

Are the World Countries Achieved the United Nations Sustainable Development Goal of Caring for People? A Case Study of Reducing Unemployment

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Abstract: The study aimed to find out the extent of achieving one of the most important sustainable development goals of the United Nations, which is the goal of caring for people, by investigating the impact of spending on education and research and development (R&D) as one of the tools for caring for people and its impact on decreasing unemployment rates. Applied to high-income countries² compared to low and middle-income countries according to the World Bank classification. Using econometrics methodology by applying Vector Autoregressive Model and Autoregressive Distributed Lag model. For high-income countries, the results of the short term, as well as the long term, confirmed that spending on education did not play a role in reducing unemployment, while spending on research and development plays a positive role in reducing unemployment. For low- and middle-income countries, short-term proved that spending on education has a positive role in reducing unemployment rates, and the positive role of spending on research and development did not prove, but in the long term, the results were counterproductive, as spending on education could not reduce unemployment, however, spending on research and development can reduce unemployment in those countries, These results reflect the distortions in the labor market and the mismatch between the education process and the requirements of the labor market in all countries of the world, and hence its slowdown in achieving sustainable development.

Keywords: Government spending - Education- Research & Development- Unemployment- Sustainable Development Goals- High Income Countries- Low & Middle Income Countries

1. INTRODUCTION

The education and scientific research sectors are considered among the most important sectors that support sustainable development in any society, as this came within the first goal of the United Nations Sustainable Development Goals, the goal of focusing on people, this is achieved through the preparation and formation of the human capital necessary to operate in all other economic sectors, in addition to supporting scientific research because of its positive impact on the development of all sectors at the community level and overcoming many problems and obstacles that may encounter.

Thus, it is possible to improve people's quality of life, eradicate poverty and achieve well-being, which is called for by the first goal of the United Nations Sustainable Development Goals.

As all countries of the world have recently gone through many economic challenges that may have cast a shadow on many different economic indicators, the importance of the study stems from investigating how these challenges affect the public expenditure allocations for both education and scientific research and their impact on the labor market represented in unemployment rates, with applying to the high-income countries segment compared to the low- & middle-income countries segment, according to the classification of the World Bank.

The study aims to analyze the impact of public spending on education and scientific research in high-income countries

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²High-income countries include 1. N. Caledonia, 2. Greece, 3. Spain, 4. Bahamas, 5. Panama, 6. Uruguay, 7. Barbados, 8. Italy, 9. Chile, 10. Croatia, 11. Sweden, 12. Puerto Rico, 13. France, 14. Lithuania, 15. Brunei, 16. Latvia, 17. Finland, 18. Canada, 19. Mauritius, 20. Saudi Arabia, 21. Slovakia, 22. Portugal, 23. Ireland, 24. Belgium, 25. Estonia, 26. Austria, 27. Cyprus, 28. USA, 29. Iceland, 30. Hong Kong, 31. Switzerland, 32. Luxembourg, 33. Romania, 34. Australia, 35. Israel, 36. Norway, 37. Denmark, 38. Tr.&Tobago, 39. UK, 40. Slovenia, 41. Hungary, 42. New Zealand, 43. Netherlands, 44. Kuwait, 45. Singapore, 46. Germany, 47. South Korea, 48. Malta, 49. Poland, 50. UA Emirates, 51. Oman, 52. Macao, 53. Czechia, 54. Japan, 55. Bahrain, 56. Qatar.

Vs low & middle-income countries, analyze the development of unemployment rates in both segments, and analyze the relationship between spending on education and scientific research and the unemployment rates in the areas under study during the period 2000-2021, then evaluating the economic policies pursued to achieve the first goal of sustainable development which is focusing on people.

The basic hypothesis H0: In all countries of the world, regardless of income groups, public spending on education and scientific research has an inverse relationship with unemployment rates, according to economic theory. H1: High-income countries are aware of the importance of the education and scientific research sectors and public spending on education and scientific research have an inverse relationship with unemployment rates, more than low and middle-income countries.

The world's nations are working to achieve sustainable development goals, the first of which, according to the United Nations, calls for increased spending on science, research, and education while simultaneously lowering unemployment rates. The research problem of the study is then addressed. To ascertain how the first objective of sustainable development has been achieved and what obstacles still remain, an investigation of how spending on education, research and development affected the unemployment rates from 2000 to 2021 is being made.

The study poses a crucial query: Are high-income countries vs low- and middle-income countries achieved united nations sustainable development goals by spending on education and R&D to reduce unemployment?

The study follows the econometrics methodology of Nevila Mehmetaj & Nevila Xhindi(2022) by analyzing the impact of public spending rates on education and scientific research and the development (R&D) on the unemployment rate applying to the group of high-income countries compared to low and middle-income countries during the period 1990-2021, building a multiple linear regression model to investigate the impact of public spending on education and scientific research as independent variables and unemployment rates as a dependent variable and applying Vector Autoregressive (VAR) Model to investigate the short run relationship between variables, and Autoregressive Distributed Lag (ARDL) model to investigate the long run through the use of a time series data for the period 1990-2021 using statistical program E-Views12.

2. LITERATURE REVIEW

The Education 2030 Agenda, a component of the worldwide effort to alleviate poverty through the accomplishment of 17 Sustainable Development Goals by 2030, is being led by UNESCO, to accomplish each of these objectives, education is necessary. 2020 (UNESCO), the relationship between education level and unemployment is theoretically supported by the human capital theories.

In terms of the relationship between spending on education and unemployment rates or employment rates and the labor market in general, W. Craig Riddell& Xueda Song (2011), studies how education affects people's transitions from employment to unemployment, with a focus on how much edu-

cation affects re-employment outcomes for those who are unemployed. given that favorable. using data on mandatory schooling laws, child labor laws, and conscription risk during the Vietnam War period to create instrumental variables to identify the causal relationships. Because correlations between education and labor force transitions are likely to be confounded by the endogeneity of education, we use these data to create instrumental variables. According to the findings, education greatly raises the rate at which the unemployed find new jobs. In the areas where students have completed 12 and 16 years of education, repercussions are particularly significant. There is conflicting evidence regarding how formal education affects unemployment rates.

The study of the labor markets in low-income nations by Yoonyoung Cho, David Margolis, David Newhouse, and David Robalino (2012) presents a three-pronged strategy that focuses on offering incentives and favorable working conditions, boosting the efficacy of job creation, and controlling risks/facilitating labor market changes.

To analyze differences in income and employment that are influenced by education level (Ilga Lavrinovicha*a, Olga Lavrinenkob, and Janis Teivans-Treinovskis, 2014) using methods of frequency, correlation, and regression analysis. This is in regard to the influence of education on the unemployment rate and incomes of residents. Empirical evidence supports the relationship between education and status in the labor market, and the relationship between education and employment is also looked at. Between the years 2012 and 2013, the study examines the effect of schooling on the unemployment rate and the level of income of Latvian inhabitants.

Panel data regression analysis was used by Zafer Pirim, William A. Owings& Leslie S. Kaplan (2014) to assess the long-term impacts of various indicators of U.S. education spending on unemployment rates over a 25-year period in all 50 states and Washington, D.C. The information contained stats at the state level on fiscal effort, graduation rates, education spending per pupil, gross state product per capita, welfare expenditure, health spending, political party identification, union versus nonunion states, and unemployment rates. The best method to successfully reduce unemployment, according to the findings, is to invest in raising the standard of human capital through supporting education. Findings particularly state that long-term investments in human capital through health care and education, as measured by per-pupil spending, might significantly lower unemployment rates.

Also Muhammad Baqir Abdullah & Others (2017) investigates the impact of jobs produced by public education spending. This spending is crucial for creating jobs, recruiting qualified workers, and meeting the labor needs of various industries. In order to boost labor productivity and combat economic issues like unemployment and poverty, education is also viewed as a human capital investment. In other words, society views education as a source of prosperity. Based on the findings of this report, it is recommended that further research be done on the effects of government spending on employment and education. It is done with the intention of determining how much of an impact education can have on Malaysia's economic sector employment.

Following that (Grabe Mpendulo & Eric E. Mang'unyi: 2018) in their study investigates the associations between young people's unemployment and educational attainment in four South African municipalities using a systematic random sample technique. It was done using a cross-sectional survey design. The young adults who were able to obtain employment provided 120 self-completed survey questionnaires, which were used to gather the data. The findings indicate that economic status and educational attainment are negatively connected, while they are positively correlated with unemployment. According to recognized relationships, education level was shown to have the greatest impact on unemployment and to positively link to unemployment.

Unemployment with Educational Attainments in Lower Middle-Income Countries: 1994-2017", by (Sifatul Mostafi, 2018) empirically examined how labor forces with different levels of educational attainment affect the overall unemployment rate in lower-middle-income countries and found that 53 low middle income countries over the period of 1994–2017, increased labor forces with advanced educational attainment tend to be more unemployed, increasing the overall unemployment rate in developing countries with lower-middle-income levels.

Olayinka K. Binuomoyo(2020), found that overwhelming majority of empirical and theoretical data supports the idea that considerable public investment in education has a multiplier effect on employment. This is not coherent in a macro-economic framework, according to empirical evidence. The government has been accused of not doing enough to support the field of education due to its budgetary limitations. The effect of government spending on unemployment in Nigeria is examined in this study. OLS estimates used for secondary data regressed over 27 years on unemployment, federal government recurrent expenditure on education, and economic growth revealed that while growth is significant and does, in fact, negatively affect unemployment in accordance with our a priori expectation, the impact of public expenditure on education is not the same. research showed that while Nigeria's educational capacity has grown, the impact has been limited because the country's economy cannot take in the graduates. In order to correct this anomaly, the government must become more successful by providing appropriate avenues for business expansion and sustainability, which will boost the latter's ability to hire more workers.

At the same level (Sinan ALÇIN, Begüm ERDİL ŞAHİN, and Merve Hamzaoglu: 2021) Using fragments of data from Turkey and Spain and Johansen Cointegration tests to evaluate the relationship between education and youth unemployment, the study finds no unidirectional causal relationship between higher education enrolment and the youth unemployment rate in Turkey and Spain. And the rise in higher education enrollment does not result in a reduction in youth unemployment. The study thus confirmed the need of considering the relationship between young unemployment and education when formulating measures to enhance youth job markets.

Osasohan Agbonlahor: 2021) According to the study, international PhD students' outcomes are influenced by economic possibilities and wealth disparities in their native countries. The study employed hierarchical linear modeling analysis

with the Survey of Earned Doctorates to look at how financial variables and macroeconomic data from the student's home country affected where they ended up in the labor market. The likelihood of remaining in the United States was significantly increased by higher home country unemployment rates, while it was significantly decreased by higher gross national income per person.

Nevila Mehmetaj & Nevila Xhindi(2022), Examine whether Albania's youth unemployment rates are influenced by the government's allocation of the country's total public education spending. a quantitative evaluation of all government spending on education and the impact of the nation's economic growth rates on the nation's young unemployment rates is examined. The analysis of the nation's economic growth rates on the youth unemployment rates of tertiary education graduates in Albania is then followed by a second, more thorough investigation of public expenditures in higher education. In order to test the short-run dynamics and long-run causalities among the variables, time series data are employed in a variety of econometric analyses, including the Augmented Dickey-Fuller test, the Johansen test, and the vector error correction (VEC) model. The study's findings indicate that while there is a long-term causal relationship between total public education spending and the young unemployment rate, there is a short-term relationship between the real economic growth rate and the youth unemployment rate.

As for the impact of spending on research and development on unemployment or employment rates, by creating an econometric model, Hiroaki Miyamoto (2010) tried to study how labor market policies affected R&D and unemployment. According to the study, worker protection rules that are more stringent on the labor market result in lower levels of R&D activity. The study also offers a theoretical framework for understanding how R&D efforts, labor market regulations, and unemployment are related.

Mariacristina Piva & Marco Vivarelli(2017), in their study about R&D for employment, micro econometric evidence from the EU," concludes that R&D expenditures have a large positive employment effect, but that this effect is limited in scope and completely attributable to the middle- and high-tech sectors, with no effect, observed, in the low-tech industries. The analysis utilizes a special firm-level database of the top European R&D investors from 2002 to 2013 and performs LSDVC calculations.

While Tommaso Ciarli et al. 2018) argued that in general, R&D development has no multiplier effect on local employment but changes its composition, according to the Impact of R&D on Employment and Self-Employment Composition in Local Labor Markets study. The study also found that depending on the initial degree of routineness, results differ greatly.

Case of Five Selected European Countries (SOKHANVAR & Serhan IFTIOLU: 2020) empirically examines the short- and long-term effects of changes in R&D intensity, in particular, the rate of unemployment as well as economic development for a sample of five European countries. Data from the sample period of 1991 to 2017 are used. They come to the conclusion that there is an ongoing relationship between

R&D, the unemployment rate, and economic expansion. It might negatively impact unemployment in the short term.

On the other hand YILDIRIM (2020) established that there is a one-way causal relationship between R&D spending and unemployment in Turkey at a significance level of 5%. A statistically significant one-way causal connection between unemployment and R&D expenditure is discovered in Azerbaijan at a significance level of 5%.

Mahinur Begum Mimi & Others (2022), examines the impact of Bangladesh's investment in human capital on unemployment from 1995 to 2019. Using the ADF and PP tests to find the unit root of the study. The effects of human capital investment on unemployment are estimated over the short- and long-terms using the Model using Autoregressive Distributed Lag (ARDL). The ARDL bound cointegration test is used to determine if cointegration exists or not. Comparatively, Granger Causality test is used to determine whether there are causal linkages between variables. The study's conclusions show that government investments in human capital's health have a big impact on Bangladesh's rate of long-term unemployment. The Pairwise Granger test reveals a single direction of causality between government spending on education and the unemployment rate. The study found no evidence of a short-term link between unemployment rates and human capital investment. The government is advised to boost health spending and enhance the health sector in order to create a healthier nation and eventually lower Bangladesh's unemployment rate. The government may grant vocational and career-focused education equal weight to general education to link education and employment.

Therefore, most of the previous studies have proven that, as stated in economic theory, spending on education supports the labor market and reduces unemployment rates, or in other words, it raises employment rates or productivity. This applied to many countries regardless of the level of income, high or low, as studies have shown. Also, spending on research and development positively affects employment rates in general as shown in the previous literature. As for the current study, it explores whether spending on education, research and development played their role in reducing unemployment rates according to economic theory by applying it to high-income countries compared to low- and middle-income countries or not, meaning that the scientific addition to the current study is in selecting the group of countries to which the economic theory is applied. Also, the current study used many economic analysis tools used by the previous literature to achieve its objective and the time frame of the current study is something that has not been addressed before.

3. DATA AND METHODOLOGY

3.1. Data

The variables chosen to examine how expenditure on education and R&D affects unemployment rates in high-income nations are listed in Table (1) below. From 2000 to 2021 in comparison to low- middle-income nations. Table (1) provides a definition of each variable that is part of the econometric model. All of the annual statistics included in the model were gathered from world bank tables and span the years 2000–2021. The analysis of the data was conducted using E-Views 12.

Table 1. Economic Variables Included in the Model.

Name	Code	Definition	Source
Expenditure on Research & Development	R&D (X1)	Research and development expenditure is the money invested in the creative effort done on a regular basis to build knowledge and use that information to create new applications.	https://stats.oecd.org/glossary/detail.asp?ID=2315
Expenditure on Education	EDU (X2)	Expenditure on Education comprises all spending on educational activities made on the national territory by all economic agents, including the federal, state, and municipal governments, businesses, and people. The organization of the educational system (general administration, educational guidance, and education research), activities intended to promote school attendance (catering and boarding facilities, school medical services, school transportation), and costs incurred by schools (supplies, books, clothing) are among these activities).	Domestic expenditure on Education, https://www.insee.fr/en/metadonnees/definition/c2093
Unemployment Rate	Unemployment (Y)	The unemployment rate is the proportion of the workforce that is unemployed. It is a lagging indicator, which means that rather than foretelling changes in economic conditions, it often rises or decreases in response to them	What Is the Unemployment Rate? https://www.investopedia.com/terms/u/unemploymentrate.asp

3.2. Methodology

This study aims to determine how expenditure on education and R&D affected unemployment rates in high-income nations in comparison to middle- and low-income countries between 2000 and 2021. Applying the Multiple Linear Regression Model while starting by applying descriptive and

tests for model variables, then applying Vector Autoregressive (VAR) Model to investigate the short-run relationship between the model variables, then applying Autoregressive Distributed Lag (ARDL) Model to investigate the long run relationship, the main model will take the following formula:

$$Y_{it} = \alpha + \beta_1 X_{1it} + \beta_2 X_{2it} + \epsilon_{it} \quad (1)$$

Where Y_{it} is the endogenous variable, refers to the unemployment rate

α is the intercept,

B1 represents the partial coefficients for the exogenous variables $X1_{it}$ (which refers to expenditure on research & development).

B2 represents the partial coefficients for the exogenous variables $X2_{it}$ (which refers to expenditure on education).

In the study, this model will be used twice. For the first time, it will be used to examine the effects of spending on R&D and education on unemployment rates in high-income nations. The second time, it will be used to examine the same relationship in middle- and low-income countries.

4. EMPIRICAL RESULTS & DISCUSSION

4.1. Descriptive and Tests for Model Variables

Table 2. Descriptive Statistics for High-income Countries.

	UNEMPLOY	EDUX1	RDX2
Mean	6.842606	12.21457	2.352370
Median	7.012601	12.25204	2.297669
Maximum	8.260613	12.99238	2.967474
Minimum	4.797537	11.29195	2.148122
Std. Dev.	0.912262	0.445095	0.219260
Skewness	-0.396053	-0.161102	1.438925
Kurtosis	2.347432	2.333392	4.673736
Jarque-Bera	1.404370	0.730909	14.77788
Probability	0.495502	0.693881	0.000618
Sum	218.9634	390.8664	75.27583
Sum Sq. Dev.	25.79890	6.141383	1.490324
Observations	32	32	32

Source: Author calculation using research data sources, applying E-views12

The descriptive statistics for high-income countries data offer quantitative insights into the chosen data set. The key measurements and standard deviation are shown in Table (2) above. The findings indicate that the means of all the variables chosen throughout the study period were positive. However, the model's unemployment rate and education spending relative to R&D spending both have substantial standard deviations. These results may differ slightly in low- and middle-income nations, as seen in table (3) below, where there is a positive mean for all chosen variables but a high standard deviation in unemployment only when compared to expenditure on education and expenditure on R & D factors.

Table 3. Descriptive Statistics for Low- and Middle-income Countries.

	UNEMPLOY	EDUX1	RDX2
Mean	4.867319	15.21029	0.969721
Median	4.952404	15.22857	0.861978
Maximum	5.832926	15.97959	1.863377
Minimum	3.799079	14.21379	0.575390
Std. Dev.	0.580936	0.393807	0.388024
Skewness	-0.511210	-0.569752	0.775115
Kurtosis	2.728553	3.837184	2.587476
Jarque-Bera	1.492033	2.665796	3.431183
Probability	0.474252	0.263712	0.179857
Sum	155.7542	486.7294	31.03107
Sum Sq. Dev.	10.46210	4.807605	4.667438
Observations	32	32	32

Source: Author calculation using research data sources, applying E-views 12.

4.2. Vector Autoregressive (VAR) Model (Short Run Relationship)

There may be a reciprocal effect between the model variables, as education can affect unemployment by reducing the unemployment rate as expected in the economic theory, but in fact, a high unemployment rate can give a negative impression about the importance of education, as well as the relationship between scientific research and unemployment, so the study chooses to apply The vector autoregressive (VAR) model which differs from univariate autoregressive models because they allow feedback to occur.

Table 4. Vector Autoregression Estimates.

High-Income Countries		low and Middle-income Countries	
Variable	Co-Efficient	Variable	Co-Efficient
UNEMPLOY (-1)	0.894971	UNEMPLOY (-1)	0.729742
UNEMPLOY (-2)	-0.370199	UNEMPLOY (-2)	-0.008368
C	4.135259	C	3.579943
EDUX1	0.105778	EDUX1	-0.152914
RDX2	-0.921563	RDX2	0.170766
R-squared	0.598028	R-squared	0.754426
F-statistic	9.3	F-statistic	19.20058

Source: Author calculation using research data sources, applying E-views12

The result for high-income countries shows that there is a short-run positive relationship between unemployment and the public expenditure on education This may reflect the

insufficiency of the labor market in absorbing labor in the short term, but for this group of countries the result shows a negative relationship between the public expenditure on R & D and the unemployment rate, this result is consistent with the economic theory as well as with achieving the goal of sustainable development, where the state is supposed to seek, through spending on education and scientific research, to improve employment rates, and then improve income and improve the quality of human life.

On the other hand, concerning low- and middle-income countries the results in the short run show that there is an inverse relationship between spending on education and unemployment rates, which means that the labor market is still thirsty for graduates and can absorb many despite the internal distortions of the labor market, where jobs may not match qualifications. While the results showed a positive relationship between spending R & D and unemployment rates, which contradicts the economic theory, perhaps this is due to labor market distortions and weak rates of spending on research and development in these countries, and then the model may not be characterized by quality in judging the relationship in this case.

Table 5. Brief of Short Run Relationship.

high-income countries	public expenditure on education (negatively affect) unemployment	public expenditure on R & D (positive effect for reducing unemployment
low- and middle-income countries	public expenditure on education (positive effect to reduce unemployment	public expenditure on R & D (negatively affect) Unemployment

Source: Author calculation using research data sources, applying E-views12

4.3. Autoregressive Distributed Lag (ARDL) model (Long Run Relationship)

The ARDL cointegration method is recommended for working with variables that are integrated in a different order, such as I(0), I(1), or a combination of both. When there is only one significant long-term relationship between the un-

derlying variables in limited sample size, it is also trustworthy. The F-statistic is used to identify whether the underlying variables have a long-term relationship; when the F-statistic exceeds the critical value band, a long-term relationship of a series is considered to have been established. The ARDL cointegration technique does not require pre-testing for unit roots, but in our opinion I,t should be done to determine the number of unit roots in the series under consideration in order to avoid ARDL model crash in the presence of integrated stochastic. This is presented in the next section:

4.3.1. Unit Root Test:

For High-income countries data: The next results in table (6) according to Augmented Dickey-Fuller (ADF) test show that the time series for all variables are normal distribution:

For testing the stationarity of (Y) variable time series, it appeared that be a station at the 2nd difference with intercept as R square greater than Durbin Watson state, while for x1 variable time series it appeared that be a station at the 2nd difference with intercept, and For x2 variable time series its appeared that be a station at the 2nd difference with intercept, as Prob T greater than T – Statistic.

For low- and middle-income countries The findings demonstrate that the time series for all variables have a normal distribution, according to the Augmented Dickey-Fuller (ADF) test:

For testing the stationarity of the (Y) variable time series, there appeared to be a station at the second difference with the intercept as R square greater than the Durbin Watson state, while for the (x1) variable time series, there appeared to be a station at the first difference with the intercept, and for the (x2) variable, there appeared to be a station at the second difference with the intercept as Prob T greater than T – Statistic.

4.3.2. ARDL Model Results

The results showed in table (7) that for low- and middle-income countries in the long term, spending on education has a positive relationship with unemployment rates, and this

Table 6. ADF Estimates.

High-Income Countries					low and Middle-income Countries				
Variable	Coefficient	Std. Error	t-Statistic	Prob.	Variable	Coefficient	Std. Error	t-Statistic	Prob
D (UNEMPLOY (-1),2)	-1.458900	0.219299	-6.652566	0.0000	D(RDX2(-1),2)	-3.023033	0.487768	-6.197680	0.0000
C	-0.042196	0.158030	-0.267012	0.7915	D(RDX2(-1),3)	1.510800	0.464821	3.250284	0.0035
R-squared	0.621088	Mean dependent var		-0.099727	D(RDX2(-2),3)	1.010573	0.279277	3.618530	0.0014
Variable	Coefficient	Std. Error	t-Statistic	Prob.	C	0.010721	0.012380	0.865983	0.3954
D(EDUX1(-1),2)	-2.456056	0.319975	-7.675781	0.0000	R-squared	0.830307	Mean dependent var		-0.011570
D(EDUX1(-1),3)	0.478922	0.175572	2.727786	0.0115					
C	-2.62E-16	0.098882	-2.65E-15	1.0000					
R-squared	0.869265	Mean dependent var	-4.44E-16						

Source: Author calculation using research data sources, applying E-views12.

Table 7. ARDL Estimates.

high-income Countries				Low- and middle-income Countries:			
Variable	Coefficient	t-Statistic	Prob.*	Variable	Coefficient	t-Statistic	Prob.*
LOG(UNEMPLOY(-1))	1.199044	5.670468	0.0000	LOG(UNEMPLOY(-1))	0.838579	3.122698	0.0168
LOG(UNEMPLOY(-2))	-0.554132	-2.909504	0.0077	LOG(UNEMPLOY(-2))	-0.011792	-0.035727	0.9725
LOG(EDUX1)	0.602472	1.291863	0.2087	LOG(UNEMPLOY(-3))	0.027550	0.159368	0.8779
LOG(RDX2)	2.659708	2.614849	0.0152	LOG(UNEMPLOY(-4))	0.057403	0.337676	0.7455
LOG(RDX2(-1))	-3.362237	-3.065041	0.0053	LOG(UNEMPLOY(-5))	-0.121664	-0.677841	0.5196
C	-0.265641	-0.222743	0.8256	LOG(UNEMPLOY(-6))	0.277320	1.572987	0.1597
R-squared	0.691291			LOG(UNEMPLOY(-7))	-0.046574	-0.216107	0.8351
				LOG(EDUX1)	0.293566	0.523563	0.6167
				LOG(EDUX1(-1))	0.099339	0.206743	0.8421
				LOG(EDUX1(-2))	0.656561	1.500301	0.1772
				LOG(EDUX1(-3))	1.207863	2.283946	0.0563
				LOG(EDUX1(-4))	1.776043	2.315388	0.0538
				LOG(RDX2)	-0.723794	-1.287858	0.2387
				LOG(RDX2(-1))	0.558957	1.302150	0.2341
				LOG(RDX2(-2))	-0.665289	-1.761113	0.1216
				LOG(RDX2(-3))	-0.225803	-0.522003	0.6178
				LOG(RDX2(-4))	1.109572	2.025536	0.0825
				C	-10.89581	-2.112753	0.0725
				R-squared	0.938383		

Source: Author calculation using research data sources, applying E-views12.

may reflect the labor market's failure to absorb graduates, especially with the increase in their numbers over time, which requires taking appropriate economic and social policies to match education outputs with the requirements of the labor market on the one hand, as well as Create an appropriate investment environment for more projects to absorb labor. As for the relationship between spending on research and development and unemployment rates, the results showed that there is a negative relationship in the long term and that this relationship becomes clear after at least two years of spending until it becomes clear its impact on reducing unemployment rates through research on labor market problems and the investment environment. And put forward and implement solutions to it, which is a logical result that is consistent with the economic theory For High-income countries Unexpectedly, the model's results are relatively comparable to the same results for low- and middle-income countries, confirming the need to create and enhance economic policies with the long-term goal of balancing labor market demands with educational outcomes, as well as improving the investment environment to create more jobs from, On the one hand, spending on research and development has a good effect on reducing unemployment rates in the long term.

Table 8. Brief of Long Run Relationship.

high-income countries	Public expenditure on education (negatively affect) Unemployment	Public expenditure on R&D (positively affect) Unemployment rate
low- and middle-income countries	Public expenditure on education (negatively affect) Unemployment	Public expenditure on R&D (positively affect) Unemployment rate

Source: Author calculation using research data sources, applying E-views12

5. CONCLUSION & POLICY RECOMMENDATIONS:

For high-income countries in the short run, the findings support the findings of (Ilga Lavrinovicha*a, Olga Lavrinenkob, and Janis Teivans-Treinovskis, 2014) that there is a positive link between unemployment and public expenditure on education, and a negative relationship between the public expenditure on R & D and the unemployment rate which is may consist with (Serhan ÇIFTÇIOĞLU & Amin SO-KHANVAR: 2020) results, and the last result matching with economic theory while the first one not matching. Also in

the long run a positive relationship between spending on education and unemployment rates was confirmed, as long as a negative relationship between spending on research and development and unemployment rates. Therefore, the results did not differ, whether in the short or long run for high-income countries.

Thus, the results are in matching with the economic theory only about the relationship between spending on research and development and unemployment rates, while the results were the opposite of economic theory in other relationships, which may reflect the existence of distortions in the labor market and in its relationship with education outputs, which requires policy modification. economic followed and so on.

For low- and middle-income countries, the results show that in the short run there is a negative relationship between spending on education and unemployment rates and this is consistent with economic theory. And a positive relationship between spending on research and development and unemployment rates, which is inconsistent with economic theory. While in the long run spending on education has a positive relationship with unemployment rates and a negative relationship between spending on research and development and unemployment rates. this result matches with (Sinan ALÇIN, Begüm ERDİL ŞAHİN, and Merve Hamzaoglu: 2021).

Thus, the study proved the validity of the alternative hypothesis more than the validity of the null hypothesis, hence, these results show that low and middle-income countries suffer from distortions in the relationship between spending on education and scientific research and their impact on reducing unemployment rates, which reflects the need for more efforts and policies to improve the business environment in a way that aims to improve the lives of citizens in general and In a way that makes the economic variables move in the right directions, whether in the short or long run and in accordance with economic theory in general. Therefore, the last group of countries needs to direct more quantitative and qualitative efforts towards developing and supporting education and scientific research so that they can have a positive impact on the labor market and the sustainable development goals with regard to focusing on people.

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