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The Effects of Foreign Direct Investment in the Insurance Industry in the Western Balkan Countries – A Panel Data Analysis

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ABSTRACT

The insurance industry is a solid cornerstone of the financial system, and by fostering an environment more favorable to investment, it significantly boosts economic growth. This is especially true for the Western Balkan countries, which are currently growing and joining the European Union. Developing countries can benefit from an additional avenue: the internationalization of insurance businesses through the reinsurance process. The aim of this research is to assess the potential impact of Foreign Direct Investment (FDI) on the insurance industry in the region. The research was carried out in six countries: Albania, Bosnia and Herzegovina, Montenegro, North Macedonia, Kosovo, and Serbia. Data from these countries were collected between 2004 and 2021, allowing for an analysis using panel data econometric models, namely the Fixed Effects and Random-Effects models (GLS). The findings of the economic analysis for the three independent variables indicate that FDI inflow positively affects Gross Written Premium (GWP), Insurance Assets (InsAsset), and Penetration Rate (PenetRate) at the α=0.05 significance level. Additionally, the models have demonstrated that the three variables have variations between the countries regarding the impact of FDI inflows using the Lagrange Multiplier (LM) Method - Breusch-Pagan test, at a confidence level of α=0.05. Since the econometric models for the three cases are based on the Random-Effects model (GLS Method), random effects are to blame for the variations in FDI influence between countries. The results have consequences for the insurance industry as well as regional policymakers, especially in Kosovo, who are deciding what measures to take to promote foreign direct investment.

1. INTRODUCTION

Technological advancement and financial liberalization have led to the extreme complexity of the financial markets. Amid the financial globalization of today, regulatory bodies face novel obstacles as they strive to keep up with the increasing sophistication of technology and finance, along with the development of regulatory infrastructure that will enable cross-border service trade. As a financial service, insurance is an integral part of the national economy and a strong pillar of the financial market [1]. Numerous studies suggest that insurance contributes materially to economic growth by improving the investment climate and promoting a more efficient mix of activities that would be undertaken in the absence of risk management instruments. Creating and developing a strong global insurance and reinsurance market is a requirement of the time but, at the same time, an indicator which proves the existence of a developed market economy.

In Kosovo and other countries of the region, the insurance industry remains underdeveloped compared to that of developed countries [2]. The internationalization of insurance activity through the reinsurance process constitutes an additional opportunity for developing countries. While the monetary levels of an economy are controlled by central bankers and fiscal matters are controlled by politicians, the rapid growth of these groups cannot be accomplished without external assistance. Therefore, there is a need for foreign direct investment (FDI) [3]. According to Moshirian [4], the empirical results indicate that FDI in insurance is a substitute for FDI in banking in the US. The development of the insurance sector, in addition to transferring the risk to reinsurers abroad, is becoming more and more attractive and influential by absorbing foreign direct investments in this sector from large insurance and reinsurance companies and groups that operate in the global market.

Foreign direct investment (FDI) is considered essential to the economic growth of the Western Balkan countries, especially in their insurance industries, since they are still establishing their integration and are at a low level of development overall. In addition, it is believed that industry and political players will value this work more because of the dearth of research in these fields, especially for the countries in the region, as it will help them create policies and take action to take advantage of the opportunities presented by FDI.

2. LITERATURE REVIEW

The insurance sector plays a crucial role in financial and economic development by compensating for losses, which reduces the financial impact on firms and households. It diminishes the need for large savings to cover potential losses, thereby encouraging investment, production, innovation, and competition. As financial intermediaries, life and non-life insurance companies are instrumental in securing long-term finance and enhancing risk management. Deposit insurance and contingency reserves also enhance the efficiency of other financial sectors, such as banking and the bond market.

In recent decades, international insurance companies have acquired many local insurers and established branches in developing countries. For example, large insurance firms such as AGF, Allianz, Aviva, AXA, and the ING Group, along with financial institutions like Lloyds Bank and the Royal Bank of Scotland through their insurance operations, have subsidiaries in most developing countries. The involvement of foreign insurers is expected to help overcome structural, financial, and technical challenges like undercapitalization, limited market size, and lack of experience in these countries [5]. According to UNCTAD [6], multinational corporations account for approximately 80% of global trade, which includes trade in intermediate goods and services.

If we focus on the countries of the Western Balkan region (Albania, Bosnia and Herzegovina, Kosovo, Montenegro, North Macedonia, and Serbia), during the years 1990-1999 they experienced a lost decade in terms of FDI, as the countries of the region were involved in a major economic crisis. and politics caused by wars, conflicts, embargoes, and external sanctions, high inflation rates, deep economic recessions, negative GDP rates, unstable exchange rates, etc., which led to the disintegration of the former Yugoslavia. Considering this history, FDI is considered a key element that will contribute to the economic growth and development of countries by helping in the necessary structural changes for the long term.

These countries, from year to year, try to create a good business climate, especially with regard to the facilities to enter the European markets. Therefore, the common objectives or common priorities of the countries in the region towards FDI are specific legal frameworks for FDI, international investment agreements, tax regimes, policies in terms of workforce qualification, etc. [7].

Various studies [8] indicate that the flow of Foreign Direct Investment (FDI) is not at a satisfactory level in the Western Balkan countries. Despite the low level of FDI flow in these transitional economies compared to developing and developed countries, projections in the World Investment Report [9] suggest a growing trend of FDI, particularly in transitional countries. Dinh et al. [10] found that FDI capital flows can impede economic growth in the short term, but they assert that FDI is an important factor for long-term economic growth, especially in emerging and developing economies. Research by others [11, 12] has shown that FDI did not affect the economic growth of regional countries in the same year that the investments were made. The evidence regarding the impact of FDI is mixed [13], with macro-level analyses investigating whether countries receiving more FDI experience faster growth; some studies have found this to be the case [14, 15]. Estrin and Uvalic [16] believe that direct attention to FDI in the Western Balkans has been scant, an area where the transition process has been slower and less successful, even though foreign capital has been an important addition to domestic savings. On the other hand, despite the fact that these countries belong to the same region and border each other, also despite the fact that they share almost the same history as former socialist countries and Albanians, the others have coexisted in one state (former RSFJ), however, there are differences with the other type as far as macroeconomic indicators are concerned and also the effect of FDI on these indicators. However, the results of the GLS model data also show that there is a difference among the countries of the region in terms of FDI's impact on economic growth. From a review of the literature, it is clear that there is a substantial body of research related to FDI inflow in the countries of the Western Balkans [2, 8, 11, 12, 16-23]. Nevertheless, there is a lack of studies examining the effect of the FDI inflow on the insurance sector in these countries.

Furthermore, Sawadogo et al. [24] have studied the impact of FDI inflow on non-life insurance penetration in 76 developing countries during the period 1996-2011. Their study is based on two well-documented elements in the literature: FDI contributes to an increase in income per capita, and higher income per capita promotes the development of insurance, particularly non-life insurance. According to Sawadogo et al. [24], the inflow of FDI may impact the insurance sector beyond the GDP per capita effect. In other words, FDI may lead to greater consumption of insurance services at a given level of GDP per capita due to specific demand from multinational firms and their employees, who generally receive higher wages than those at local firms.

2.1 Study objectives and hypothesis

The aim of this research is to investigate if foreign direct investment (FDI) has, as reported in the previous studies, actually contributed positively to the expansion of the insurance industry in the Western Balkan countries. The definition of the main hypothesis is also based on Bukowski and Lament [25], consequently, we will test alternative cause-effect hypotheses that we can formulate as follows:

The first group of alternative hypotheses in the study:

H_1 - FDI inflows have a positive effect on the Gross Written Premium.

H_2 – FDI inflows have a positive effect on the Insurance Sector Assets.

H_3 – FDI inflows have a positive effect on the Penetration Rate.

Additional hypotheses pertaining to the three main research hypotheses will be tested by examining whether there are significant statistical variations between the countries for each of the three variables of interest. The second set of alternative claims is therefore expressed as follows:

H_{1a} – FdI inflows has different effect by countries in the Insurance Assets.

H_{2a} – FdI inflows has different effect by countries in the Gross Written Premium.

H_{3a} – FDI inflows have different effects on countries in the Penetration Rate.

3. PROCEDURES AND METHODS

3.1 The model

For testing the hypotheses raised for this research, we will

use appropriate econometric models depending on the data and characteristics. Starting from the fact that the general objective is to evaluate the effect of FDI in the insurance sector in the countries of the Western Balkans, more specifically in six countries: Albania, Bosnia and Herzegovina, Montenegro, North Macedonia, Kosovo, and Serbia, we should use data that show the dynamics of the development of the factors obtained in the research over a period of time. In this case, we are dealing with panel data, the meaning of which can be found in almost every econometrics book. The following authors, Wooldridge [26], Gujarati [27], Greene [28], Baltagi [29], Osmani [30], etc., determine that panel data contain observations of individuals, families, firms, and countries, each of which has repeated measurements at several points in a period of time.

A panel data set contains n entities or subjects, each of which includes T observations measured at 1 through t time period. Thus, the total number of observations in the panel data is nT. Panel data may have individual (group) effects, time effects, or both, which are analyzed by fixed effect and/or random effect models [31].

Based on the reviewed econometric books in relation to the applicable econometric models for testing our hypotheses, as well as based on works that have applied models with panel data specifically to analyze the effect of FDI in the six countries of the Western Balkans [18-20] or other authors [32-34], we will apply Pooled OLS, Fixed Effects, and Random Effects. Then, using functional tests, we will choose which of these three models is most suitable to use for testing our hypotheses. Figure 1 provides a big picture of the panel data modeling process devised by Park [31].

This econometric model treats the data as grouped time series and does not allow to identify or evaluate the eventual differences in behavior at a time between individuals (entities) or the differences between different time periods independently of the individuals [30]. The (pooled) OLS is a pooled linear regression without fixed and/or random effects. It assumes a constant intercept and slope regardless of group and time period [31].

This model is estimated with the OLS method and has the form:

$$Yit = \alpha + BX_{it} + \varepsilon_{it} \quad (1)$$

X_{it} - is a 1 x k vector of independent variables observed for unit *i* in period *t*,

B - is a 1 x k vector of parameters,

ε_{it} – is an error term specific to unit *i* in period *t*.

If individual effect ui (cross-sectional or time-specific effect) does not exist (ui =0), ordinary least squares (OLS) produce efficient and consistent parameter estimates [31].

Pooled OLS model

The hypotheses we test to validate the model, when we have a regression with more than one independent variable, are:

- *H_0: All the coefficients of the regressors are equal to zero* ($\sum B_k = 0$)
- *H_a: Not all parameters in the model are the same* ($\sum B_k \neq 0$)

Fixed effects model

Fixed-effects models are mainly used when we are interested in estimating the effects of time-varying variables. When the model is built according to individuals, then the assumption is that between individuals there are factors that differentiate them [30], and these factors are time-invariant. Therefore, in some cases, we are interested in analyzing and testing the differences between individuals, the model we build according to individuals, while we are interested in changes over time without taking into account the differences between individuals, or the model is built according to time. In this case, we have a one-way fixed effect model. In our case, the model will be built on the basis of individuals that tests the effects that vary by country.

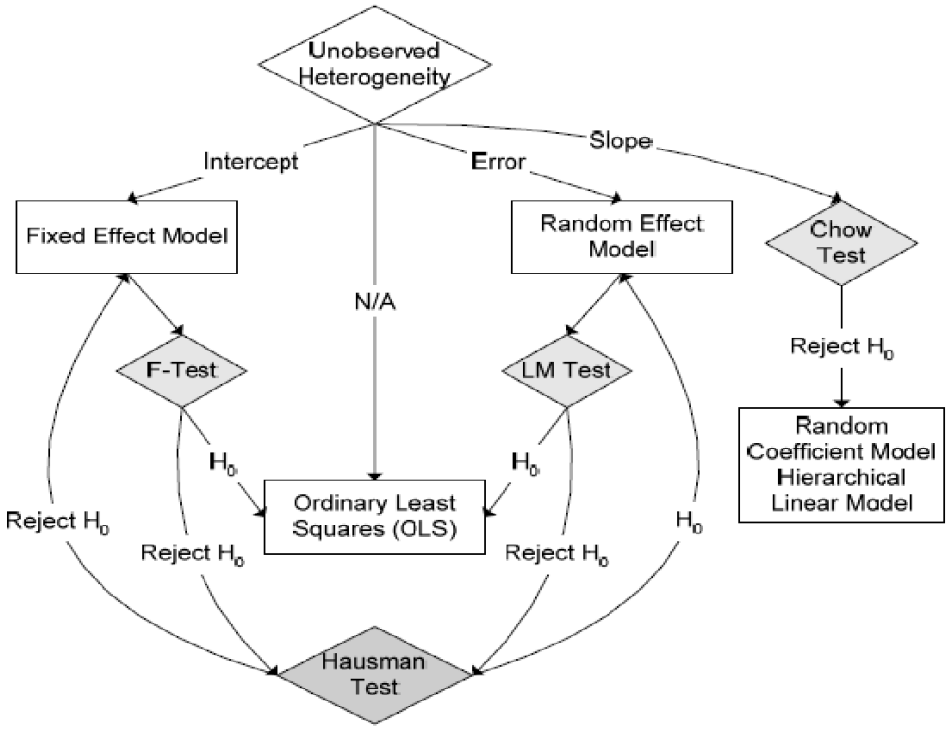

Figure 1. Panel data modeling process [31]

A fixed group effect model examines individual differences in intercepts, assuming the same slopes and constant variance across individuals (group and entity) [31]. In this model intercept has two parts: one fixed part α and a random one u_i that does not change with time (time-invariant) but according to individuals. Therefore, the functional forms of one-way fixed effect models are:

$$Y_{it} = (\alpha + u_i) + BX_{it} + \varepsilon_{it} \quad (2)$$

The parameter B indicates that when X changes by the one unit of time, Y is expected to change by the value of B. This fixed effect model is estimated by least squares dummy variable (LSDV) regression. Since we test the difference between individuals which is represented in the intercept then using:

Testin e Fisherit (F-test) the hypotheses for the validity of the model are:

- *H_0: All individuals' intercepts are equal*
- *H_a: All intercepts are not equal*

With these models, we cannot measure the effect of factors that do not change over time (time-invariant variable). The absence of these variables in the model is included in the intercept of the individual and this does not affect the estimations of the coefficients on which they are based [30].

Random effects model

In models with random effects, the differences between individuals are represented by the specific individual error term; u_i, which is part of the error term ε_i while intercepts and regressors are assumed constant. For this model, the variance of the error term is not the same for each individual; therefore, differences between individuals do not appear in the intercept but in the variance of the error term [30]. This is the functional form of the model with random effects:

$$Y_{it} = \alpha + BX_{it} + (u_i + e_{it}) \quad (3)$$

$$\text{where } (u_i + e_{it}) = \varepsilon_{it} \quad (4)$$

A random effect model is estimated by generalized least squares (GLS) when a covariance structure of individual i, Σ (sigma) [30, 31]. In our case, it was a balanced and fixed panel (all entities have measurements in all time periods), where the GLS method can be used. In this case, the hypotheses for validating the model are built as follows:

- *H_0: The variances in the error term are the same $\sigma^2 = 0$.*
- *H_a: The variances in the error term are the same $\sigma^2 \neq 0$.*

Testing these hypotheses, specifically the presence or not of random effects in a model is done by Lagrange multiplier (LM) test, also known as Breusch – Pagan test (according to the authors).

Model selection between Pooled, Fixed effects, and Random effects model.

As a procedure for selecting the model, it will start with the testing of the Pooled OLS model, where it will be estimated for the statistical significance of the regression coefficients and for the model itself. This testing will be done through the F-test and if we succeed in rejecting the null hypothesis and accepting the alternative hypothesis that at least one coefficient of the regressors is significant, we conclude that the model is significant and that the changes in the dependent variable can be explained by changes in the independent variables.

Pooled vs Fixed Effect

The choice between pooled OLS and the fixed effect was examined by least squares dummy variable (LSDV) regression. If in this case, we manage to reject the null hypothesis that all intercepts of the individuals are equal, then we can conclude that there is a significant fixed effect or significant increase in goodness-of-fit in the fixed effect model; therefore, the fixed effect model is better than the pooled OLS.

Pooled vs Random Effect

Choosing between pooled OLS and random effect examined by Lagrange multiplier (LM) test. If we manage to reject the null hypothesis and accept the alternative hypothesis that the variances in the error term are the same, $\sigma^2 \neq 0$, then we can conclude that there is a significant random effect in the panel data and that this model is not better than pooled OLS.

Fixed vs Random Effects – Hausman Test

When the null hypotheses are rejected and the alternative ones are accepted in the two aforementioned (2.1.4 and 2.1.5) situations, then we come to a new situation when we have to choose between the model with fixed effects and the one with random effects. To know which effect is more important than we use the Hausman Test which tests the following hypotheses:

- *H0: Individual effects are uncorrelated with any regressor in the model*
- *Ha: Individual effects are correlated with any regressor in the model*

If we manage to reject the null hypothesis and accept the alternative then we can conclude that the fixed effects model is better than the random effects model. On the contrary, when we fail to reject the null hypothesis, then we conclude that the best is the model with random effects. The test is based on the idea that under the hypothesis of no correlation, both OLS in the LSDV model and GLS are consistent, but OLS is inefficient, whereas under the alternative, OLS is consistent, but GLS is not [28].

3.2 The estimated procedure of econometric models

Being that the main condition in econometric models with panel data is the stationarity of the variables, while these types of data tend to be non-stationary, so they have a trend component, so the initial tests for all the variables are done specifically to ascertain the stationarity of the variables by testing them for the presence or absence of the root unit. The unit root test in our case is done by applying the augmented Dickey–Fuller test (ADF) developed by Levin et al. [35] as well as the pooled ADF test.

The presence of the unit root indicates that the variable is not stationary and infinite. The hypotheses of this test are formulated as

- *H_0: panels contain a unit root*
- *Ha: panel are stationary*

If the p-value of the Levin-Lin-Chu pooled ADF test is less than 0.05 ($p<0.05$), we reject the null hypothesis and accept the alternative hypothesis that the given variable is stationary, and inverse if the p-value of the Levin-Lin-Chu pooled ADF test is less than 0.05 ($p>0.05$), we do not reject the hypothesis but say that the variable has a unit root, especially non-stationary.

In the cases of non-stationary variables, the transformation of non-stationary variables was tested using annual differences or the natural logarithm [30]. After several tests, we came to

the conclusion that the transformation of the variables using the natural logarithm is more suitable since it, in addition to the positive effect on the stationarity of the variables, also has the effect of improving the normal distribution of the variables.

Then, for all the models, we used the same procedure through the Gretl software program, also relying on the STATA program. The most practical and fast possibility offered by Gretl for the selection between pool OLS, fixed, and random models facilitates the model selection process. Thus, the pool OLS model is first evaluated, and based on its output, it is possible to test for all comparisons and decide which model to select. The selection is therefore made on the basis of the results of the hypothesis testing for the models. The results of this test are presented in the annex of the paper, while only the selected model is presented in the results section.

3.3 The data

The data collection for this research is based on archival data of local and international financial institutions, from specific documents: official annual reports, annual financial stability reports, annual reports of the Statistical Agency of Kosovo, World Bank, International Monetary Fund, etc., for six Western Balkans countries: Albania, Bosnia and Herzegovina, Kosovo, Montenegro, North Macedonia, and Serbia. Due to the specifics of the region and the data available for all these countries (for Kosovo, the data on Foreign Direct Investments exist only from 2004 onwards), we have a balanced panel, the data were obtained over a period of 18 years: 2004 - 2021.

4. RESULTS AND DISCUSSIONS

4.1 Analysis and discussion of the results for descriptive statistics for Western Balkan countries – Insurance sector

Although the overall descriptive statistics for panel data are more difficult to interpret, Table 1 presents the descriptive data for all the variables included in the research also by country. In this way, we can see the differences separately according to certain countries, but also their ratio with the overall annual average of the development of the phenomenon for the research period, which is 2004–2021. So, in this table are the average data for six variables for an 18-year period where six countries of the Western Balkans are included in the research.

Regarding the GDP variable (expressed in million euros), we see that the overall average is €12 billion and 610 million per year, while Serbia and Bosnia and Herzegovina are above this average, while Albania, North Macedonia, Kosovo, and Montenegro (in this ranking) have average individual GDP below the overall average value.

When analyzing the GDP per capita statistics, we observe that the country ranking differs from that of GDP. Despite the overall average of €4,780 per capita per year, Montenegro and Serbia have individual averages above the overall average, with Montenegro having the highest individual average, followed by Serbia. While the other countries have individual averages below the overall average according to this ranking: Bosnia and Herzegovina, North Macedonia, Albania, and Kosovo.

Serbia has attracted the highest amount of foreign direct investments in the region. While the overall average of FDI in the six Western Balkan countries is €867.73 million per year, only Serbia has an individual average above the general average. During this time period, on average, there was an inflow of FDI of €2 billion and 895 per year, which is three times more than the general average. Below the general average are ranked: Albania, which is close to the value of the national average with €764.93 per year, Montenegro, B&H, North Macedonia, and Kosovo.

In Table 1, it is evident that Serbia and B&H have a more advanced insurance sector than the overall average for the three variables analyzed. These two countries have individual annual averages above the overall averages for the three variables. As for assets, the overall average is €480 million per year, while Serbia has an average of €1 billion and 476 million per year, while B&H has €660 million per year. North Macedonia, Albania, Montenegro, and Kosovo are listed in the general ranking for the value of annual Insurance Assets.

Table 1. Summary statistics, using the observations 1:01 - 6:18 (108 obs.) (2004-2021)

		GDP (mil €)	GDP per Capita	FDI (mil €)	Assets (mil €)	GWP (mil €)	Penetration Rate (%)
OVERALL	Mean	12,610.19	4,078.80	867.73	480.44	215.67	1.66
	St.Dev.	11,441.15	1,444.88	1,064.47	574.93	222.52	0.45
Kosovo	Mean	5,005.33	2,738.00	277.70	129.61	74.66	1.51
	St.Dev.	1,469.59	880.86	104.51	57.81	20.03	0.18
North Macedonia	Mean	8,099.83	3,927.53	329.80	261.79	124.69	1.56
	St.Dev.	2,180.77	1,035.40	148.20	93.30	30.70	0.11
Albania	Mean	9,929.17	3,429.69	764.93	202.92	92.61	0.89
	St.Dev.	2,573.98	952.48	273.56	90.46	43.69	0.24
Bosna and Hercegovina	Mean	13,788.33	3,937.49	457.70	660.05	288.67	2.06
	St.Dev.	2,985.08	1,053.88	274.15	257.24	85.38	0.19
Montenegro	Mean	3,392.94	5,472.37	481.66	152.06	71.90	2.13
	St.Dev.	965.76	1,540.07	219.34	65.65	19.04	0.13
Serbia	Mean	35,445.50	4,967.76	2,894.58	1,476.22	641.48	1.79
	St.Dev.	8,159.55	1,270.64	1,236.54	727.35	188.11	0.17

*Source: Annual Reports from National Banks of respective Countries and Agency for Supervision of Insurance Sector (*Kosovo: https://bqk-kos.org/publications/cbk-annual-report/?lang=en;,(Annual Reports 2004-2021); Albania: http://amf.gov.al/, (Annual Reports 2004-2021); Bosnia and Herzegovina: www.azobih.gov.ba, (Annual Reports 2004-2021); North Macedonia: https://aso.mk/en/, (Annual Reports 2004-2021); Monte Negro: https://www.ano.me/en (Annual Reports 2004-2021); Serbia: https://nbs.rs/en/finansijske-institucije/osiguranje/izvestaj/ (Annual Reports 2004-2021)*)*

The overall average GWP is close to €216 million per year, whereas Serbia has an individual average of €641 million per year and B&H around €289 million per year. Individual averages below the general average have other countries in this order: North Macedonia, Albania, Kosovo, and Montenegro. But Montenegro has the highest value of Penetration Rate of all the other countries. Regarding this variable, the overall average is 1.66%, where the following countries rank above the average: Montenegro with 2.13%, B&H with 2.06%, and Serbia with 1.79%. North Macedonia (1.56%), Kosovo (1.51%), and Albania (0.89%) have individual average scores below the national average.

4.2 Analysis and verification of hypothesis

The econometric analysis for hypothesis testing consists of three separate models, since in our hypotheses we have three variables of interest, which in econometric models we call dependent or explained variables. For all three of these models, we analyzed two independent or explanatory variables. The first variable is the level of FDI, which is the variable for which we test the hypotheses, and the second variable is GDP per Capita as a control variable. Since GDP and GDP per Capita have a high correlation between themselves, in order to eliminate the possible problems of multicollinearity that can be caused by the correlation between independent variables, we took only the GDP per Capita variable into the models as the most suitable indicator to show the eventual impact on the growth of the insurance sector versus the impact that FDI may have on the sector.

Initially, all the variables were tested whether or not they have a unit root in order to fulfill the main criterion of econometric models with panel data that the variables should be stationary. Depending on the results of the initial form of the variables, their transformation was done until finding the form where the variables do not contain a unit root, i.e., they are stationary, using Levin-Lin-Chu pooled ADF tests. We mainly applied the natural logarithm, but also the first difference. In all cases, after the logarithm or square differences have been applied, they have been transformed into a stationary series

$$(L\_GDPCap \Rightarrow p = 0.0008\,;\ L\_GWP \Rightarrow p = 0.0614;\ d\_InsAsset \Rightarrow p = 0.0002\ and\ L\_PenetRate \Rightarrow p = 0.0328)$$

These results are from the individual tests of the variables using the STATA software program by applying Levin-Lin-Chu pooled ADF test with constant and trend including one lag of (1-L) Bartlett truncation at 8 lags.

Results of the econometric model of the first hypothesis

First econometric model estimates the significance of FDI impact on GWP. Therefore, through this model, the first two alternative hypotheses of the thesis will be tested:

- *H_1 - FDI inflows have a positive effect on the Gross Written Premium, and*
- *H_{1a} – There are the difference between countries of FDI inflow effect in the Gross Written Premium.*

As explained in the methodology section, the pooled OLS model was first evaluated and then in its output (see annex 3.1), Greatly enables diagnostic testing to select which of the three econometric models - pooled OLS, fixed, and random effects - are more appropriate. The results of the diagnostic testing show that the most suitable model, with an efficient and consistent coefficient, is the one with random effect, which is estimated by generalized least squares (GLS). We come to this conclusion after we find that for the comparison of pooled OLS vs fixed effects model the joint significance of differing group means: $F\,(5, 100) = 546.021$ with p-value $6.72643e-071$, so a low p-value ($p < 0.05$) counts against the null hypothesis that the pooled OLS model is adequate, in favor of the fixed effects alternative. And for the comparison of the proposed OLS vs random effects model, the Breusch-Pagan statistical test is used, according to which: $LM = 641.955$ with $p-value = prob\,(chi-square\,(1) > 641.955) = 1.25557e-141$, so a low p-value ($p < 0.05$) counts against the null hypotheses that the pooled OLS model is adequate, in favor of the random effects alternative. Since both models, fixed and random effects are more adequate than pooled OLS, then the Hausman Test is used to choose between the fixed or random effects model. As can be seen in Table 2, Hausman test statistic: $H = 2.19524$ with $p-value = prob\,(chi-square\,(2) > 2.19524) = 0.333664$. Thus, a low p-value ($p < 0.05$) counts against the null hypotheses that the random effects model is consistent, in favor of the fixed effects model. In this case, we cannot reject the null hypothesis since p ≥ 0.05 therefore we choose the model with random effects as more appropriate than both poled OLS and fixed effects model.

As can we see from the results of this model, which are presented in Table 2, the FDI is ($p = 0.0108 < 0.05$) and GDP per Capita ($p = 0.0001 < 0.05$) have significant impacts on GWP. Since the Joint test on named regressors is significant ($p-value = 1.38563e-146 < 0.05$), we can conclude that the independent variables have joint significant effects on influencing or explanation of dependent variable.

Table 2. Random-effects model of estimation FDI impact on Gross Written Premium (2004-2021)

Dependent Variable: l_GWP	***Coefficient***	***Std. Error***	**z**	***p-value***	
const	−3.85300	0.465617	−8.275	<0.0001	***
l_FDI	0.0582757	0.0228684	2.548	0.0108	**
l_GDPCapita	1.02423	0.0441375	23.21	<0.0001	***
Joint significance of differing group means: F (5, 100) = 546.021 with p-value 6.72643e-071					
Joint test on named regressors - Asymptotic test statistic: Chi-square(2) = 671.703 with p-value = 1.38563e-146					
corr(y,yhat)^2 = 0.314018*					
Breusch-Pagan test - Null hypothesis: Variance of the unit-specific error = 0					
Asymptotic test statistic: Chi-square (1) = 641.955 with p-value = 1.25557e-141					
Hausman test - Null hypothesis: GLS estimates are consistent					
Asymptotic test statistic: Chi-square (2) = 2.19524 with p-value = 0.333664					

** The Gretl raporting for overall R-squared*

Source: Annual Reports from National Banks of respective Countries and Agency for Supervision of Insurance Sector –Processing through Gretl

Table 3. Random-effects model of estimation FDI impact on Insurance Assets (2004-2021)

Dependent Variable: d_InsAssets	*Coefficient*	*Std. Error*	z	*p-value*	
const	−314.716	127.216	−2.474	0.0134	**
l_FDI	19.7942	7.90374	2.504	0.0123	**
l_GDPCapita	27.8267	15.5696	1.787	0.0739	*
Joint significance of differing group means: F(5, 94) = 8.85073 with p-value 6.5043e-007					
Joint test on named regressors - Asymptotic test statistic: Chi-square (2) = 12.3456 with p-value = 0.00208536					
corr(y,yhat)^2 = 0.383099*					
Breusch-Pagan test - Null hypothesis: Variance of the unit-specific error = 0					
Asymptotic test statistic: Chi-square (1) = 34.7663 with p-value = 3.7175e-09					
Hausman test - Null hypothesis: GLS estimates are consistent					
Asymptotic test statistic: Chi-square(2) = 3.85375 with p-value = 0.145602					

** The Gretl raporting for overall R-squared*

Source: Annual Reports from National Banks of respective Countries and Agency for Supervision of Insurance Sector –Processing through Gretl

In equation form, the estimated model from Table 2 is:

$$l\_GWP_{it} = -3.85 + 0.058 * l\_FDI_{it} + 1.024 * l\_GDPCapita_{it} \quad (5)$$

Since the functional form of the model is log-log, the coefficients of the model measure the relative change (%) in the dependent variable by a change of 1% in the independent variable, ceteris paribus (holding all other variables constant). Thus, the coefficient for FDI shows that ceteris paribus, with FDI increase by 1% then GWP will increase by 0.058%.

Whereas with the increase of GDP Capita by 1% then GWP will increase by 1.024%. From the signs of the coefficients, we see that in both cases we have a positive relationship, which means that as the value of the independent variable increases, the value of the dependent variable increases and vice versa.

Regarding the effects of the case and the differences of these effects between the countries in Table 2, we see that the results of the Breusch-Pagan test (LM test) show that there is a significant difference in the variance of the unit-specific error ($p = 1.25557e-141 < 0.05$).

This shows that there are significant differences between countries regarding the effect of the independent variables on the dependent variable. So, in this group of countries included in the research, the effect of FDI is statistically significant, but there are differences between countries in how FDI affects GWP, and these differences are not fixed but random. This shows Hausman Test ($p = 0.333664 > 0.05$) this means that the individual effects are random and uncorrelated with any regressor in the model. This shows that GLS estimates are consistent and the random effect model is more relevant than the fixed effect model.

From the results of the estimated model, here are conclusions for the tested hypotheses:

- *H_1: We have sufficient evidence to reject the null hypothesis and to accept the alternative hypothesis that "FDI inflows have a positive effect on the Gross Written Premium".*
- *H_{1a}: We have sufficient evidence to reject the null hypothesis and to accept the alternative hypothesis that "There is the difference between countries of FDI inflow effect in the Gross Written Premium".*

Results of the econometric model of the second hypothesis

In the second econometric model, the impact of FDI on Insurance Assets was estimated, where GDP per capita was also used as the control variable. After this model, the two-second alternative hypotheses will be tested:

- *H_2 – FDI inflows have a positive effect on the Insurance Assets, and*
- *H_{2a} – There are the difference between countries of FDI inflow effect in the Insurance Assets.*

From the results of the initial assessment applying the pool OLS model and then from the diagnostic tests by Gretl, it can be seen that the best model is the one with random effects.

From the results of the model, it is evident that only FDI ($p = 0.0123 < 0.05$) has a significant impact on Insurance Assets, while GDP per Capita ($p = 0.0739 > 0.05$) this means that at the $\alpha = 0.05$ significance level, this variable has no significant impact on Insurance Assets. The significance of this variable corresponds to the 90% confidence level ($\alpha = 0.1$). Since the Joint test on named regressors is significant ($p - value = 0.002 < 0.05$), we can conclude that the independent variables have joint significant effects on influencing or explanation of dependent variable.

In equation form, the estimated model from Table 3 is:

$$d\_InsAssets_{it} = -314.716 + 19.794 * l\_FDI_{it} + 27.827 * l\_GDPCapita_{it} \quad (6)$$

Unlike the first model here, the functional form of the model is of the lin-log type, where the dependent variable is expressed in linear form but transformed into the first difference, while the independent variables are in logarithms.

For this form of the model, the interpretation of the coefficients is such that when the independent variable increases by 1%, then the dependent variable will increase by 1/100 of the coefficient, ceteris paribus. For example, with a 1% increase in the value of FDI, the annual increase in Insurance Assets will be 0.19794 million euros (19.794/100), holding all other variables constant. The impact of GDP per capita is also interpreted in the same way. As this model illustrates, there is a positive link between the two independent variables and the dependent variable; that is, as the independent variable's value rises, the dependent variable's value rises as well. Further on in Table 3 we also see the results on the random effects and on the existence or not of differences between the countries regarding the random effects between the countries. The results of the Breusch-Pagan test (LM test) show that there is a significant difference in the variance of the unit-specific error with a value of p= 3.7175e-09<0.05, confirming the existence of random effects in relation to the influence of FDI in Insurance Assets. Also, this result shows that we have enough evidence to conclude that the differences between countries are statistically significant for the random effects of the impact of FDI on Insurance Assets. Although the Hausman Test with values of p=0.145602>0.05, does not allow us to reject the null

hypothesis, which means that the individual effects are random and uncorrelated with any regressor in the model. This result shows that GLS estimates are consistent over time and that the random effect model is more appropriate than the fixed effect model.

From the results of the evaluated model, here are four conclusions for the tested hypotheses:

- *H_2: We have sufficient evidence to reject the null hypothesis and to accept the alternative hypothesis that "FDI inflows have a positive effect on the Insurance Assets".*
- *H_{2a}: We have sufficient evidence to reject the null hypothesis and to accept the alternative hypothesis that "There are differences between countries of FDI inflow effect in the Insurance Assets".*

Results of the econometric model of the Third Hypothesis

The third econometric model of the data analysis was based on the estimation of the impact of FDI on the Penetration Rate. Even in this model, the control variable used is GDP per Capita. This model is applied to test the last two alternative hypotheses:

H_3 – FDI inflows have a positive effect on the Penetration Rate, and

H_{3a} – There are differences between countries of FDI inflow effect in the Penetration Rate.

From the results of the initial assessment, applying the pool OLS model, and then from the diagnostic tests (by Gretl) it can be seen that the best model is the one with random effects.

In Table 4, it can be seen that both independent variables have a significant impact on the explanation of changes in the dependent variable. Specifically, for the FDI variable, the value of p=0.0362<0.05, means that we have sufficient evidence that FDI has a significant impact on the Penetration Rate.

Even for the other variable, the value of p is smaller than 0.05 (p= 0.0239>0.05), therefore for both variables we have sufficient evidence that GDP per Capita has a significant impact on Penetration Since Joint test on named regressors is significant (p-value = 0.00063<0.05), we can conclude that the independent variable has joint significant effects on influencing or exploitation of dependent variable.

In equation form, the estimated model from Table 4 is:

$$l\_PenetRate_{it} = -0.743 + 0.051 * l\_FDI_{it} + 0.107 l\_GDPCApita_{it} \quad (7)$$

As seen in the equation above (no. 7), the functional form of this model is the same as that of the first model, i.e., log-log, therefore, the interpretations of the coefficients are the same as those of the first model. Thus, with a 1% increase in FDI, the Penetration Rate is expected to increase by 0.05%, ceteris paribus. While with the 1% increase in GDP per Capita, it is expected that the Penetration Rate will increase by 0.107%, ceteris paribus. Even in this model, there is a positive correlation between the two independent variables and the dependent variable; that is, as the independent variable's value rises, so does the dependent variable's value, and vice versa.

As with the previous two models, the estimation of the result in these two models is also predicated on the existence of country-specific differences and random effects.

The results of the Breusch-Pagan test (LM test) presented in Table 4 show that there is a significant difference in the variance of the unit-specific error with a value of p= 4.14955e-103<0.05.

Through this test, it is confirmed that there is sufficient evidence to confirm the existence of chance effects in relation to the impact of FDI on Penetration Rate. This result also shows that we have sufficient evidence to conclude that the differences between countries are statistically significant for the random effects of FDI's impact on Penetration Rate. While Hausman Test with values of p=0.329471>0.05, it shows us that the individual effects are random and uncorrelated with any regressor in the model. Therefore, it is concluded that GLS estimates are consistent over time and that the model with a random effect is more appropriate than the one with a fixed effect.

From the results of the evaluated model, here are the conclusions for the tested hypotheses:

- *H_3: We have sufficient evidence to reject the null hypothesis and to accept the alternative hypothesis that "FDI inflows have a positive effect on the Penetration Rate".*
- *H_{3a}: We have sufficient evidence to reject the null hypothesis and to accept the alternative hypothesis that "There are differences between countries of FDI inflow effect in the Penetration Rate".*

The three econometric models' results show that FDI positively and statistically significantly affects each of the three dependent variables (variables of interest). This analysis of the data indicates that FDI has a favorable impact on all industry indicators, such as Gross Written Premium, Penetration Rate, and Insurance Assets.

Table 4. Random-effects model of estimation FDI impact on Penetration Rate (2004- 2021)

Dependent Variable: l_PenetRate	***Coefficient***	***Std. Error***	**z**	***p-value***	
const	−0.743031	0.387452	−1.918	0.0551	*
l_FDI	0.0510073	0.0243483	2.095	0.0362	**
l_GDPCapita	0.106740	0.0472423	2.259	0.0239	**
Joint significance of differing group means F (5, 100) = 92.1903 with p-value 7.40443e-036					
Joint test on named regressors - Asymptotic test statistic: Chi-square(2) = 14.73 with p-value = 0.000633025					
corr(y,yhat)^2 = 0.156013*					
Breusch-Pagan test - Null hypothesis: Variance of the unit-specific error = 0					
Asymptotic test statistic: Chi-square (1) = 464.889 with p-value = 4.14955e-103					
Hausman test - Null hypothesis: GLS estimates are consistent					
Asymptotic test statistic: Chi-square(2) = 2.22053 with p-value = 0.329471					

** The Gretl raporting for overall R-squared*

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Furthermore, the influence of foreign direct investment (FDI) on those variables varies throughout countries, according to the findings of testing the second set of assumptions, as shown by the three econometric models. This suggests that there are variations in size among the countries in this group, even if the influence of foreign direct investment (FDI) on the variables of interest is statistically significant in each of these countries. The level of development in each country, the policies that differentiate them, the different stages of the EU integration process, internal political difficulties, etc. are some of the reasons that can account for this.

5. CONCLUSIONS

From the analysis of the results of the econometric models that were used in this research and the testing of the hypotheses, we come to the general conclusion that FDI inflow has a significant positive impact on the insurance sector in the countries of the Western Balkans. These results appear significant for the three main indicators of the industry, namely Gross Written Premiums, Insurance Assets, and Penetration Rate, where FDI inflow has a positive effect, especially with the increase in FDI inflow, these three indicators also increase. The results are in line with Sawadogo et al. [24], who find that FDI has a positive impact on the insurance sector.

Likewise, the results show that although the region has common characteristics, the differences are also evident and statistically significant. This difference in the effect of FDI Inflow in the insurance sector, based on the GLS model for random effects, is sufficiently evident that the effects are random. This shows that the differences are not due to the influence of my invariant variables but to different aspects of the development of certain factors between these countries. These differences may be related to their different progress in regard to development policies, facilitation for doing business, and implementation of reforms in the insurance sector as a whole. Differences can also appear as regards the level of economic development of these countries, where from the analysis of the data it is evident that there are different levels of FDI Inflow as well as different levels of GDP, specifically GDP per Capita.

These results imply the implementation of positive policies for FDI withdrawal facilities in general, but also in the financial sector and, more specifically, in insurance.

The research also had its limitations, which are related to the not very long period of the data, which would enable the inclusion of an even larger number of variables in the research as well as produce more detailed results. Since all countries, with the exception of Albania, were part of a single state until 1990 and the current states' structures emerged in 1999 or later, we have only included statistics from that period, immediately following Kosovo's 1999 and 2006 separations from Serbia and Montenegro.

On the other hand, the results have important implications for future research that focuses on a more accurate determination of which aspects have significant differences between countries and which have positive or negative effects. The results also imply further research in the aspect of studying the potential of the sector to increase the absorption of FDI, the factors that influence these aspects, as well as the barriers that exist.

Since the results of the research showed that FDI has a significant positive impact on the insurance industry in the region, the study's primary purpose has been realized. Policymakers and industry participants should be aware of this reality in order to encourage increased FDI absorption for the growth of the industry and the economies of the participating countries overall.

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