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Social Progress-Economic Performance Nexus: Causality Analysis for D8 and G8

Abstract. *This study examines the relationship between social progress and economic performance across countries with varying levels of development. While social progress enhances well-being through improvements in education, health, and quality of life, its connection to economic development may differ by context. The research investigates this relationship for G8 and D8 countries over the 2000–2020 period using the Kónya Bootstrap panel causality test, which accounts for inter-unit heterogeneity and cross-sectional dependence. Social progress is represented by the Social Progress Index (SPI), while a new economic performance indicator is constructed using Multi-Criteria Decision Making (MCDM) methods. The results indicate a unidirectional causality from economic performance to social progress in G8 countries, whereas evidence for causality from social progress to economic performance is stronger in D8 countries. These findings suggest that promoting social progress may enhance economic performance in developing contexts. Limitations include issues related to endogeneity and the exclusion of potentially relevant variables.*

Keywords: *economic performance, social progress index, G8 countries, D8 countries, bootstrap panel causality.*

JEL Classification: C23, C02, O11, O15.

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1. Introduction

One of the key challenges facing modern economies is assessing whether economic advancements align with citizens' well-being. The distribution of benefits to those involved in production processes is crucial, yet this is often not reflected in quantitative measures such as wages. While economic growth can foster a system that meets individual, social, and environmental needs, these needs are frequently overlooked, with returns from production commonly used as indicators of

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development. Gross domestic product (GDP) remains a widely used proxy for measuring economic development. However, GDP-based assessments often fall short, as they neglect critical issues such as inequality, social dissatisfaction, and environmental harm (Wang and Chen, 2022). Recent discussions have underscored GDP's limitations in capturing human development, social progress, and welfare. In response, some economists have proposed alternative metrics under the 'Beyond GDP' movement, initiated in 2007. These limitations are often referred to as the 'GDP paradox', despite earlier efforts to develop substitutes (Bergh, 2009).

The relationship between economic progress and welfare has been tested using indicators such as social progress, social expenditures, social sector, and human development. However, the main interest here is in the case where human development represents welfare. The Human Development Index (HDI) is used as an indicator of human development. However, the HDI has been criticised for its methodology and scope (Comim, 2016; Hou et al., 2015). Instead, the Social Progress Index (SPI) variable is recommended, which measures the ability of countries to meet the social and environmental needs of their citizens. Other hybrid indices, such as the HDI or the OECD Better Life Index, combine economic and social indicators. The SPI aims for a methodology that isolates the non-economic dimensions of social performance (Stern et al., 2014). Any indicator sensitive to economic indicators will make well-being a function of direct economic input. Accordingly, the SPI is considered to be a more appropriate measure for testing the relationship between economic progress and social progress.

This study explores the relationship between economic progress and related concepts such as human development, social progress, and welfare. Rather than merely questioning whether GDP is an adequate indicator, it examines whether economic development fosters other dimensions of progress and whether human and social development can, in turn, stimulate economic growth. While economic development is vital for prosperity, it may also lead to inequality, environmental degradation, and social unrest. Therefore, it is posited that human and social development can also drive economic progress. The central research question concerns the existence of a cyclical relationship between economic and social progress. Economic development can enhance social progress through mechanisms such as higher income, increased employment, and greater investment in human capital. These two forms of progress are thus expected to reinforce each other. However, whether this cycle holds across all development stages remains debated. In less developed economies, social progress may exert a stronger impact on economic performance, whereas in more advanced economies, policies prioritising human and social development are likely to be more influential. Hence, comparing countries at different development levels is essential for testing this relationship.

Evaluating the economy based on a single indicator is insufficient due to the multidimensional and complex nature of economic systems. The state of an economy should be analysed from multiple perspectives through various indicators, as a country may exhibit superior performance in certain economic criteria while lagging in others. This situation necessitates treating economic performance analysis as a decision-

making problem. In this context, the comprehensive and objective measurement of economic performance requires the use of integrated multi-criteria decision-making (MCDM) models that consider the relative importance and interrelationships of diverse indicators. Thus, data derived from multiple indicators can be synthesised within a rational and systematic framework, enabling a holistic assessment of the overall economic performance.

The study focuses on D8 and G8 countries, aiming to assess the relationship between economic performance and social progress across varying development levels. The Social Progress Index (SPI) is used to represent social progress, reducing the influence of economic input variables. Recognising that economic progress is multidimensional, the study constructs a composite economic performance indicator using variables such as GDP per capita, growth rate, export and import growth, current account balance (as % of GDP), exchange rate, inflation, and unemployment. This indicator is developed via an integrated multi-criterion decision-making (MCDM) approach. The CRITIC method is used to determine the weights of the indicators, and the MOOSRA method is applied to calculate the economic performance index. The relationship between this index and SPI is then tested using the Kónya Bootstrap panel causality test.

2. Literature review

This chapter presents a comprehensive review of previous studies that have analysed the relationship between economic performance and social progress. By analysing the existing approaches that have been proposed in the literature, the different methodologies that have been used, and the findings that have been reported, the aim is to develop a deeper understanding of the interaction between these two concepts.

Bogoviz et al. (2020) highlight a contrast between economic growth and social development. Economic growth prioritises output through policies like resource mobilisation, tax cuts, labour market reforms, and entrepreneurship incentives. In contrast, social development relies on direct investments in non-profit areas and reallocating taxes toward social projects and welfare policies. The relationship among economic development, social progress, and human development has been examined using various variables. Mishra et al. (2020) found that social sector improvements positively impact economic growth. Asandului et al. (2016), using the Social Progress Index (SPI), observed a strong positive correlation between GDP per capita and SPI. Similarly, Mazumdar (1996) found causality from social progress to economic development in middle- and low-income countries, but no clear relationship in high-income countries. Pradhan et al. (2013) reported mixed findings, noting that countries where economic growth supports social development tend to be high-income, while the reverse is observed in lower-income countries. These findings suggest the relationship may depend on a country's income level and align with Rostow's (1959) development stages, where a phase of mass consumption follows sufficient development. Ranis et al. (2000) showed that good or poor

performance in economic growth and human development can lead to reinforcing virtuous or vicious cycles. They argue that prioritising human development initially is more efficient for long-term growth, supporting the idea that social development fosters growth in low-income countries. Reichel (2022), using social expenditures as a welfare indicator, found that higher social security spending may reduce long-term growth. Prayitno et al. (2022), in an individual-level analysis, could not confirm a link between social capital and household welfare. There are studies on the relationship between human development which is another welfare indicator, and growth (Chikalipah & Makina, 2019; Elistia & Syahzuni, 2018; Sušnik & Zaag, 2017). The findings obtained from the studies of Ozturk & Suluk, (2020) reveal that human development supports economic growth. In the studies of Sušnik & Zaag, (2017) and Elistia & Syahzuni, (2018), the existence of a correlation relationship between economic development and human development is emphasised.

3. Data and Methodology

In this study, the relationship between social progress and economic performance is analysed for D8 and G8 countries representing different levels of development. The study spans the period between 2000 and 2020. In testing this relationship, the SPI variable is used to represent social progress. An economic performance index has been calculated using the MCDM method by using the variables GDP per capita, growth rate, export growth rate, current account balance (share in GDP), exchange rate, inflation, import growth rate, and unemployment rate, which have an impact on welfare. This index is symbolised as EP. The EP index has been obtained using the CRITIC-MOOSRA integrated model. In the proposed integrated model, the CRITIC method is used as the weighting method, and the MOOSRA method is used to calculate the index values for the countries considered.

The CRITIC method is a weighting method introduced by Diakoulaki et al. (1995) in the literature of MCDM. The CRITIC method is an objective weighting method that considers the relationship between the criteria and the standard deviations of the criteria. In addition, this method is not affected by negative values (Diakoulaki vd., 1995:765). Subjective weighting methods are preferred due to the influence of decision-makers and the above-mentioned advantages of this method. The CRITIC method consists of 6 steps. The application stages of the method are shown in Table 1 (Madić and Radovanović, 2015).

Table 1. Main steps of the CRITIC method

Steps	Transactions	
Determining the initial decision matrix	$C = [Z_{ij}]_{m*n} = [z_{11}\ z_{12}\ \cdots\ z_{1n}\ z_{21}\ z_{12}\ \cdots\ z_{2n}\ \vdots\ z_{m1}\ \vdots\ z_{m2}\ \vdots\vdots\ \cdots\ z_{mn}\ ]$	(1)
Normalisation of the decision matrix	$r_{ij} = \frac{z_{ij} - z_j^{min}}{z_j^{max} - z_j^{min}} \quad (for\ utility - based\ criteria)$ $r_{ij} = \frac{z_j^{max} - z_{ij}}{z_j^{max} - z_j^{min}} \quad (for\ cost - based\ criteria)$	(2)
Determining the relationship between the criteria	$y_{jk} = \frac{\sum_{i=1}^{m} (r_{ij} - \underline{r}_j)(r_{ik} - \underline{r}_k)}{\sqrt{\sum_{i=1}^{m} (r_{ij} - \underline{r}_j)^2 (r_{ik} - \underline{r}_k)^2}} \quad j,k = 1,2,\dots,n$	(3)
Calculation of standard deviations of criteria	$\sigma_j = \sqrt{\frac{1}{n-1}\sum_{i=1}^{m} (x_{ij} - \underline{x}_j)^2}; \quad j = 1,2,\dots,n$	(4)
Calculating the amount of information in the criteria	$s_j = \sigma_j \sum_{k=1}^{n} (1 - p_{jk}) \quad j = 1,2,\dots,n$	(5)
Determining the importance levels of the criteria	$w_j = \frac{s_j}{\sum_{k=1}^{n} s_j} \quad j = 1,2,\dots,n$	(6)

Source: authors.

The EP index values were obtained by using the importance levels obtained with Equation 6 in the MOOSRA method. The MOOSRA method, which is used to obtain EP index values, was introduced to the MCDM literature by Das et al. (2012). The MOOSRA method is not affected by negative values while calculating, and its application stages are short and simple. In this method, calculations are made by considering the alternatives, criteria, the importance level of the criteria, and the performance measure of the alternatives according to the criteria. In addition, while normalising the initial decision matrix, the simple ratio method is used to calculate the benefit criteria and cost criteria of the criteria (Balezentiene, et al., 2013). Due to these advantages of the MOOSRA method, this method was preferred for the proposed hybrid model. The 4 stages of the MOOSRA method are presented in Table 2 (Jagadish and Ray; 2014).

Table 2. Main steps of the MOORA method

Steps	Transactions	
Determining the initial decision matrix	$X_{ij} = [x_{11}\ x_{12}\ x_{21}\ x_{22}\ \cdots\ x_{1n}\ \cdots\ x_{2n}\ \vdots\ \vdots\ x_{m1}\ x_{m2}\ \vdots\ \vdots\ \cdots\ x_{mn}\ ]\ i = 1,2,,\dots,m\ ;\ j = 1,2,\dots,n$	(7)
Normalisation of the decision matrix	$x_{ij}^* = \frac{x_{ij}}{\sqrt{\sum_{i=1}^{n} x_{ij}^2}}$	(8)
Calculating alternative values	$Y_i = \frac{\sum_{j=1}^{g} w_j x_{ij}^*}{\sum_{j=g+1}^{n} w_j x_{ij}^*}$	(9)
Ranking of alternatives	Y_i The values obtained from Equation (9) are ranked in descending order	

Source: authors.

The relationship between the calculated economic performance index and SPI variables is analysed with the Kónya Bootstrap panel causality test. The Kónya panel causality test is advantageous in that it considers both cross-sectional dependence and heterogeneity. Indeed, it is important to capture heterogeneity in panel data to reveal country-specific characteristics. Moreover, the current global economy increases the interaction between countries. Therefore, it is predicted that macroeconomic variables may respond similarly to the same shocks. Accordingly, controlling horizontal cross-sectional dependence is considered as a necessity in panel data studies. Pesaran (2006) states that ignoring horizontal cross-sectional dependence will lead to size and bias problems. It is possible to overcome these problems with the new panel data approach based on Seemingly Unrelated Regressions (SUR) systems and country-specific bootstrap critical values and the Wald test developed by Kónya (2006). This test does not assume that the parameters are homogeneous. Therefore, it is possible to test Granger causality for each member of the panel. In addition, since the parameters allow for simultaneous correlation among panel members, the test makes it possible to benefit from the extra information provided by the panel. Another advantage of the Kónya Bootstrap panel causality test is that it does not require preliminary unit root and co-integration tests (Kónya, 2006). This approach follows the following set of equations and is written in the form of

$$\begin{aligned} y_{1,t} &= \alpha_{1,1} + \sum_{l=1}^{mly_1} \beta_{1,1,l} y_{1,t-l} + \sum_{l=1}^{mlx_1} \gamma_{1,1,l} x_{1,t-l} + \varepsilon_{1,1,t} \\ y_{2,t} &= \alpha_{1,2} + \sum_{l=1}^{mly_1} \beta_{1,2,l} y_{2,t-l} + \sum_{l=1}^{mlx_1} \gamma_{1,2,l} x_{2,t-l} + \varepsilon_{1,2,t} \\ &\vdots \qquad\qquad\qquad\qquad \vdots \\ y_{N,t} &= \alpha_{1,N} + \sum_{l=1}^{mly_1} \beta_{1,N,l} y_{N,t-l} + \sum_{l=1}^{mlx_1} \gamma_{1,N,l} x_{N,t-l} + \varepsilon_{1,N,t} \end{aligned} \tag{10}$$

and

$$\begin{aligned} x_{1,t} &= \alpha_{2,1} + \sum_{l=1}^{mly2} \beta_{2,1,l} y_{1,t-l} + \sum_{l=1}^{mlx2} \gamma_{2,1,l} x_{1,t-l} + \varepsilon_{2,1,t} \\ x_{2,t} &= \alpha_{2,2} + \sum_{l=1}^{mly2} \beta_{2,2,l} y_{2,t-l} + \sum_{l=1}^{mlx2} \gamma_{2,2,l} x_{2,t-l} + \varepsilon_{2,2,t} \\ &\vdots \qquad\qquad\qquad\qquad \vdots \\ x_{N,t} &= \alpha_{2,N} + \sum_{l=1}^{mly2} \beta_{2,N,l} y_{N,t-l} + \sum_{l=1}^{mlx2} \gamma_{2,N,l} x_{N,t-l} + \varepsilon_{2,N,t} \end{aligned} \tag{11}$$

Here y and x represent variables and N represents the number of members in the panel. t is the period and l is the number of lags. ε represents white noise

errors that are correlated for a given country but uncorrelated across countries. Both equations in the system have different predetermined variables. The possible link between the panel member-specific regressions is the simultaneous correlation within the systems. Therefore, these equations represent SUR systems and not VAR systems. Moreover, since country-specific bootstrap critical values are used in the system, no stationarity condition is required for the variables. The series are used at their level values regardless of their time series properties (Kar et al., 2011; Kónya, 2006) If all $\gamma_{1,i}$ are non-zero, there is Granger causality from x to y for country i in Equation 10. If all $\beta_{2,i}$ are non-zero, there is causality from y to x for country i in Equation 11.

4. Results and discussion

The implementation steps of the proposed hybrid model for finding the economic performance values in the study are presented in Table 1 and Table 2. The implementation of the proposed hybrid model and information on the criteria used will be presented at this stage.

Table 3. Criteria for performance evaluation

Code	Criteria	Optimisation	References
ECO1	GDP per capita	Utility-based	Skare & Rabar (2017)
ECO2	Growth rate	Utility-based	Oussama, et al., (2024)
ECO3	Export growth rate	Utility-based	Oussama, et al., (2024)
ECO4	Current account	Utility-based	Skare & Rabar (2017)
ECO5	Foreign exchange rate	Cost-based	Oussama, et al., (2024)
ECO6	Inflation rate	Cost-based	Skare & Rabar (2017); Oussama, et al., (2024)
ECO7	Import growth rate	Cost-based	Oussama, et al., (2024)
ECO8	Unemployment rate	Cost-based	Skare & Rabar (2017); Oussama, et al., (2024)

Source: authors.

Since the primary objective of the study is to test the relationship between economic performance and social progress, no interpretation has been made regarding the performance of the countries. Additionally, the steps followed for performance evaluation have not been detailed. All steps corresponding to Equations 1 to 9 have been applied separately for both D8 and G8 countries for the period 2000–2020, using the indicators presented in Table 3. The resulting economic performance scores are presented in Table 4.

Table 4. Alternative evaluation scores for selected countries

Alternative evaluation scores for D8 countries											
	2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
Bangladesh	1.531	2.330	1.619	1.117	1.286	1.042	1.212	1.295	1.540	1.361	1.128
Egypt	1.334	1.881	1.298	1.183	0.967	0.807	0.889	1.078	1.086	0.978	0.831
Indonesia	0.654	0.719	0.624	0.611	0.591	0.484	0.557	0.657	0.651	0.747	0.667
Iran	0.859	1.027	0.729	0.632	0.569	0.567	0.681	0.720	0.603	0.675	0.644
Malaysia	2.986	5.166	3.566	3.684	3.430	2.559	2.645	3.467	3.636	2.915	2.497
Nigeria	1.729	1.018	1.740	1.063	1.790	1.172	1.715	1.489	2.946	1.095	1.444

Alternative evaluation scores for D8 countries											
	2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
Pakistan	2.328	3.773	2.173	2.416	1.897	0.897	1.097	1.672	0.857	1.296	1.078
Türkiye	1.016	1.149	1.053	1.166	1.537	1.304	1.435	1.559	1.726	1.367	1.188
	2011	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	
Bangladesh	1.149	1.290	1.490	1.076	1.104	1.320	1.838	1.272	1.742	1.788	
Egypt	0.754	0.735	0.910	0.630	0.689	0.481	1.036	1.038	1.248	1.636	
Indonesia	0.796	0.769	0.921	0.718	0.851	0.808	1.396	1.170	1.343	1.420	
Iran	0.699	0.546	0.624	0.564	0.621	0.698	0.753	0.565	0.364	0.680	
Malaysia	3.060	2.702	2.944	2.391	2.206	2.438	3.770	3.813	3.241	2.814	
Nigeria	1.919	2.468	1.338	1.264	1.427	0.790	1.307	0.798	0.793	0.817	
Pakistan	1.327	1.080	1.556	1.093	1.214	0.951	1.454	1.160	1.199	1.664	
Türkiye	1.555	1.642	1.545	1.312	1.294	1.157	1.640	1.277	1.275	1.137	
Alternative evaluation scores for G8 countries											
	2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
Canada	0.178	0.174	0.171	0.145	0.143	0.152	0.130	0.097	0.087	0.170	0.030
France	0.037	0.044	-0.026	-0.030	-0.040	-0.065	0.009	-0.008	0.121	0.013	0.139
Germany	-0.004	-0.005	-0.021	0.002	0.013	-0.002	0.027	0.014	-0.024	0.012	-0.001
Italy	0.113	0.172	0.179	0.158	0.131	0.114	0.082	0.059	0.058	0.066	0.019
Japan	0.105	0.064	0.070	0.077	0.088	0.149	0.115	0.198	0.178	0.146	0.063
Russia	0.022	0.034	-0.002	0.019	0.018	0.017	0.016	0.006	0.154	0.130	0.001
United Kingdom	-0.019	-0.009	0.015	-0.001	-0.007	-0.024	-0.038	-0.035	-0.057	-0.053	0.055
United States	-0.146	-0.172	-0.085	-0.096	-0.071	-0.062	-0.073	-0.043	-0.241	-0.191	-0.042
	2011	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	
Canada	0.045	0.113	0.111	0.132	0.170	0.092	0.104	0.108	0.184	0.133	
France	0.261	0.127	0.103	0.158	0.081	0.146	0.144	0.113	0.133	0.211	
Germany	0.001	-0.147	-0.095	-0.114	-0.100	-0.055	-0.048	-0.008	-0.059	-0.034	
Italy	0.021	0.039	0.049	0.127	0.110	0.096	0.043	0.044	0.108	0.031	
Japan	0.148	0.114	0.113	0.132	-0.016	-0.011	0.093	0.054	0.106	0.035	
Russia	0.149	0.079	0.044	0.098	-0.025	0.001	0.042	0.033	0.210	0.010	
United Kingdom	-0.007	0.036	-0.003	-0.161	-0.070	-0.103	-0.029	-0.023	-0.094	0.065	
United States	-0.349	-0.090	-0.061	-0.084	0.144	0.119	-0.069	-0.044	-0.294	-0.132	

Source: Calculation made by authors.

Table 4 presents the calculated economic performance scores for the G8 and D8 countries. The underlying rationale for calculating these scores is the recognition that a single indicator cannot adequately represent the overall state of an economy. In this context, an economic performance score was derived by incorporating eight macroeconomic indicators. The use of these composite scores enables a more comprehensive and multidimensional analysis of economic performance.

The Kónya Bootstrap panel causality test is used to test the relationship between economic performance and social progress. First, a cross-sectional dependence test was applied to reconsider the justification for choosing this method. The findings from the CD_{BP} (Breusch & Pagan, 1980), CD_{LM} (Pesaran, 2004), and CD (Pesaran, 2004) are presented in Table 5. In both country groups, the null hypothesis that there is no horizontal cross-section dependence among panel members is statistically rejected at the 5% significance level. This reveals that there is horizontal cross-sectional dependence in the analysed panels. Thus, it is concluded that it is

appropriate to use the approach proposed by Kónya (2006) to investigate the causality relationship between the variables under consideration.

Table 5. Results of cross-sectional dependence tests

Test	D8 Countries		G8 Countries	
	statistic	p-value	statistic	p-value
CD_{BP}	43.108	0.034	70.059	0.000
CD_{LM}	2.019	0.043	5.620	0.000
CD	3.761	0.000	31.908	0.000

Source: Calculation made by authors.

The causality between economic performance and social progress was tested separately for the G8 and D8 countries. The results of the Kónya Bootstrap panel causality test, which provides Granger causality findings for each panel member, are presented in Tables 6 and Table 7. Table 6 summarises the causality test findings between economic performance and social progress in G8 countries. Accordingly, the null hypothesis that progress is not a cause of economic growth can be rejected only for Italy. Therefore, the expectation that social progress will contribute to economic performance is not confirmed in the context of G8 countries. On the other hand, the null hypothesis that economic performance is not the cause of social progress can be rejected for Canada, France, Germany, Japan, and the United States. Economic performance does not cause social progress in Russia, the United Kingdom, and Italy.

Table 6. Panel causality test results: G8 countries

Countries	H_0: SPI does not cause EP				H_0: EP does not cause SPI			
	Wald statistic	Bootstrap critical values			Wald statistic	Bootstrap critical values		
		%1	%5	%10		%1	%5	%10
Canada	3.999	1.920	1.409	1.183	3.874[a]	0.486	0.458	0.446
France	1.444	26.113	16.610	12.704	7.165[a]	4.659	4.507	4.385
Germany	1.323	30.725	20.296	15.397	8.718[a]	3.286	3.149	3.091
Italy	3.748[b]	5.010	3.471	2.456	5.188	8.762	8.520	8.413
Japan	0.056	4.923	3.400	2.552	5.630[a]	1.892	1.777	1.720
Russia	0.458	16.042	9.636	7.200	3.926	6.839	6.650	6.536
United Kingdom	0.463	20.221	12.308	9.413	4.496	15.793	14.923	14.578
United States	0.287	0.669	0.455	0.326	19.845[a]	7.747	7.491	7.348

[a], [b], and [c] indicate rejection of the null hypothesis at the 1, 5, and 10 percent levels of significance, respectively

Source: Calculation made by authors.

Table 7 presents the causality relationship between economic performance and social progress in D8 countries. According to the findings, the null hypothesis that social progress does not cause economic performance can be rejected for Indonesia, Malaysia, and Pakistan. For the other D8 countries, it can be stated that there is no causality from social progress to economic performance. The null hypothesis that economic performance is not the cause of social progress cannot be rejected for any of the D8 countries. Thus, it can be inferred that there is no causality from economic performance to social progress for all D8 countries.

Table 7. Panel causality test results: D8 countries

Countries	H_0: SPI does not cause EP				H_0: EP does not cause SPI			
	Wald statistic	Bootstrap critical values			Wald statistic	Bootstrap critical values		
		%1	%5	%10		%1	%5	%10
Bangladesh	0.680	2.632	1.243	0.867	4.583	21.367	15.374	13.211
Egypt	0.404	9.892	6.198	5.058	12.693	20.243	15.525	13.490
Indonesia	3.032[b]	3.748	2.243	1.516	26.716	31.923	30.100	28.955
Iran	1.697	12.643	9.139	7.753	1.505	2.942	2.495	2.300
Malaysia	1.729[a]	1.623	1.094	0.742	15.941	26.888	22.732	20.768
Nigeria	0.001	7.751	3.995	3.104	2.083	5.422	4.534	4.219
Pakistan	1.642[c]	3.428	2.171	1.592	1.378	21.179	19.612	18.827
Türkiye	0.325	23.115	16.150	14.161	5.456	14.533	13.933	13.627

[a], [b], and [c] indicate rejection of the null hypothesis at the 1, 5, and 10 percent levels of significance, respectively.

Source: Calculation made by authors.

The findings from the Kónya Bootstrap panel causality test do not allow general inferences to be drawn for country groups regarding the causal relationship between economic performance and social progress. However, some significant country group-based differences need to be emphasised for the relationship analysed in the context of G8 and D8 countries. A causal relationship from economic performance to social progress was found for five of the G8 countries. However, this cannot be confirmed for any of the D8 countries. Therefore, G8 and D8 countries show a significant divergence in the causality from economic performance to social progress. This finding is noteworthy given the fact that the country groups considered have a classification representing different levels of development. This is because while the causality between economic performance and social progress can be established in countries with higher levels of development, this link cannot be established in any country in the D8 group of less developed countries. This finding is considered to be similar to the results obtained by Pradhan et al. (2013). Pradhan et al. (2013) have reached the finding that economic growth supports social development in their study. However, when the findings are analysed, it is seen that the countries where growth supports social development are in higher income groups. In this context, the inference that the pass-through of economic performance to social development depends on a certain level of development is reported as an important finding. This is in line with Rostow (1959), stating that after a certain stage of development ends, the period of mass consumption, i.e,. the period of increasing welfare will be reached.

According to the findings from the Kónya Bootstrap panel causality test, economic performance is not the cause of social progress in any country in the D8 country group. The findings differ in the other dimension of causality. The null hypothesis stating that social progress is not the cause of economic performance is rejected for Indonesia, Malaysia, and Pakistan. Thus, it can be inferred that economic progress based on social progress can be achieved in these countries. Among the G8

countries, the causality relationship, which is valid only for Italy, is found to be valid for the three D8 member countries. These findings confirm the findings of studies such as the one conducted by Elistia & Syahzuni (2018), and Sušnik & van der Zaag (2017). Moreover, the similarity of the findings of this study with the inferences drawn from the studies of Mazumdar (1996) and Pradhan et al. (2013), stating that social progress affects economic performance in less developed and developing countries, is emphasised. Namely, the findings indicate that the relationship between social progress and economic performance will emerge in different directions at different levels of development.

5. Conclusions

In this study, the relationship between economic performance and social progress is tested using the Kónya Bootstrap panel causality test, which does not require a priori requirements on homogeneity of parameters and horizontal cross-section dependence. Given the criticisms of the Human Development Index and some other indices, the Social Progress Index variable is used to represent social progress. As for economic progress, an Economic Performance Index was calculated for countries using the MCDM method with an evaluation beyond GDP. In the calculation of this index, GDP, growth rate, export growth rate, exchange rate, inflation, import growth rate, and unemployment rate variables were used. Thus, it was possible to associate social progress with a new variable representing economic development. The causality between economic performance and social progress was tested for G8 and D8 countries, and the effect of the current level of development on the existence and direction of the relationship in question was tried to be determined in the study.

The results provide evidence for the existence of a causal relationship from economic performance to social progress in G8 countries with higher levels of development. The null hypothesis is rejected for five out of eight countries. As for the causal relationship from social progress to economic performance, more evidence is found in D8 countries. Thus, it can be inferred that in countries with higher levels of development, attention shifts from economic progress to social progress. In countries with relatively lower levels of development, social progress can be posited as a cause of economic progress. Investments in social progress can be a strategic policy tool for countries seeking to achieve positive outcomes related to economic performance.

Social progress not only improves social welfare but also strengthens the basic building blocks of a country's economic development. Investments in social services, education, health, housing, and other basic needs strengthen human resources, which in the long run improves the quality of the labour force. A healthier and better-educated population stimulates economic growth by increasing the productivity of the labour force. Education is a fundamental element of social advancement. The provision of high-quality education improves the skills of individuals, thereby enhancing their productivity. An educated labour force is capable of innovative

thinking and constitutes a crucial element of a competitive economy. Furthermore, improvements in health services enable the labour force to work more efficiently, as healthy individuals can work for longer and more productively. Investments in social areas such as health and education increase the general welfare of society, while simultaneously establishing a fundamental basis for economic development. Furthermore, investments in social progress reinforce social peace, mitigate social unrest, and engender a more stable economic environment over the long term. Consequently, investment in social services represents a crucial instrument that can simultaneously yield social benefits in the near term and stimulate economic growth and development in the long term. In underdeveloped and developing countries, investment in social capital can be expressed as a policy that accelerates economic progress. Further research on the relationship between economic performance and social progress at the current level of development is recommended. Analysis of possible non-linear relationships between variables is another research suggestion for future studies. It should be noted that the causality tests used in this study also detect temporal precedence rather than establishing a causal mechanism. This situation constitutes a limitation of the study. Inferences regarding the causal relationships between variables must be considered together with the theoretical framework of the research topic. In addition, the study acknowledges the limitations of the econometric method related to endogeneity and omitted variables.

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