Process-oriented social responsibility indicator of mutual funds: A multi-criteria decision analysis approach

INTERNATIONAL MCDA WORKSHOP ON PROMETHEE: RESEARCH AND CASE STUDIES

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Socially responsible investment funds

- Taking into account extra-financial criteria

  - Beyond traditional mean-variance framework

  - *"Bi-objective optimization"*

- *Two opposing views*

- Traditional approach in research

  - SRI funds vs. conventional funds

  - No account of heterogeneity

  - No account of multi-dimensional nature of sustainability

Goal

- Application of MCDA/PROMETHEE in SRI research

- Design process-oriented SRI indicator to take into account heterogeneity

- Determine best approach for both academic and professional applications

MCDA methodology

Comparisons	Score output	State-of-the-art	Qualitative input	Translation of criteria	Implementation	Judgments
Value measurement methods						
Analytic hierarchy process	X	X	X	X	X	X
Analytic network process	X	X	X	X	X	
MACBETH	X	X	X	X	X	X
Multi-attribute utility theory	X	X	X	X	X	X
UTADIS/GRIP	X	X	X	X	X	
Outranking methods						
ELECTRE			X	X		
PROMETHEE	X	X	X	X	X	X
Goal, aspiration or reference level methods						
TOPSIS	X	X	X	X	X	X
Goal programming	X	X			X	X
Data envelopment analysis*	X	X			X	X
Other						
Decision rules		X	X	X	X	

MCDA methodology (2)

Eligible methods

- Analytic Hierarchy Process (AHP)

- MACBETH

- PROMETHEE

- TOPSIS

Weighting procedure

- AHP-type questionnaire from 2 SRI experts

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MCDA methodology (3)

Goal	Criteria	Subcriteria	Sub-subcriteria
Social performance indicator	Screening process and consistency	Priority screening process	
		Independent data gathering and analysis of sustainability	Data gathering and analysis of sustainability by independent external specialists (e.g. EIRIS)
			Incorporation of SRI principles established by reputable organizations (e.g. UN SRI, Febelfin)
			Information from stakeholders and relevant NGOs
		Positive selection criteria	Best-in-class approach for criteria with respect to ESG criteria
			Use of sector specific positive criteria
			Investment is principally (> 75%) in companies that invest in sustainable technologies
		Negative selection criteria	Use of categorical rejects
			Assessment by means of negative criteria
			Exclusion of unsustainable technologies
		Monitoring and updates	A research teams checks legal and regulatory developments, trends and behavior of companies such that criteria are in line with recent societal developments
			Monitoring if portfolio is consistent with defined criteria (continuously, sector specific or occasion specific)
		Dialogue	Companies are informed about conclusions selection methodology
			Active engagement policy (constructive and critical dialogue with companies in portfolio)
			Active voting policy (voting at companies' shareholder meetings)
	Transparency and control	Transparency	Release of qualitative information about the screening process (e.g. applied screens)
			Release of quantitative information about the screening process (e.g. scores)
			Release of current portfolio
			Compliance with external transparency guidelines (e.g. Eurosif/Belsif)
		Board of experts	

MCDA methodology (4)

SRI funds	Conventional funds
BNPP L1 Equity World Aqua (LU0831546592)	BNPP L1 Equity World (LU0072778490)
Dexia L Sustainable World (LU0113400328)	Dexia Quant Equities World (LU0235267860)
ING L Invest Sustainable Equity (LU0394658412)	ING L Invest World (LU0119219730)
KBC EcoFund World (BE0133741752)	KBC Equity Fund World (BE6213775529)
Triodos Sustainable Pioneer Fund (LU0278272843)	

MCDA methodology (5)

- Aim of indicator: "Objectivize subjectivity"

  o Transparent methodology

  o "Objective" assessment of criteria using publicly disclosed information (e.g. prospectus)

  - Binary-coded performance matrix
  - No further need for expert judgment

	C1	C2	...	C20
A1	1	1	...	0
A2	0	1	...	1
...	...	...	...	...
A9	1	0	...	0

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Results

Summary results (non-normalized)

Alternatives	AHP	PROMETHEE	TOPSIS	MACBETH
Max	0.158	0.7016	0.082050188	1
Triodos Sustainable Pioneer Fund	0.15	0.6739	0.08144545	0.9336
KBC EcoFund World	0.139	0.6376	0.07966546	0.8622
Dexia L Sustainable World	0.138	0.632	0.07963925	0.852
ING L Invest Sustainable Equity	0.128	0.6167	0.079327669	0.8061
BNPP L1 Equity World Aqua	0.125	0.5861	0.078209529	0.7143
BNPP L1 Equity World	0.052	0.3295	0.030019509	0.4336
ING L Invest World	0.049	0.3175	0.029618428	0.3979
KBC Equity Fund World	0.032	0.2585	0.022141209	0.2857
Dexia Quant Equities World	0.029	0.2466	0.021608729	0.25

Summary results (normalized)

Alternatives	AHP	PROMETHEE	TOPSIS	MACBETH
Max	100.00%	100.00%	100.00%	100.00%
Triodos Sustainable Pioneer Fund	94.94%	96.05%	99.26%	93.36%
KBC EcoFund World	87.97%	90.88%	97.09%	86.22%
Dexia L Sustainable World	87.34%	90.08%	97.06%	85.20%
ING L Invest Sustainable Equity	81.01%	87.90%	96.68%	80.61%
BNPP L1 Equity World Aqua	79.11%	83.54%	95.32%	71.43%
BNPP L1 Equity World	32.91%	46.96%	36.59%	43.36%
ING L Invest World	31.01%	45.25%	36.10%	39.79%
KBC Equity Fund World	20.25%	36.84%	26.98%	28.57%
Dexia Quant Equities World	18.35%	35.15%	26.34%	25.00%

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Discussion

Application comparisons	AHP	MACBETH	PROMETHEE	TOPSIS
Overall robustness		x	x	x
	Academic application			
Availability and cost of software	x		x	x
Ease of understanding	x			x
	Professional application			
Extensiveness of sensitivity analysis			x	

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Discussion (2)

Bottom-level criteria weight robustness

Criterion	Weight	AHP		PROMETHEE		TOPSIS		MACBETH	
		L	U	L	U	L	U	L	U
Priority screening process	33.15%	0.00%	98.10%	0.00%	100.00%	0.00%	100.00%	0.00%	100.00%
Data gathering and analysis of sustainability by independent external specialists (e.g. EIRIS)	2.16%	0.00%	94.50%	0.00%	100.00%	0.00%	100.00%	0.00%	100.00%
Incorporation of SRI principles established by reputable organizations (e.g. UN SRI, Febelfin)	5.03%	0.00%	97.80%	0.00%	100.00%	0.00%	100.00%	0.00%	100.00%
Information from stakeholders and relevant NGOs	0.56%	0.00%	97.10%	0.00%	100.00%	0.00%	100.00%	0.00%	100.00%
Best-in-class approach for criteria with respect to ESG criteria	5.74%	0.00%	97.30%	0.00%	100.00%	0.00%	100.00%	0.00%	100.00%
Use of sector specific positive criteria	2.76%	0.00%	95.00%	0.00%	100.00%	0.00%	100.00%	0.00%	100.00%
Investment is principally (> 75%) in companies that invest in sustainable technologies	0.49%	0.00%	3.30%	0.00%	7.08%	0.00%	6.89%	0.00%	7.80%
Use of categorical rejects	7.57%	0.00%	97.80%	0.00%	100.00%	0.00%	100.00%	0.00%	100.00%
Assessment by means of negative criteria	7.57%	0.00%	97.30%	0.00%	100.00%	0.00%	100.00%	0.00%	100.00%
Exclusion of unsustainable technologies	7.57%	6.20%	100.00%	0.00%	100.00%	0.00%	100.00%	0.00%	100.00%
A research teams checks legal and regulatory developments, trends and behavior of companies such that criteria are in line with recent societal developments	5.25%	0.00%	94.70%	0.00%	100.00%	0.00%	100.00%	0.00%	100.00%

Discussion (3)

Bottom-level criteria weight robustness

Criterion	Weight	AHP		PROMETHEE		TOPSIS		MACBETH	
		L	U	L	U	L	U	L	U
Monitoring if portfolio is consistent with defined criteria (continuously, sector specific or occasion specific)	1.75%	0.00%	97.10%	0.00%	100.00%	0.00%	100.00%	0.00%	100.00%
Companies are informed about conclusions selection methodology	0.24%	0.00%	96.40%	0.00%	100.00%	0.00%	100.00%	0.00%	100.00%
Active engagement policy (constructive and critical dialogue with companies in portfolio)	0.51%	0.00%	97.30%	0.00%	100.00%	0.00%	100.00%	0.00%	100.00%
Active voting policy (voting at companies' shareholder meetings)	2.83%	0.00%	95.50%	0.00%	100.00%	0.00%	100.00%	0.00%	100.00%
Release of qualitative information about the screening process (e.g. applied screens)	4.00%	0.00%	95.00%	0.00%	100.00%	0.00%	100.00%	0.00%	100.00%
Release of quantitative information about the screening process (e.g. scores)	4.00%	0.00%	100.00%	0.00%	100.00%	0.00%	100.00%	0.00%	100.00%
Release of current portfolio	2.23%	0.00%	95.20%	0.00%	100.00%	0.00%	100.00%	0.00%	100.00%
Compliance with external transparency guidelines (e.g. Eurosif/Belsif)	0.91%	0.00%	94.20%	0.00%	100.00%	0.00%	100.00%	0.00%	100.00%
Board of experts	5.56%	0.00%	97.80%	0.00%	100.00%	0.00%	100.00%	0.00%	100.00%
Summary		**91.76%**		**95.35%**		**95.34%**		**95.39%**	

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Discussion (4)

- Academic application → TOPSIS

    o Robust

    o Easy to understand and implement

- Professional application → PROMETHEE

    o Robust

    o Extensive sensitivity analysis

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Future research

- Application of indicator in SRI performance research

  ○ Parametric (asset pricing regressions)

$$r_{it} - r_{ft} = \alpha_i + \beta_{1i}(r_{Mt} - r_{ft}) + \beta_{2i}SMB_t + \beta_{3i}HML_t + \beta_{4i}MOM_t + \beta_{5i}SRIP_t + \varepsilon_{it}$$

  ○ Non-parametric (e.g. DEA)

- Application of indicator to better design SRI funds

- Potentially useful for regulation

- Potentially useful for individual investors

Thank you for your attention

Questions?

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