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The effect of preferential tariffs of the EU: Some evidence from B&H

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Abstract. The process of trade liberalization is more or less accompanied by a reduction or elimination of tariffs. In this sense, the preferential tariffs for foreign exporters aim to increase trade flows, ensure access to foreign markets and achieve social welfare. Namely, both before and after the signing of the Stabilization and Association Agreement in 2000, Bosnia and Herzegovina (B&H) realized some benefits from the reduction of preferential tariffs of the EU which aimed to ease the access of B&H products to the EU market. Accordingly, the question arises to what extent the preferential tariffs of the EU may lead to an increase in exports of products from the six leading sectors of B&H, observed on the basis of the volume of exports. In order to assess the effect of the preferential tariffs on the export of six leading sector of B&H, we applied the gravity equation, aggregate data on an annual basis from 1995 to 2015, and some econometric techniques, such as pooled OLS, fixed effects, random effects and dynamic panel GMM. The results of the coefficients have shown that the average preferential tariffs are significant, i.e. that have a positive effect on the overall exports. On the other hand, the results of the coefficient estimates of the average preferential tariffs on the individual export of six leading sectors have shown a significant effect in the case of half the sectors.
Keywords. Tariffs, Export, Sectors, Gravity equation.
JEL. F10, F11, F14.

1. Introduction

In the past, on the basis of reciprocity, trade liberalization has been an extremely slow and time-consuming process of negotiations between developed countries. However, the overall process of trade liberalization began under the auspices of GATT in 1947 (The General Agreement on Tariffs and Trade - GATT) and regional free trade agreements. During the Uruguay round of negotiations, members of GATT agreed to reduce tariffs and non-tariff barriers. For comparison, in 1947 the average tariff was 40%, while by the end of 1974 it amounted to between 6% and 8% for most industrialized countries (Bown & Irwin, 2016). The trade liberalization process was further intensified through WTO negotiations,

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bilateral and unilateral agreements (Dessus *et al.,* 1999; Baldwin, 2011; Keenan *et al.,* 2011).

Preferential trade agreements have made a mark on international trade relations over the past five decades. One the one hand, they arose as a reaction to the slow progress of multilateral trade liberalization and its discriminatory nature (Hansen & Sala, 2013; Bown & Crowley, 2016). Thus in 1970 the number of signed preferential contracts amounted to approximately 70, in order for it to rise to 600 in the year 2016 (Orefice, 2015; Bown *et al.,* 2014). On the other hand, the preferential agreements in international trade may lead to risk of reducing social welfare, i.e. be stumbling or building blocks in relation to multilateral trade. Theoretically speaking, preferential agreements may block multilateral agreements only when the preferential tariff is equal to zero (Limão 2005; Karacaovalı & Limão, 2005; Melchior, 2003, 2009; Baier *et al.,* 2014).

The reduction of tariffs leads to improving the position of foreign imported products compared to domestic products, i.e. it ensures the growth of sales for foreign manufacturers, and thereby a higher market share compared to domestic producers. By reducing tariffs, importing countries are faced with the growth of import demand curve, i.e. they provide a stronger access to foreign exporters. On the other hand, by this act the importing countries provide for its exporters the same conditions in a foreign country. However, the reduction of tariffs often does not lead to establishing access to foreign markets. The export of products depends on the price elasticity of demand and supply of certain types of products, and on the application of certain trade barriers and potential protection measures (Bagwell & Staiger, 2001; Aggarwal, 2004).

In fact, in a situation where tariffs for foreign exporters are reduced and domestic producers have a high market share, the reduction of tariffs will lead to the growth of imports. The reverse happens in a situation where the market share of domestic producers is low, i.e. the reduction of tariffs does not lead to an increase in imports of the product. Finally, when the share of domestic producers is zero, tariff reduction leads to an increase in imports provided that the total consumption increases. In the end, this relationship, first and foremost, depends from one group of products subject to import to another (Melchior, 2003).

In recent decades, there's been a growing interest shown by economists for the effect of tariff reductions. In this regard, numerous studies have been conducted that have confirmed both positive and negative effects of reducing tariffs on the export of products. In accordance with this, Rose & Ostry (1989) assessed the macroeconomic impact of changes in tariffs on the trade balance, currency exchange rates and social well-being of the United States. The increase in tariffs in the US has led to a smaller volume of trade with Germany, Canada, Japan and Italy – the positive effect of changes in tariffs on the macroeconomic stability of the United States was absent. Various authors led by Deardorff, A. (1998), Feenstra *et al.,* (2001), Anderson & Wincoop (2001), Baldwin & Taglioni (2006), Bucha *et al.,* (2004), Disdier & Head (2008), Hayakawa (2011) used the gravity equation to estimate the effect of liberalization on bilateral trade flows.

Haveman & Schatz (2003) examined whether the reduction of preferential tariffs of the EU leads to the growth of exports of developing countries. Aggarwal (2004) examined the impact of tariff reductions on exports of India to the United States. Test results showed that the reduction of tariffs on certain products affects the growth of export products to the US. Manchin (2005) examined the effect of reducing the preferential tariffs on the export growth of African, Caribbean and Pacific countries to the EU. Test results showed that if the preferential tariffs are lower than the tariffs common in the world, then we have an increase in exports and the reduction of demands to give preferences. Alfieri & Cirera (2008) examined the unilateral reduction of tariffs by the EU and found that it has not led to significant growth in exports of products from Mozambique, because most of the products exported by Mozambique have zero tariff of the most favored nation. On the other hand, exporters are achieving a slight pricing margin on the basis of the

differences between the tariffs of most-favored nation and preferential tariffs. Using the example of Latin American countries, Estevadeordal *et al.,* (2008) have found that the preferential reduction of tariffs in some sectors does not affect the reduction of exports tariffs and that there is no connection between the tariffs of most-favored nation and preferential tariff rates.

Using Norway as an example, Melchior *et al.,* (2009) found that the reduction of tariffs by 4% results in an increase of export from 4 to 12 billion dollars. In addition to that, most-favored nation tariffs and preferential tariffs have a positive effect on the export of sector products from Norway. Calvo-Pardo *et al.,* (2009) examined the effect of preferential and import tariffs on the reduction of imports from member countries within and outside of ASEAN. The results have shown that the preferential liberalization has led to a reduction in imports from non-member countries, and that the external liberalization had a powerful effect on products which were affected negatively by the preferences. Cirera (2010) examined whether the effect of the reduction of preferential tariffs in the EU affects the increase in imports and whether foreign exporters achieve a preferential annuity. The results showed that a tariff reduction leads to an increase in export prices and achieving preferential annuity. Cipollina *et al.,* (2013) examined how preferential privileges introduced by the EU and the United States impact developing countries in terms of volume of trade and the size of the margin. The assessment results have shown that developing countries export more and achieve better margins with the EU than with the US. Candau *et al.,* (2014) investigated the effect of preferential regime on the export of foreign products in the EU. The results of the research have shown that the reduction of preferential tariffs has no influence on facilitating market access of exporters in the EU.

There is an open dilemma in all transition countries of the Western Balkans as to what extent do the preferential tariffs by the EU have a positive effect on product exports or on the improvement of the trade balance. It is known that the EU is the main trading partner of B&H as well as the rest of the Western Balkan countries. To this end, this study is unique in that it attempts to answer whether B&H has a positive effect, in terms of product exports, on the basis of preferential tariffs of the EU. In addition, the research provides an answer to the dilemma of many economists who question the usefulness of concluding preferential trade agreements and their positive effects on the economy of transition countries. Accordingly, the main objective of this study is to examine whether there is a positive effect of preferential tariffs of the EU on the growth of export of the six main sectors, observed by the volume of exports.

The remainder of the paper is structured as follows. In part 2, certain facts are presented relating to the state of the B&H economy in terms of export, import and customs tariffs. Section 3 presents the economic model, econometric techniques and data sources for the variables that are used in our model. Section 4 presents the results of the assessment. Section 5 refers to the conclusion.

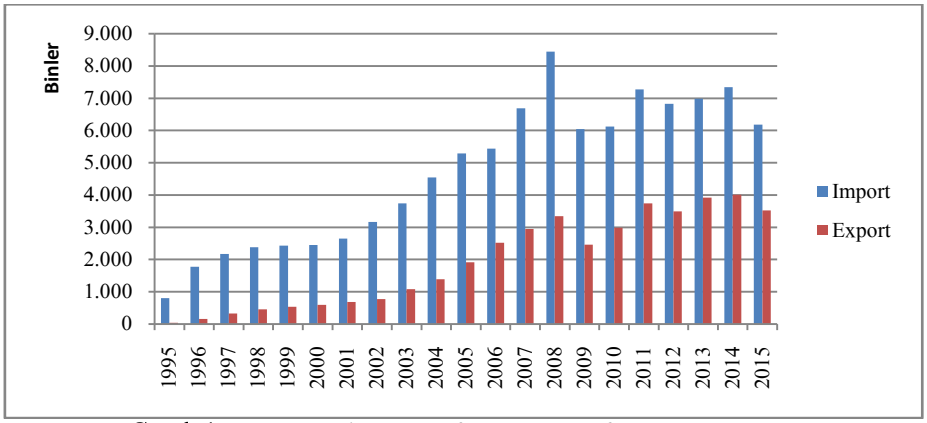
2. Some Facts

As part of the former Yugoslavia, B&H recorded a positive trade balance. However, during the war from 1992 to 1995, its economy experienced a collapse which had a negative impact on the decline of competitiveness in the international market and at the same time led to an economy highly-dependent on import (Kurtovic & Talovic, 2015). In the post-war period B&H entered the process of transition of its economy which included involvement in the economic integration processes. In 2000, B&H and other Western Balkan countries accepted the initiative of the EU to join the Stabilization and Association Agreement (SAA) (Kurtovic & Talovic, 2015). Then, in 2008, it signed the Agreement on Trade and Trade-Related Matters between B&H and the EU. This agreement is part of the Stabilization and Association Agreement and regulates the trade of goods. In the year 2010, it also signed the adapted Stabilization and Association agreement. This agreement regulates customs duties on industrial and agricultural products, i.e. it

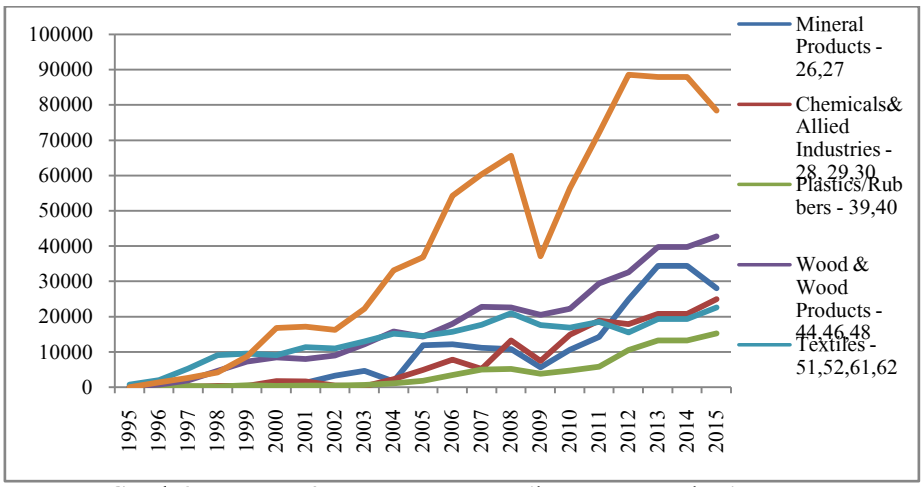
introduces a zero tariff, while in the case of fish and fish products it uses a combination of tariff-rate quota.

In the last three decades, the EU has been the most important trading partner of B&H. Bosnia and Herzegovina recorded a negative trade balance with the EU. Thus, in the period from 1995 to 2015, B&H exported a total value of goods in the amount of 40,899 billion dollars, while on the other hand, it imported a total value of goods in the amount of 98,760 billion dollars. The trade deficit of B&H from 1995 to 2015 amounted to 57,870 billion dollars, and the export-import ratio stood at 41% (see Graph 1). Of the total exports of B&H in 2015 on EU refers 72%, while 61% of the total imports into B&H came from the EU.

Traditionally speaking, B&H exports raw materials, components and semi-finished products to the EU. Based on the Harmonized System, B&H exports mainly metals, wood and wood products, textiles, mineral products, chemicals and related industries and plastic/rubber to the EU. Exports of metals is especially stands out because of its growth compared to other sectors, but with some fluctuations that occurred during the economic crisis of 2008 and 2009. After this period, the export of metal grew as a result of exiting the recession of the EU economy. After metals, the export of wood and wood products holds second place, followed by the export of textiles, mineral products, chemicals and related industries and plastics/rubbers (see Graph 2).

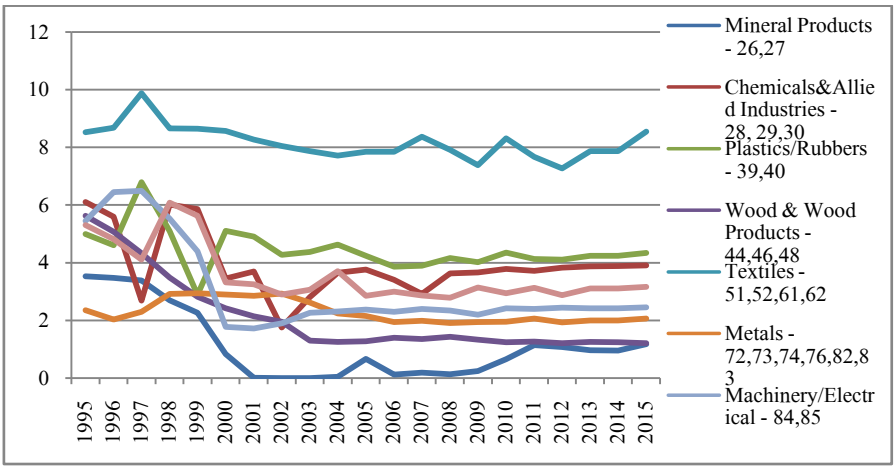


Graph 1. *Export and Import of B&H to EU from 1995 to 2015*
Notes: Graph Obtained Based on the Data of the International Financial Statistics (Direction of Trade Statistics)
Source: Author's

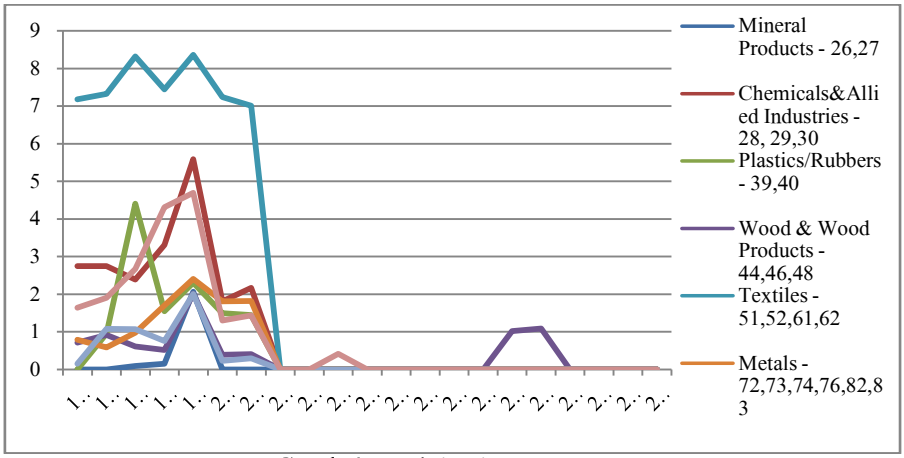


Graph 2. *Export of B&H to EU According to Harmonized System*
Notes: Graph Obtained on the Basis of TRAINS Data.
Source: Author's

Since 1995, B&H recorded a significant reduction of preferential tariffs and tariffs of the most-favored nation. This trend continues strongly after signing the Stabilization and Association Agreement in 2010 which introduced a zero-preferential tariff rate for most exports of B&H products. Accordingly, based on a harmonized system, the weighted average tariff most-favored nation (MFN) in the mineral products sector (26,27) for the period of 1995 to 2015 amounted to 1.12%, while the weighted average preferential tariff (PRF) amounted to 0.11%. In the case of chemical and allied industries (28, 29, 30) the weighted average MFN amounted to 3.91%, while the weighted average PRF amounted to 0.98%. When it comes to plastics/rubbers (39, 40) the weighted average MFN amounted to 4.44%, while the weighted average PRF amounted to 0.57%. For wood and wood products (44,46,48) the weighted average MFN amounted to 2.13%, while the weighted average PRF amounted to 0.36%. In the case of textiles (51, 52, 61, 62) the weighted average MFN amounted to 8.18%, while the weighted average PRF amounted to 2.51%. In the end, the weighted average MFN for metals (72, 73,74, 76, 82, 83) amounted to 2.29%, while the weighted average PRF amounted to 0.48% (see Graph 3 and 4).



Graph 3. *Weighted Average MNF*
Notes: Graph Obtained on the Basis of TRAINS Data
Source: Author's



Graph 4. *Weighted Average PRF*
Notes: Graph obtained on the basis of TRAINS data
Source: Author's

3. Methodology and Data

3.1. Basic model

Tinbergen (1962) and Pöyhönen (1963) pioneered the research of trade flows based on the application of the gravity equation by which the equation gained relevance. The gravity equation rests on the basis of Newton's laws of gravity and serves to explain the functioning of bilateral trade flows between the two trading partners X and Y. In fact, it is about trade flows that are proportional to the gross domestic product of trading partners and are inverse to the distance between them (Chaney, 2013). Therefore, the total supply of products or factors of production that is offered in the country *i*, Y_i corresponds to the demand of products or factors of production in the country *j*, E_j, but the potential trade flows depend on the distance between the two countries D_{ij}^2 (Anderson, 2010). Gravity equation can be represented as:

$$X_{ij} = \frac{Y_i E_j}{D_{ij}^2} \quad (1)$$

X_{ij} - gravity attraction; $Y_i E_j$ – gross domestic product of country i gross domestic product of country j; D_{ij}^2 – distance.

The gravity equation that rests on Linnemann's (1966) theoretical assumptions starts from the premise that exports of the country *i* to the country *j* depend on the influence of three interrelated factors. The first factor relates to the possibility of export supply of the country *i*, i.e. which depends on the extent of income of the exporting country. The second factor relates to the import demand function of the importing country *j* which depends on the extent of income of the importing country. Finally, the third factor is related to trade barriers in the form of total costs, tariffs, invisible tariff barriers, sharing a common border and language and colonial past (Caporale *et al.,* 2009; Hayakawa, 2011). In addition to the above factors, we can add to our gravity equation GDP per capita which is about consumer power in the importing country *j* (Bergstrand, 1989).

However, the gravity equation (1) was adapted by Krugman & Obstfeld (1996) and was named the standard gravity equation (Deardorff, 1998):

$$T_{ij} = A\frac{Y_i Y_j}{D_{ij}^2} \quad (2)$$

where T_{ij} – value of exports from country i to country j; $Y_i Y_j$ – gross domestic product of country i gross domestic product of country j; D_{ij}^2 – distance between the two countries; A – a constant term.

The equation (2) can be written in the form a regression equation:

$$lnT_{ij} = \beta_0 + \beta_1 lnGDP_i + \beta_2 lnGDP_j + \beta_3 lnDistance_{ij} + \varepsilon_{ij}. \quad (3)$$

Recent theories point to certain specificities if the gravity equation. The volume of GDP and the size of trading partners affect the volume of trade, and lead to the growth of the overall supply and demand. When we use the gravity equation to show the export or import, the estimate of GDP is symmetrical. Namely, when we use the gravity equations to measure the impact of different sectors, export or import have a different influence on GDP. A country that has a higher volume of production, in principle, will have exports greater than imports. Finally, the distance between trading partners has a negative value. The distance is mainly related to the cost of trade. The negative value of distance can be reduced if the costs resulting from the existence of numerous trade barriers are eliminated. If we reduce the cost of trade, it would not significantly lead to changes in the given

factors (Feenstra *et al.,* 2001; Bucha *et al.,* 2004; Baldwin & Taglioni, 2006; Disdier & Head, 2008; Melchior *et al.*, 2009).

In our research, we took the gravity equation as the framework on the basis of which we will assess the bilateral trade flows between trading partners, i.e. as a result of the effects of certain factors. Given that our research is based on Linnemann's (1966) gravity equation, a regression equation will be presented on the basis of the equation (3):

$$\ln(Exports_{kpj}) = \beta_0 + \beta_1 \ln(GDP_j) + \beta_1 \ln(Dist_{ij}) + \varepsilon_{ij}. \quad (4)$$

Then we added tariffs to the equation (5):

$$\ln(TotalExports_{kpj}) = \beta_0 + \beta_1 \ln(GDP_j) + \beta_2 \ln(MNF_{kpj}) + \beta_3 \ln(PRF_{kpj}) + \beta_4 \ln(Dist_{ij}) + \varepsilon_{ij}. \quad (5)$$

Finally, we added to the equations (6) the GDP per capita of the country *j*; gross domestic product per capita is about consumer power in the importing country *j* (Bergstrand, 1989). In the equation (6) we estimated the effect of independent variables on individual export of six leading sectors:

$$ln(\text{Exports}_{\text{kpj}}) = \beta_0 + \beta_1 \ln(GDP_j) + \beta_2 \ln(GDP\ per\ capita_j) + \beta_3 \ln(MNF_{kpj}) + \beta_4 \ln(PRF_{kpj}) + \beta_5 \ln(Dist_{ij}) + \beta_6 Lang_{ij} + \beta_7 Border_{ij} + \varepsilon_{ij}. \quad (6)$$

where $LnTotalExportskpij$ – total export of products of the country j; $\ln Exports_{skj}$ – export of six leading sectors according to a harmonized system into the country j; $lnGDP_j$ – real gross domestic product of the country j; $lnGDP\ per\ capita_j$ – gross domestic product per capita of the country j; $\ln MNF_{kpj}$ - weighted average tariff of the most favored nation j for sector k; $\ln PRF_{kpj}$ - weighted average preferential tariff of country j for sector k; $lnDistance_{ij}$ – distance between the economic centres of the trade partners ij; $Language_{ij}$ – language will have the value of one if 9% of the population of both trade partners speak the same language and zero if that percentage is smaller (Hayakawa, 2011); $Border_{ij}$ – sharing a common border will be marked as one if two trade partners share a border, and zero if they do not; ε_{ij} - residual term.

Based on the regression equations (4), (5) and (6) we expect our variables to have the following expected signs. For the gross domestic product of country j (GDP_j) we expect it to have a positive sign (+), while we expect the gross domestic product per capita of country j ($GDP_{per\ capitaj}$) to have a positive and negative sign (+/-). For the weighted average tariff of the most-favored nation j for sector k (MNF_{kpj}) and the weighted average preferential tariff of country j for sector k (PRF_{kpj}) we expect a negative sign (-), because both types of tariffs were drastically reduced in the last two decades. Finally, in case of a distance between economic centres of the trading partners ($Dist_{ij}$) we expect a positive and negative sign (+/-), of language ($Language_{ij}$) positive and negative sign (+/-) and sharing a common border ($Border_{ij}$) a positive and negative sign (+/-).

3.2. The Econometric Methodology

In order to estimate the effects of tariffs on the exports of sector products, the method of the ordinary least square was used in the past (OLS) to express the gravity equation. Namely, recent studies point out that standard cross-section methods do not provide objective results, i.e. do not take into account the heterogeneity of data (e.g. linguistic, historical, cultural differences etc.). On the

other hand, an important advantage of panel data compared to time series or cross-sectional data sets is that it allows identification of certain parameters or questions, without the need to make restrictive assumptions. Panel data make it possible to analyze changes on an individual level. That is, panel data are not only suitable to model or explain why individual units behave differently but also to model why a given unit behaves differently at different time periods (for example, because of a different past). The use of a panel data will often yield more efficient estimators than a series of independent cross-sections (where different units are sampled in each period). A second advantage of the availability of panel data is that it reduces identification problems (Caporale *et al.,* 2009; Marno, 2004).

However, in order to assess the bilateral specific effect an assessor or estimator is used, i.e. a fixed effects model and a random effects model. These models allow the assessment of unspecified factors that explain the trade patterns between two countries and provide effective and objective results. Random effects models can be biased and lead to a reduction variances of the coefficient estimator while the fixed effect is not partial, but is very dependent on the sample size (Clark & Linzer, 2015).

Fixed-effects model are applicable to research questions with complex structure, including both place-based hierarchies and temporal hierarchies, where measurement occasions are nested within entities such as individuals or countries (Bell & Jones, 2015). If z_i is unobserved, but coorelated with x_{it}, then the least squares estimator of β is biased and inconsistent as a consequence of an omitted variable. Fixed effects model is (Greene, 2008):

$$y_{it} = x_{it}^{'}\beta + \alpha_i + \varepsilon_{it}. \quad (7)$$

where x_{it} is 1 x K and can contain observable variables that change across t but not i, variables that change across i but not t, and variables that change across i and t (Wooldridge, 2002). This fixed-effects approach takes α_i to be a group-specific constant term in the regression model. It should be noted that the term fixed as used here signifies the correlation of α_i and x_{it}, not that α_i is nonstochastic (Greene, 2008).

RE would be the preferred choice because of its greater flexibility and generalisability, and its ability to model context, including variables that are only measured at the higher level (Bell & Jones, 2015). If the unobserved individual heterogeneity, however formulated, can be assumed to be uncorrelated with the included variables, then the model may be formulated as (Greene, 2008):

$$y_{it} = x_{it}^{'}\beta + E[Z_i^{'}\alpha] + \{z_i^{'} - [Z_i^{'}\alpha]\} + \varepsilon_{it} = x_{it}^{'}\beta + \alpha + \mu_i + \varepsilon_{it}. \quad (8)$$

that is, as a linear regression model with a compound disturbance that may be consistently, albeit inefficiently, estimated by least squares. This random-effects approach specifies that u_i is a group-specific random element, similar to e_{it} except that for each group, there is but a single draw that enters the regression identically in each period. Again, the crucial distinction between fixed and random effects is whether the unobserved individual effect embodies elements that are correlated with the regressors in the model, not whether these effects are stochastic or not (Greene, 2008). We will give preference to the RE estimator if we can be sure that the individual-specific effect really is an unrelated effect. This is usually tested by a (Durbin-Wu-Hausmann test). Hausman test is only valid under homoscedasticity and cannot include time fixed effects (Schmidheiny, 2016).

The Hausman test is designed to detect violation of the random effects modeling assumption that the explanatory variables are orthogonal to the unit effects. If there is no correlation between the independent variable(s) and the unit effects, the estimates of β in the fixed effects model ($\hat{\beta}_{FF}$) should be similar to estimates of β in the random effects model ($\hat{\beta}_{RE}$). The Hausman test statistic H is a measure of the

difference between the two estimates (Clark & Linzer, 2012; Kurtovic & Talovic, 2015):

$$H = (\hat{\beta}_{RE} - \hat{\beta}_{FE})' \left[Var(\hat{\beta}_{FE}) - Var(\hat{\beta}_{FE})\right]^{-1} (\hat{\beta}_{RE}\text{-}\hat{\beta}_{FE}). \quad (9)$$

Under the null hypothesis of orthogonality, H is distributed chi-square with degrees of freedom equal to the number of regressors in the model. A finding that $p < 0.05\%$ is taken as evidence that, at conventional levels of significance, the two models are different enough to reject the null hypothesis, and hence to reject the random effects model in favor of the Fixed Effects model. If the Hausman test does not indicate a significant difference ($p < 0.05\%$), however, it does not necessarily follow that the random effects estimator is "safely" free from bias, and therefore to be preferred over the fixed effects estimator. In most applications, the true correlation between the covariates and unit effects is not exactly zero (Clark & Linzer, 2012; Kurtovic & Talovic, 2015).

In addition to the FE and RE, we will implement the dynamic panel estimators generalized method of moment. The GMM estimator is derived directly from a set of moment conditions. In applications of GMM in the literature, the moment conditions are typically derived directly from economic theory. Under rational expectations, implications of an economic theory can often be formulated as (Nielsen, 2005; Kurtovic *et al.,* 2016a; 2016b):

$$E[u(w_{t+1}, \theta_0)/I_t] = 0. \quad (10)$$

where $u(w_{t+1}, \theta_0)$ is a (potentially non-linear) function of future observations of a variable, w_{t+1}; while I_t is the information set available at time t. For a vector of variables contained in the information set, $z_t \in I_t$, the condition in (1) implies the unconditional expectation:

$$E[u(w_{t+1}, \theta_0)\ x\ z_t] = 0. \quad (11)$$

which is a moment condition stating that the variables z_t are uncorrelated with $u(w_{t+1}, \theta_0)$. In many cases, the theoretical conditions in (2) turn out to be sufficient to derive a consistent estimator, $\hat{\theta}_{GMM}$ (Nielsen, 2005; Kurtovic *et al.,* 2016a; 2016b).

GMM provides a framework that encompasses most estimation techniques used in economics. Instrumental variables estimation, although a predecessor to GMM, can be recast as a special case of GMM (Calderón **et** *al.,* 2005; Kurtovic *et al.,* 2016a; 2016b). The general regression equation to be estimated is the:

$$y_{i,t} = \alpha y_{i,t-1} + \beta X_{i,t} + \mu_i + v_t + e_{i,t}. \quad (12)$$

where $y_{i,t}$ is the dependent variable, $X_{i,t}$ represents the explanatory variables of the model, μ_i is the individual specific effect, v_t is the time specific effect, and $e_{i,t}$ is the error term (i is individual index, and t is the time index).

The presence of the lagged as an explanatory variable does not allow the use of standard econometric techniques. The GMM method for dynamic panels provides solutions to the problems of simultaneity bias, reverse causality and omitted variables. Besides, it allows one to control for individual specific effects μ_i, and time effects v_t, as well as to overcome the endogeneity bias (Calderón **et** *al.,* 2005; Kurtovic *et al.,* 2016a; 2016b).

3.2. Data

Our research was based on the aggregate annual data for the EU and B&H for the period from 1995 to 2015. The data was obtained from the following databases. Bilateral data on the export of sector products of B&H in the EU were obtained from the International Financial Statistics (Direction of Trade Statistics). The value of exports of the product is expressed in millions of $US ex-ship or at the port of export (f.o.b. price). Real gross domestic product and gross domestic product per capita were obtained from the World Bank's WDI (World Development Indicators) and Eurostat (Economy and Finance). Real GDP and GPD per capita are expressed in millions of $US. Data on the weighted average preferential tariffs and the weighted average tariffs of most-favored nation, according to the harmonized system HS1992, were obtained from the World Bank's World Integrated Trade Solution (WITS), i.e. from UNCTAD's TRAINS database. According to the TRAINS database, MFN is defined as the tariff applicable to countries with the status of most-favored nation. It is the lowest possible tariff which can be charged or designated to another country. On the other hand, PRF or preferential tariff is related to the customs duties introduced under certain preferential trade agreements. Most of the exports of sector products from B&H to the EU is under preferential tariff arrangements. The reduction of preferential tariffs occurred significantly after the year 2000, and a duty-free export of almost all B&H products in the EU was introduced as of 2011. In addition to that, we opted to use the MNF tariffs in our research in order to conduct a comparative analysis. PRF and MNF tariffs are presented as weighted average of customs duties and represent the average of six leading groups of sector products that B&H exports to the EU. We used tariff-line level data at the six-digit level for the six major export sectors which were converted to double-digit level with the help of conversion tables HS1992, HS1996, HS2002, HS2007. Data on geographical distance, common border and language are derived from CEPI (www.cepii.fr).

4. Estimation Results and Discussion

The research results were presented in two parts. In the first part we did an estimate with the help of pooled OLS. Then we applied the FE and RE and Hausman's test in order to check whether there was a bias and correlation between variables within the FE and RE. In the second part of the research we used the GMM to evaluate the effect of exploratory variables, i.e. especially the weighted average preferential tariff rates on individual exports of the six leading sectors.

The results of the estimates of the coefficients were given in Table 1, based on the pooled OLS model, independent variables, with a significant value and the expected sign, of the total aggregate exports of the six leading sectors. The Pooled OLS model gives us the ability to estimate the effect of independent individual variables on the total exports. Based on the regression equation (6), we determined that the coefficients of weighted average preferential tariffs was negatively significant at the level of 1%, i.e. positively affecting the overall growth of exports of the six leading sectors. Research done by Manchin (2005), Aggarwal (2004) and Cirera (2010), Melchior *et al.,* (2009) and Estevadeordal et *al.,* (2008) correlated with the results of our research. In the trading process between the EU and B&H after the year 2000, there was a significant reduction in preferential tariff rates as a result of the signing of the Stabilization and Association Agreement, which reflected positively on the increase of the exports of the main six sectors. This applies in particular to the period from the year 2011 when the zero-preferential rate was introduced. In the case of other variables, no positive effect was recorded. Finally, the R^2 statistics shows us that independent variables explain the dependent variable with 65%.

Table 1. *Pooled OLS – Total Sector Exports from B&H to the EU*

Dependent Variable: lnTotalExportskpj	Pooled OLS (I)	Fixed Effects (II)	Random Effects (III)
Variable	Coefficient and probability	Coefficient and probability	Coefficient and probability
lnGPDj	8.112.492 (0.0958*)	7.079.925 (0.0180**)	3.615.818 (0.0203**)
lnGDPpcj	8.207.840 (0.0970*)	7.197.429 (0.0178**)	3.729.730 (0.0200**)
lnMNFkpj	-0.091359 -0.4458	-0.365265 (0.0039**)	-0.393078 (0.0013**)
lnPRFkpj	-0.318032 (0.0001)***	-0.254643 (0.0000***)	-0.233843 (0.0000***)
lnDistij	2.313.672 -0.8447	1.919.681 -0.7886	
Borderij	-0.512242 -0.4151	-0.356246 -0.3544	
Language	-0.80537 -0.1705	-0.554766 -0.1302	
C	1.836.556 -0.0006	1.514.708 -0.0002	-1.316.324 -0.0067
R-squared	0.673434	0.88525	0.844919
Adjusted R-squared	0.651105	0.871931	0.838457
S.E. of regression	1.327.645	0.804373	0.798305
Sum squared resid	2.062.291	7.246.575	1.307.576
Log likelihood	-2.098.267	-1.439.367	
F-statistic	3.015.925	6.646.408	
Prob (F-statistic)	0	0	0
Mean dependent var	1.767.518	1.767.518	2.172.247
S.D. dependent var	2.247.681	2.247.681	1.986.208
Akaike info criterion	3.473.440	2.506.931	7.647.485
Schwarz criterion	3.676.031	2.822.074	0.758872
Hannan-Quinn criter.	3.555.746	2.634.964	
Durbin-Watson stat	0.291258	0.814931	
Hausman Test			0 -0.06657

Notes: * significant at 10%; ** significant at 5%; *** significant at 1%
Source: Author's

Based on the regression equation (6), the results of the assessment of the FE were presented in column (II). The estimated coefficients of the weighted preferential tariff rate and the weighted average customs rate of the most-favored nation are negatively significant at the level of 1% and 5%, i.e. have a positive effect on the total exports of six leading sectors. Identical results were obtained by Hayakawa & Ito (2015) for the customs rate of the most favored nation. The estimated coefficient of the total exports of B&H products to the EU is significant at the level of 1%, i.e. it has a positive effect on the total exports of the six leading sectors. The estimated coefficient of the gross domestic product and gross domestic product per capita are significant at the level of 5%, i.e. they have a positive effect on the total exports of the six leading sectors. Finally, no significant value was recorded in case of the other variables.

In addition to that, based on the regression equation (6), the results of the assessment of the random effect were presented in column (III). The estimated coefficients of the weighted average preferential tariff rate and the weighted average tariff rate of the most favored nation are negatively significant at the level of 1% and 5%, i.e. have a positive impact on the total exports of the six leading sectors. The estimated coefficients of the gross domestic product and the gross domestic product per capita are insignificant, i.e. have no impact on the total export of the six leading sectors. Finally, no significant value was recorded in case of the other variables.

After we tested FE and RE, we applied the Hausman test to verify whether there was any bias of the random effects explanatory orthogonal variable with respect to unit effects (Clark & Linzer, 2012). The assessment results show that, based on the estimation of the non-significant value of the coefficient of independent variables

and the non-significant values of the test summary, the random effect corresponds to the fixed effect, i.e. it is exempt from prejudice.

Table 2 shows the results of the regression equation (4), (5) and (6). The results of the assessment are shown in columns (I), (II) and (III) and are related to the estimated coefficients with a significant value and the expected symbol. The results of the estimates of the real GDP are significant at the level of 1% and 5% and are presented in columns (I), (II) and (III). The real GDP grew during the analyzed period except during the economic crisis of 2008/2009, which had a positive effect on the growth of demand for products from the six major export sectors. In addition to that, the results of the coefficient estimate of GDP per capita are significant at the level of 5%, i.e. have a positive impact on the growth of exports in the case of mineral products, chemicals & allied industries, plastics and rubbers and metal. It is evident that GDP per capita has not had a significantly stimulating effect on the growth of export of sector products because it is mainly about the export of raw materials, components and assemblies, not the final product. The results of the coefficient estimate of weighted average tariffs of the most privileged nation are negatively significant at the level of 1% and 5%, i.e. have a positive influence on the growth of export of mineral products, in the column (II) and (III); plastics & rubbers, in the column (III); wood and wood products, in the column (II) and (III); and metals, in the column (II). The research results of Haveman & Schatz (2003) and Manchin (2005) correlated with the results of our research. In the case of estimating the coefficients of weighted average preferential tariffs, we determined a significant negative at the level of 1% and 5%, i.e. that it had a positive influence on the growth of exports of mineral products, in column (II); chemicals & allied industries, in column (II) and (III); plastics and rubber, in column (III); wood and wood products, in column (II and III). The reduction of preferential tariffs by the EU during the last fifteen years had a positive impact on exports of the six main sectors. Finally, for the dummy variables, such as language a significant value for the chemicals & allied industries, in column (II and III), while in other cases no significance was found, which is consistent with theoretical concepts and empirical research.

Table 2. *GMM Estimate of the Effects of Independent Variables on the Exports of Individual Leading Sectors of B&H*

Sectors	Variable	GMM I	GMM II	GMM III
		p-value	p-value	p-value
Mineral Products	lnGDPj	8.761.045 (0.0011)**	5.731.307 (0.003) ***	2.970918 (0.0020) **
Mineral Products	lnGDPpcj			3.008193 (0.0023) **
Mineral Products	lnDistij	2.365.984 (-0.6618)	2.197.511 (-0.6345)	2.993480 (0.7189)
Mineral Products	Borderij			1.579772 (0.1308)
Mineral Products	Langij			1.397026 (0.1847)
Mineral Products	lnMNFkpj		-1.516.429 (0.000) ***	-0.627251 (0.0182) **
Mineral Products	lnPRFkpj		-1.172.183 (0.023) **	-0.331790 (0.2993)
Chemicals & Allied Industries	lnGDPj	6.870.089 (0.0002)**	9.171097 (0.0000) ***	2.104272 (0.0018) ***
Chemicals & Allied Industries	lnGDPpcj			2.090733 (0.0028) ***
Chemicals & Allied Industries	lnDistij	1.068.219 (0.0992)*	2.855628 (0.0780)	2.583028 (0.1131)
Chemicals & Allied Industries	Borderij			-1.696782 (0.0518) **
Chemicals & Allied Industries	langij			-1.258243 (0.0307) **
Chemicals & Allied Industries	lnMNFkpj		-1.804813 (0.1304)	-0.653232 (0.4966)

Chemicals & Allied Industries	lnPRFkpj		-0.502332 (0.0253) **	-0.448356 (0.0102) **
Plastics & Rubbers	lnGDPj	5.736.232 (0.0001)***	5.627820 (0.0016) ***	1.767097 (0.0043) ***
Plastics & Rubbers	lnGDPpcj			1.767671 (0.0051) ***
Plastics & Rubbers	lDistij	2.281.551 (0.3464)	1.111586 (0.5654)	1.250581 (0.5263)
Plastics & Rubbers	Borderij			-0.946025 (0.1594)
Plastics & Rubbers	langij			-0.976582 (0.1490)
Plastics & Rubbers	lnMNFkpj		-1.181519 (0.02544) **	-1.232539 (0.0048) ***
Plastics & Rubbers	lnPRFkpj		-0.351937 (0.1873)	-0.509492 (0.004)
Wood & Wood Products	lnGDPj	3.446.728 (0.0049)**	0.288149 (0.6791)	1.632866 (0.4542)
Wood & Wood Products	lnGDPpcj			-1.774175 (0.4209)
Wood & Wood Products	lnDistij	1.655.466 (0.4171)	1.183098 (0.6770)	1.186436 (0.4912)
Wood & Wood Products	Borderij			0.156864 (0.5366)
Wood & Wood Products	langij			0.601878 (0.994)
Wood & Wood Products	lnMNFkpj		-2.325585 (0.0004) ***	-2.310161 (0.0012) ***
Wood & Wood Products	lnPRFkpj		-0.193756 (0.46668)	-0.256115 (0.3481)
Textiles	lnGDPj	1.857.335 (0.0155)**	0.7706772 (0.0013) ***	5.610335 (0.2677)
Textiles	lnGDPpcj			-5.675604 (0.2703)
Textiles	lnDistij	1.456.493 (0.3284)	1.391419 (0.8730)	1.109565 (0.9635)
Textiles	Borderij			-0.439807 (0.4799)
Textiles	langij			-0.401087 (0.5503)
Textiles	lnMNFkpj		-0.208068 (0.9237)	-0.413991 (0.8340)
Textiles	lnPRFkpj		-0.060612 (0.4609)	-0.022627 (0.7749)
Metals	lnGDPj	4.528.414 (0.0057)**	6.888843 (0.0004) ***	1.341222 (0.0332) **
Metals	lnGDPpcj			1.307201 (0.0432) **
Metals	lnDistij	2.851.708 (0.3655)	2.501744 (0.7952)	2.851495 (0.8483)
Metals	Borderij			-1.209017 (0.0956)
Metals	langij			-1.2633765 (0.1074)
Metals	lnMNFkpj		-6.640306 (0.0116) **	-5.279439 (0.0699)
Metals	lnPRFkpj		-0.57058 (0.8455)	-0.231906 (0.3440)

Notes: * significant at 10%; ** significant at 5%; *** significant at 1%
Source: Author's

5. Conclusions

B&H has made certain benefits in the process of trade liberalization with the EU over the past two decades and more. This can first of all be attributed to the Stabilization and Association Agreement, which has introduced preferential tariffs on most exports of B&H products. As a result, a growth in the volume of trade with the EU has been achieved, and the situation in the trade balance of B&H has been improved. Nevertheless, there are some doubts among economists that countries in

transition do not realize the promised benefits of preferential tariffs. In order to demystify the role of preferential tariffs, it was necessary to carry out their assessment in terms of impact on export growth.

This study is considered a pioneering work which provides empirical evidence on the effect of preferential tariffs of the EU to the exports of the six leading sectors of B&H. In accordance to that, the assessment is done on the basis of aggregate annual data from 1995 to 2015. The study consists of two parts. In the first part, we applied econometric techniques, such as pooled OLS, fixed effect, random effect and dynamic panel GMM, in order to calculate the effect of independent variables on the total export of the six leading sectors. In the second part, we applied GMM in order to calculate the effect of independent variables on the individual export of the six leading sectors. The results of the assessment of the first part showed that the weighted preferential tariffs and the weighted tariff of the most favored nation has a positive effect on the total growth of export of the six leading sectors. In addition to that, the real GDP and GDP per capita of the EU have a positive impact on the total growth of export of the six leading sectors. In the second part, the results of the assessment show that the weighted average preferential tariff has a positive effect on the growth of individual export of products from the sectors of plastics and rubber, mineral products, wood and wood products, chemicals and related products. However, in the case of weighted tariff of the most favored nation the results of the assessment showed a positive impact on the exports of products from the sectors of mineral products, metals, wood and wood, plastics & rubbers products.

In the end, this research can serve as a good basis for future research which will apply to the assessment of the effects of preferential tariffs on the growth of import and export prices of EU products and the countries of the Western Balkans.

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