Swiss Sustainable Finance

WWF

WEBINAR: EVALUATING CLIMATE RISK ASSESSMENT TOOLS

10 SEPTEMBER 2020

TECHNICAL INFORMATION

SSF YOUTUBE LIVE STREAM:
HTTPS://YOUTU.BE/SWJNDMQWHH8

PROGRAMME

Evaluating climate risk assessment tools

9:00	**Welcome and introduction**	**Sabine Döbeli**, CEO, Swiss Sustainable Finance **Ivo Mugglin**, Head Sustainable Finance ad interim, WWF Switzerland
9:05	**Paper presentation:** Taming the Green Swan: How to improve climate-related financial risk assessment	**Julia Bingler**, Doctoral Researcher at D-MTEC Chair of Economics / Resource Economics CER-ETH – Center of Economic Research, ETH Zürich
9:20	**Practitioner perspectives and moderated discussion**	• **Stefan Gross**, Senior Specialist on Sustainable Finance, Strategic Services Division, FINMA • **Andy Howard**, Global Head of Sustainable Investment, Schroders Hamburg • **Julia Bingler**, ETH Zurich Moderated by: Sabine Döbeli, CEO, Swiss Sustainable Finance
9:40	**Q&A**	

SABINE DÖBELI

CEO, SWISS SUSTAINABLE FINANCE

IVO MUGGLIN

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JULIA BINGLER

DOCTORAL RESEARCHER, ETH ZÜRICH

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Taming the Green Swan: How to improve climate-related financial risk assessments

Julia Anna Bingler **Chiara Colesanti Senni**

4th event of WWF/SSF series to meet the academics
10 September 2020

Outline

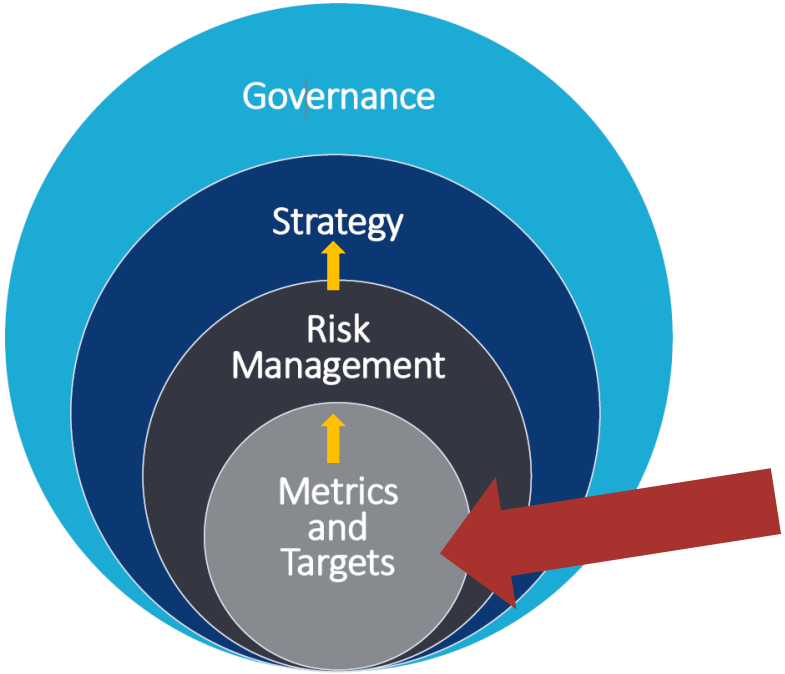
I. Background
II. Method
III. Results
IV. Implications

Our Partners

I. Background: Why it matters

Internal and external relevance

Own risk management and enable risk management by third parties



High quality?

Comparable?

Decision-relevant?

- Mostly boilerplate information
- Not comparable across firms & years
- Information & data difficult to find & extract
- Metrics
  - Difficult to interpret
  - Mostly not forward-looking
  - No assumptions reporting

Bingler, Kraus, Leippold, Wang 2020: ClimateBert – A machine learning approach to analyse climate-related financial risk disclosures, based on the TCFD recommendations. Work in progress.

II. Method: How we did it

Set of criteria to assess tools

First step towards a comprehensive climate risk tool theory

I. ACCOUNTABILITY

1. Public transparency
a) Model modules, code public
b) Study questionnaire completed*

2. Emission data strategy
a) Data sources reported
b) Third party verified
c) Missing data strategy explained

3. Science-based approach
a) Scientific references
b) Peer-reviewed

II. DEPTH OF RISK ANALYSIS

4. Hazard (shock / smooth transition)
a) 1.5/<2°C scenario
b) Country-differentiated
c) Sector-differentiated

5. Exposure
a) Current GHG emissions
b) Expected GHG emissions

6. Vulnerability & Resilience
a) Profits to cover costs
b) Peers performance, competition
c) Cost pass-through

7. Adaptability
a) Input substitution
b) Climate strategy, climate-aligned R&D or future CAPEX plans

8. Economic impact
a) Economic losses and gains
b) Macroeconomic development

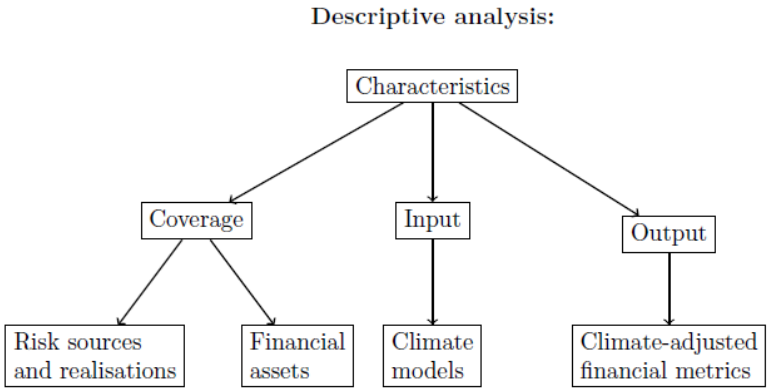
9. Risk amplification
a) Mutual risk amplification
b) Financial market amplification

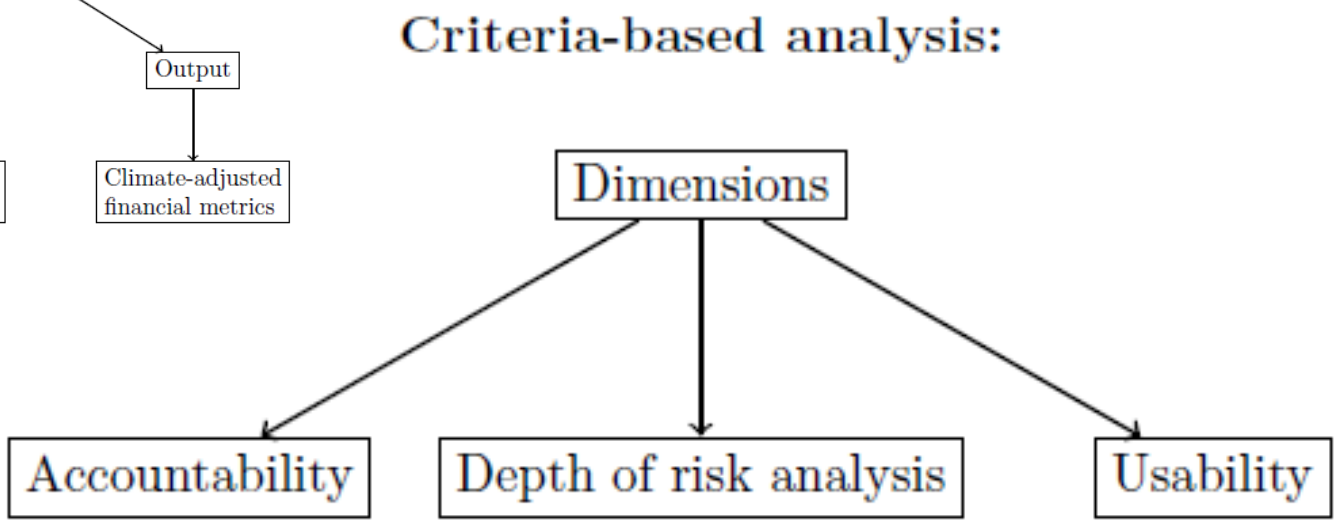
III. USABILITY

10. Output interpretability
a) Model structure, scenarios and assumptions reported
b) Assumptions-based output communication

11. Uncertainty
a) Baseline adaptable
b) Scenario-neutral (various risk realisations)
c) Probability distribution input (timing)
d) Probability distribution output (values)

Descriptive and criteria-based analysis





Analysis of 16 climate risk tools

Show state of the art and areas for further development

Provider	Tool name	Shortname	Type	Sector
2 Degrees Investing Initiative	PACTA	2DII	alignment/risk	think tank
Battiston, Monasterolo and Mandel	CLIMAFIN	CFIN	risk	academia
Cambridge Econometrics	E3ME-FTT-GENIE	CAME	risk	academia
Cambridge Institute for Sustainability Leadership	ClimateWise	CISL	risk	academia
Carbone 4	Carbon Impact Analytics	CAR4	impact	think tank
ISS ESG	Portfolio Climate Impact Report and Raw Data	ISSE	risk/impact	financial services
MSCI/Carbon Delta	Climate VaR	MSCI	risk	financial services
Oliver Wyman	Climate Transition Risk Methodology	OLWY	risk	financial services
Ortec Finance	ClimateMAPS	ORTE	risk	financial services
PwC/The CO-Firm	Climate Excellence	PWC	risk	financial services
right. based on science	XDC Model	RIGH	alignment/risk	think tank
Science-based targets initiative	SBT Tool and SDA Transport Tool	SBTI	target	think tank
S&P Global Market Intelligence	Climate Linked Credit Analytics	SPCM	risk	financial services
S&P Global Market Intelligence	Climate Linked Credit Risk Tool	SPPD	risk	financial services
University of Augsburg	CARIMA	UNIA	risk	academia
Vivid economics	Climate Risk Toolkit	VIVE	risk	financial services

III. Results: What we find

Coverage: Risk sources and realisations

Tool coverage: Risk sources and realisations

Risk source & realisation / Tool	2DII	CFIN	CAME	CISL	CAR4	ISSE	MSCI	OLWY	ORTE	PWC	RIGHT	SBTI	SPCM	SPPD	UNIA	VIVE
Policy																
Smooth	x	-	x	x	(x)	x	x	x	x	x	x	n/a	x	x	(x)	x
Shock	x	x	x	-	x	x	-	x	x	(c)	(c)	n/a	x	x	(x)	x
Market upstream (supply chain)																
Smooth	(c)	-	x	x	x	x	-	x	x	x	(c)	n/a	(c)	-	(x)	x
Shock	(c)	x	x	-	x	x	-	x	x	(c)	(c)	n/a	(c)	-	(x)	x
Market downstream (demand)																
Smooth	(c)	-	x	x	x	x	-	x	x	x	(c)	n/a	(c)	-	(x)	x
Shock	(c)	x	x	-	x	x	-	x	x	(c)	(c)	n/a	(c)	-	(x)	x
Technology																
Smooth	(c)	-	x	x	-	x	x	x	x	x	(c)	n/a	-	x	(x)	x
Shock	(c)	x	x	-	-	x	-	x	x	(c)	(c)	n/a	-	(c)	(x)	x
Other																
									financial disruption						divestment	

x: covered — (x): indirectly covered (e.g. via market expectations) — (c): only in customized approach — -: not covered — n/a: not applicable — .: information not available or confidential — dvp: under development

Sources: Study questionnaire, tool documentation

Users should consider:

- Mostly policy risks
- Mostly smooth / orderly
- Few cover all sources

Coverage: Asset classes

Tool coverage: Financial assets

Financial asset	Tool															
	2DII	CFIN	CAME	CISL	CAR4	ISSE	MSCI	OLWY	ORTE	PWC	RIGHT	SBTI	SPCM	SPPD	UNIA	VIVE
Individual assets																
Stocks	x	x	-	-	x	x	x	-	x	x	x	n/a	-	x	x	x
Bonds - corporate	x	x	-	-	x	x	.	x	x	x	x	n/a	x	x	x	x
Bonds - government	x	x	-	-	x	x	.	-	x	-	x	n/a	-	-	x	x
Loans - corporate	x	x	-	-	x	x	.	x	x	x	x	n/a	x	x	x	x
Loans - project	x	-	-	-	x	x	.	-	-	x	(c)	n/a	-	-	x	x
Mortgages	-	-	-	-	x	x	.	-	x	x	-	n/a	-	-	-	x
Credits (personal loans)	(c)	-	-	-	x	x	x	-	-	x	x	n/a	-	-	(c)	-
Real assets	x	-	-	x	x	x	-	-	x	dvp	dvp	n/a	-	-	-	x
Options & Derivatives	-	x	-	-	-	(c)	-	-	x	dvp	-	n/a	-	-	(c)	-
Aggregated assets																
Portfolios	x	-	-	x	x	x	x	x	x	x	x	n/a	-	-	x	x
Funds	x	-	-	-	x	x	x	-	x	x	x	n/a	-	-	x	x
Other																
			financial flows									dvp: FI targets				

x: covered — (c): only in customized approach — -: not covered — n/a: not applicable — .: information not available or confidential — dvp: under development

Sources: Study questionnaire, tool documentation

Users should consider:

- Mostly publicly traded assets (data!)
- Project loans, mortgages and real assets poor coverage

Input: Scenarios

Tool input: Climate scenarios

Scenario	Tool															
	2DII	CFIN	CAME	CISL	CAR4	ISSE	MSCI	OLWY	ORTE	PWC	RIGHT	SBTI	SPCM	SPPD	UNIA	VIVE
IEA																
IEA ETP scenarios*	x	(c)	(c)	x	x	x	-	-	-	x	x	-	(c)	-	-	(c)
IEA WEO/WEM scenarios**	x	(c)	(c)	x	-	x	-	-	-	x	x	-	(c)	-	-	(c)
IAMs																
REMIND (PIK) - MAgPIE (IIASA) scenarios***	-	-	(c)	-	-	-	x	x	-	dvp	-	-	x	-	-	(c)
MESSAGEix-GLOBIOM scenarios	-	-	(c)	-	-	-	-	x	-	-	x	-	(c)	-	-	(c)
Other																
Greenpeace Energy [R]evolution	x	(c)	(c)	-	-	-	-	-	-	(c)	-	-	(c)	-	-	(c)
PRI IPR: Forecast Policy Scenario	-	(c)	(c)	-	-	-	-	-	-	-	-	-	-	-	-	x
Own scenario	-	-	x	-	-	-	-	x	x	-	-	x	(c)	-	-	x

x: covered — (c): customized / scenarios adaptable — -: not covered — n/a: not applicable — .: information not available or confidential — dvp: under development
* e.g. RTS and B2DS/2DS/4DS/6DS — ** e.g. CPS and STEPS/SDS — *** e.g. NGFS reference scenarios

Sources: Study questionnaire, tool documentation

Users should consider:

- Mostly IEA (granunlarity) and IAMs (science-based), both also criticised
- Emerging trend: NGFS scenarios (various advantages)

Output: Climate-adjusted financial metrics

Tool output: Climate-adjusted financial metrics

Financial risk/valuation metric	Tool															
	2DII	CFIN	CAME	CISL	CAR4	ISSE	MSCI	OLWY	ORTE	PWC	RIGHT	SBTI	SPCM	SPPD	UNIA	VIVE
Firm valuation																
Firm value (market cap/EV)	n/a	x	-	(x)	n/a	(c)	x	-	-	-	n/a	n/a	-	x	-	x
Cost of capital	n/a	-	-	(x)	n/a	(c)	-	-	-	-	n/a	n/a	-	-	-	-
Assets value in liquidation case	n/a	-	-	-	n/a	(c)	-	-	-	(x)	n/a	n/a	-	-	-	-
Financial asset risk / valuation metric																
Asset price	n/a	x	-	-	n/a	(c)	-	x	x	(x)	n/a	n/a	-	-	-	x
Expected returns	n/a	x	-	-	n/a	(c)	-	x	x	x	n/a	n/a	-	(x)	x	(x)
Expected dividends	n/a	x	-	-	n/a	(c)	-	x	-	(x)	n/a	n/a	-	-	-	x
Alpha **)	n/a	-	-	-	n/a	(c)	-	-	-	(x)	n/a	n/a	-	-	x	-
Beta **)	n/a	-	-	-	n/a	(c)	-	-	-	(x)	n/a	n/a	-	-	x	-
CAPM factor	n/a	-	-	-	n/a	(c)	-	-	-	(x)	n/a	n/a	-	-	x	-
Standard deviation	n/a	-	-	-	n/a	(c)	-	-	x	(x)	n/a	n/a	-	-	x	-
R-squared **)	n/a	-	-	-	n/a	(c)	-	-	-	-	n/a	n/a	-	-	x	-
Sharpe ratio **)	n/a	-	-	-	n/a	(c)	-	-	x	(x)	n/a	n/a	-	-	x	-
Sortino ratio **)	n/a	-	-	-	n/a	(c)	-	-	x	(x)	n/a	n/a	-	-	-	-
Value at risk	n/a	x	x	(x)	n/a	(c)	x	-	x	(x)	n/a	n/a	-	-	x	x
Maximum drawdown	n/a	x	-	-	n/a	(c)	-	-	x	-	n/a	n/a	-	-	x	-
**) adjusted benchmark						(c)			(c)	(c)					dvp	
Credit risk metrics																
Probability of default	n/a	x	-	-	n/a	(c)	x	x	x	(x)	n/a	n/a	x	x	x	x
Loss given default	n/a	x	-	-	n/a	(c)	x	x	x	-	n/a	n/a	-	-	-	x
Value of collateral	n/a	-	-	-	n/a	(c)	-	x	(x)	(x)	n/a	n/a	-	-	-	(c)
Distance to default (Merton)	n/a	x	-	-	n/a	(c)	x	x	-	-	n/a	n/a	-	x	-	x
Credit rating	n/a	-	-	-	n/a	(c)	x	x	x	(x)	n/a	n/a	x	x	-	x
Other																
			central bank interest rates			(c)			various							

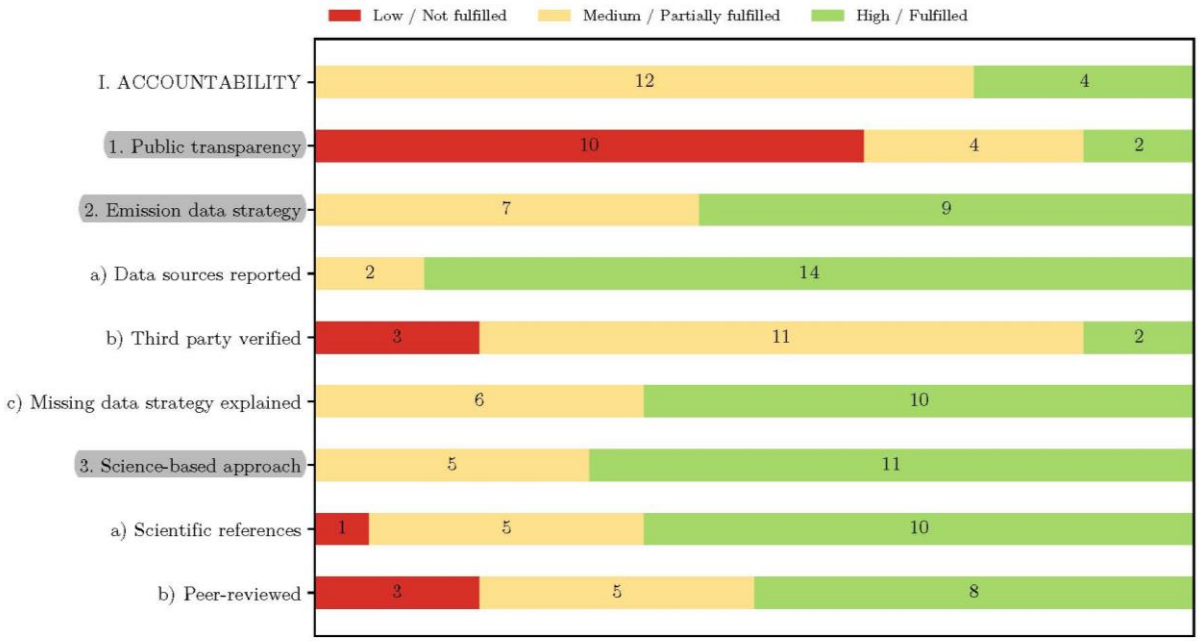
x: available as tool output — (x): can be easily calculated with tool output — (c): only in customized approach — -: not available — n/a: not applicable — .: information not available or confidential — dvp: under development

Sources: Study questionnaire, tool documentation

Users should consider:

- Mostly VaR, Expected Return; PD, credit rating
- Be careful about market-based valuations (underestimation)

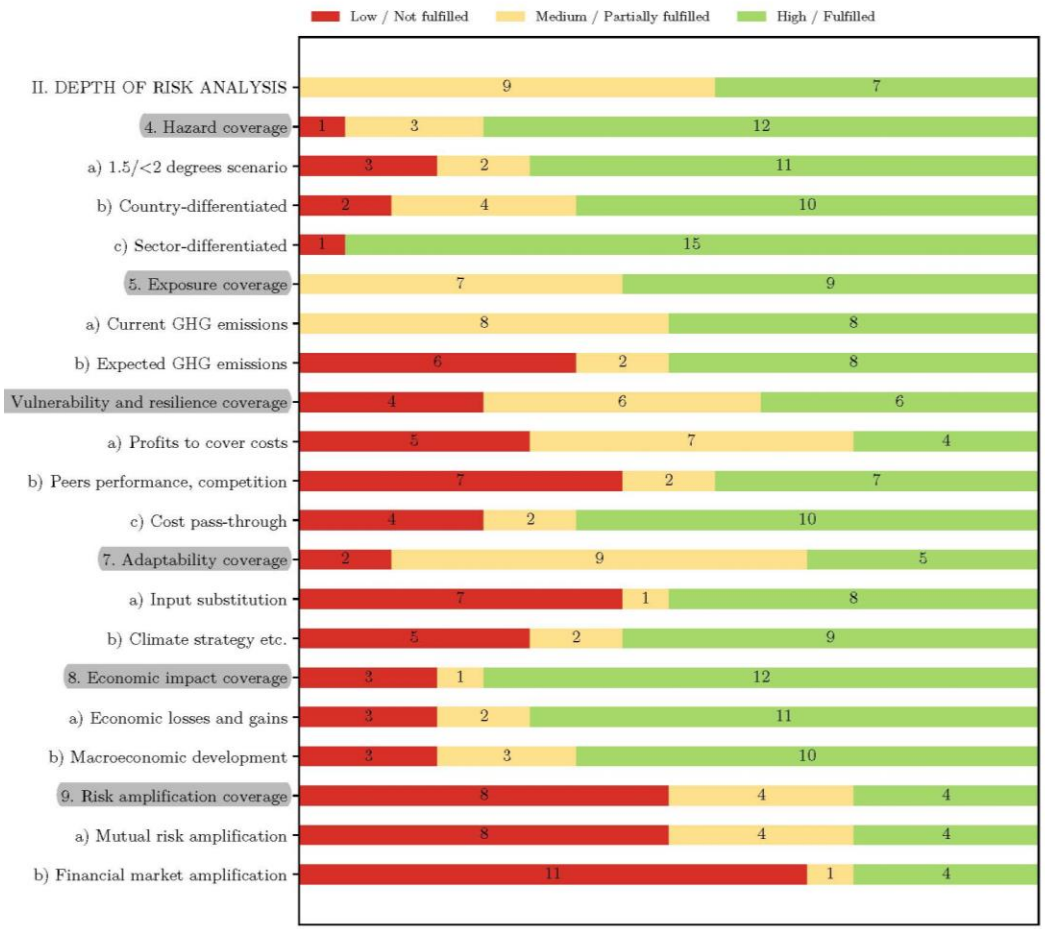
Accountability



Users should be aware of:

- Public transparency
- Third-party verified data
- Peer-reviews

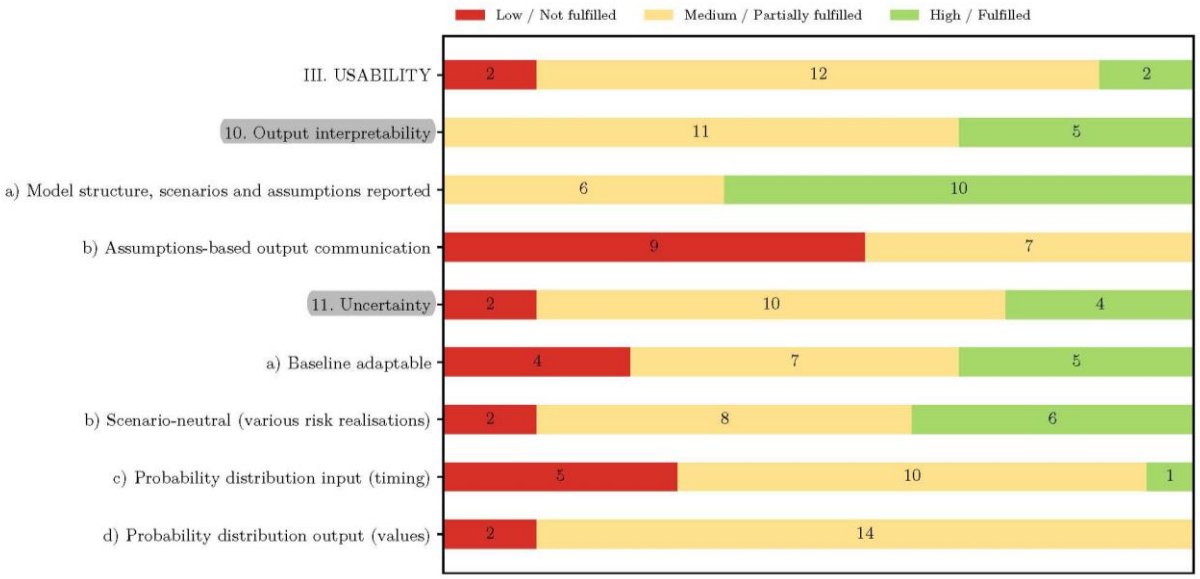
Depth of risk analysis



Users should be aware of:

- Ïmpact on final output values and correct interpretation
- Analyses beyond hazard and exposure
- Risk amplification mechanisms
  - Mutual risk sources amplification
  - Financial markets amplifications
- Quality of modelling

Usability



Users should be aware of:

- Assumptions reporting
- Output communication
- Possibility to generate probability distributions of final output based on probability distributions of input values
- Use of state-of-the art scenarios / scenario-neutrality

IV. Implications: What it means

Tool users
Start now and learn by doing

Tool selection: consider

- Multiple tools
- Multiple risk sources & realisations
- Scenario-neutrality / NGFS

Tool performance: be aware

- Accountability
- Depth of risk analysis
- Usability

Risk disclosures: be precise

- Assumptions-based
- Output probability distributions
- Metrics for internal risk management & external users
- Minimum once a year

Tool users, providers, regulators
Agree on standards

Standardised TCFD Metrics & Targets disclosure templates

- Assumptions-based
- Incl. probability distributions
- Machine-readable

Joint assessment principles

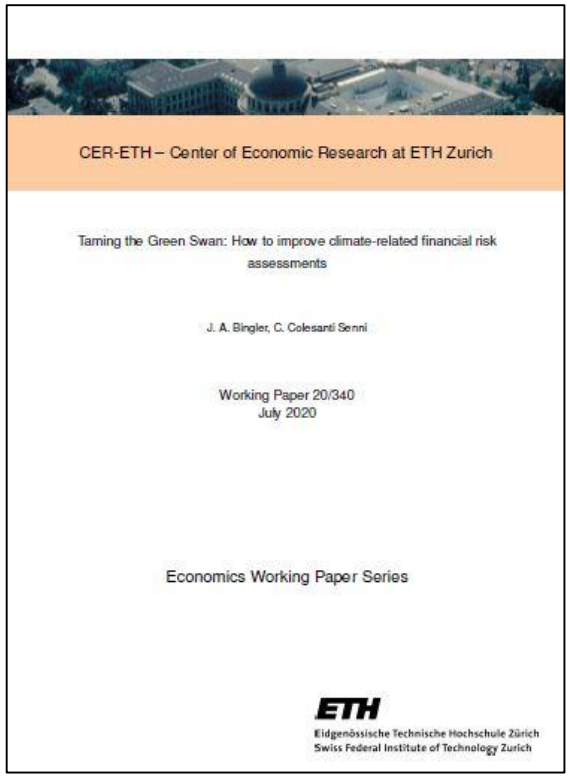
- Scenarios
- Output probability distributions
- Minimum once a year

Harmonised tool documentation

- Tool setup and drivers
- Tool output and assumptions
- Peer reviews

+ Corporate data disclosure requirements: e.g. CAPEX by technology, assets lifetime, geolocation, asset-based business activity share in turnover, land use and methane emissions data

Further useful information in the paper



- Explanation of scenarios, tool structure and important concepts (economic climate risk indicator vs. financial climate risk indicator)
- Explanation of difference between climate risk/alignment/target setting tools
- Relation to ESG analyses and EU Taxonomy
- Detailed criteria description
- 16 individual tool analyses
- Further steps to improve the assessments

Bingler, Colesanti Senni 2020: Taming the Green Swan: How to improve climate-related financial risk assessments. CER-ETH Working Paper 20/340. https://doi.org/10.3929/ethz-b-000428321 Summary of main findings: https://investesg.eu/2020/09/04/climate-risk-analysis-requires-common-standards-eth-zurich-and-the-council-on-economic-policy-cep/

ETH zürich

Thank you!

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Images: pexels.com

PRACTITIONER PERSPECTIVES AND MODERATED DISCUSSION

Stefan Gross	FINMA
Andy Howard	Global Head of Sustainable Investment, Schroders
Julia Bingler	ETH Zurich
Moderated by: **Sabine Döbeli**	CEO, Swiss Sustainable Finance

STEFAN GROSS

SENIOR SPECIALIST ON SUSTAINABLE FINANCE, STRATEGIC SERVICES DIVISION, FINMA

ANDY HOWARD

GLOBAL HEAD OF SUSTAINABLE INVESTMENT, SCHRODERS

Schroders

Climate change risk framework

Andy Howard, Global Head of Sustainable Investment

September, 2020

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Environmental, Social and Governance is referred to as ESG throughout the presentation.

Separating the climate question into when and what

Building a climate risk measurement & management toolkit

Climate risk & opportunity

Speed and scale of action to mitigate climate change

Impact of climate action on investments

Climate Progress Dashboard tracks pace and scale of climate action

Climate risk analyses (Carbon VAR, Physical risk etc) examine impacts of action on investments & portfolios

Climate risk tools available across investment desks

Source: Schroders

Significant changes ahead to reach global targets

Climate Progress Dashboard tracks scale and speed of climate action

Aggregate implied temperature rise **3.9°**

	Political ambition	Business and finance	Technology solutions	Entrenched industry
Aspiration	Political ambition **2.8°**	Corporate planning **3.4°**	Electric vehicles **3.1°**	Oil & gas investment **3.6°**
	Public concern **3.3°**	Climate finance **5.5°**	Renewable capacity **3.0°**	Fossil fuel reserves **4.7°**
Action	Political action **3.0°**	Carbon prices **3.0°**	CCS[1] capacity **4.9°**	Fossil fuel production **6.1°**

Source: Schroders analysis based on industry sources. Based on data available as at Q2 2020. For further details please visit: http://www.schroders.com/en/sysglobalassets/digital/insights/2017/pdf/sustainable/climate-change-dashboard/climatedashboard-july2017.pdf [1]Carbon capture & storage.

Climate change: wide range of impacts across markets

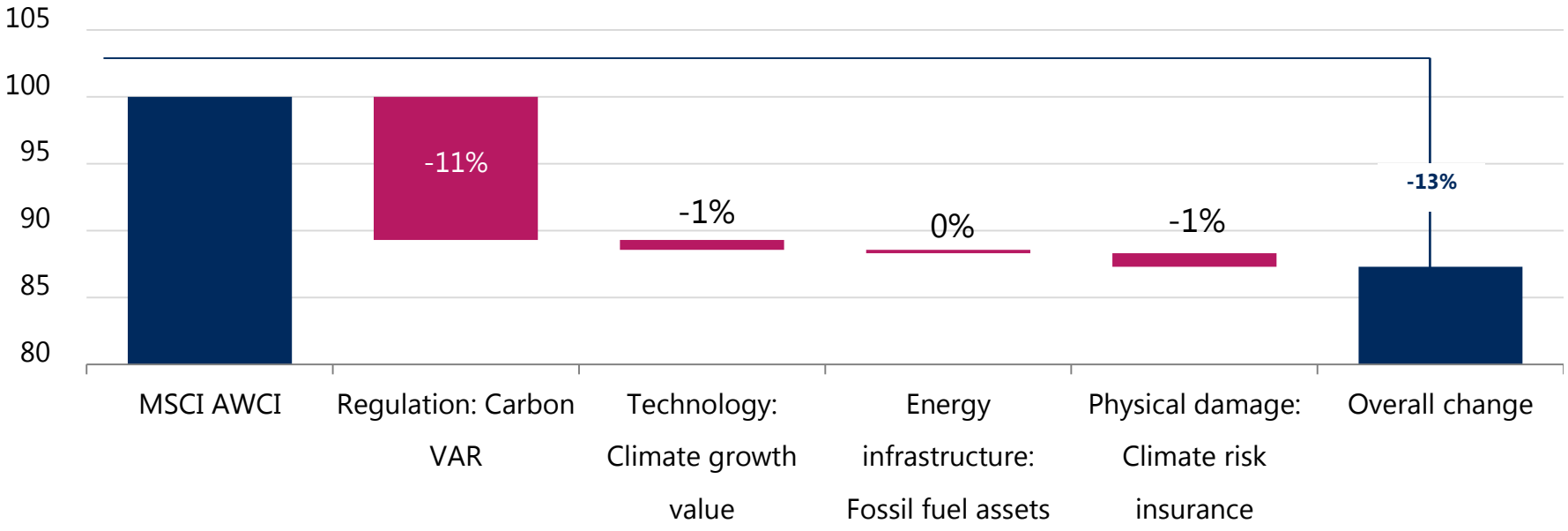
Starting with ‘what will change’

What needs to change?	How will those changes be achieved?	Impact on earnings and valuations?	Overall risk exposure?
1 Regulation	E.g. Carbon prices to $100/t	Global cash flows 15–20% lower	**Most portfolios face 10–20% valuation risk under 2° scenario**
2 Technology	E.g. 6% p.a. growth in wind capacity	Positive growth options 25–30% of market cap	
3 Fossil fuels	E.g. 35% drop in fossil fuel production	Up to 70% impact on sector valuation	
4 Physical risk	E.g. 3% p.a. increase in economic costs	Insurance costs up to 5% of current valuations	

Source: Schroders.

Applying risk assessment to global portfolios

10–20% impact on global equity valuations



Source: Thomson Reuters, MSCI, CDP, Schroders.

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Schroders commissioned Research Plus Ltd to conduct an independent online survey of 25,743 investors in 32 locations throughout the world, with fieldwork held between 4 April – 7 May 2019. This research defines 'investors' as people who will be investing at least €10,000 (or the equivalent) in the next 12 months and who have made changes to their investments within the last 10 years; these individuals represent the views of people in each location included in the survey. Retired investors were boosted in each location, where it was feasible.

Schroders commissioned CoreData to conduct the third Institutional Investor Study to analyse the world's largest investors' key areas of focus and concern including the macroeconomic and geopolitical climate, return expectations, asset allocation and attitudes to private assets and sustainable investing. The respondent pool represents a spectrum of institutions, including pension funds, insurance companies, sovereign wealth funds, endowments and foundations managing approximately $25.4 trillion in assets. The research was carried out in May 2019. The 650 institutional respondents were split as follows: 175 in North America, 250 in Europe, 175 in Asia-Pacific and 50 in Latin America. Respondents were sourced from 20 different locations.

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Q&A

Moderated by **Sabine Döbeli,** CEO, SSF

Swiss Sustainable Finance

WWF

THANK YOU FOR JOINING US TODAY!

10 SEPTEMBER 2020

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