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DOES FEMALE EDUCATION GENERATE ECONOMIC GROWTH? AN EMPIRICAL ANALYSIS OF WESTERN BALKAN COUNTRIES

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Abstract: This paper investigates the relationship between female education and economic growth in Western Balkan countries during the period 2000-2019. The motive behind choosing Western Balkan countries was because there is insufficient research that has been made in this field of study; hence, this research assists to expand the issue of this topic. By using GDP as dependent variable, the paper addresses the question whether female education generates or not economic growth. The techniques applied for this study are OLS, fixed and random effects, and Hausman-Taylor model IVs. The findings show a positive relationship between GDP per capita, female labor participation, school enrollment primary, and literacy rate. On the other hand, there exists a negative relationship with fertility rate, while the school enrollment tertiary is statistically insignificant. This paper brings evidence that female education generates more economic growth in Western Balkan countries. Therefore, the Government of the Western Balkans should take into consideration to invest more on education of the woman in those countries. These in turn will lead to higher economic growth.

JEL Classification: I24, J16, J21, O1, O57;
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1. Introduction

The relationship between female's education and economic growth has been intensely investigated. Yet, the findings are still open to discussion. Most of the studies have concluded that female's education generates economic growth (Hassan and Rafaz, 2017; Sheehan et al., 2017; Tansel and Gungor, 2016;

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Sehrawat and Giri, 2017; Ince, 2011; Khan, 2016). What is surprising is the fact that there exist insufficient studies that investigate such relationship in Western Balkans countries, particularly in Kosovo, North Macedonia, Bosnia, and Herzegovina, Montenegro, Serbia, and Albania (Atoyan and Rahman, 2017; Eric, 2018; Lilyanova, 2018; Browne, 2017; Lazarević and Tadić, 2018).

Regarding the relationship between economic growth and human capital, there exist a lot of studies that support the claim that human capital is the key to economic growth of a country. With other words, it reduces poverty, migration and it improves the quality of institutions and citizens' society. According to Barro (2013), individual health, social capital and education (the main components of human capital) refer to the knowledge and skills embodied in human beings that contribute to achieve the advancement of production and social and economic growth. But the suspicion is how does a government which is so far away from being an ideal state of development to move forward? The answer lays in its education. When it comes to the future of the region, education is the key – especially female education. In such a way, the region through education will be able to let go of the past and focus on the joint future. Therefore, the primary research question is whether women's education is associated with economic growth?

The first contribution of this research study is to bring new evidences toward the relationship between females' education and economic growth, since there exist a gap of such investigation made on Western Balkans countries. The second contribution is to realize where does Western Balkans countries stand in the context of female's education and economic growth when comparing with other regions and further. The third contribution is to pronounce a critical argument of evidence not only by presenting a general frame of all previous research paper on this topic, but by developing the conceptual outline. Most of the studies made on this topic have been heavily criticized because of the usage of only one econometric technique such as OLS. OLS, Fixed and Random-effects model, and the Haussmann–Taylor model are very appropriate techniques to be implemented for such topics but they were ignored by previous researchers (El Alaoui, 2015; Kaur & Letic, 2012; Hong, Kim, Park, & Sim, 2019).

The results of the research show that various factors have effects on the economic growth of the Western Balkans countries, namely FLFP (female labor force participation) and other factors such as SEPF (school enrolment primary female) and FLR (literacy rate female) which present significant effects on GDP.

The research paper is organized in five sections as: Section 2 reviews the literature; Section 3 discusses the research methodology and data; Section 4 provides the results; Section 5 provides the conclusion.

2. Literature review

This section presents the empirical evidence whether female's education generate economic growth or not. Hassan and Rafaz (2017) investigated the "Role of Female Education in Economic Growth of Pakistan". According to their results, fertility rate must be as low as possible in order to boost the economic development. Their study indicates that females' education will reduce fertility rate, which in turn it may have a positive effect on economic growth. Moreover, Hassan and Rafaz

concluded that many opportunities are being created for female employment which has led to a higher rate of female labor force participation and such achievement is contributing impressively to the economic growth of Pakistan.

Sehrawat and Giri (2017) investigated whether female human capital generates economic growth or not. They found out that female education is significant and positively related with economic growth. The same conclusions were reached even by Tansel and Gungor (2016). Based on their study results, they found out that education is considered to be the primary essential sector leading to female empowerment, especially in developing countries. According to them, females' education has many benefits because it reduces fertility and infant mortality, while it increases life expectancy and quantity and quality of children's education. Moreover, their study infers that a country grows faster when having higher levels of education attainment. They came to such conclusion because recently the number of females graduating from high school has increased and in this way their participation in the labor force has also increased. This means that female labor force participation rate increases by an additional year of female schooling. This in turn leads to a raise to GDP.

Oztunc, Chi Oo and Serin (2015) made a study on the contribution of female education to economic growth (long-term). This study included 11 countries of the Asia Pacific by using the random effects model. The results of their investigation show that female labor force participation rate and female primary school enrolment have positive effect on GDP, while female literacy rate does not have any significant effect at all. However, the most significant factor affecting GDP per capita growth is considered to be fertility rate factor.

Another contribution on this research filed was made even by the author Khan (2016). He investigated the role of human capital on the economic growth. This investigation took place at Pakistan by using economic growth as dependent variable, while female human capital, male human capital, physical capital and labor force were used as independent variables. Based on study results, female human capital is positively related to economic growth and is significant only in the long run, while male human capital is positively related to economic growth but is insignificant.

Forbes (2000) explored the relationship between inequality and growth for 45 countries. Growth was used as dependent variable, while income, female education, male education, inequality and PPP (price level of investments) were used as independent variables. Based on study results, Forbes came to conclusion that female education generates economic growth. With such conclusion agree even other authors (Knowles, Lorgelly and Owen, 2002), which tried to figure out whether gender inequality in education causes or not a break on economic development. Their findings show that female education has a positive effect on the real output of a country.

Even though many authors have concluded a positive relationship between female education and economic growth in different regions of Western Balkan countries, yet, the findings are still open to discussion. Not only that, but findings do not even ensure any relationship between female education and economic growth at all (Heath and Jayachandran, 2017; Kim, 2016; and Hong, Kim, Park, and Sim, 2019). Based on their results, GDP growth is not improved by female's education. Actually, what they concluded is that education not anyway leads in a higher probability of working, but it may improve health and environmental conditions.

This research study will be an attempt to figure out whether female education generates economic growth or simply it follows economic growth. In order to overcome the lack of robustness of the result, this research study applies three econometric models: OLS, fixed and random effects models, and Haussmann–Taylor model (IV).

3. Methodology

This section presents the empirical econometric model to assess the relationship and the causal link between female education and economic growth in the Western Balkans Countries during the period 2000-2019. For such purpose, there are applied three econometric models: pooled OLS, fixed and random effects and the Hausman–Taylor IV. Besides, there is also applied the Hausman test in order to differentiate between fixed effects, random effects and the Hausman–Taylor model. As shown in table two, the Hausman–Taylor (IV) method is reflected to be a better choice than Fe and Re model.

3.1 Panel data model

The reason why the Hausman–Taylor model is applied to examine the relationship and the causal link between female education and economic growth in the Western Balkans is because this model is considered to be more consistent and efficient than the fixed and random effects.

Furthermore, the Hausman–Taylor model helps in finding solutions if endogeneity problem appears. This model is very practical to be applied because it identifies endogenous variables if they are present in the regression model. The main cases when endogenous variables perform in the model are measurement error, omitted variable bias and simultaneity causality. One of the main assumptions of Ordinary Leas Square is that there should be no correlations between error term and predictor variables, but if this happens, then it should be reviewed if endogenous variables are present in the model. Thus, Hausman–Taylor model is a solution to figure out whether statistical model corresponds to the data or not. For comparison purpose, there are shown even the results from pooled OLS, fixed effects and random effects for the comparison purpose.

The specification of the Hausman–Taylor empirical model is as follows:

$$\begin{aligned} \mathrm{y_{it}} = \mathrm{c} + \beta_1(\mathrm{Y_{it}} - 1) + \beta_2(\mathrm{FLFP_{it}}) + \beta_3(\mathrm{SEPF_{it}}) + \beta_4(\mathrm{SETF_{it}}) + \\ + \beta_5(\mathrm{FLR_{it}}) + \beta_6(\mathrm{FR_{it}}) + \mu_{\mathrm{it}} \end{aligned} \quad (1)$$

Where y_{it} is the dependent variable which represents the GDP growth rate for each country while t represents years and c is the term of constant. The explanatory variables include y_{it-1} which is the first lag of the dependent variable, $FLFP_{it}$ represents labor force female participation (% of female's population – aged 15-64), $\mathrm{SEPF_{it}}$ characterizes school enrolment primary female, $SETF_{it}$ symbolizes

school enrolment tertiary female, FLR_{it} stands for literacy rate adult female (% of literacy rate of females aged 15 and over), FR_{it} symbolizes fertility rate and u_{it} is an exogenous disturbance (table one).

The data have been downloaded by the World Bank and have been administered and analyzed through the statistical program Stata 13. The most amount of information is contained in nominal and interval scale data.

Table 1: Description of variables

Serial no	Variables	Definitions of Variables	Code	Source
1	GDP	Economic growth GDP growth rate (annual %)	GDP Growth	WBI, IM
2	Female's labor force participation	Female's labor force participation % of female's population – aged 15-64	FLFP	WBI
3	School enrolment primary female	% of female enrollment in primary school	SEPF	WBI, IM
4	School enrolment tertiary female	% of female enrollment in tertiary school	SETF	WBI, IM
5	Female literacy rate	% of literacy rate of females aged 15 and over	FLR	WBI, IM
6	Fertility rate	Fertility rate, total (births per person)	FR	WBI

Notes: WBI means World Bank Indicators (IMB Indicators) and IM means Index Mundi

4. Results

This section highlights the final results gathered from the econometric techniques applied in this research study. Since the coefficient from pooled OLS estimator is biased because of the presence of the heterogeneity of unobservable individual-specific effect, then, the fixed and random effects models have been calculated. In order to choose between Fe model and Re model, the Hausman test is run.

It should be mentioned that if the null hypothesis is not rejected, then, the preferred model is random effect model. In the other hand, if null hypothesis is rejected and alternative hypothesis stands, then, the preferred model is fixed effect

model. The Hausman test tries to detect if there exist a correlation between error term and the explanatory variables. If there is no correlation between the two, then the null hypothesis stands in the model.

Special attention should be paid to the trade-of between bias and variance in the two estimators. The fixed effect model doesn't introduce bias but it may have a very high degree of variance, while the random effect model doesn't remain unbiased but it may reduce the variance of estimates of coefficients. In this case, if the null hypothesis is rejected in the model, this means that probably the error term is correlated with one or more regressors under the random effect model.

As shown in table two, the Hausman test is calculated with the aim to choose between Fe model and Re model. As it can be seen, the Hausman test p value is 7.99, which means that the null hypothesis stands in the model in favor of Hausman–Taylor IV.

Table 2: Fixed Effect, Random Effect and Hausman – Taylor IVs

Test	Chi^2	$Prob>chi^2$	Result
Fixed Effects vs Random Effects	8.99	0.1094	Reject H_0
vs Hausman – Taylor IVs	0.17	7.99	Does not reject H_0

Source: Authors' calculations

Based on these results, it is understandable that the Hausman–Taylor (IV) method with IVs eradicates the correlation between error term and explanatory variables. Moreover, the problem of endogeneity is eliminated as well. To conclude it all, the better choice than Fe and Re model is considered to be the Hausman–Taylor (IV) method.

In our model the variables such as female labor force participation, school enrollment primary female and ferility rate are considered to be exogenous variables and are used as their own instruments. While the variables such as school enrollment tertiary female and femaile literacy rate are instruments by the deviation of the individual mean and endogenous. Table three presents the regression results.

Table 3: Regression results

Variables	OLS	FIXED EFFECTS	RANDOM EFFECTS	HAUSMAN TYLOR IV
First lag GDP-per capita				-.061
s.e.				(0.795)
FLFP	.288**	.913*	.287*	.706*
s.e.	(0.125)	(0.254)	(0.125)	(0.223)
SEPF	.181**	.102	.181*	.127**

Variables	OLS	FIXED EFFECTS	RANDOM EFFECTS	HAUSMAN TYLOR IV
s.e.	(0.072)	(0.071)	(0.071)	(0.069)
SETF	.000	.001	.000	-.003
s.e.	(0.028)	(0.032)	(0.028)	(0.031)
FLR	.050	.121*	.050	.099*
s.e.	(0.106)	(0.053)	(0.029)	(0.048)
FR	5.894*	-5.054*	5.893*	-2.600
s.e.	(3.275)	(5.66)	(3.278)	(5.301)
CONS	-6.144	-29.097*	-6.144*	-19.911**
s.e.	(4.819)	(0.028)	(4.819)	(11.589)
R-square	0.387	*0.431*		
F	4.93	5.32		
Chi^2			24.67	24.47

*Notes: *Statistically significant at 5% level; **statistically significant at 10%*
Source: Authors' calculations

As shown in the table three, the female labor force participation (FLFP) has positive coefficient 0.706 (s.e.0.223) and is statistically significant which means that the female labor force participation has a positive effect in country's GDP per capita growth. According to this, female labor force participation stimulates economy growth even that the gap in labor forces participation rates of men and women's remains high. Only in the second quarter of 2019, the percentage of female inactivity in Western Balkans scored very high, at 46.3 percent while the percentage of male inactivity was lower, at 27.1% (WBG, 2019). The main factor leading to such high level of female inactivity are low levels of education attainments, family responsibilities, cultural and religious reasons and lack of affordable or available child care (especially in rural areas). Moreover, the positive relationship between female labor force participation and GDP growth are same as the most of previous studies (Ince, 2011; Oztunc, Chi Oo and Serin, 2015; Khan, 2016).

The results in table three shows that school enrolment primary female (SEPF) with coefficient 0.127 (s.e.0.069) affect GDP per capita growth positively while school enrolment tertiary female (SETF) with coefficient -0.003 (s.e.0.031) has a negative impact on GDP. In the other side, school enrolment primary female it is statistically significant in contrast to school enrolment tertiary, which is statistically insignificant. This is consistent with studies by Oztunc et al., (2015) which found that school enrolment primary female has positive impact in GDP growth.

While female literacy rate (FLR) has a positive coefficient of 0.099(s.e.0.048) and is statistically significant which means that female literacy rate has positive impact on GDP growth. In order to increase their position in labor force, females need to increase their literacy rate by increasing their education which in return leads to an increase in GDP per capita. Such result is controversial to the findings of other researches such as Heath and Jayachandran (2017); Kim (2016); and Hong, et al. (2019) whom did not find (statistically) significant evidence that GDP growth is

improved by female's education. Meanwhile, fertility rate (FR) has a negative coefficient -2.600(s.e.5.301) and is statistically significant, which means that fertility rate has a negative effect on GDP growth.

5. Conclusion and discussion

The research has shown interesting impacts on GDP per capita and this impact is evident for the period 2000-2019, since it includes two decades of a region that has gone through more economic crisis than economic stability. The effects of FLFP (female labor force participation) are a positive and important element for the development and emancipation of women and their position in the workplace. On the other hand, there is an effect from SEPF (school enrolment primary female) and FLR (literacy rate female) which present significant effects on GDP. In general, the effect of the female labor force, school enrolment primary, and literacy rate have a meaning for all stakeholders, both for the states and for the society itself, as this represents a new social structure, where women have an impact on the economic situation of their states.

The work and results may be appropriate for the development of economic development strategies and the field of education. The recommendation for all participating states is to have a clearer development policy, where the influence of women is more productive and with positive effects for the state and society in general.

In this context, this paper has a scientific contribution since it brings these new evidences toward the relationship between females' education and economic growth in Western Balkans countries. Additionally, it reveals where Western Balkans countries stand in the context of female's education and economic growth when comparing with other regions and further. And last but not least, it pronounces a critical argument of evidence not only by presenting a general frame of all previous research paper on this topic, but by developing the conceptual outline.

Despite the insights gained from the current study, this research faced some limitations as well. The lack of data in some of the countries was a major limitation. Additionally, there were no sufficient research studies toward this topic, especially in Western Balkan countries. These limitations affected the collection of the data in a way; however, they didn't create huge difficulties on exploring the topic.

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