

The Next Generation of ESG Risk Metrics

An Introduction to FESG

INTRODUCING FESG, THE FOURTH DIMENSION OF ADVANCED ESG ANALYTICS

Probus Sigma Research & Two leading Professors of Economics who specialize in Neural Finance Technologies have invested eight and seven years respectively to solve the issue of defining quantitatively based Financial, Environmental, Social and Governance metrics.

Probus Sigma are the technical research experts who over the last 16 years, have built or contributed to 90% of the Global Standards implemented as investment benchmark tools by the International Financial Investment Markets. These Standards now carry over \$ 1Trn per annum in trade. The Sigma Algorithm identifies and analyses quantitatively based environmental, social and governance risk, (ESG) within Portfolio construction, project design, supply chains and more. Probus Research is based in Lisbon, home of International research and development of ISO based Standards.





- For the last seven years Professors Nouri Chtourou and Rochdi Feki have pioneered Neural Finance technologies eventually building Cfar-m, this powerful Neural Finance based analytical algorithm builds upon the Sigma platform, applying advanced Neural analytics to aggregate and define previously unquantifiable data. Cfar-m was designed for the IMF, World Bank and the RE-Insurance Industry to provide credible risk analytics to address Climate Change. The Professors are based at Sfax University Business School and Sophia-Antipolis.



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- The deployment of these two unique and powerful algorithms, has resulted in Sigma-Cfar-FESG, the world's first quantitatively based four dimensional Financial, Environmental, Social and Governance, (FESG) analytical tool. For the first time all four major investment risks may be calculated, separated and compared to listed or non-listed company's across the Globes 42 recognized Stock Exchanges very quickly. The basis of the Platform facilitates exact, "like for like" FESG performance across 162 Countries.
 - Existing non quantitative SRI methodologies may be applied post establishment of the real, quantifiable risk metrics via Sigma-Cfar.



This next illustration demonstrates Companies who have a high level of environmental risk and a high level of financial risk.



High Financial Risk

High Environmental Risk

ESG Specific Risk Index
for a company

	Parent Company	Subsidiary or Business unit	Beta	Sigma	CFAR-m Indice	Rank
1	Metsa Board	Meulemans	1,3800	1,8601	1,00000	1
2	Metsa Board	Tako Carton (Järvenpää)	1,3800	1,8601	1,00000	1
3	Metsa Board	Tako Carton (Tampere)	1,3800	1,8601	1,00000	1
4	Stora Enso	Arzamas	1,2300	2,0833	0,99076	4
5	Stora Enso	Balabanovo	1,2300	2,0833	0,99076	4
6	Stora Enso	Loviisa	1,2300	1,4881	0,80194	6
7	Stora Enso	Sunila	1,2300	1,4881	0,80194	6
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14	UPM-Kymmene Oyj	Otepa	1,1500	1,6234	0,78398	14
15	UPM-Kymmene Oyj	ZAO Chudovo	1,1500	1,6234	0,78398	14
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34	Metsa Board	Pont Sainte Maxence	1,3800	1,1419	0,77794	34
35	Tieto Corporation	Tieto France S.A.	0,8100	3,1250	0,77449	35
36	Tieto Corporation	PT TietoEnator Indonesia	0,8100	3,1250	0,77449	35
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55	Metsa Board	Kemiart Liners	1,3800	1,0506	0,77099	55
56	Metsa Board	Simpele	1,3800	1,0506	0,77099	55
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58	Metsa Board	Zanders Reflex	1,3800	1,0506	0,77099	55

While Sigma establishes a reliable, quantitative risk ESG Metric, the addition of Cfar Neural Technologies provides the advanced analytics which:

- a) Capture the complex non-linear relationships between the two types of risk. (Financial & ESG)
- b) Companies who appear in the mid-rankings illustrate possible compensations between the two types of risk.

Parent Company	Subsidiary or Business unit	Beta	Sigma	CFAR-m Indice	Rank
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346	Vodafone Group Plc Vodafone Portugal-Comunicações Pessoais, S.A.(6) Network operator Portugal 100.0	0,6200	0,9957	0,07967	346
347	Deutsche Telekom AG PTC Polska Telefonía Cyfrowa Sp.z o.o.	0,6100	0,9821	0,07084	347
348	Deutsche Telekom AG T-Systems Schweiz AG	0,6100	0,9821	0,07084	347
349	Vodafone Group Plc Vodacom Group (Pty) Limited Holding company South Africa 50.0	0,6200	0,9127	0,05235	349
350	Deutsche Telekom AG TMobile Deutschland GmbH, Bonn	0,6100	0,8839	0,04057	350
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354	Deutsche Telekom AG T-Systems Italia S.p.A.	0,6100	0,8571	0,03649	354
355	Vodafone Group Plc Vodafone Group Services Limited(5) Global products and services provider England 100.0	0,6200	0,7738	0,02196	355
356	Vodafone Group Plc Vodafone Limited Network operator England 100.0	0,6200	0,7738	0,02196	355
357	Deutsche Telekom AG Slovak Telekom, a.s.	0,6100	0,7597	0,01621	357
358	Deutsche Telekom AG IQSYS Zrt. (IQSYS Computing Limited by Shares)	0,6100	0,6753	0,00428	358
359	Vodafone Group Plc Vodafone-Panafon Hellenic Telecommunications Company S.A. Network operator Greece 99.9	0,6200	0,5974	0,00000	359

Low Financial Risk

Low Environmental Risk



High Level of Financial Risk

Low Level of Environmental Risk

Parent Company	Subsidiary or Business unit	Beta	Sigma	CFAR-m Indice	Rank
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141	Vodafone Group Plc Vodafone Malta Limited Network operator Malta 100.0	0,6200	3,1250	0,66523	126
142	Metsa Board Biberist	1,3800	0,4241	0,66495	142
143	Deutsche Telekom AG Deutsche Telekom Value Added Services Austria GmbH	0,6100	3,1250	0,66101	143
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180	Stora Enso Uetersen	1,2300	0,9697	0,65741	178
....
185	Stora Enso Whiting	1,2300	0,9673	0,65723	183
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187	Metsa Board Joutseno BCTMP	1,3800	0,1965	0,65433	186
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209	Telefonica S.A. Brazil - Fixed Lines	0,7300	2,6042	0,63093	209
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Low Level of Financial Risk

High Level of Environmental Risk



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- Both generations of Sigma are designed to provide strong elements of compliance
 - Future proof SEC & FSA compliance
 - NGO friendly
 - Compliant with ISO Guides
 - Compliant with WTO requirements

In comprehensive market tests (Sigma I without GHG risk & addition of Cfar Technologies) our clients asked for:

- Traditional risk factors, (financial) & Environmental, Social & Governance risks to be calculated and available in one document
- They asked for each risk element to be presented separately

This they now have.