Universität Augsburg
Wirtschaftswissenschaftliche
Fakultät

You never know the value of water until the well runs dry - The impact of Sustainable Development Goals on firm value

Martin Nerlinger and Marco Wilkens

University of Augsburg

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Outline

01

MOTIVATION

Sustainable Development Goals

17 Sustainable Development Goals (SDGs)

Source: UN

Sustainable Development Goals

The interlinked nature of the SDGs

- Many Sustainable Development Goals are interlinked, in some cases in harmony and in others in conflict.
- The high degree of interconnectedness of SDGs can make it difficult to measure the SDGs performance of a firm on an aggregated basis.

Source: Eurostat

Sustainable Development Goals

Sustainability performance: ESG (conduct dimension) and SDGs (product dimension)

Figure 1: SDGs Mapped Against Environmental, Social, and Governance Categories

- An investor or a firm focuses primarily on establishing ESG policies and processes.
- A firm's sustainability is not limited to the conduct dimension of sustainability.
- A firm's product and services alignment towards the SDGs constitutes the product dimension of sustainability.
- By considering both dimensions, an investor can obtain a holistic picture of the sustainability of a firm.

Source: Walden Asset Management

“I believe we are on the edge of a fundamental reshaping of finance” *(Larry Fink, 2020)*

SDGs in Asset Management

ROBECO Insights Funds Strategies Key strengths About us

Lower credit risk observed in sectors that are positively aligned with the SDGs

07-11-2019 | Insight

Our analysis of historical performance data confirms what we see in practice. Credit sectors with positive or neutral Sustainable Development Goal (SDG) scores have less downside credit risk than those with negative SDG scores.

Webinar: Getting alpha out of SDG Credit Investing

10-09-2019 | Webinar

In this episode of our webinar series, we look at how the SDGs fit into credit portfolios.

SDG Investment Trends Monitor

June 2019 | Market Perspective

The Importance of SDG Investing in Emerging Markets

American Century Investments®

FRANKLIN TEMPLETON

October 2019

Beyond Alignment: Contributing to the Sustainable Development Goals

- Ever more asset managers consider SDGs to be an important investment aspect and plan to integrate SDGs into their investment processes.

Source: various

Related Literature

ESG, CSR and Impact investing

- Valuation and performance effects of CSR (Fatemi et al., 2015, JBF), ESG (Friede et al., 2015, JSFI), or sustainability in general (Hussain et al., 2018, CSR&EM)
- Impact of sustainability on risk (Lins et al., 2017, JF; Albuquerque et al., 2019, MS)
- Relationship between sustainability & firm characteristics (Bardos et al., 2020, JCF; Buchanan et al., 2018, JCF)
- Influence of CSR on the cost of capital (El Ghoul et al., 2011, JBF)
- Disclosure of non-financial information (Crifo et al., 2015, JCF; Grewal et al., 2019, MS)
- Impact investing (Bauer et al., 2019, WP; Barber et al., 2019, WP)
- Investment decision considering sustainability (Hartzmark & Sussman, 2019, JF)

Contribution

Sustainability and financial performance

- Discuss the differences between SDG information disclosing and non-disclosing firms
- Analyze the impact of different SDG performance measures on firm value
- Provide first insights into the relationship between ESG and SDGs in a corporate finance analysis

- Help investors to consider SDGs in their investment decisions to achieve not only a more holistic sustainability but also better financial performance

02

DATA & DESCRIPTIVE STATISTICS

Data

Sustainable Development Objectives (SOSs)

Objective	SDG
Social Objectives	
Alleviating poverty	SDG 1
Combating hunger and malnutrition	SDG 2
Ensuring health	SDG 3
Delivering education	SDG 4
Attaining gender equality	SDG 5
Providing basic services	SDG 6
Safeguarding peace	SDG 16
Environmental Objectives	
Achieving sustainable agriculture & forestry	SDG 2, SDG 13, SDG 15
Conserving water	SDG 6, SDG 14
Contributing to sustainable energy use	SDG 7
Promoting sustainable buildings	SDG 11, SDG 12
Optimizing material use	SDG 12
Mitigating climate change	SDG 13
Preserving marine ecosystems	SDG 14
Preserving terrestrial ecosystems	SDG 15

- ISS measures the contribution or obstruction of products and services towards 15 different Sustainable Objectives derived from the 17 SDGs for over 5,800 global firms since August 2017.

Data

Methodology

1. **Sustainable Objective Score (SOS)**

a) Determine whether a product or service category makes a significant or a limited net contribution or obstruction to any Sustainable Objective

b) Calculate the relevant share of net sales for each of the classified products and services

c) Assign a score to each Sustainable Objective by netting the relevant share of classified products and services (score range: -10.0 to 10.0, 10.0 equals 100% of net sales are achieved with a product)

2. **Environmental and Social Pillar Score (EPS, SPS)**

- Out of all SOSs that belong to one pillar, only the most distinct SOSs are considered

3. **Sustainable Solutions Score (SSS)**

- Out of all SOSs, only the most distinct SOSs are considered

Data Exploration

Examples of SDG Contributors and Obstructers

Objective	High SDG Contributors	High SDG Obstructers
Social Objectives		
Alleviating poverty	Molina Healthcare Inc. (health plans for low-income population)	PlayAGS Inc. (gambling devices and solutions)
Combating hunger and malnutrition	Limoneira Co. (fruits)	United Spirits Ltd. (alcoholic beverages)
Ensuring health	Carl Zeiss Meditec AG (professional diagnostic and treatment devices)	Philip Morris International Inc. (cigarettes, cigars and other tobacco-related products)
Delivering education	G8 Education Ltd. (developmental and educational childcare services)	*no high obstructing firm*
Attaining gender equality	Veru Inc. (female condoms)	*no high obstructing firm*
Providing basic services	Genossenschaft Emissionszentrale für gemeinnützige Wohnbauträger EGW (funding of social housing)	*no high obstructing firm*
Safeguarding peace	Sophos Group plc (IT security solutions)	Huntington Ingalls Industries Inc. (key components for nuclear weapons, armed submarines)

Data Exploration

Examples of SDG Contributors and Obstructers

Objective	High SDG Contributors	High SDG Obstructers
Environmental Objectives		
Achieving sustainable agriculture & forestry	Bellamy's Australia Ltd. (certified organic products)	Bumitama Agri Ltd. (conventional palm oil, non-certified energy-crop based biofuels)
Conserving water	California Water Service Group (water/wastewater services)	Paramount Resources Ltd. (hydrocarbons produced using hydraulic fracturing)
Contributing to sustainable energy use	Vestas Wind Systems A/S (wind power equipment)	Africa Oil Corp. (oil exploration)
Promoting sustainable buildings	Meritage Homes Corp. (buildings certified to a sustainable building standard (Energy Star))	*no high obstructing firm*
Optimizing material use	ALBA SE (Recycling services (e.g. metals, e-waste))	*no high obstructing firm*
Mitigating climate change	Yingli Green Energy Holding Co. Ltd. (solar power equipment and projects)	Coal India Ltd. (coal, coal-related services)
Preserving marine ecosystems	Angel Seafood Holdings Ltd. (certified organic products)	Pingtan Marine Enterprise Ltd. (products based on uncertified fish)
Preserving terrestrial ecosystems	Daiseki Eco. Solution Co. Ltd. (Industrial effluent and wastewater treatment, soil remediation, improvement)	AngloGold Ashanti Ltd. (gold mining)

Data

Descriptive statistics – SDGs performance

Variable	N	Mean	P5	Median	P95	SD
Sustainability Solution Score	10,984	0.34	-6.30	0.00	9.10	3.74
Social Pillar Score	10,984	0.71	-1.90	0.00	8.80	2.89
Environmental Pillar Score	10,984	-0.31	-5.00	0.00	3.00	2.46
Alleviating poverty	10,984	-0.02	0.00	0.00	0.00	0.42
Combating hunger and malnutrition	10,984	-0.19	-0.60	0.00	0.00	1.22
Ensuring health	10,984	0.56	-1.50	0.00	8.80	2.64
Delivering education	10,984	0.05	0.00	0.00	0.00	0.52
Attaining gender equality	10,984	0.01	0.00	0.00	0.00	0.20
Providing basic services	10,984	0.24	0.00	0.00	1.80	0.81
Safeguarding peace	10,984	-0.01	-0.10	0.00	0.00	0.41
Achieving sustainable agr. & forestry	10,984	0.03	0.00	0.00	0.10	0.44
Conserving water	10,984	-0.03	-0.10	0.00	0.00	0.76
Contributing to sustainable energy use	10,984	-0.37	-4.70	0.00	1.00	2.01
Promoting sustainable buildings	10,984	0.10	0.00	0.00	0.10	0.67
Optimizing material use	10,984	0.04	0.00	0.00	0.00	0.42
Mitigating climate change	10,984	-0.35	-4.60	0.00	1.30	2.03
Preserving marine ecosystems	10,984	-0.05	-0.20	0.00	0.00	0.33
Preserving terrestrial ecosystems	10,984	-0.10	-0.10	0.00	0.00	1.01

- A firm contributes usually only to a few Sustainable Objectives.

Data

Descriptive statistics – Financials and Firm Characteristics

Variable	N	Mean	P5	Median	P95	SD
Tobin's Q	75,131	1.24	0.15	0.89	4.29	1.08
Total assets	51,063	20.49	17.43	20.33	24.08	1.79
Net sales	45,401	19.29	15.10	19.44	22.17	1.79
Book-to-market	49,309	0.79	0.06	0.59	2.57	0.66
Dividends	36,192	16.55	13.56	16.53	19.66	1.92
EBIT	40,539	17.90	15.02	17.85	21.01	1.79
EBITDA	41,741	18.19	15.35	18.13	21.35	1.78
Cash flow	39,723	17.82	14.75	17.79	20.99	1.87
Cash	49,129	17.20	11.10	17.53	21.00	2.47
R&D	21,378	15.96	12.07	15.96	19.57	1.96
Return on assets	51,317	0.05	0.00	0.04	0.16	0.05
Leverage	49,467	0.62	0.00	0.43	2.00	0.64
ESG performance score	10,984	30.23	10.65	27.90	56.42	14.54
Institutional ownership	83,911	0.41	0.00	0.43	0.96	0.33
Individual investors	68,084	0.11	0.00	0.02	0.55	0.18
Number of reporting databases	31,379	1.80	1.00	2.00	4.00	0.92
Sector disclosure proportion	83,911	0.13	0.07	0.12	0.23	0.05

- The dataset of financials and firm characteristics comprises over 28,000 global firms.

Descriptive Statistics

Correlations of SDG performance measures

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
(1)	Sustainability Solution Score	1																
(2)	Social Score	0.78	1															
(3)	Environmental Score	0.67	0.09	1														
(4)	Alleviating poverty	0.11	0.16	-0.00	1													
(5)	Combating hunger and malnutrition	0.33	0.46	0.02	-0.00	1												
(6)	Ensuring health	0.73	0.93	0.08	0.15	0.30	1											
(7)	Delivering education	0.12	0.14	0.01	0.00	0.01	-0.01	1										
(8)	Attaining gender equality	0.06	0.08	0.00	0.13	0.00	0.02	0.15	1									
(9)	Providing basic services	0.20	0.26	0.07	0.09	0.04	0.11	0.01	0.08	1								
(10)	Safeguarding peace	0.11	0.14	0.06	-0.00	-0.00	0.06	-0.01	0.00	0.00	1							
(11)	Achieving sustainable agr. & forestry	0.07	-0.01	0.16	0.01	0.00	-0.02	-0.00	0.00	-0.02	0.00	1						
(12)	Conserving water	0.27	0.13	0.36	-0.00	0.13	0.13	0.00	0.00	0.12	-0.00	0.06	1					
(13)	Contributing to sustainable energy use	0.55	0.05	0.80	-0.01	-0.02	0.05	0.01	0.00	0.03	0.08	0.01	0.17	1				
(14)	Promoting sustainable buildings	0.16	-0.03	0.29	-0.02	0.02	-0.03	-0.00	-0.00	-0.01	0.00	0.00	0.00	0.06	1			
(15)	Optimizing material use	0.10	-0.00	0.17	0.00	0.01	-0.00	-0.00	-0.00	-0.00	0.00	0.05	0.03	0.02	-0.01	1		
(16)	Mitigating climate change	0.56	0.07	0.81	-0.00	0.00	0.05	0.01	0.00	0.06	0.05	0.04	0.20	0.94	0.06	0.01	1	
(17)	Preserving marine ecosystems	0.11	0.07	0.11	-0.00	-0.00	0.08	0.01	0.00	0.03	-0.00	-0.01	0.01	0.00	0.02	0.00	0.00	1
(18)	Preserving terrestrial ecosystems	0.27	0.04	0.39	-0.00	-0.01	0.04	0.00	0.00	0.01	0.01	0.19	0.02	0.01	0.01	0.03	-0.00	0.11

- SDG performance measures are correlated based on their nature or by construction.

Descriptive Statistics

Correlations of SDG performance measures, financials and firm characteristics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
Tobin's Q	0.16	0.15	0.07	-0.02	-0.07	0.19	0.00	0.02	-0.08	0.04	0.01	0.00	0.11	-0.04	0.01	0.10	-0.03	-0.00
Total assets	-0.12	-0.08	-0.09	0.02	-0.00	-0.10	-0.04	-0.05	0.11	-0.05	-0.05	-0.02	-0.14	0.01	-0.05	-0.12	0.03	0.03
Net sales	-0.19	-0.20	-0.08	-0.01	-0.09	-0.24	0.00	0.01	0.02	-0.01	-0.05	-0.02	-0.13	-0.04	0.00	-0.15	-0.00	0.09
Book-to-market	-0.08	-0.05	-0.05	0.02	0.04	-0.08	0.00	-0.00	0.03	-0.00	-0.01	-0.03	-0.09	0.06	-0.00	-0.08	0.00	-0.00
Return on assets	-0.07	-0.03	-0.07	-0.02	-0.01	-0.04	-0.04	-0.01	0.05	-0.00	-0.00	-0.00	-0.11	0.03	-0.03	-0.09	0.03	0.00
EBIT	-0.08	-0.03	-0.10	0.01	-0.02	-0.03	-0.05	-0.01	0.07	-0.02	-0.01	-0.01	-0.13	-0.01	-0.04	-0.12	0.00	0.04
EBITDA	-0.11	-0.04	-0.12	0.00	-0.02	-0.05	-0.05	-0.02	0.08	-0.02	-0.04	-0.03	-0.15	-0.02	-0.04	-0.13	0.00	0.03
Cash flow	-0.10	-0.03	-0.12	0.00	-0.02	-0.04	-0.04	-0.01	0.08	-0.02	-0.02	-0.03	-0.14	-0.04	-0.03	-0.12	-0.00	0.00
Cash	-0.05	-0.03	-0.06	-0.00	-0.03	-0.02	-0.02	-0.03	-0.00	-0.02	-0.06	0.02	-0.05	-0.06	-0.04	-0.04	0.01	0.00
R&D	0.08	0.10	-0.03	-0.01	0.09	0.11	-0.03	-0.02	-0.10	-0.03	-0.03	-0.07	-0.00	-0.06	-0.10	0.00	0.14	0.01
Dividends	0.00	-0.01	0.00	-0.02	-0.04	0.01	-0.00	-0.00	-0.08	-0.00	0.03	-0.00	0.02	-0.02	-0.00	0.01	-0.02	0.01
Leverage	-0.06	-0.07	-0.00	-0.01	-0.03	-0.10	-0.00	0.01	0.08	0.01	-0.02	0.01	-0.03	-0.00	-0.01	-0.03	0.00	0.04
ESG performance score	0.27	0.16	0.27	0.05	0.05	0.14	0.06	0.04	0.13	0.01	0.12	0.14	0.20	0.10	0.11	0.21	0.03	0.05
Institutional ownership	-0.01	0.00	-0.03	0.01	-0.02	0.01	0.02	-0.02	-0.00	-0.02	-0.00	-0.03	-0.04	0.00	0.01	-0.04	-0.00	0.00
Individual investors	0.03	0.00	0.05	-0.01	-0.00	0.00	-0.00	0.01	-0.02	0.03	-0.00	-0.01	0.06	0.00	0.00	0.05	-0.02	0.02
Number of reporting databases	-0.03	-0.02	-0.03	0.00	-0.01	-0.01	0.00	-0.01	0.00	-0.01	0.01	-0.01	-0.02	-0.03	0.01	-0.02	0.00	0.01
Sector disclosure proportion	-0.03	-0.02	-0.02	0.00	0.01	-0.06	-0.03	-0.01	0.18	-0.11	-0.00	0.05	-0.09	0.06	-0.00	-0.07	0.03	0.04

- SDG performance measures are correlated to financials and firm characteristics.

03

EMPIRICAL ANALYSIS

Mean Comparison Test

SDGs disclosing and non-disclosing firms

Variable	SDGs firm	Non-SDGs firm	Diff.	Std. error	Obs.
Tobin's Q	1.3730	1.2182	0.1548***	0.0112	75,131
Total assets	22.5669	20.1344	2.4325***	0.0198	51,063
Net sales	20.4017	19.2459	1.1557***	0.0439	45,401
Book-to-market	0.6022	0.8116	-0.2093***	0.0092	49,309
Return on assets	18.6039	16.1393	2.4646***	0.0238	36,192
EBIT	19.8590	17.5106	2.3485***	0.0208	40,539
EBITDA	20.2177	17.8045	2.4132***	0.0207	41,741
Cash flow	19.8764	17.4108	2.4656***	0.0220	39,723
Cash	19.3888	16.8298	2.5589***	0.0295	49,129
R&D	18.0635	15.6199	2.4437***	0.0349	21,378
Dividends	0.0693	0.0506	0.0187***	0.0006	51,317
Leverage	0.6702	0.6147	0.0555***	0.0089	49,467
Institutional ownership	0.6779	0.3754	0.3025***	0.0033	83,911
Individual investors	0.0466	0.1233	-0.0767***	0.0019	68,084

- SDG disclosing firms have on average a higher firm value, are more profitable and spend more on research than non-disclosing firms.

Mean Comparison Test

High and low Sustainable Solutions Score firms

Variable	High SSS firm	Low SSS firm	Diff.	Std. error	Obs.
Tobin's Q	1.5132	1.2700	0.2433***	0.0220	10,893
Total assets	22.4675	22.6368	-0.1693***	0.0337	7,438
Net sales	20.2654	20.4876	-0.2222***	0.0725	1,697
Book-to-market	0.5598	0.6319	-0.0720***	0.0131	5,831
Return on assets	18.5956	18.6097	-0.0141	0.0319	6,025
EBIT	19.8194	19.8869	-0.0674**	0.0313	6,744
EBITDA	20.1639	20.2559	-0.0920***	0.0308	6,657
Cash flow	19.8334	19.9079	-0.0745**	0.0313	6,606
Cash	19.3487	19.4217	-0.0730*	0.0402	7,098
R&D	18.1433	17.9858	0.1576**	0.0631	2,964
Dividends	0.0675	0.0706	-0.0031*	0.0017	7,533
Leverage	0.6563	0.6799	-0.0236*	0.0136	5,831
Institutional ownership	0.6743	0.6805	-0.0061	0.0044	10,984
Individual investors	0.0483	0.0453	0.0030	0.0021	10,944

- Firms with a high SSS have on average a higher firm value, are less profitable and spend more on research than firms with a low SSS.

Regression Model

Heckman model using the Full Information Maximum Likelihood (FIML) approach

Disclosure-choice Model

$$Disclosing\_SDGs_i = \alpha_i + \beta_{1,i}\, Size_i + \beta_{2,i}\, Value_i + \beta_{3,i}\, Profitability_i + \beta_{4,i}\, Leverage_i + \beta_{5,i}\, Dividends_i + \beta_{6,i}\, Sector\ disc.proportion_i + \beta_{7,i}\, Institutional\ investors_i + \beta_{8,i}\, Individual\ investors_i + \beta_{9,i}\, Reporting\ databases_i + \varepsilon_i \quad (1)$$

Firm-value Model

$$Tobin's\ Q_i = \alpha_i + \beta_i\, SDG_i + \gamma_i\, Controls_i + \delta_i\, FE_i + \theta_i\, Heckmann_i + \varepsilon_i \quad (2)$$

- The first disclosure-choice model allows to analyze the drivers for disclosing SDG information and integrate them into the second model.
- The second firm-value model allows the analysis of the impact of SDG performance measures on firm value.

Disclosure-choice Model

Probability of SDG data disclosure

- Firms that disclose SDG data are on average larger, have higher net sales and a lower book-to-market ratio.
- They are more profitable, pay higher dividends, spend more on R&D, have higher cash holdings, higher cash flows and a higher leverage ratio.
- A higher number of institutional investors than individual investors own SDG disclosing firms.

	(1) Disclosing SDGs	(2) Disclosing SDGs
Total assets	0.51***	0.48***
	(33.46)	(31.02)
Book-to-market	-0.61***	-0.55***
	(-22.43)	(-19.42)
Return on assets	8.35***	7.96***
	(27.29)	(24.85)
Leverage	-0.23***	-0.21***
	(-9.34)	(-8.61)
Dividends	0.073***	0.091***
	(5.36)	(6.54)
Sector disclosure proportion	0.19	0.50**
	(0.87)	(2.14)
Institutional investors	-0.24***	-0.54***
	(-3.92)	(-8.57)
Individual investor	-0.73***	-1.05***
	(-6.53)	(-8.94)
Number of reporting databases	0.25***	0.27***
	(19.24)	(20.42)
Constant	-13.5***	-13.1***
	(-53.95)	(-51.60)
Country fixed effects	no	yes
Industry fixed effects	no	yes
adj. R^2	0.33	0.33
N	14,861	14,861

Firm-value Model

Impact of the Sustainability Solutions Score on firm value

- The Sustainability Solutions Score has no clear and constant impact on firm value across all six different model specifications.

	(1) Tobin's Q	(2) Tobin's Q	(3) Tobin's Q	(4) Tobin's Q	(5) Tobin's Q	(6) Tobin's Q
Sustainability Solutions Score	0.016***	0.017***	-0.0041	0.0012	0.014***	0.0015
	(4.12)	(4.52)	(-0.75)	(0.23)	(3.80)	(0.31)
Controls	yes	yes	yes	yes	yes	yes
Country fixed effects	no	yes	no	yes	no	yes
Industry fixed effects	no	no	yes	yes	no	yes
Heckman	no	no	no	no	yes	yes
adj. R^2	0.41	0.48	0.56	0.60		
within R^2		0.42	0.33	0.32		
log likelihood					-10,869	-10,131
Wald test of independence					3,312	6,289
p-value					0.00	0.00
N	4,418	4,412	4,417	4,411	14,861	14,861
N uncensored					4,269	4,269

Firm-value Model

Impact of the Social and the Environmental Pillar Scores on firm value

- The Social and Environmental Pillar Scores have no clear and constant impact on firm value across all six different model specifications.

	(1) Tobin's Q	(2) Tobin's Q	(3) Tobin's Q	(4) Tobin's Q	(5) Tobin's Q	(6) Tobin's Q
Social Pillar Score	0.017***	0.019***	-0.0057	-0.00043	0.013***	0.00040
	(3.56)	(4.21)	(-0.80)	(-0.06)	(2.92)	(0.06)
Environmental Pillar Score	0.0070	0.0070	0.00021	0.0060	0.0095*	0.0067
	(1.23)	(1.25)	(0.03)	(0.88)	(1.72)	(1.04)
Controls	yes	yes	yes	yes	yes	yes
Country fixed effects	no	yes	no	yes	no	yes
Industry fixed effects	no	no	yes	yes	no	yes
Heckman	no	no	no	no	yes	yes
adj. R^2	0.41	0.48	0.56	0.60		
within R^2		0.42	0.33	0.32		
log likelihood					-10,870	-10,131
Wald test of independence					3,308	6,292
p-value					0.00	0.00
N	4,418	4,412	4,417	4,411	14,861	14,861
N uncensored					4,269	4,269

Firm-value Model

Impact of the Sustainable Objective Scores on firm value

- Specific Sustainable Objective Scores, such as “combating hunger”, “attaining gender equality”, and “optimizing material use” have a significantly negative impact on firm value.

	(1) Tobin’s Q	(2) Tobin’s Q	(3) Tobin’s Q	(4) Tobin’s Q	(5) Tobin’s Q	(6) Tobin’s Q
Combating hunger and malnutrition	-0.087***	-0.084***	-0.044***	-0.047***	-0.072***	-0.030***
	(-8.97)	(-9.03)	(-3.71)	(-4.05)	(-7.52)	(-2.70)
Attaining gender equality	-0.0081	0.00078	-0.29**	-0.28**	-0.028	-0.25**
	(-0.05)	(0.01)	(-2.00)	(-1.99)	(-0.20)	(-2.07)
Optimizing material use	-0.067**	-0.088***	-0.068**	-0.070**	-0.070***	-0.079***
	(-2.46)	(-3.38)	(-2.28)	(-2.45)	(-2.82)	(-3.10)
Controls	yes	yes	yes	yes	yes	yes
Country fixed effects	no	yes	no	yes	no	yes
Industry fixed effects	no	no	yes	yes	no	yes
Heckman	no	no	no	no	yes	yes
adj. R^2	0.44	0.50	0.56	0.60		
within R^2		0.44	0.34	0.33		
log likelihood					-10,794	-10,114
Wald test of independence					3,593	6,376
p-value					0.00	0.00
N	4,418	4,412	4,417	4,411	14,861	14,861
N uncensored					4,269	4,269

Firm-value Model

Impact of the Sustainable Objective Scores on firm value

- Specific Sustainable Objective Scores, such as “ensuring health” and “mitigating climate change” have a significantly positive impact on firm value.

	(1) Tobin’s Q	(2) Tobin’s Q	(3) Tobin’s Q	(4) Tobin’s Q	(5) Tobin’s Q	(6) Tobin’s Q
Ensuring health	0.063***	0.060***	0.025**	0.030**	0.052***	0.020*
	(10.50)	(10.43)	(2.05)	(2.57)	(8.96)	(1.80)
Mitigating climate change	0.047**	0.036*	0.045**	0.037**	0.045**	0.038**
	(2.33)	(1.87)	(2.35)	(1.98)	(2.42)	(2.19)
Controls	yes	yes	yes	yes	yes	yes
Country fixed effects	no	yes	no	yes	no	yes
Industry fixed effects	no	no	yes	yes	no	yes
Heckman	no	no	no	no	yes	yes
adj. R^2	0.44	0.50	0.56	0.60		
within R^2		0.44	0.34	0.33		
log likelihood					-10,794	-10,114
Wald test of independence					3,593	6,376
p-value					0.00	0.00
N	4,418	4,412	4,417	4,411	14,861	14,861
N uncensored					4,269	4,269

Firm-value Model

Impact of the Sustainable Objective Scores on firm value

- The other ten Sustainable Objective Scores have no significant impact on firm value.

	(1) Tobin's Q	(2) Tobin's Q	(3) Tobin's Q	(4) Tobin's Q	(5) Tobin's Q	(6) Tobin's Q
Alleviating poverty	-0.11***	-0.10***	-0.0086	-0.015	-0.087***	-0.010
	(-3.48)	(-3.04)	(-0.26)	(-0.44)	(-3.02)	(-0.30)
Delivering education	0.012	0.016	0.028	0.028	0.0029	0.017
	(0.46)	(0.63)	(0.91)	(0.92)	(0.12)	(0.62)
Providing basic services	-0.059***	-0.041***	0.0031	0.0030	-0.057***	-0.0019
	(-3.76)	(-2.68)	(0.17)	(0.17)	(-3.84)	(-0.11)
Safeguarding peace	-0.063**	-0.037	-0.042	-0.025	-0.028	-0.0045
	(-2.08)	(-1.28)	(-1.17)	(-0.73)	(-0.95)	(-0.13)
Achieving sustainable agr. & forestry	0.0071	0.018	0.0038	0.019	0.010	0.017
	(0.21)	(0.55)	(0.10)	(0.51)	(0.33)	(0.49)
Conserving water	-0.058***	-0.038**	-0.048**	-0.023	-0.049***	-0.015
	(-3.11)	(-2.11)	(-2.29)	(-1.12)	(-2.81)	(-0.76)
Contributing sustainable energy use	-0.0075	0.0020	-0.028	-0.013	-0.0078	-0.017
	(-0.37)	(0.10)	(-1.35)	(-0.67)	(-0.42)	(-0.92)
Promoting sustainable buildings	-0.065***	-0.059***	-0.0095	-0.011	-0.038**	-0.0016
	(-3.76)	(-3.56)	(-0.56)	(-0.64)	(-2.31)	(-0.10)
Preserving marine ecosystems	-0.11**	-0.12***	0.046	0.029	-0.097**	0.018
	(-2.57)	(-3.01)	(1.17)	(0.75)	(-2.35)	(0.50)
Preserving terrestrial ecosystems	-0.030*	-0.030*	-0.036**	-0.024	-0.024*	-0.020
	(-1.88)	(-1.94)	(-2.30)	(-1.55)	(-1.69)	(-1.41)

Firm-value Model & ESG Performance

Impact of the SOSs and the ESG Performance Score on firm value

- The ESG performance score has no clear and constant impact on firm value across all six different model specifications.
- The ESG performance score has only a small influence on the relationship between a firm's SDG performance and its value.

	(1) Tobin's Q	(2) Tobin's Q	(3) Tobin's Q	(4) Tobin's Q	(5) Tobin's Q	(6) Tobin's Q
Combating hunger and malnutrition	-0.086***	-0.082***	-0.044***	-0.046***	-0.071***	-0.030***
	(-8.81)	(-8.82)	(-3.71)	(-4.02)	(-7.45)	(-2.69)
Attaining gender equality	-0.023	-0.028	-0.29**	-0.28**	-0.035	-0.25**
	(-0.14)	(-0.19)	(-2.00)	(-2.00)	(-0.25)	(-2.08)
Optimizing material use	-0.085***	-0.12***	-0.068**	-0.074**	-0.078***	-0.082***
	(-3.10)	(-4.64)	(-2.27)	(-2.56)	(-3.14)	(-3.18)
ESG performance score	0.0046***	0.0081***	-0.00020	0.0022**	0.0023**	0.0014
	(4.98)	(8.08)	(-0.23)	(2.19)	(2.53)	(1.42)
Controls	yes	yes	yes	yes	yes	yes
Country fixed effects	no	yes	no	yes	no	yes
Industry fixed effects	no	no	yes	yes	no	yes
Heckman	no	no	no	no	yes	yes
adj. R^2	0.44	0.51	0.56	0.60		
within R^2		0.45	0.34	0.33		
log likelihood					-10,791	-10,113
Wald test of independence					3,615	6,389
p-value					0.00	0.00
N	4,418	4,412	4,417	4,411	14,861	14,861
N uncensored					4,269	4,269

Firm-value Model & SDG Global Index Score

Impact of the SOSs and the SDG Global Index Score on firm value

- The SDG Global Index Score has no clear and constant impact on firm value across all six different model specifications.
- The SDG Global Index Score has only a small influence on the relationship between a firm's SDG performance and its value.

	(1) Tobin's Q	(2) Tobin's Q	(3) Tobin's Q	(4) Tobin's Q	(5) Tobin's Q	(6) Tobin's Q
Combating hunger and malnutrition	-0.089***	-0.084***	-0.048***	-0.047***	-0.074***	-0.031***
	(-9.03)	(-8.87)	(-4.08)	(-4.06)	(-7.69)	(-2.75)
Attaining gender equality	-0.032	-0.00082	-0.31**	-0.29**	-0.050	-0.25**
	(-0.20)	(-0.01)	(-2.14)	(-2.02)	(-0.36)	(-2.09)
Optimizing material use	-0.067**	-0.087***	-0.066**	-0.071**	-0.071***	-0.079***
	(-2.42)	(-3.31)	(-2.21)	(-2.42)	(-2.86)	(-3.04)
SDG Global Index Score	-0.021***	-0.0061	-0.023***	-0.0040	-0.023***	-0.0087
	(-7.88)	(-0.37)	(-9.28)	(-0.26)	(-8.85)	(-0.62)
Controls	yes	yes	yes	yes	yes	yes
Country fixed effects	no	yes	no	yes	no	yes
Industry fixed effects	no	no	yes	yes	no	yes
Heckman	no	no	no	no	yes	yes
adj. R^2	0.44	0.51	0.56	0.60		
within R^2		0.45	0.34	0.33		
log likelihood					-10,791	-10,113
Wald test of independence					3,615	6,389
p-value					0.00	0.00
N	4,418	4,412	4,417	4,411	14,861	14,861
N uncensored					4,269	4,269

Empirical Analysis

Further robustness tests

- Aggregation of the Sustainable Objective Scores
  - Aggregation of SOSs using the mean
  - Principal components analysis (PCA) of SOSs

  -> Conflicting nature of Sustainable Development Goals harms the explanatory power of aggregation measures
- Correction of standard errors
  - Clustering on firm-level

  -> Results remain basically the same
- Estimation of the impact of each Sustainable Objective Score
  - Addressing the interconnectedness of SDGs by estimating both models for each of the 15 Sustainable Objective Scores separately

  -> The same SOSs (except “ensuring health”) show significant results

04

CONCLUSION

Conclusion

Key Takeaways

- The SDG performance of a firm has an impact on its value
- The SOSs “combating hunger”, “attaining gender equality”, and “optimizing material use” have a significantly negative impact on firm value
- The SOSs “ensuring health” and “mitigating climate change” have a significantly positive impact on firm value
- ESG and SDGs performance are correlated, but only together they can represent the sustainability of a firm holistically

Implications for Investors

- Firms aligning their products and services towards certain SDGs have a higher Tobin’s Q
- Investors can allocate their capital towards firms with a high SDG performance to achieve a more holistic sustainability performance
- An integration of a SDGs framework into asset management is the next step to combine sustainability and sustainable financial performance

Thank you very much for your attention.

Martin Nerlinger
Chair of Banking and Finance
University of Augsburg
Germany

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