), Ukraine has a diversified structure of foreign trade wherein the majority corresponds to third countries other than the EU, Russia and/or the CIS - although the EU, Russia and CIS are the most important as individual countries or blocks. More important, with respect to Ukraine, could be the implementation of all chapters of the Association Agreement including the DCFTA, which is not directly related to trade. This would foster the implementation of reforms, modernisation, increased labour productivity and economic competitiveness as well improve energy use efficiency and the investment climate. It is only after incorporating such actions that a country can expect to achieve sustainable growth and increase social standards to the EU level. Although trade liberalization can also produce a restructuring of the Ukrainian economy with redirections of the trade and investment flows and as a result change in the shares of contributions of each sector to GDP. But such effects can only be captured in a long run and other methodology need to be used to quantify that.

The results obtained in the current study must be considered with caution due to the limitations of the approach. In all positive scenarios, whereas the agricultural sector is projected to be a main beneficiary of the DCFTA, the modelling approach does not take into account the exception of almost 400 commodity items, mainly agricultural and food products, from free trade procedures. Though some of the agricultural products are given duty free quotas (grain, meat, etc.), the size of the quotas given is less than 6% of the EU market of these products Haydutskiy (2013). Regarding the industrial goods produced in Ukraine, the problems with exports to the EU could increase due to the necessary compilation of standards and certifications. Therefore, all Ukrainian producers must invest additional money to bring their production in line with the EU requirements, which is difficult for big businesses and impossible for small ones, and doing so would reduce the projected growth of the GDP for all simulated scenarios.

Another important aspect of the results that must be considered is that the data are from 2008, and as such, they reflect situation that differs from current situations. Due to the latest developments in Ukraine, such as a war in the eastern part of the country and the annexation of Crimea by Russia, it is reasonable to predict a decline in those regions in the production of coal, peat and some chemical products, in the processing of partial metallurgy and metal and in the tourism and agricultural industries. As the quantitative evaluation of this decline is currently ongoing, to overcome this limitation, a new SAM must be composed with current data that take into account the aforementioned changes.

Finally, it is necessary to address the methodological limitations. Although the modelling of the simulations was conducted with all necessary scientific rigor, several shortfalls must be discussed. The methodology used in this study is the linear multipliers model, which has certain known limitations. For example, the data are cross-sectional in nature and thus represent a snapshot in time. Therefore, it is not useful

for forecasting and can be used only for assessing short-term effects. Furthermore, the models are designed to assess the economy-wide effects of a change in final demand, and thus, they assume perfectly elastic factors of production. This means that there is no supply constraint, a situation that is rarely observed in reality. One of the outcomes of the SAM linear model limitation is the inability to analyse the impact of EU imports on Ukrainian producers.

To overcome the mentioned limitations of linear models in future research, a CGE model could be used as CGE models allow for a variety of adjustments that can incorporate more details of the DCFTA as well as restrictions and specific structural variables that more realistically reflect the country's reality.

Conclusions. In this study, four simulated scenarios were presented. In the first scenario, the loss of government income due to not collecting import duties was simulated, and as a result, the country's GDP was reduced by nearly 0.5%. The most negatively affected sectors included education (-1.18%), public administration (-1.17%) and health care and social assistance (-1.16%). In the second scenario, the unilateral abolishment of import tariffs by the EU was simulated, a case that corresponds to the current state of relations between the EU and Ukraine. Taking into account the trade data of 2013 in this scenario, the Ukrainian GDP increased by 1.02%. The major recipients of such an increase were agriculture (+3.42%), mining of coal and peat (+3.22%), production of hydrocarbons (+1.40%) and metallurgy and metal processing (+1.22%). The third scenario merged the first and second scenarios such that the loss of government income and the gains of Ukrainian exporters to the EU were considered simultaneously. The overall results of this scenario indicated a growth in GDP of 0.53% with the primary beneficiaries in this scenario being agriculture (+2.96%), the mining of coal and peat (+2.79%), the processing of metallurgy and metal (+1.15%) and the manufacturing of coke products (+1.00%). Those experiencing the greatest losses in this scenario were education (-1.03%), public administration (-1.02), health care and social assistance (-1.00%), and research and development (-0.53%). In a fourth scenario, the same assumption as that in the second scenario was made in addition to a 25% increase in trade between Ukraine and the EU. The GDP increased by 1.17%, and the main beneficiaries of increased trade were agriculture (+3.61%) and the mining of coal and peat (+3.60%).

As in all corresponding scenarios, the agricultural sector appeared to be a main beneficiary of the FTA, and therefore, it should be analysed in a separate study as in Nekhay et al. (2012) because a major part of the exceptions from free trade are agricultural products due to quotas and non-tariff barriers, such as sanitary and phytosanitary norms in the EU. Thus, this would likely reduce the benefits realised by the agricultural sector from the DCFTA.

From the discussion of the results, it is further concluded that only reforms agreed upon in the Association Agreement can actually stimulate the Ukrainian economy as long as the trade liberalization is only a vehicle for trade flows between the two according our results in a short run.

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The Scenario 1 is an exception due to its assumptions.

<http://ec.europa.eu/trade/policy/countries-and-regions/countries/ukraine/> Consulted on 01/11/2016.

<http://ec.europa.eu/trade/policy/countries-and-regions/countries/ukraine/> Consulted on 14/09/2014.