

The Relationship between Corporate Environmental, Social and Governance Performance, and Economic Performance: Empirical Study on Czech Manufacturing Industry

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Abstract—The article examines the relationship between environmental, social, governance (ESG) performance and economic performance of the Czech manufacturing companies. The aim of the empirical study is to test whether ESG performance improves economic performance of these companies. The interaction between ESG and economic performance indicators was tested in 79 Czech manufacturing companies. Data was acquired through empirical research in the Czech Republic, which was completed in 2011-2013. The analysis was performed using multiple linear regressions. The results show that the Czech companies in manufacturing industries do not exhibit a significant correlation between ESG performance, and economic performance.

Keywords—ESG indicators; economic indicators; performance; t-test; multiple linear regressions; correlation

I. INTRODUCTION

SUSTAINABILITY is a multidimensional concept with three important dimensions: economic growth, social responsibility and environmental protection. In reality, sustainability is at the forefront for many international organisations and it is undergoing study from various aspects, including the establishment of an appropriate set of indicators. Unfortunately, a company's contribution to sustainability is still hard to measure. It can be argued that empirical research into corporate sustainability based on ESG and performance indicators is non-existent in Czech companies. Thus sustainability cannot be separated from environmental, social

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and economic development, and demonstrably it cannot be separated from corporate governance either, as we saw recently.

Assessment by means of financial indicators has basically zero relevance for stakeholders and therefore there arises the need to evaluate and compare companies on the basis of performance integration by creating such indicators that would inform about ESG as well as the economic performance of the company with sufficient informative value. The inclusion of ESG indicators in the integrating performance is based on further research; some of the authors [1-4] note that it is important to include ESG indicators in the strategy of the company because financial indicators do not provide accurate information on the overall performance. Therefore, we can say that the integration of ESG has currently become an investment strategy as well as a tool for future cash flow [5-8].

II. CONCEPTUAL AND THEORETICAL APPROACH

Many scholarly books and studies have been written about business performance, but in measuring sustainable performance through financial and non-financial indicators it is necessary to focus on and define Key Performance Indicators (KPIs). In terms of the specialist literature, authors [9] see the measuring of performance as the acquisition and analysis of information about the actual achievement of corporate goals and plans, and about factors that can influence the achievement of these goals. As noted by [10], performance management includes the methodology, system framework and indicators designed to assist organisations in formulating and assessing strategies to motivate staff and communicate business performance to external entities.

A. Interaction between ESG and economic performance

The interaction between corporate environmental and economic performance has been researched by many authors. A study confirming the link between carbon performance and financial performance in Australian NGER reporting companies discovered that carbon performance and financial performance are significantly negatively related in public

listed companies, suggesting worse carbon performers tend to enjoy higher financial returns while stronger financial performers are more likely to pollute more and consume more energy. In private companies, no significant link between the two performances has been confirmed, which means that enhancing carbon performance does not create significant financial value [11]. He stated that even in previous studies concentrating on heavy polluting industries [12] environmental performance had a negative impact on financial performance. Other authors, [13], focused on the food industry and found a negative relationship too. A positive link between environmental and economic performance in manufacturing companies was confirmed by [14-15]. In his study he illustrated the relationship between environmental and economic performance on a curve of environmental gain. He sees environmental gain as the isolated net economic impact of the environment on business performance [16].

Corporate environmental and social performance is associated mainly with CSR. The relationship between the environmental and social performance leading to economic benefits was studied by the authors [17]. Their study suggests that voluntary environmental and social activities, which are being introduced to improve the environmental and social performance of companies, produce CSR performance.

The relationship between the social and economic performance was also proven to be positive, which means that social involvement had a positive impact on the economic performance of the company. Most studies use short-term economic metrics, such as profit, return on equity or market price of shares, but the economic impact of social involvement could span a period that is longer than the period of these indicators [18]. The authors demonstrated that (1) across studies, corporate social performance is positively correlated with corporate financial performance, (2) the relationship tends to be bidirectional and simultaneous, (3) reputation appears to be an important mediator of the relationship, and (4) stakeholder mismatching, sampling error, and measurement error can explain between 15 % and 100 % of the cross-study variation in various subsets of CSP–CFP correlations. Corporate virtue in the form of social and, to a lesser extent, environmental responsibility is rewarding in more ways than one [19].

The authors [20] tried to establish whether there is a positive or negative relationship between corporate governance mechanisms and corporate social responsibility (CSR) contingent on satisfaction with business performance. As a point of departure they used previous research which has come under increasing criticism for combining the positive and negative dimensions of CSR [21-22]. The results indicate that effective governance has a symmetric effect on CSR and that it reduces both positive and negative CSR.

III. METHODOLOGY

Based on a previous empirical research [23-28] ESG and economic performance indicators for companies

manufacturing companies (according to CZ-NACE) were determined. The basis of the empirical research was a questionnaire prepared with the use of international sources (GRI 2006, 2011, EMAS III, IFAC, 2012, ASSET 2010, EFFAS-DVFA 2008, ISO 26000, CSR, OECD, Green Paper 2011, Czech Statistical Office 2012, and companies' financial statements). The research was conducted in 2011 and 2013. All computations were performed in SPSS for Windows, ver. 22 using a combination of statistical methods and factor analysis. Seventy nine manufacturing companies with more than 250 employees were selected from a Czech Statistical Office database and included into our research. To determine corporate performance indicator a factor analysis, PCA method with VARIMAX rotation was used, the suitability of gathered data was tested using Bartlett's Test of Sphericity and its value was below $p < 0.05$, Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) was also used, recommended minimum value to perform factor analysis is 0.6. Thirteen environmental, twelve social, fifteen corporate governance and nineteen economic performance indicators were determined. Multivariate analysis was then employed, its aim was to reduce the number of indicators through removing variables which provide similar information as other variable or group of variables. Input variables were standardized (Z-score) an explanatory factor analysis was used again, on that basis final number of seven environmental, seven social, three corporate governance and ten economic performance indicators was set, Table 1.

TABLE I. FACTORS ESG AND ECONOMIC INDICATORS

Measurement Area (Factor Loadings for Components)		Key performance indicators (KPI)	Cronbach's alpha
Environmental	Investments	EN1 - Environmental investments for protection.[CZK]	0.959
		EN2 - Environmental non-investment expenditure.[CZK]	
	Emissions	EN3 -Total annual emissions.[t/CZK]	0.777
		EN4 -Total annual emission of greenhouse gases.[t/CZK]	
		EN5 - Emission of ozone-depleting substances.[t/CZK]	
	Waste	EN6 - Production of waste.[t/CZK]	0.705
		EN7 - Production of hazardous waste.[t/CZK]	
Social	Society	SO1 - Community.[%]	0.743
		SO2 - Allowances to municipalities.[CZK]	
		SO3 - Active in politics.[yes or no]	
	Human rights	SO4 - Discrimination.[%]	0.821
		SO5 - Equivalent opportunities.[%]	
	Labour Practices and Decent Work	SO6 - The rate of staff turnover.[%]	0.691
		SO7 - Occupational illnesses. [%]	
Corporate Governance	Monitoring and Reporting	CG1 - Information about the company.[occurrence] (inform about company goals, inform about changes of ownership, inform about financial results)	0.835

	Corporate Governance Effectiveness	CG2 - Responsibility Corporate Governance.[occurrence] (defend activities, present collective report, present a specific action report)	0,809
		CG3 - Ethical behaviour.[occurrence]	
Economic	Return on	EC1 - Return on Assets (ROA).[%] EC2 - Return on Investment (ROI).[%] EC3 - Return on Sales (ROS).[%] EC4 - Return on Equity (ROE).[%]	0,981
	Economic results	EC5 - Earnings after Taxes (EAT).[CZK] EC6 - Earnings before Taxes (EBT).[CZK] EC7 - Turnover size.[%]	0,699
	Cash Flow	EC8 - Free Cash Flow.[CZK] EC9 - Operating Cash Flow.[CZK] EC10 - Market share. [%]	0,702

Source: own processing of research

The proposed conceptual framework of ESG and the economic performance indicators correspond to international sources such as GRI, IFAC, EFFAS-DVFA and ASSET4.

IV. RESULTS AND DISCUSSION

The objective is to construct a descriptive regression model, determine the predictive ability of the established ESG performance indicators, and ascertain if the impact of these indicators on the economic performance of a company is positive or negative.

A. Testing of interdependencies - T-test

In our empirical study, we used the T-test to test the statistical significance of economic performance factors in relation to environmental, social and corporate governance performance factors. The T-test showed practically no statistically significant relationship between the indicators tested, there basically is no real dependence between those indicators. The Levene's F-Test for Equality of Variances, which is the most commonly used statistic, is used to test the assumption of homogeneity of variance. One advantage of this test is that it does not require normality of the data. Levene's test, unlike Bartlett's test, is robust when the normal assumption is violated [32-33].

Table 2 (see the Appendix 1) shows the results of a test of the influence of economic performance indicators (F1_{ECO} Return on and F2_{ECO} Cash Flow) on environmental (F1_{ENVI} through F3_{ENVI}), social (F1_{SOC} through F3_{SOC}) and corporate governance performance indicators (F1_{CG} through F2_{CG}). We reject the null hypothesis based on Sig.> 0.05, environmental, social and corporate governance indicators do not affect economic performance indicators and cash flow.

Table 3 (see the Appendix 2) shows the results of a test of the influence of economic performance indicators (F2_{ECO} Economic results) on environmental (F1_{ENVI} through F3_{ENVI}), social (F1_{SOC} through F3_{SOC}) and corporate governance (F1_{CG} through F2_{CG}) performance indicators. Statistically significant results were not recorded and we again reject the null hypothesis based on Sig.> 0.05, environmental, social and

corporate governance indicators do not affect economic results.

B. The regression analysis

Regression analysis characterizes the closeness of the dependent and independent variables. The regression tells us how ESG performance indicators affect the economic performance, and what the specific value of that performance will be in terms of profitability, return on, economic results, and cash flow. The values of ESG indicators, based on the devised descriptive regression model, allow us to predict the level of economic performance. Thus the hypothesis in this study can be formulated as follows:

H0: Environmental performance do not lead to better economic performance.

H1: Better economic performance results in better environmental, performance in manufacturing companies.

H0: Social performance do not lead to better economic performance.

H2: Better economic performance results in better social performance in manufacturing companies.

H0: Corporate governance performance does not lead to better economic performance.

H3: Better economic performance results in better corporate governance performance.

The equation to test the hypotheses is expressed by the following basic regression model:

$$F_{ECO} = b_0 + b_1 F_{ENVI} \quad (1)$$

$$F_{ECO} = b_0 + b_1 F_{SOC} \quad (2)$$

$$F_{ECO} = b_0 + b_1 F_{CG} \quad (3)$$

The constant b_0 is the value of the dependent variable when the independent variable is zero (also called an intercept for being a point where the regression line intersects the Y-axis). Coefficients b_1 , b_2 , b_3 represent the estimated change in the mean value of the dependent variable for each unit of change in the independent variable. The independent variables in this regression equation are the following ESG factors: F_{ENVI} -Environmental Performance, F_{SOC} -Social Performance, and F_{CG} -Corporate Governance Performance. Dependent variable: F_{ECO} -Economic Performance.

The model was then tested using regression analysis, following a series of test to fulfill its classic assumptions. These are including tests of: autocorrelation, multicollinearity, and heteroscedacity. Based on the results of multicollinearity test obtained that all the independent variables and moderating variable have VIF values < 10, which means there is not multicollinearity. Hypothesis testing was done by using regression method.

The hypothesis testing utilized a regression method. After processing the data in the model, the results showed the effect of ESG performance indicators as independent variables on the

economic performance as a dependent variable, characterized by $F1_{ECO}$ Return on (ROA, ROS, ROE, ROI), $F2_{ECO}$ Cash Flow (Operating Cash Flow, Free Cash Flow, Market share), $F3_{ECO}$ Economic results (EAT, EBT, Turnover size), which are defined and expressed in the equations of linear regression:

Hypothesis 1:

$$F2_{ECO} CF = 0.023 + 0.371F_{ENVI} Waste \quad (4)$$

$$F3_{ECO} ER = -0.004 - 0.347F_{ENVI} Emissions \quad (5)$$

Hypothesis 2:

$$F2_{ECO} CF = -0.079 - 0.224HumanRights + 0.429Society + 0.175LabourpracticesAndDecentwork \quad (6)$$

Hypothesis 3:

$$F2_{ECO} CF = 0.039 + 0.099MonitorngAnd Re porting + 0.467CorporateGovernanceEffectiveness \quad (7)$$

$$F2_{ECO} ER = 0.039 + 0.099MonitorngAnd Re porting + 0.467CorporateGovernanceEffectiveness \quad (8)$$

TABLE V. REGRESSIONS ON ECONOMIC PERFORMANCE ON ENVIRONMENTAL PERFORMANCE

Independent variables		Dependent Variable: F_{ECO} Return on				
		Unstandardized Coefficients		Standardized Coefficients		Sig.
		B	Std. Error	Beta	t	
Model 1	(Constant)	0.083	0.144	-	0.573	0.569
	F_{ENVI} Investment	0.066	0.146	0.061	0.453	0.652
	F_{ENVI} Emissions	-0.070	0.154	-0.061	-0.456	0.650
	F_{ENVI} Waste	-0.190	0.139	-0.183	-1,362	0.179
	R Square	0.041				
	Adjusted R Square	-0.014				
	Residual	62.0725				
	F	0.751				0.527 ^b
Dependent Variable: F_{ECO} Return on						
b. Predictors: (Constant), F_{ENVI} Waste, F_{ENVI} Investment F_{ENVI} Emissions						
Model 2	Dependent Variable: F_{ECO} Cash Flow					
	(Constant)	0.023	0.126		0.182	0.857
	F_{ENVI} Waste	0.371	0.122	0.380	3.043	0.004
	R Square	0.144				
	Adjusted R Square	0.128				
	Residual	49.455				
F	9.257				0.004 ^b	
Dependent Variable: F_{ECO} Cash Flow						
b. Predictors: (Constant), F_{ENVI} Waste						
Model 3	Dependent Variable: F_{ECO} Economic results					
	(Constant)	-0.004	0.139		-0.031	0.975
	F_{ENVI}	-0.347	0.148	-0.301	-2.344	0.

Emissions					023
R Square	0.091				
Adjusted R Square	0.074				
Residual	59.776				
F	5.496				0.023 ^b
Dependent Variable: F_{ECO} Economic results					
b. Predictors: (Constant), F_{ENVI} Emissions					

Source: own processing of research

TABLE VI. REGRESSIONS ON ECONOMIC PERFORMANCE ON SOCIAL PERFORMANCE

Independent variables		Dependent Variable: F_{ECO} Return on				
		Unstandardized Coefficients		Standardized Coefficients		Sig.
		B	Std. Error	Beta	t	
Model 1	(Constant)	-0.061	0.126	-	-0.489	0.627
	$F2_{SOC}$ Human rights	-0.226	0.137	-0.229	-1.654	0.105
	$F1_{SOC}$ Society	0.033	0.125	0.036	0.263	0.794
	$F3_{SOC}$ Labour Practices and Decent Work	-0.205	0.136	-0.209	-1.509	0.138
	R Square	0.097				
	Adjusted R Square	0.039				
	Residual	37.380				
	F	1.679				0.184 ^b
Dependent Variable: F_{ECO} Return on						
b. Predictors: (Constant), $F3_{SOC}$ Labour Practices and Decent Work, $F2_{SOC}$ Human rights, $F1_{SOC}$ Society						
Model 2	Dependent Variable: F_{ECO} Cash Flow					
	(Constant)	-0.079	0.135		-0.588	0.559
	$F2_{SOC}$ Human rights	-0.224	0.147	-0.196	-1.531	0.133
	$F1_{SOC}$ Society	0.429	0.134	0.410	3.191	0.003
	$F3_{SOC}$ Labour Practices and Decent Work	0.175	0.146	0.154	1.198	0.237
	R Square	0.226				
	Adjusted R Square	0.177				
	Residual	43.022				
F	4.575				0.007 ^b	
Dependent Variable: F_{ECO} Cash Flow						
b. Predictors: (Constant), $F3_{SOC}$ Labour Practices and Decent Work, $F2_{SOC}$ Human rights, $F1_{SOC}$ Society						
Model 3	Dependent Variable: F_{ECO} Economic results					
	(Constant)	-0.030	0.155		-0.194	0.847
	$F2_{SOC}$ Human rights	-0.221	0.169	-0.181	-1.308	0.197
	$F1_{SOC}$ Society	0.291	0.155	0.260	1.878	0.067
	$F3_{SOC}$ Labour Practices and Decent Work	-0.001	0.168	0.000	-0.004	0.997
	R Square	0.100				
Adjusted R Square	0.043					

Residual	57.086
F	1.744 0.171 ^b
Dependent Variable: <i>F_{ECO} Economic results</i>	
b.Predictors: (Constant), <i>F_{3SOC} Labour Practices and Decent Work</i> , <i>F_{2SOC} Human rights</i> , <i>F_{1SOC} Society</i>	

Source: own processing of research

TABLE VII. REGRESSIONS ON ECONOMIC PERFORMANCE ON CORPORATE GOVERNANCE PERFORMANCE

Independent variables		Dependent Variable: <i>F_{ECO} Return on</i>				
		Unstandardized Coefficients		Standardized Coefficients		Sig.
		B	Std. Error	Beta	t	
Model 1	(Constant)	-0.013	0.131	-	-0.102	0.919
	<i>F_{1CG} Monitoring and Reporting</i>	0.165	0.131	0.166	1.263	0.212
	<i>F_{2CG} CG Effectiveness</i>	-0.101	0.131	-0.101	-0.772	0.443
	R Square	0.037				
	Adjusted R Square	0.003				
	Residual	56.888				
F		1.079			0.347 ^b	
Dependent Variable: <i>F_{ECO} Return on</i>						
b. Predictors: (Constant), <i>F_{2CG} CG Effectiveness</i> , <i>F_{1CG} Monitoring and Reporting</i>						
		Dependent Variable: <i>F_{ECO} Cash Flow</i>				
Model 2	(Constant)	0.039	0.118		0.332	0.741
	<i>F_{1CG} Monitoring and Reporting</i>	0.099	0.117	0.099	0.843	0.403
	<i>F_{2CG} CG Effectiveness</i>	0.467	0.117	0.468	3.988	0.000
	R Square	0.480				
	Adjusted R Square	0.203				
	Residual	45.699				
F		8.369			0.001 ^b	
Dependent Variable: <i>F_{ECO} Cash Flow</i>						
b. Predictors: (Constant), <i>F_{2CG} CG Effectiveness</i> , <i>F_{1CG} Monitoring and Reporting</i>						
		Dependent Variable: <i>F_{ECO} Economic results</i>				
Model 3	(Constant)	0.039	0.118		0.332	0.741
	<i>F_{1CG} Monitoring and Reporting</i>	0.099	0.117	0.099	0.843	0.403
	<i>F_{2CG} CG Effectiveness</i>	0.467	0.117	0.468	3.988	0.000
	R Square	0.230				
	Adjusted R Square	0.203				
	Residual	45.699				
F		8.369			0.001 ^b	
Dependent Variable: <i>F_{ECO} Economic results</i>						
b. Predictors: (Constant), <i>F_{2CG} CG Effectiveness</i> , <i>F_{1CG} Monitoring and Reporting</i>						

Source: own processing of research

The regression analysis results revealed the influence of environmental, social and corporate governance performance indicators on economic performance and what specific value the economic performance will have (it is determined by return on, economic results, and cash flow) the manufacturing industry companies.

Table 5 shows the result for regression analysis by enter

method. In the research this link was proved by the weak results and it confirms the first hypothesis (H1) only partially.

Environmental performance indicators *F_{ENVI}* (Model 2) affect *F_{ECO} Cash Flow*, based on statistical test results it was obtained Adjusted R² value of 0.128. Variable *F_{ENVI} Waste* (0.371) is connected with *F_{ECO} Cash Flow* (Free Cash Flow, Operating Cash Flow, Market share.). Environmental performance indicators *F_{1ENVI}* (Model 3) influence *F_{ECO} Economic results*, based on statistical test results it was obtained Adjusted R² value of 0.074. Variable *F_{ENVI} Emissions* (-0.347) is associated with *F_{ECO} Economic results* (EAT, EBT, Turnover size). The study produced mixed results, only partially confirming the first hypothesis (H1).

Table 6 shows the result for regression analysis by enter method. Social performance indicators *F_{SOC}* (Model 2) influence *F_{ECO} Cash Flow*, Adjusted R² value is 0.177. Variables *F_{2SOC} Human rights* (-0.224), *F_{1SOC} Society* (0.429) a *F_{3SOC} Labour Practices and Decent Work* are associated with *F_{ECO} Cash Flow* (Free Cash Flow, Operating Cash Flow, Market share.). Social performance indicators *F_{1SOC}* (Model 2) explained just 17.7 %, hypothesis H2 was not confirmed.

Table 7 shows the result for regression analysis by enter method. Corporate Governance performance indicators *F_{CG}* (Model 2) influence *F_{ECO} Cash Flow* i *F_{ECO} Economic results*, based on statistical test results it was obtained Adjusted R² value of 0.203.

The most prominent was the influence of *F_{1CG} Monitoring and Reporting* (0.099), *F_{2CG} CG Effectiveness* (0.467) (Model 2,3) on *F_{ECO} Cash Flow* and *F_{ECO} Economic results* explaining 23.0 % (R²=0.230) of variation of *F_{ECO} Cash Flow* i *F_{ECO} Economic results*, meaning that 23.0 % of it is due to variables *F_{1CG} Monitoring and Reporting* (0.099), *F_{2CG} CG Effectiveness* (0.467). The remaining 77.0 % must be accounted for by other variables. Hypothesis H3 was only partially confirmed.

The first, second, third hypothesis states that ESG indicators, as independent variables, improve economic performance. The results of the statistical tests make it clear that ESG indicators, as independent variables, have little effect on performance in terms of Return on, Economic results and Cash flow, and no effect on profitability. Therefore, the first hypothesis (H1) cannot be confirmed. The results of this study are consistent with the research of [11], [13], [30], [21-22] and [30], whose findings show that environmental, social and corporate governance performance indicators do not have a significant impact on economic performance.

C. The correlations analysis

The correlation between ESG indicators and economic performance indicators, i.e. the question whether the changes in one variable are accompanied by consistent changes in the other, was studied with the aid of correlation analysis [29]. The correlation matrix contains three environmental factors, three social factors, two corporate governance factors, and three economic factors. The correlation coefficients calculated between the various dimensions are presented in Table 4 (see

the Appendix 3). Table 4 confirms the fact that there is mean and significant correlation between environmental, social, corporate governance and economic performance indicators. Correlations vary from -0.010 (correlation between $F2_{ENVI}$ Emissions and $F3_{ENVI}$ Waste) to 0.512 (correlation between $F2_C$ CG Effectiveness and $F2_{ECO}$ Cash Flow). There is a correlation between $F1_{ENVI}$ Investments and $F1_{SOC}$ Society (0.445), $F2_{SOC}$ Human rights (0,354) a $F1_{CG}$ Monitoring and Reporting (0.371): with environmental investments grow responsibility to society and their reporting in annual reports and voluntary reports. Another correlation between $F3_{ENVI}$ Waste and $F3_{SOC}$ Labour Practices and Decent Work (0,507), $F2_{ECO}$ Cash Flow (0,468): waste is very closely related to labor relations and with the impact on cash flow. Correlation $F1_{SOC}$ Society a $F2_{ECO}$ Cash Flow (0.394) is related to social investments and donations to local community support and thus are inherently connected with cash flow. Correlation $F3_{SOC}$ Labour Practices and Decent Work and $F1_{ECO}$ Return on (-0,303) – there is a negative relationship. Correlation between $F2_{CG}$ CG Effectiveness and $F2_{ECO}$ Cash Flow (0,512) – with the responsibility of corporate governance grows cash flow of a company.

V. CONCLUSION

Environmental performance indicators in the context of an Environmental Management Systems (EMS and EMAS) of the organisation should be address primarily those organisation's environmental impacts that are most significant and which the company can influence by its operations, management, activities, products and services to environment and sustainable growth. They should fulfil the dual purpose of assisting the management of the organisation and providing information to stakeholders [28]. Corporate environmental (sustainable) reporting is the part of organisation's environmental communication that is directed from the organisation to various target groups. Nowadays corporate environmental reporting has evolved to sustainability reporting, which covers a wider area of the organisation's performance also including economic and social aspects [30]. This empirical study examines the relationship between ESG performance indicators and economic performance in Czech companies within the manufacturing sector. Theoretical considerations suggest that the environmental and social performance have a positive effect, as asserted by authors [14], [17], [19] and [31], but also a negative impact on the company's economic success, per [11-12].

This empirical study therefore focuses on the link between the ESG performance indicators and economic indicators (Return on, economic results, and cash flow) in companies active in the manufacturing sector during the period 2011-2013, T-test by means of correlation analysis. The T-test of the influence of economic performance on ESG performance indicators yielded no statistically significant results.

The correlation results support the conclusion that there exists a positive correlation between ESG and economic

performance. This multiple regression analysis did not find a significant correlation between ESG indicators and economic indicators in the companies from the manufacturing sector. The hypothesis that better economic performance brings about better ESG performance in these companies has to be rejected due to inconclusive results. The results indicate that Czech companies have not discovered the connection between ESG indicators and economic indicators. A future study could possibly refine these results by focusing not only on the companies with ISO 14 001, but also on those that monitor and report the financial - and especially non-financial - indicators, for example according to GRI, or which publish CSR reports. This could explain in part why the study did not provide an unequivocal confirmation of positive results.

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Appendix 1:

TABLE II. TESTING OF THE STATISTICAL SIGNIFICANCE (T-TEST) OF THE FACTORS IN THE ECONOMIC PERFORMANCE (F1_{ECO} RETURN ON AND F2_{ECO} CASH FLOW)

		F1 _{ECO} Return on					F2 _{ECO} Cash Flow				
		Levene's Test for Equality of Variances		T-test for Equality of Means			Levene's Test for Equality of Variances		T-test for Equality of Means		
		F	P -value	t	df	P-value. (2-tail.)	F	P -value	t	df	P-value. (2-tail.)
F1 _{ENVI} Investments	EQVA*	0.078	0.782	0.693	55	0.491	0.850	0.360	1.440	55	0.156
	EQVNA**			0.700	54.762	0.487			1.435	52.356	0.157
F2 _{ENVI} Emissions	EQVA*	0.690	0.410	-0.509	55	0.613	6.690	0.012	1.601	55	0.115
	EQVNA**			-0.504	50.970	0.616			1.610	51.279	0.114
F3 _{ENVI} Waste	EQVA*	8.808	0.004	-1,595	55	0.116	0.027	0.869	-0.251	55	0.803
	EQVNA**			-1,684	45.544	0.099			-0.250	52.739	0.804
F1 _{SOC} Society	EQVA*	0.482	0.491	0.677	49	0.502	0.166	0.685	-0.454	49	0.652
	EQVNA**			0.669	44.452	0.507			-0.457	48.144	0.650
F2 _{SOC} Human rights	EQVA*	1.428	0.238	-0.343	49	0.733	2.127	0.151	1.063	49	0.293
	EQVNA**			-0.347	48.441	0.730			1.095	48.414	0.279
F3 _{SOC} Labour Practices and Decent Work	EQVA*	0.171	0.681	-0.030	49	0.976	0.749	0.391	-0.470	49	0.640
	EQVNA**			-0.030	48.873	0.976			-0.451	36.171	0.655
F1 _{CG} Monitoring and Reporting	EQVA*	5.951	0.018	2,153	57	0.036	0.269	0.606	-0.657	57	0.514
	EQVNA**			2,223	44.373	0.031			-0.659	54.792	0.512
F2 _{CG} CG Effectiveness	EQVA*	0.298	0.587	-0.697	57	0.488	0.799	0.375	1.549	57	0.127
	EQVNA**			-0.700	56.972	0.487			1.543	53.379	0.129

EQVA* - Equal variances assumed EQVNA** - Equal variances not assumed

(Source: own processing of research)

Appendix 2:

TABLE III. TESTING OF THE STATISTICAL SIGNIFICANCE (T-TEST) OF THE FACTORS IN THE ECONOMIC PERFORMANCE (F2_{ECO} ECONOMIC RESULTS)

		F2 _{ECO} Economic results				
		Levene's Test for Equality of Variances		T-test for Equality of Means		
		F	P -value	t	df	P-value. (2-tail.)
F1 _{ENVI} Investments	EQVA*	0.850	0.360	1.440	55	0.156
	EQVNA**			1.435	52.356	0.157
F2 _{ENVI} Emissions	EQVA*	6.690	0.012	1.601	55	0.115
	EQVNA**			1.610	51.279	0.114
F3 _{ENVI} Waste	EQVA*	0.027	0.869	-0.251	55	0.803
	EQVNA**			-0.250	52.739	0.804
F1 _{SOC} Society	EQVA*	0.166	0.685	-0.454	49	0.652
	EQVNA**			-0.457	48.144	0.650
F2 _{SOC} Human rights	EQVA*	2.127	0.151	1.063	49	0.293
	EQVNA**			1.095	48.414	0.279
F3 _{SOC} Labour Practices and Decent Work	EQVA*	0.749	0.391	-0.470	49	0.640
	EQVNA**			-0.451	36.171	0.655
F1 _{CG} Monitoring and Reporting	EQVA*	0.269	0.606	-0.657	57	0.514

EQVA* - Equal variances assumed EQVNA** - Equal variances not assumed

(Source: own processing of research)

Appendix 3:

TABLE IV. CORRELATION MATRIX THE INFLUENCE OF ESG PERFORMANCE ON ECONOMIC PERFORMANCE INDICATORS

Correlations^c

Pearson Correlation

	F1 _{ENVI}	F2 _{ENVI}	F3 _{ENVI}	F2 _{SOC}	F1 _{SOC}	F3 _{SOC}	F1 _{CG}	F2 _{CG}	F1 _{ECO}	F2 _{ECO}	F3 _{ECO}
F1 _{ENVI} Investments	1										
F2 _{ENVI} Emissions	-0.040	1									
F3 _{ENVI} Waste	0.000	-0.010	1								
F2 _{SOC} Human rights	0.354*	0.138	-0.112	1							
F1 _{SOC} Society	0.445**	0.010	0.159	0.008	1						
F3 _{SOC} Labour Practices and Decent Work	0.196	-0.051	0.507**	-0.033	0.026	1					
F1 _{CG} Monitoring and Reporting	0.371*	-0.045	0.119	0.275	0.152	0.259	1				
F2 _{CG} CG Effectiveness	0.298	0.216	0.242	0.227	0.103	0.059	0.173	1			
F1 _{ECO} Return on	-0.076	-0.120	-0.324*	-0.264	-0.039	-0.303*	0.094	-0.024	1		
F2 _{ECO} Cash Flow	0.280	0.153	0.468**	-0.146	0.394**	0.252	0.182	0.512**	-0.035	1	
F3 _{ECO} Economic results	-0.090	-0.284	0.149	-0.153	0.207	0.045	0.033	-0.228	0.005	-0.142	1

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

c. Listwise N=43

(Source: own processing of research)