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EDUCATION AND INTERNET USERS INDICATORS AND THEIR IMPACT ON THE UNEMPLOYMENT RATE IN EUROPEAN UNION COUNTRIES

Case Study

Keywords
Education index;
Internet users index;
Unemployment rate;
European Union;
Human development index;

JEL Classification
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Abstract

The purpose of the study is to examine the impact of Education and Internet users indicators on the Unemployment rate in two specific periods: 2016 and 2018. This study used Cross-sectional analyses to analyze data for two given years (2016 and 2018) by using multiple linear regression methods using SPSS software. The stepwise selection method was used to choose the variables. As the study indicates, there is no impact of Education index and Internet users index on the Unemployment rate in two given periods (2016 and 2018). The research implication of this study is that the data of 23 European Union countries have used to be analyzed in just two specific years (2016 and 2018).

INTRODUCTION

Nations seek to develop their economy in order to have efficient economic performance, therefore the process of decision making should be done by qualified economists (Balogh and Alhendi, 2019).
The Human Development Index is created and presented by the experts of UNDP which is known as the United Nations Development Program since 1990, as a reason for the operationalization of the capability approach, which was first developed during the 1980s (Malin, 2018).
Human Development index has a variety of indicators, some related to education, and another related to Internet users in different countries around the world. Education index can be considered as the average of mean years of schooling (of adults) and expected years of schooling (of children), both expressed as an index obtained by scaling with the corresponding maxima (Human Development Reports, 2019).
In the socio-economic issue which is marked by high unemployment rates, education is considered a crucial factor in the economic cycle (Cristescu, 2017).
In this study, the researcher examines the impact of two independent variables which are Education index and Internet users (2016 and 2018) on the Unemployment rate (2016 and 2018.) Hence, the hypotheses of this study are as follows:
H1: Education index 2016 has an impact on Unemployment rate 2016.
H2: Internet users 2016 has an impact on Unemployment rate 2016.
H3: Education index 2018 has an impact on Unemployment rate 2018.
H4: Internet users 2018 has an impact on Unemployment rate 2018.

METHODS AND PROCEDURES

The indicators of European Union countries were used by the researcher to be applied in this study, a total of 28 countries among European Union except five countries excluded because the data is not available. The researcher used cross-sectional analysis to analyze data for two years (2016 and 2018).
To investigate the purpose of this study the Education and Internet users indicators and their impact on the unemployment rate in European Union countries, the variables were coded as follows:
As shown in Table 1, the study adopted six variables, four of them were independent variables (Education index 2016, Education index 2018, Internet users 2016, Education index 2018) and two – dependent variables (Unemployment rate 2016 and Unemployment rate 2018). The education index means the average of mean years of schooling (of adults) and expected years of schooling (of children) in 2016 and 2018. Besides, Internet users also could be considered as the total persons using Internet compared with the total population (% of population) in a specific country in 2016 and 2016. These variables mentioned above have been analyzed to pinpoint their impact on unemployment rates in 2016 and 2018.
This study covered 23 European Union countries based on the availability of data; five countries were excluded. Data was gathered from two main sources United Nations Development Program which is known as UNDP and The Organisation for Economic Co-operation and Development (OECD).
To achieve study aims, Cross-sectional analysis was adopted to analyze data for two given years (2016 and 2018) by using multiple linear regression method, using SPSS software. Stepwise selection method was used to choose the variables.

RESULTS

The data of this study was collected for two years (2016 and 2018) for achieving comparisons. Then, two different models are discussed in the results as follows:

The first model (2016)
The data of 23 countries from European Union countries was gathered from two main sources to be analyzed by using multiple linear regression (using SPSS software). Therefore, the model is shown in the Table 2.
As the Table 2 illustrates, each of R, R Square, Adjusted R Square as well as Standard error of the estimate could indicate how the regression model fits the data (Balogh and Alhendi, 2019). Therefore, the value of the multiple correlation coefficients between Unemployment rate and predictors is represented by R. The value of R equals to 0.478 (close to +0.5), which indicates an acceptable value of prediction. R square (which equals to 0.228) reflects that the variability in Unemployment rate related to the selected predictors in the model is not high. Furthermore, in the fourth column of the table, Adjusted R square equals to 0.192 which is less than R Square by 0.036 or 3.6%. Based on this result, the value of R square is not high; it is a normal case when the independent variable is closed to be a human behavior (Education index and Internet users). Hence, the regression model is closed to fit the data.
Table 3 illustrates the statistical significance of the model through F-ratio, as follows:
As observed in the Table 3, $F(1, 21) = 6.215$, $p(.000) < .05$ (i.e., the regression model is a good fit of the data).

As for Table 4 of multiple linear regression, it can be observed by looking at the numbers in the column of Sig., the Education2016 p(0.021)>0.001 is not significant predictor. On the other meaning, there is no relationship between the variable and Unemployment rate.
On the other hand, the Internet users have been excluded from the model.
In the column of Standardized coefficients, in terms of Beta value, the contributive predictor which can explain Education2016 is Education2016 (-.478).
In this model, Multicollinearity problem does not exist because VIF for the predictor is less than 10 and also Tolerance equals 0.1.

Second Model (2018)
The second model includes data of 2018 related to education and Internet users indicators and the dependent variable which is the Unemployment rate. Data was also collected from two main sources, the same as in the first model (data 2016).
In model 2, Table 5, it can be observed that the value of multiple correlation coefficient between the independent and dependent variables is represented by R, which equals 0.434; it is less than 0.5 but is still acceptable to fit the data. Besides, R square value is 0.188. It means that the variability in the Unemployment in terms of independent variables is not high. Moreover, 0.149 is the value of adjusted R square, it can be observed that it is less than R square by 0.039 (3.9%). According to the result, as researcher mentioned in model (1), the independent variables are closed to be a human behavior; it is the main reason why the values of R and R square are not high.
Table 6 examines the statistical significance of the model through F-ratio, as follows.
In terms of Table 6, the value of p (.000)<.05, F (1, 21) = 4.860, then the regression model is a suitable fit of the data. Also, it is clear that in the column of sig., the Education 2018 p (0.039)>0.001, which meant it is not a significant predictor. It is possible to say there is no relationship between the Education 2018 and the Unemployment rate. To be noticed, Internet users2018 variable has been excluded from the model.
With regard to Table 7, in the column of Standardized coefficients, in terms of Beta value, the contributive predictor which can explain Education2018 is Education2018 (-.434).
In this model, VIF for the predictor is less than 10 and also Tolerance equals 0.1 that means Multicollinearity problem does not exist.

DISCUSSIONS

Based on the results in previous section, cross sectional analysis for two specific periods was used to fulfill the study objectives as well as Stepwise method was adopted. The results show the following observations.
As it could be observed in Table 8, it examines the differences between model 2016 and model 2018. Therefore, no variables have a high significant to affect the Unemployment rate in two periods (2016 and 2018). This variable is highly significant in each of 2015 and 2018.
On the other hand, the study of Giray (2014) indicates that all the measures of globalization and trade openness affect the unemployment rate. Hence, it could be mentioned that Education index and Internet users have a low effect on unemployment rate in European Union countries (23 countries) based on the results.

CONCLUSIONS

This study includes two independent variables as predictors (Education index and Internet users) as well as the dependent variable which is the Unemployment rate. Results reveal that there is no impact of the predictors on the Unemployment rate in two periods (2016 and 2018).
According to Giray (2014), globalization and trade openness have a high influence on the Unemployment rate. Besides, Hindun (2019), in his study illustrates that the level of education has a significant and negative impact on the unemployment rate. In the study of Mpendulo and Mang'unyi (2018), it is concluded that the education positively affect the unemployment.
The education significantly raises the re-employment rates of the unemployed persons. Particularly large impacts are found in the neighborhoods of 12 and 16 years of schooling (Riddell and Song, 2011).
By looking at the results of previous studies, it can be observed that the Unemployment rate is affected by different factors, these studies applied in different areas with a variety of dimensions related to education. The results of this study differ compared with previous studies because it has its' own features, it adopted 23 countries of the European Union and used cross-sectional analysis for just two periods (2016 and 2018).

REFERENCES

[1] Malin, H. (2018). *A capability analysis of Rwandan development policy: calling into question human development indicators*. Third World Quarterly, 39(1), 140-157.
[2] Human Development Reports (2019). Retrieved from: hdr.undp.org/en/indicators/103706#.
[3] Giray, G. (2014). *The impact of trade openness on the unemployment rate in G7 countries*. The

Journal of International Trade & Economic Development, 23(7), 1018-1037.

[4] Hindun (2019). *Impact of Education Level on Unemployment Rate in Indonesia*. International Journal of Educational Research Review, 321-324.

[5] Riddell, W. & Song, X. (2011). *The Impact of Education on Unemployment Incidence and Re-employment Success: Evidence from the U.S. Labour Market.* Canadian Labour Market and Skills Researcher Network Working Paper No. 80.

[6] Cristescu, A. (2017). *The impact of education on the unemployment rate in the Southern European Model*. Romanian Journal of Regional Science, 11(1), 62-75.

[7] Alhendi, O. & Balogh, P. (2019). *Economic development across the globe in terms of English Proficiency and Employability*. conference paper, Karoly Ihrig doctoral school-Debrecen University, 22 November 2019.

LIST OF TABLES

Table 1
Independent and dependent variables of the study

Variables	Independent / Dependent	Code	Data source
Education index 2016	Independent	Education2016	Undp
Education index 2018	Independent	Education	Undp
Internet users 2016	Independent	Internetusers2016	Undp
Internet users 2018	Independent	Internetusers	Undp
Unemployment rate 2016	Dependent	Unempl2016	Oecd
Unemployment rate 2018	Dependent	Unempl2018	Oecd

Table 2
Model Summary b (For the data of 2016)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.478a	.228	.192	4.165383559

a. Predictors: (Constant), Education2016
b. Dependent Variable: Unempl2016

Table 3
(Data of 2016) ANOVAa

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	107.827	1	107.827	6.215	.021b
Residual	364.359	21	17.350		
Total	472.186	22			

a. Dependent Variable: Unempl2016
b. Predictors: (Constant), Education2016

Table 4
(Data of 2016) Coefficients a

Coefficients[a]								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	46.462	15.202		3.056	.000		
	Education2016	-43.715	17.536	-.478	-2.493	.021	1.000	1.000

a. Dependent Variable: Unempl2016

Table 5
Model Summary e (For the data of 2018)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.434a	.188	.149	3.575263649

a. Predictors: (Constant), Education
b. Dependent Variable: Unempl2018

Table 6
(Data of 2018) ANOVAa

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	62.120	1	62.120	4.860	.039b
Residual	268.433	21	12.783		
Total	330.553	22			

a. Dependent Variable: Unempl2018
b. Predictors: (Constant), Education

Table 7
(Data of 2018) Coefficients a

Coefficients[a]								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	35.904	13.275		2.705	.013		
	Education2018	-33.678	15.277	-.434	-2.204	.039	1.000	1.000

a. Dependent Variable: Unempl2018

Table 8
Comparison between Model 2016 and 2018

Model 2016		Model 2018	
Predictors	Significance	Predictors	Significance
Education index 2016	Not sign.	Education index 2018	Not sign.
Internet users 2016	Not sign.	Internet users 2018	Not sign.

Appendix 1
The data which analyzed in the study

#	Country	Index 2018	Index 2016	Internet users2018	Internet users2016	Unemployment rate 2018	Un. rate 2017	Un. rate 2016
1.	Belgium	0.893	0.893	88.7	86.5	5.949855	7.088736	7.833329
2.	France	0.811	0.809	82	79.3	9.059228	9.398605	10.05661
3.	Germany	0.946	0.946	89.7	84.2	3.38409	3.746631	4.122733
4.	Italy	0.793	0.79	74.4	61.3	10.60792	11.21117	11.68803
5.	Luxembourg	0.802	0.798	97.1	98.1	5.582682	5.516146	6.285928
6.	Netherlands	0.906	0.906	94.7	90.4	3.832352	4.840418	6.00791
7.	Denmark	0.92	0.92	97.6	97	5.132677	5.833254	5.988536
8.	Ireland	0.918	0.918	84.5	85	5.738596	6.71373	8.37511
9.	United Kingdom	0.916	0.914	94.9	94.8	3.996093	4.330292	4.809951
10.	Greece	0.833	0.824	73	69.1	19.29447	21.48901	23.54104
11.	Portugal	0.759	0.759	74.7	70.4	6.994051	8.870407	11.06846
12.	Spain	0.824	0.822	86.1	80.6	15.25788	17.22489	19.63388
13.	Austria	0.871	0.865	87.7	84.3	4.848801	5.500528	6.014071
14.	Finland	0.915	0.915	88.9	87.7	7.357432	8.63445	8.811286
15.	Sweden	0.914	0.914	92.1	89.7	6.364352	6.718704	6.991096
16.	Czech	0.892	0.892	80.7	76.5	2.243518	2.890817	3.952049
17.	Estonia	0.881	0.882	89.4	87.2	5.374337	5.762793	6.753039
18.	Hungary	0.816	0.815	76.1	79.3	3.707886	4.157162	5.119285
19.	Latvia	0.871	0.865	83.6	79.8	7.415344	8.716354	9.641258
20.	Lithuania	0.89	0.887	79.7	74.4	6.152077	7.07182	7.860914
21.	Poland	0.866	0.866	77.5	73.3	3.846072	4.887239	6.161703
22.	Slovakia	0.824	0.822	80.7	80.5	6.536399	8.130965	9.671689
23.	Slovenia	0.893	0.885	79.8	75.5	5.110229	6.569075	8.006598