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SUSTAINABILITY AND RESILIENCE FROM THE PERSPECTIVE OF THE LABOUR MARKET OF CENTRAL AND EAST EUROPEAN (CEE) MEMBER STATES

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Abstract: The paper examines the short-term relationship among the labour market and two key indices, namely the ESGI (Environment, Social, and Governmental Index) measuring sustainability-related risks, and the SRI (State Resilience Index), focusing on Central and Eastern European (CEE) member countries. The findings indicate that an expansion of the labour force contributes to heightened environmental, social, and governance risks, but enhances state resilience. Factors such as adapting to digitisation, enhancing quality of life amidst economic growth, and increased education levels contribute to a more robust workforce. Economic growth tends to discourage individuals from pursuing higher education, and unemployment among those with tertiary education disrupts the labour market equilibrium. In this context, state intervention through additional investments in education yields positive effects on the labour market and, by extension, on state resilience, potentially mitigating environmental, social, and governance risks. The results address existing gaps in the literature and provide valuable insights for shaping economic policy measures in CEE countries.

Keywords: sustainability, resilience, labour market, digitisation, economic growth.

1. INTRODUCTION

Reducing environmental, social, and governance risks and strengthening state resilience are macroeconomic policy objectives which are receiving increasing attention due to their importance in supporting development.

ESGI values are considered a sustainability assessment tool (Rajesh, 2019). Sustainability involves meeting the needs of the present without affecting the ability of future generations to meet their own. Performance in terms of sustainability involves analysing the potential negative impact of economic activities on the environment in both developed and emerging countries. Organizational sustainability takes shape at the intersection between the environment and society (Rajesh, 2019). In the initial stages, practices oriented towards ESG directions are considered costly. When they exceed the minimum requirements of legal

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standards, they lead to a reduction in the value of companies and have unfavourable macroeconomic effects (Sadiq et al., 2020). Adopting environmentally and socially responsible measures through good governance is necessary; otherwise, the long-term costs can be much higher.

The concept of ESG existed before the 1950s, but only in the 2010s did it start to be included among the points of interest for companies (Gao et al., 2021). The three directions of the concept, according to Gao et al. (2021), refer to social responsibility (improving environmental performance in production and reducing environmental costs per output unit), social responsibility (presupposes that companies apply business ethics, social ethics, legal standards to which is added the importance of relations with the external society, which includes human rights, the interest of different parties, and ecological improvement), and corporate governance responsibility (the management system through which a company should improve its modern corporate system). ESG is a leading indicator of non-financial performance. Baier et al. (2020) consider the concept of ESG as not clearly defined and therefore difficult to measure. On the same line is the argumentation of Dmuchowski et al. (2023), who found that ESG performance analyses are not conclusive due to the lack of a clear definition, available data, insufficient quality of ESG data and ratings.

Resilience is considered the result of the application of structural economic policy measures generating sustainable economic growth. Such growth gives the economy the capacity to cope with shocks, to overcome them easily, and to reduce risks (Webber et al., 2018). All the ways in which a country achieves its economic growth goals support resilience. According to Muštra et al. (2017), growth is associated with resilience, and this generates opportunities in the labour market. Associating resilience with economic policy brings to the fore the state and its ability to be resilient as a result of measures able to have a positive impact on the economy, society, and the environment.

The concept of resilience, borrowed from other disciplines, essentially from psychology and ecology, refers to the ability to recover from shocks and cope with future shocks (Gong et al., 2020). According to Gong et al. (2020), the concept of resilience is site-sensitive, multi-layered, and multi-scalar, conflict-ridden, and contingent. Resilience depends, to a large extent, on the nature of the crises, on institutional experience in managing them, on the economic policy measures taken, and on the regional industrial structures which can influence the recovery rates. The increase in the number of events with a high degree of uncertainty, such as natural, social, political, and economic risks, has brought to the fore the need for resilience.

Resilience is associated with the labour market. A resilient labour market offers conditions for the workforce to overcome difficult situations and the possibility of designing and implementing actions through which working conditions will be modified favourably (Ryelzic & Anitha, 2019). The resilient labour market is characterized by an upward demand for labour, the capacity to absorb as much of the labour force as possible, and adaptation to changes (Malik & Garg, 2017). Periods of crisis, usually unbalancing, are easier to overcome in conditions of resilience, and in the labour market, such a situation benefits the educated workforce (Kasen, 2018). More recently, digitization is producing transformations in the labour market with effects on resilience. The process of accelerated digitization produces increased productivity, connectivity, and transformations of workforce skills (Androniceanu et al., 2020).

The importance of sustainability and resilience justifies the proposed research objective, namely to examine the short-term relationship among the labour market and two key indices, namely the ESGI (Environment, Social, and Governmental Index) measuring sustainability-related risks, and the SRI (State Resilience Index), focusing on Central and Eastern European (CEE) member countries.

2. LITERATURE REVIEW

2.1. ESGI (Environment, Social and Governance Index)

The effects of ESGI, especially at the microeconomic level, have been intensively studied in the literature. Sadiq et al. (2020) demonstrated, using the example of Malaysian companies from 2011 to 2019, that reduced ESG risks increase the value of companies; however, an excessively high focus on ESG directions has opposite effects. The results of the best ESG-performing companies are based on investments, according to Umar et al. (2020). The authors concluded that there is a risk of contagion and diminishing benefits during turbulent economic and social periods. Duque-Grisales and Aguilera-Caracuel (2021), seeking to determine the extent to which a firm's financial performance is associated with reduced ESG risks in the markets of 104 multinational companies in Brazil, Chile, Colombia, Mexico, and Peru between 2011 and 2015, noted that the relationship is negative. Evidence was also provided regarding the moderating effect of financial relaxation and international geographic diversification on the relationship between financial performance and reduced ESG risks.

Cek and Eyupoglu (2020) assessed the influence of ESG performance on the economic performance of 500 companies for the period 2010-2015 and found a significant relationship between them. The significance of the relationship is observed between social and governance performance and economic performance, but not between environmental and economic performance.

The relationships between ESG and financial performance of companies originating from emerging and developed countries were assessed by Garcia and Orsato (2020). This relationship is affected by existing institutional weaknesses in emerging countries, the tendency of firms to prioritize capital accumulation, and the lack of recognition of the strategic benefits of socially responsible investment. Mohammad and Wasiuzzaman (2021) studied the ESG effects of 661 firms in Malaysia between 2012 and 2017 on their performance, moderated by the firm's competitive advantage. Reduced risks associated with ESG components improve firm performance and are associated with highly competitive advantage.

Zheng et al. (2022) conducted research in which they investigated the bidirectional cointegration relationship between ESG performance and corporate green innovation on a panel of 770 Chinese firms from 2011 to 2020. It was found that there is a long-term bidirectional correlation between ESG performance and ecological innovation of companies. ESG performance co-evolves with green innovation production for the profile industry, and ESG performance is found in a long-term relationship with green invention patent production for the polluting industry.

The impact of ESG on public and private companies globally during the period 2007 – 2015 was studied by Li and Wu (2020). They found a robust and striking difference between public and private firms. Private companies manage to reduce the risks associated with ESG compared to public ones. At the root of these discrepancies are conflicts of interest among shareholders, but the conflict is mediated by the type of ownership, proximity to end consumers, and the type of ESG incidence.

ESG performance maximizes financial performance in the case of companies that pay attention to shareholders, especially external ones. Maximizing shareholder value is considered an optimal strategy for achieving the company's objectives, to which efforts to improve non-financial performance are added, according to Al Amosh et al. (2022).

Dmuchowski et al. (2023) found that most studies capture a positive correlation between ESG factors and financial performance, with this positive relationship being more pronounced in the long run. The conclusion is drawn from an analysis of the specific case of Poland. The

main obstacles to sustainable financial development were identified as educational and communication barriers, with education standing out as a prerequisite for the ability to achieve financial development goals.

The effects of ESGI have also been studied at the macroeconomic level, but to a small extent. Sadiq et al. (2022) analysed the impact of ESG and economic growth on the objectives of sustainable development in ASEAN countries for the period 1986–2020. Low risks associated with ESG and economic growth are positively associated with the sustainable development of Asian states.

Most of the existing studies focus on analysing the relationship among various variants of ESG and the financial performance of firms. Despite not providing unidirectional results, these studies highlight the positive relationship between reduced ESG risks and maximizing firm performance. Given the limited study of the relationship between ESGI and the labour market, with macroeconomic analyses being almost neglected, we identify a deficit in the literature that we aim to address by validating the research hypothesis (H1): *the labour market influences the risks associated with ESG*.

2.2. SRI (State Resilience Index) and resilience of labour market

Giannakis and Bruggeman (2019) compared the economic resilience of rural and urban EU regions and its determinants using three different resilience indicators based on changes in employment. The conclusion is that migration and agriculture have significantly positive effects on rural-urban economic resilience.

One of the most evident effects of an economic crisis is felt in the labour market through an increase in the unemployment rate. Liotti (2020), after studying 20 Italian regions between 2001 and 2016, found that the most vulnerable group in crisis conditions on the labour market is that of young people. Empirical results do not demonstrate that high labour market flexibility reduces youth unemployment. High resilience, translated into mitigating the impact of a recession on both youth and adult unemployment, is supported by regional exports, participation in regional politics, average wage growth, private investment, and regional productivity.

Bai et al. (2021) constructed an index of resilience for US firms in the context of the Covid-19 pandemic by assessing the feasibility of working from home and labour demand. Digitization has been found to make certain activities, jobs, and companies resilient to unforeseen shocks. Firms with high digital resilience have shown good overall performance, especially in non-core industries. The ability to use digitization for remote work matters more in non-high-tech industries than in high-tech ones, and bridging the digital gap is possible with the help of significant investments in software. Androniceanu et al. (2020) demonstrated the influence that digitization had on the workforce in 19 developed countries in a certain period, producing structural changes as it alters economic and social patterns.

Grigoli et al. (2020) demonstrated the effects of technological progress, especially on productivity and economic growth, and the fact that it reshapes the labour market. Automation has significant negative effects on the labour market participation rates of middle-aged men and women, and there is a high likelihood that routine workers will face challenges. However, increasing spending on active labour market programs and education is associated with lower negative effects of technological change on labour market participation.

Jollès et al. (2023) assessed the structural characteristics important for economic resilience, especially those likely to absorb shocks in EU states. Based on data characteristic of the period 1998-2018, it was found that the factors that allow the absorption of shocks differ from those which facilitate recovery in the face of a common shock. Labour market

characteristics play an important role in absorbing shocks, and labour market rigidity dampens resilience the most, especially factors that hinder labour reallocation and the production of goods and services. High public debt hinders the capacity to absorb shocks, high private debt weakens the capacity for resilience, while a high degree of economic openness has a negative impact on the absorption capacity in the event of a common shock because it also affects trading partners but has a positive impact on resilience. Furthermore, resilience capacity differs among countries and depends on well-calibrated reforms.

The literature demonstrates concern for resilience in relation to the labour market, economic growth, and digitalization. However, the subject remains open to analysis, especially in correlation with ESGI and SRI, where the gap in the literature is evident through the gaps in the analysis of state resilience. In this context, we aim to address the existing deficit by validating the research hypothesis (H2): *the labour market, economic growth, and digitization influence the resilience of the state*.

The two hypotheses enable the achievement of the proposed objective, which is to examine the short-term relationship among the labour market and two key indices, namely the ESGI (Environment, Social, and Governmental Index) measuring sustainability-related risks, and the SRI (State Resilience Index), focusing on Central and Eastern European (CEE) member countries.

3. METHODOLOGY

3.1. Data

Data describing the dependent variables are very limited in availability. Therefore, the short-term empirical analysis, confined to the year 2022, can offer significant information, making a valuable contribution to the literature and economic practice. It also sets the stage for future research, where directions or trends worthy of further exploration will be identified. The group of countries analysed comprises Central and Eastern European EU members (Estonia, Latvia, Lithuania, Poland, Czech Republic, Slovakia, Hungary, Romania, Bulgaria, Slovenia, and Croatia).

The dependent variables of the analysis describe risks associated with sustainability (ESGI) and state resilience (SRI). The ESGI (Environmental, Social, and Governance Index) covers major aspects related to environmental risks (30%), human rights (50%), health and safety (20%). ESGI sub-indices cover the environment (environmental pollution and climate change), human rights (social rights, civil and political rights, collective rights indicators), health and safety (life expectancy, access to drinking water, safety at work, social protection). According to the Global Risk Profile (www.risk-indexes.com), the ESGI assessment also takes into account spatial inequity adjustment (rural/urban). ESGI is an index that describes environmental, social, and governance risks, taking values between 0 and 100. The higher the value of the index, the higher the risks.

SRI (State Resilience Index) measures seven pillars of resilience: inclusion (of young people, politics, access to financial sources, group-based inclusion, access to economic resources, access to employment, protection against precarity), social cohesion (social capital, social relationships, confidence in national institutions), state capacity (finances, government effectiveness, disaster risk reduction, public health, education outcomes, rule of law, freedom from corruption), individual capacities (food/nutrition, the education system, health, wealth), environment/ecology (pollution, ocean and fisheries health, agricultural productivity, ecosystem wealth, biodiversity, long-term climate stability, clean energy, water availability), economy (diversification, business environment, dynamism/innovation, physical infrastructure,

capital flows, economic management), civic space (engagement, accountability, democratic structures, human rights and civil liberties, information access) (Anastopoulo, 2022).

The independent variables assess the labour market and other related macroeconomic aspects: labour force (LAB), enrollment in secondary school (ESS), enrollment in tertiary school (ETS), government expenditure for education (GEE), unemployment (UNE), unemployment with advanced education (UNEA), population (POP), individuals using the internet (IUI), and gross domestic product (GDP). Among the nine variables, we consider six of them relevant to describe the labour market (LAB, ESS, ETS, GEE, UNE, UNEA) because they provide information regarding its situation and education, a factor with a direct and decisive impact, and three of them as control variables. Where the statistical information was not valid for the year 2022, we considered the values constant from the previous year. For the accuracy of the results, the data were logarithmized.

3.2. Methodology

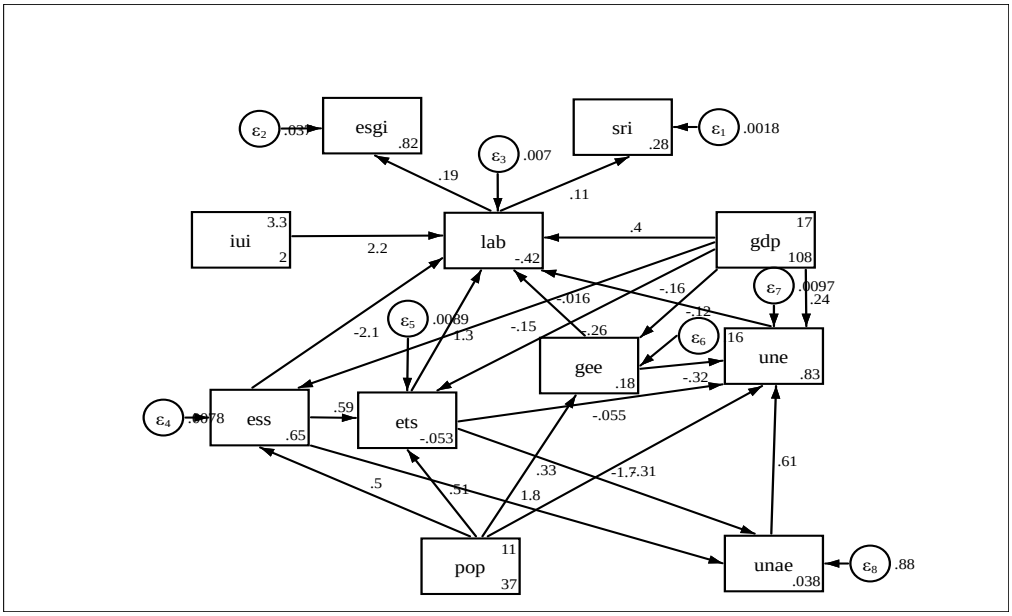
The structural equations method was applied. This method involves running linear regressions presented as path diagrams showing the direct relationships among variables combined with a factor analysis. The structural equation method offers the advantage of estimating multiple and interdependent dependencies in a single analysis. The structural model presents the potential for causal dependence between endogenous and exogenous variables. The relationships among variables take the form of regression equations:

$$Y = \alpha + \beta 1X1 + \ldots + \beta nXn \quad (1)$$

where Y is dependent variable, α is constant (intercept), β1,…,n are regression coefficients, and X1,…,n are independent variables.

4. RESULTS AND DISCUSSION

The empirical results are presented in Graph 1 and Table 1. Equation (1) is reformulated in forms (2 - 7).



Graph 1: Structural model (Author`s contribution)

$$SRI = 0.28 + 0.11 \times LAB \quad (2)$$
$$ESGI = 0.82 + 0.19 \times LAB \quad (3)$$
$$LAB = -2.08 \times ESS + 1.34 \times ETS + 0.4 \times GDP + 2.17 \times IUI \quad (4)$$
$$ESS = 0.65 + 0.49 \times POP \quad (5)$$
$$ETS = 0.51 \times POP - 0.26 \times GDP \quad (6)$$
$$UNE = 0.83 + 0.61 \times UNAE - 0.32 \times GEE \quad (7)$$

From equations (2-7), Graph 1, and Table 1, it can be observed that the sustainability and resilience of the countries in CEE are influenced by the labour market situation. An increase in the size of the labour force generates an increase of 0.11 units in SRI and 0.19 in ESGI. In other words, the rising LAB accentuates ESG risks but contributes to strengthening SRI. If LAB effects are disregarded, the trend would be similar. ESG risks would increase (α = 0.82), and SRI would improve (α = 0.28).

Table 1. Structural model results (Author`s contribution)

Variable	Coefficient	z	P>/z/	[95% Coefficient Interval]	
SRI					
LAB	0.11	47.35	0.000	0.01	0.11
_cons	0.28	10.87	0.000	0.23	0.34
ESGI					
LAB	0.19	18.59	0.000	0.16	0.21
_cons	0.82	6.99	0.000	0.59	1.05
LAB					
ESS	-2.08	-3.36	0.001	-3.29	-0.87
ETS	1.34	0.39	0.001	0.57	2.10
UNE	-0.16	-1.04	0.298	-0.46	0.14
GEE	-0.02	-0.12	0.903	-0.27	0.24
GDP	0.4	3.55	0.000	0.18	0.62
IUI	2.17	1.98	0.048	0.02	4.32
_cons	-0.42	0.87	0.624	-2.12	1.27
ESS					
POP	0.49	2.61	0.009	0.12	0.87
GDP	-0.15	-1.36	0.175	-0.37	0.07
_cons	0.65	3.83	0.000	0.32	0.98
ETS					
ESS	0.59	1.83	0.067	-0.04	1.22
POP	0.51	1.98	0.047	0.01	1.02
GDP	-0.26	-2.02	0.043	-0.51	-0.01
_cons	-0.05	-0.19	0.850	-0.6	0.49
UNAE					
ESS	1.76	0.78	0.436	-2.67	6.18
ETS	-1.7	-0.66	0.507	-6.71	3.31
_cons	0.04	0.05	0.959	-1.42	1.49
UNE					
ETS	-0.06	-0.13	0.900	-0.91	0.80
UNAE	0.61	12.95	0.000	0.51	0.69
GEE	-0.32	-2.18	0.030	-0.61	-0.03
POP	-0.31	-0.84	0.399	-1.02	0.41
GDP	0.24	1.31	0.189	-0.12	0.59
_cons	0.83	3.26	0.001	0.33	1.33
GEE					
POP	0.33	0.38	0.707	-1.37	2.02
GDP	-0.12	-0.24	0.811	-1.12	0.88
_cons	0.18	0.23	0.821	-1.34	1.69

The size of LAB changes under the influence of ESS AND ETS, GDP, and IUI. Increasing ESS contracts LAB (β_{ESS} = -2.08), and increasing ETS has the opposite effect (β_{ETS} = 1.34). As ESS increases, the labour force in the CEE market decreases to a greater extent than the increase due to ETS. The explanations are found in the current trends imposed by the changes induced by digitization and technology (Haller, 2023). GDP and adaptation to digitization support labour (β_{GDP} = 0.4 and β_{IUI} = 2.17).

ESS is increasing (α = 0.65). Development efforts and emphasis on studies are visible through the trend of educational progress. In addition to the fact that education is supported by state policy, given the advantages it generates in society, the economy, and beyond, people are becoming aware that knowledge adds value and increases their chances of finding a job and improving their quality of life. The increase in POP is positively reflected in the tendency to continue basic studies (β_{POP} = 0.49).

If we notice from equation (5) that, regardless of demographic evolution, the tendency is to increase ESS, this is not true for ETS. ESS depends on the positive evolution of POP (β_{POP} = 0.51) in the sense that demographic progress is accompanied by educational progress. However, from equation (6), it appears that GDP is negatively associated with the decision to pursue higher education (β_{GDP} = -0.26). Sustained economic growth improves the quality of life in such a way that it was found to be associated with the tendency to reduce the number of those who decide to continue their studies with the tertiary education cycle.

Labour force refers to people who are able to work, employed, and looking for work. Unemployment, in turn, if we abstract from influencing factors, is increasing in CEE countries (α = 0.83). UNAE influences UNE in CEE countries (β_{UNAE} = 0.61). Instead, the involvement of the state by increasing GEE has a positive effect on the labour market, contributing to the reduction of UNE (β_{GEE} = -0.32).

ESG and SRI risks are subject to the influence of other variables from those analysed; however, their effect has no statistical significance, which makes their interpretation difficult (Table 1). Increasing UNE and increasing GEE could cause a decline in LAB (β_{UNE} = -0.16; β_{GEE} = -0.02). If we disregard the analysed variables, the labour force could be reduced in the markets of the CEE countries (α = -0.42). The number of ESS can be reduced as a result of an increase in GDP (β_{GDP} = -0.15), and that of people who decide to continue higher education can be positively influenced by the number of secondary school graduates (β_{ESS} = 0.59). Additionally, if we remove from the discussion the influence of the analysed variables, in the CEE countries, the tendency to compress the number of ETS can be manifested (α = -0.05). UNAE can be influenced both by ESS, in a negative sense (the higher the ESS, the higher the probability of an increase in UNE for ETS (β_{ESS} = 1.76)), and by ETS in a positive sense (the higher the ETS, the higher the probability of UNE reduction is higher (β_{ETS} = -1.7)). UNE among ETS is likely to be influenced by ESS and ETS. If we abstract from educational factors, there is a probability of increasing UNE among ETS (α = 0.04). If we refer to UNE, in CEE countries, there is the possibility that it will decrease as a result of the increase in ETS (β_{ETS} = -0.06), POP (β_{POP} = -0.31) but increase as a result of GDP (β_{GDP} = 0.24). Education is an important factor in progress, which is why the involvement of the state through investments is a constant objective of economic policy. The results show the probability that GEE will increase even in the absence of the action of the analysed factors (α = 0.18). POP growth can print the same trend (β_{POP} = 0.33), while GDP can reduce GEE (β_{GDP} = -0.12).

There is a good fit between the model and the data according to the SRMR (Standardized Root Mean Squared Residual) value of 0.046. The good fit of the model equations reveals the high influence of the determinants of LAB on ESG risks and SRI (Table 2). The influence of these factors amounts to a weight of 99.99%. LAB imprints ESG risks in the proportion of 96.92% and SRI in the proportion of 99.51%. These weights show how

important LAB is for macroeconomic stability. The determining factors of LAB, more specifically ESS, ETS, UNE, GEE, GDP, and IUI have an influence of 99.97%. Demographic growth has an impact on the ESS of 99.63%, and together these two factors determine the weighted ETS of 99.47%. As a result of the statistical insignificance of the results, UNE among those with higher education is affected by the determining factors in the weight of only 17.32%. In the cases of UNE and GEE, the determinants have an impact of 98.48% and 76.66%, respectively.

Table 2. Equation – level goodness of fit

Variable	R^2	Variable	R^2	Variable	R^2	Variable	R^2
LAB	0.9997	ESGI	0.9692	ETS	0.9947	UNE	0.9848
SRI	0.9951	ESS	0.9963	UNAE	0.1732	GEE	0.7666
Overall	0.9999						

LAB exerts direct effects on ESG risks and SRI. Some factors with influence on LAB, in this case, ESS and ETS, GDP, and IUI, also have direct effects on it. Similarly, POP makes its mark directly on ESS and ETS. ETS also depends directly on GDP. UNE among ETS and GEE exerts, in turn, direct influence on UNE. We find indirect influences (from ESS, ETS, and IUI to SRI and ESGI) and total (from LAB to ESGI and SRI, from ESS, ETS, and IUI to LAB, ESGI, and SRI, from POP to ESS, on the one hand, and from POP and GDP to ETS, from UNAE and GEE to UNE). The results of the empirical analysis validate the two research hypotheses and enable the achievement of the proposed objective.

5. CONCLUSION

The paper examines the short-term relationship among the labour market and two key indices, namely the ESGI (Environment, Social, and Governmental Index) measuring sustainability-related risks, and the SRI (State Resilience Index), focusing on Central and Eastern European (CEE) member countries. To achieve this objective, we started with two research hypotheses: (H1) the labour market influences the risks associated with ESG, and (H2) the labour market, economic growth, and digitization influence SRI.

The conclusions follow several directions corresponding to the equations of the structural model. The growth of the labour force in the market of CEE countries accentuates environmental, social, and governance risks but supports the resilience of the state. Adaptation to digitization and familiarity with technology, improved quality of life amid economic growth, and advancement in knowledge through higher education are fueling the workforce of CEE countries. The number of those who decide to pursue secondary and higher education increases with demographic growth, and the number of those who pursue higher education decreases in conditions of economic growth. If unemployment among those with higher education negatively affects the labour market, the involvement of the state by allocating funds to education affects it positively. Therefore, the labour market of the CEE countries, as a result of the increase in the labour force, accentuates environmental, social, and governance risks and, simultaneously, supports the resilience of the state.

The results confirm those of Bai et al. (2021), Androniceanu et al. (2020), Grigoli et al. (2020), and indirectly those of Dmuchowski et al. (2023). The analysis has limitations, with the main one stemming from the lack of data availability over a long period of time. The results contribute to the literature, provide support for economic policymakers, and open the way for future investigations of the subject.

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