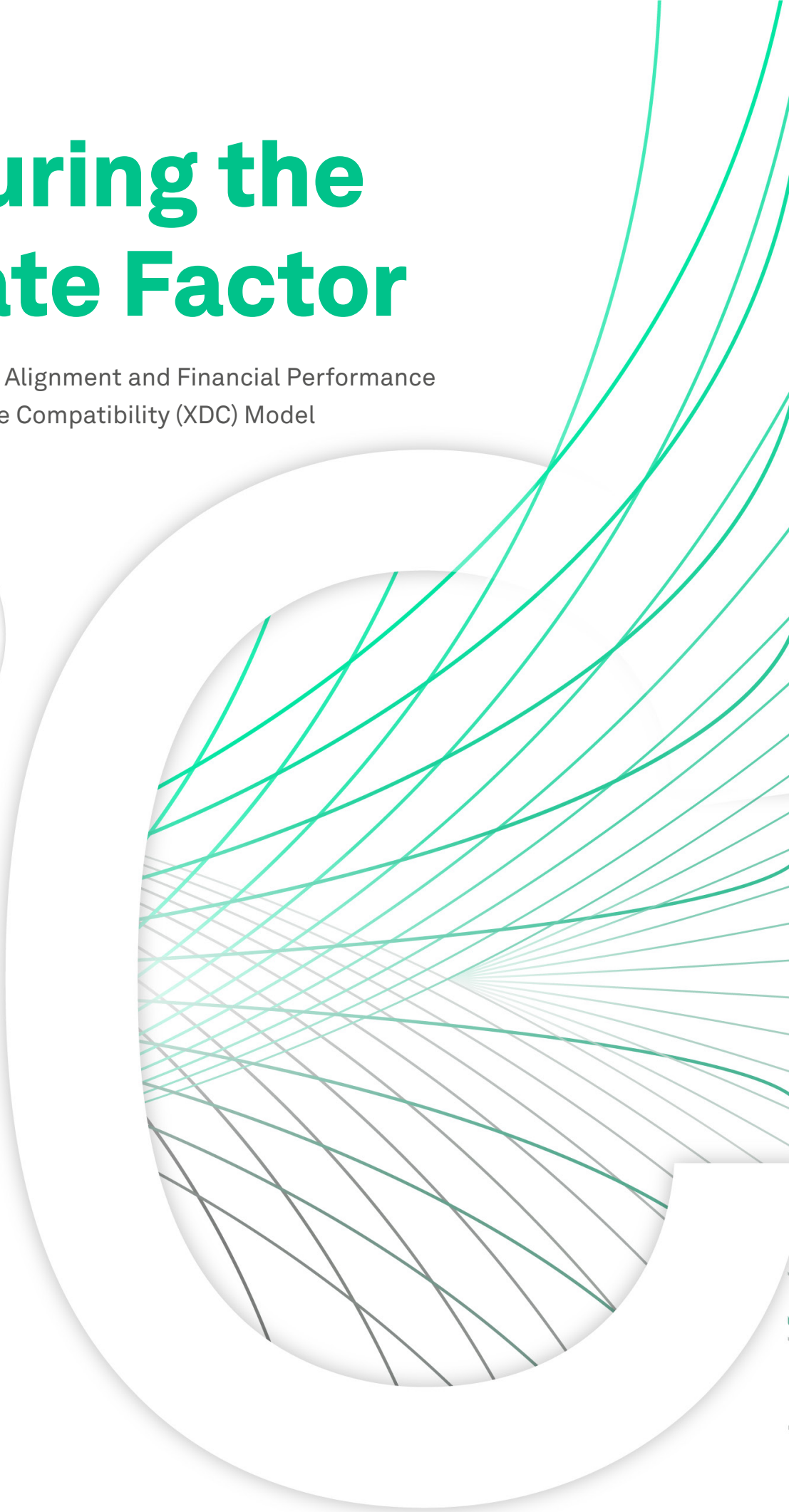
Capturing the °Climate Factor

Linking Temperature Alignment and Financial Performance through the X-Degree Compatibility (XDC) Model

Updated: March 2021



right.
based on science

Foreword

© Farideh Fotografie

Temperature Alignment analyses are full of uncertainty – true. But, rather than viewing uncertainty as the enemy of applicable metrics to steer us towards the future, we should see their informational value as our friend. This analysis shows that both aspects – uncertainty and informational value – are not mutually exclusive. In uncovering a Climate Factor, our team at right. based on science has achieved a true milestone. Laying a strong foundation for the application of Temperature Alignment methodologies in finance & investment management and establishing them as powerful tools to shape our shared future.

Hannah Helmke,
Co-Founder and CEO, right. based on science

Content

3 Summary

4 Introduction

5 Research Scope & Methodology

6 The XDC Model

7 Analysis & Results

11 Conclusion

12 Outlook

13 Authors

14 References

Summary

In Numbers

875
companies

10
sectors

7
years backtest

60%
outperformance

The 2015 Paris Agreement aims at limiting global temperature rise to well below two degrees Celsius above pre-industrial levels. As we continue burning through the remaining carbon budget[1] and are beginning to see the impacts of climate change[2], the related physical, transitional, reputational, commercial, and regulatory risks are mounting for issuers and investors alike. It stands to reason that this will also affect market prices. Investors who are able to seize the opportunities and manage the risks inherent in these developments stand to gain considerable advantages – and will also be fulfilling their fiduciary duty in the 21st century, as stipulated by the UN Principles of Responsible Investment (PRI) and UNEP Finance Initiative.[3]

This report investigates the emergence of a **Climate Factor** within the European stock market, its correlation to returns, and whether it can be leveraged to capture market outperformance.

The analysis was sparked by discovering that European securities which, according to our own X-Degree Compatibility (XDC) Model, are aligned with the Paris Agreement outperformed the market. In this case, we categorised the universe of the *Solactive Europe 600 Index* since 2013 (875 securities in total) into (i) those stocks that are aligned with a maximum 2°C warming scenario until 2050 and (ii) those that are not. In a backtest from January 2013 through July 2020, the 2°C-Aligned stock selection beat the market both in total return (over +25%) as well as average annual returns, while maintaining similar volatility throughout.

In an effort to better understand the drivers of this outperformance, we subdivided the 2°C-Aligned and Non-Aligned categories into three subsets each (ranging from '*somewhat*' and '*strongly aligned / non-aligned*' to '*most aligned*' and '*least aligned*'). We then conducted a separate backtest for each of these six subsets. Looking at their historical performance on returns, the evidence is consistent with the Climate Factor hypothesis. However, the middle ranges are not yet very distinct.

Finally, we looked more closely at the two subsets on the outer margins: the 'Most Aligned' and 'Least Aligned' stocks within the Europe 600 universe. Here, all levels of returns, drawdowns, volatility, and resilience show the stark contrast that is in line with the Climate Factor hypothesis. The 'Most Aligned' securities yielded over 107% higher total returns over the 'Least Aligned' across the seven-year period under review, while maintaining similar volatility. Finally, a sector breakdown shows no significant bias towards assumed 'greener' industries, such as tech or pharmaceuticals, but a robust diversification of sectors in both the 'Most Aligned' and 'Least Aligned' subsets.

We end with an outlook on other investigations that could deliver further insights on the existence and effect of a Climate Factor, as well as market, policy, and economy shifts that may further drive its impact – making it all the more valuable to *Capture the Climate Factor.*

1. Mercator Research Institute on Global Commons and Climate Change (2020). Remaining Carbon Budget. Retrieved from https://www.mcc-berlin.net/en/research/co2-budget.html
2. National Geographic (2020, Oct 11). Reference: Effects of global warming. Retrieved from https://www.nationalgeographic.com/environment/global-warming/global-warming-effects/
3. PRI / UNEP FI (undated). Fiduciary Duty in the 21st Century. pp.17. Retrieved from https://www.unpri.org/download?ac=9792

Introduction

For years now, investors have been struggling to find approaches that can help them adequately integrate the risks of climate change into their investment process. Until recently, the focus here was on the effect that the externalities of climate change have on investments (outside-in perspective). But in the past year, awareness of the 'double materiality'[4] of climate change is growing. That is to say: investors are integrating the inside-out perspective, which is the effect that investments have on climate change, by financing economic activities which contribute to greenhouse gas emissions and global warming.

While 'green', sustainable, and ESG criteria are increasingly becoming standard elements in investment processes[5], much scepticism and contention still remains on the best ways to define, analyse, and track 'sustainability', as well as the potential positive or negative effects these selection criteria may have on investments' risk/return profile in the short-, mid-, and long-term.

Regarding climate change and global warming, developments like the Paris Agreement, the EU Green Deal and the Action Plan on Sustainable Finance, as well as public awareness and concern (exemplified by the Fridays for Future and Global Climate Strike movements) are mounting pressure on investors and issuers alike to transform their business models in alignment with a well below 2°C future (so-called 'Temperature Alignment'). Self-commitments such as the United Nations-convened Net-Zero Asset Owner Alliance[6] and BlackRock's declaration that „*Climate risk is investment risk*"[7] are a testament to a fundamental shift taking place in capital markets.

However, a key question is: how much has this shift already begun to affect markets and returns? We are familiar with factors such as liquidity, market cap, and book-to-market value which generate potential return premiums. With regard to current global economic developments and the impact of upcoming sustainability legislation, this begs the question: is a new factor emerging that is correlated to higher returns – a **Climate Factor**?

Here, we utilize the X-Degree Compatibility (XDC) Model[8], developed by right. based on science, to analyse whether Temperature Alignment and market performance are significantly related, and in what way. To do so, we calculate the alignment to a 2°C global warming scenario (IEA 2DS[9]) of a total of 875 securities from the Solactive Europe 600 Index universe from 2013 to 2020. The (average 73) issuers showing the smallest climate impact or, more specifically, the strongest Temperature Alignment, significantly outperformed the market (Solactive Europe 600) by +4.4% p.a. over the past seven years (+59.6% overall). At the other end of the spectrum, those (average 72) issuers with the weakest Temperature Alignment, markedly underperformed the market (by -47%) within the same time frame.

A step towards steering?

These results indicate that not only is there a climate-related driver in the market, which becomes more visible the further securities are in or out of alignment with the Paris Goals, but applying the XDC Model to investment and portfolio analysis allows investors to capture this Climate Factor and thereby lay the foundation for the generation of Climate Alpha.

4. European Commission - Directorate-General for Financial Stability, Financial Services and Capital Markets Union (2019). Guidelines on reporting climate-related information. Brussels: European Union. pp.6. Retrieved from https://ec.europa.eu/finance/docs/policy/190618-climate-related-information-reporting-guidelines_en.pdf
5. *A recent survey of investment professionals found that 40% already incorporate climate change information in their investment process.* Orsagh, Matt (2020). Climate Change Analysis in the Investment Process. Charlottesville, VA: CFA Institute. p. 18. Retrieved from https://www.cfainstitute.org/-/media/documents/article/industry-research/climate-change-analysis.ashx
6. UNEP FI (2019). United Nations-Convened Net-Zero Asset Owner Alliance. Retrieved from https://www.unepfi.org/net-zero-alliance/
7. Fink, L. (2020, Jan 14). A Fundamental Reshaping of Finance – Annual Letter to CEOs. New York: BlackRock, Inc. Retrieved from https://www.blackrock.com/corporate/investor-relations/larry-fink-ceo-letter
8. See p. 6 in this document and Helmke, H. et al. (2020). Provision of Climate Services – The XDC Model. In: Filho, W. / Jacob, D. (eds.). Handbook of Climate Services. Cham: Springer Nature. pp. 223. Retrieved from https://link.springer.com/chapter/10.1007%2F978-3-030-36875-3_12
9. IEA (2017). Energy Technology Perspectives 2017. Paris: IEA. Retrieved from https://www.iea.org/reports/energy-technology-perspectives-2017

Research Scope & Methodology

The starting point for this analysis was the creation of the *Solactive right. 2 Degree-Aligned Europe Index* (hereafter: '2°C Index') in June 2020. This index is comprised of a sub-set of the *Solactive Europe 600 Index* (hereafter: 'Europe 600'), and covers only those securities from that universe which are aligned to a maximum 2°C warming scenario until 2050, according to XDC Model calculations and under base-line assumptions.[10] That is to say: all securities included in the 2°C Index must have an XDC Gap of ≤0 between their Baseline XDC and Target XDC in the given base year (see p. 6).

We determine the historical composition of the 2°C Index by conducting an XDC analysis of 875 securities that have been covered in the Europe 600 since 2013 (no survivorship bias).

The following backtest shows an outperformance of 25.2% for the 2°C Index against the underlying universe (Europe 600). This is accompanied by a stronger volatility adjusted risk profile. The Sharpe Ratio increases from 0.41 to 0.55. A subset comprised of all non-aligned securities under-performed against both the Europe 600 (-19.3%) and the 2°C-Aligned subset (-40.3%) during the same timeframe. From here, we go on to further analyse the possible drivers of said outperformance.

We subdivide the 2°C-Aligned and Non-Aligned categories into six XDC Gap ranges (three for each category). The two extreme ranges on either side, representing XDC Gaps of -3 to -1 (hereafter: 'Most Aligned') and +2 to +4 (hereafter: 'Least Aligned') are compared in greater detail.

	Aligned to a 2°C Warming Scenario			Not Aligned to a 2°C Warming Scenario		
XDC Gap range	≤0			>0		
Average no. of constituents (2013-20)	217			340		
XDC Gap range	-3<X≤-1	-1<X≤-0.5	-0.5<X≤0	0<X≤1	1<X≤2	X>2
Average no. of constituents (2013-20)	73	44	100	197	71	72

Table 1 – XDC Gap ranges and average no. of constituents in each

According to the hypothesis that there is a Climate Factor which can capture outperformance, securities with a lower XDC Gap (i.e. further into the sub-zero ranges) should yield higher returns, and vice versa.

In terms of the backtest, a rolling forward window approach is used here, in order to prevent forward-looking bias in the data. Survivorship bias has been avoided by considering all historical constituents. Initially, a preliminary analysis was carried out, using fixed weights, which would exclude compounding effects. Although this approach does not mirror the actual environment of real markets, it highlighted the potential effects of a Climate Factor. As this first analysis yielded positive results, a more detailed analysis using historical data, market share weighting, regular (quarterly) rebalancing, and compounding effects was carried out. In this whitepaper, we demonstrate the results of this final backtest, as it most closely reflects market investment behaviour.

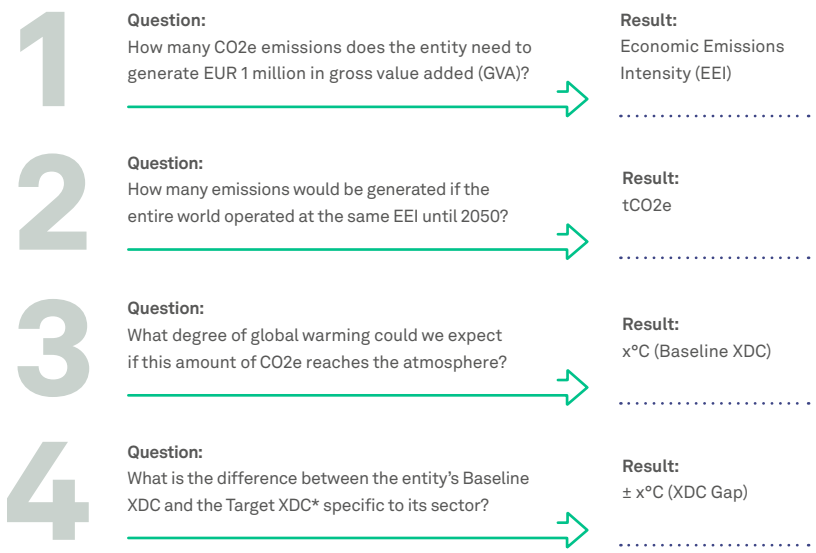
10. Baseline assumptions are growth rates derived from a continuation of past trends from the base year (2013-2018) until 2050 for both emissions and gross value-added (GVA). These rates are calibrated based on the Shared Socioeconomic Pathway 2 (SSP2) Scenario.
Source SSP2: O'Neill, B.C. et al. (2015). The roads ahead: Narratives for shared socioeconomic pathways describing world futures in the 21st century. In: Global Environmental Change (2017, Jan). Volume 42. pp. 169-180. Retrieved from https://doi.org/10.1016/j.gloenvcha.2015.01.004
Data sources: Urgentem (Scope 1-3 emissions) and FactSet Research Systems (GVA).

The X-Degree Compatibility Model

The X-Degree Compatibility (XDC) Model, developed by right. based on science, calculates the contributions of a company, portfolio or any other economic entity to climate change, answering the question: How much global warming could we expect, if the entire world operated at the same economic emission intensity as the entity in question until 2050 under a specific scenario? Results are expressed in a tangible degree Celsius (°C) number: the XDC. These are mapped against a sector-specific temperature benchmark (Target XDC), which determines whether the entity is aligned with a chosen global warming scenario (e.g. 2°C, 1.75°C) or not.

How it works

X-Degree Compatibility is calculated in four steps:[11]



XDC Gaps ≤0 indicate that the entity is aligned with the chosen global warming scenario, while XDC Gaps >0 indicate Non-Alignment.

The XDC Model is science-based, peer-reviewed, forward-looking, TCFD-compatible, aligned with the EU Green Deal, transparent and Open Source (currently for academia; fully Open Source from 2021). It is also – to our knowledge – the only methodology of its kind to integrate a full climate model (the FaIR Model[12] also used by the UN Intergovernmental Panel on Climate Change (IPCC)).

*The International Energy Agency (IEA) allocates the remaining emissions[13] budget to stay below e. g. 2°C (2DS) or 1.75°C (B2DS) global warming between sectors, taking into consideration their inherent differences in emissions intensity and cost-optimised capacity to reduce emissions. This allocation is ‚translated' into °C values utilizing the XDC Model, yielding sector-specific Target XDCs.

11. *For a detailed and peer-reviewed description of the XDC Model and methodology, see:* Helmke, H. et al. (2020).
12. Smith, C. J. et al. (2018). FAIR v1.3: a simple emissions-based impulse response and carbon cycle model. Geosci. Model Dev., 11. pp.2273–2297. Retrieved from https://doi.org/10.5194/gmd-11-2273-2018.
And Millar et al. (2017). FaIR. Retrieved from https://fair.readthedocs.io/en/latest/intro.html
13. *Our analysis here is based on IEA 2DS.* IEA (2017).

Analysis & Results

1st Step

Comparing 2°C-Aligned (x≤0) vs. Non-Aligned (x>0) Securities

First, we compare the main two categories of 2°C-Aligned and Non-Aligned securities. The Non-Aligned category (XDC Gap range x>0) included 395 constituents in January 2013 and 327 by July 2020. During that time, they accumulated 45.3% total return (5.2% p.a.), while exhibiting a volatility of 17.4%. The 2°C-Aligned category (XDC Gap range x≤0) grew from 205 constituents in January 2013 to 260 in July 2020. They generated 85.6% total return (8.7% p.a.), which corresponds to an outperformance of 40.3%. Volatility for this group was also slightly lower at 16.3%.

The maximum drawdown was greater for the 2°C-Aligned securities at -36.5% versus -35.5% for the Non-Aligned securities.

Figure 1 – Returns for the Europe 600, the 2°C-Aligned, and Non-Aligned categories

2nd Step

A Closer Look – Most, Somewhat, and Least Aligned

Breaking the 2°C-Aligned and Non-Aligned categories down further into three XDC Gap ranges on either side, provides a clearer view on the main clusters of out-/underperformance in both categories. Each of the three XDC Gap ranges within the 2°C-Aligned spectrum delivered higher returns than any of the Non-Aligned ranges, exhibiting a steady increase or decrease in performance, the further the range is in alignment / non-alignment (see Fig. 2).

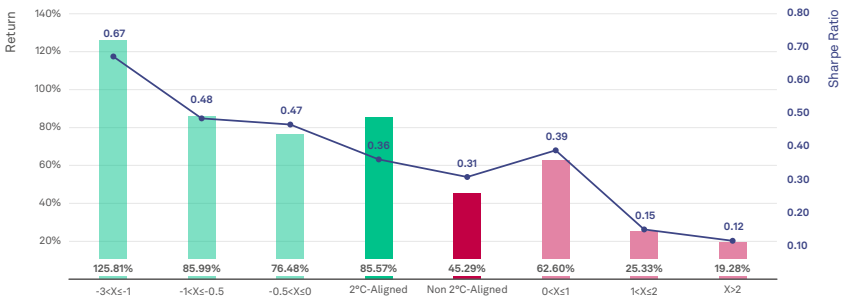


Figure 2 – Total return & Sharpe Ratio per XDC Gap range

2nd Step

Figure 3 – Returns by XDC Gap ranges

Volatility, too, is in line with the Climate Factor hypothesis: While the 2°C-Aligned ranges remain consistent with the overall Europe 600 volatility (16.6%), the Non-Aligned ranges show a steady increase in volatility ending at 20.1% for the 'Least Aligned' range. That being said, the two mid-ranges (XDC Gaps of ‚-0.5 to 0' and ‚0 to 1') do not show a very marked difference in risk-adjusted returns (Sharpe Ratio) (see Table 1 and Fig. 2). The contrast becomes clearer, once we move further out on both the 2°C-Aligned and Non-Aligned spectrum. We therefore go on to focus exclusively on the two extreme ends of the spectrum, the 'Most Aligned' (XDC Gaps -3 to -1) and 'Least Aligned' (XDC Gaps >2) ranges.

	'Most Aligned'														'Least Aligned'	
	-3<X≤-1		-1<X≤-0.5		-0.5<X≤0		X≤0		X>0		0<X≤1		1<X≤2		X>2	
avg. Return p.a.	11.2%		8.4%		7.7%		8.7%		5.2%		6.5%		3%		2.3%	
	Return p.a.	Vola	Return p.a.	Vola	Return p.a.	Vola	Return p.a.	Vola	Return p.a.	Vola	Return p.a.	Vola	Return p.a.	Vola	Return p.a.	Vola
2013	13.3%	13.1%	13.1%	11.8%	17.3%	11.8%	15.8%	11.7%	22.4%	13.0%	24.6%	13.5%	19.6%	12.3%	19.7%	13.8%
2014	12.9%	12.7%	-0.6%	12.9%	13.8%	11.6%	12.0%	11.6%	5.1%	14.5%	5.7%	14.7%	2.2%	15.1%	4.1%	15%
2015	14.9%	20.0%	22.2%	19.4%	13.2%	18.5%	14.8%	18.8%	7.5%	20.5%	10.6%	20.2%	10.6%	21.4%	-4.7%	21.8%
2016	10.9%	17.9%	8.1%	19.7%	3.9%	19%	7.1%	18.3%	-0.4%	21.3%	-0.7%	21.5%	4.3%	20.7%	-2.5%	22.9%
2017	13.1%	9.1%	15.8%	9.7%	11.5%	8.7%	13.1%	8.3%	10.3%	8.9%	8.7%	8.8%	12.4%	9.6%	12.8%	10.2%
2018	-13.1%	13.1%	-6.2%	13.4%	-5.9%	11.6%	-7.5%	11.8%	-13.5%	13.6%	-13.4%	13.2%	-15.2%	14.5%	-7.2%	15.1%
2019	40.8%	13.4%	29.3%	12.2%	23.5%	11.3%	28.8%	11.6%	26.9%	11.3%	28.8%	10.8%	21.5%	14.4%	22.3%	13.9%
2020	0.1%	29.2%	-10.8%	33.4%	-13.3%	31.8%	-13.6%	36.8%	-12.8%	34.9%	-7.2%	26.7%	-23.3%	40.8%	-19.5%	38.9%
	Return	SR	Return	SR	Return	SR	Return	SR	Return	SR	Return	SR	Return	SR	Return	SR
Total 2013-20	125.8%	0.67	86.0%	0.48	76.5%	0.47	85.6%	0.54	45.3%	0.30	62.6%	0.39	25.3%	0.15	19.3%	0.12

Table 2 – Annual returns & volatility, total return & Sharpe Ratio by XDC Gap range

3rd Step

Exploring the Margins - Most and Least Aligned

While volatility remains roughly the same for both the 'Most' and 'Least Aligned' ranges throughout the entire seven-year timeframe (respectively totalling 16.7% and 20.1%, see Table 2), returns increasingly diverge from 2015. By August 2020, the 'Most Aligned' range had yielded 107% higher total returns than the 'Least Aligned'.

Figure 4 – Outperformance 'Most Aligned' vs. 'Least Aligned' XDC Gap range

Up to this point, the empirical results support our hypothesis. However, to complete the picture resilience must be considered alongside risk-adjusted returns. As a historical underwater equity curve shows, the 'Most Aligned' stock selection proved to be more resilient in 2016 and 2020, compared to the 'Least Aligned' (see Fig. 5). However, it failed to provide an advantage in 2018. Overall, the maximum drawdown of -30.6% for the 'Most Aligned' range clearly improves the tail risk profile. But, perhaps more remarkably: The 'Least Aligned' range exhibits not only a persistent weak tail risk profile, but also the highest maximum drawdown of -42.6% of all subsets considered in the analysis. Besides, the 'Most Aligned' range shows a Sortino Ratio of 0.84 overall, while the 'Least Aligned' only achieves 0.14.

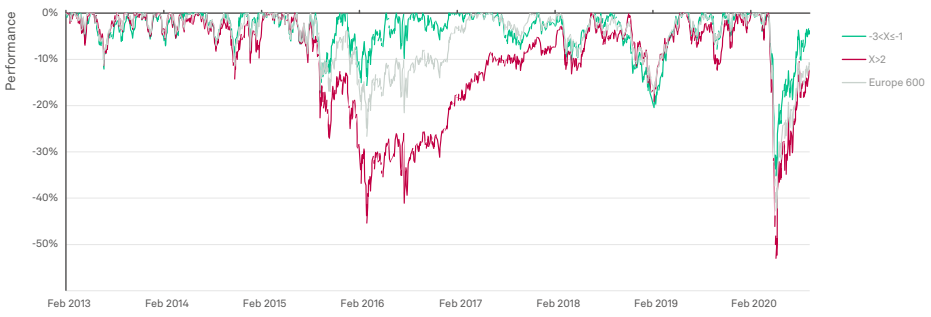


Figure 5 – Underwater Equity Curve / max. drawdown for the Europe 600, 'Most Aligned', and 'Least Aligned' XDC Gap ranges

Tracking volatility, returns and maximum drawdown over time, the 'Most Aligned' range shows a clear outperformance against the 'Least Aligned' during market upswings and remains more resilient during market corrections, as seen in 2016 and 2018.

3rd Step

	Return		Max. Drawdown		Sortino Ratio	
	-3<x≤-1	X>2	-3<X≤-1	X>2	-3<X≤-1	X>2
2013	13.3%	19.7%	-11.6%	-10.9%	1.43	2.22
2014	12.9%	4.1%	-9.4%	-13.8%	1.46	0.39
2015	14.9%	-4.7%	-16.4%	-24.7%	1.10	-0.30
2016	10.9%	-2.5%	-9.8%	-23.0%	0.81	-0.12
2017	13.1%	12.8%	-7.7%	-4.4%	2.13	2.22
2018	-13.1%	-7.2%	-18.8%	-18.0%	-1.41	-0.63
2019	40.8%	22.3%	-7.7%	-11.9%	3.96	2.34
2020	0.1%	-19.5%	-30.6%	-42.6%	0.00	-0.59

Table 3 – Return, max. drawdown, and Sortino Ratio by year, 'Most Aligned' vs. 'Least Aligned' XDC Gap ranges

Black Swan events, such as the COVID-19 crisis of early 2020, affect all XDC Gap ranges to a similar degree. However, there are some signs that the 2°C-Aligned securities are quicker to recover. One example is to look at the 2019 year-end values of both the 'Most Aligned' and 'Least Aligned' ranges, and compare how long it took for each of them to rebound back to this value, after the COVID-19 crisis started. After both ranges reached their lowest value on March 18th, the 'Least Aligned' stock selection had not yet rebounded to its year-end 2019 value as of October 8th and remained down 19% from the start of the year. The 'Most Aligned' range came back to its 2019 year-end price on October 5th.

4th Step

Checking for Sector Bias

It might be expected, that some less emissions-intensive industries such as technology or financial services would be dominant within the 2°C Index and, especially, within the 'Most Aligned' range, while ‚heavy' industries such as utilities, would be over-represented in the Non-Aligned and 'Least Aligned' ranges. However, as described on p.6, XDC Gaps are always calculated relative to a sector-specific target and therefore already take sector differences into account. As a result, even the 'Most Aligned' stock selection shows a diverse sector mix throughout the seven-year time frame exhibiting similarities to the Solactive Europe 600 Index. The current allocation overweights the *Industries* sector by 20.8% and underweights the *Finance & Healthcare* sectors. The relative proportions of each sector show similar changes over time in both the 'Most' and 'Least Aligned' ranges.

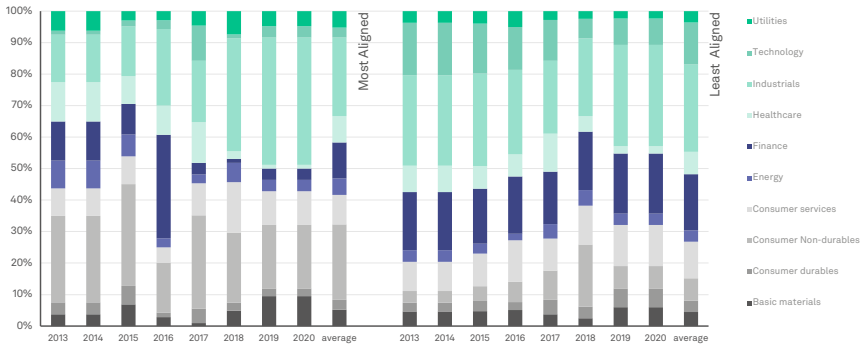


Figure 6 – Sector breakdown 'Most Aligned' and 'Least Aligned' XDC Gap ranges

Conclusion

We set out to discover whether a **Climate Factor** is observable in the market and whether it can capture outperformance. The initial analysis conducted here for 875 of the largest European stocks from 2013 to 2020 supports both points.

Our analysis followed four main steps: **1)** Sparked by discovering a historical outperformance of the newly created *Solactive right. 2-Degree Aligned Europe Index* against the market (the *Solactive Europe 600*), we first compared that 2°C-Aligned stock selection to all remaining Non-Aligned securities. As expected, the comparison showed a clear difference in return as well as volatility. **2)** We then further divided these two categories into three subsets each, by creating XDC Gap ranges which move from 'Most Aligned' (XDC Gaps of -3 to -1) and 'strongly aligned' (-1 to -0.5) through the 'somewhat aligned' (-0.5 to 0) and 'somewhat non-aligned' (0 to 1), to the 'strongly non-aligned' (1 to 2) and 'Least Aligned' (2 and above) ranges. Separate backtests conducted for each of these subsets revealed only a small difference in performance between the somewhat aligned / non-aligned ranges. However, the four 'outer' ranges show marked differences in risk-adjusted returns. **3)** We then went on to compare the two outermost ranges - the 'Most Aligned' and 'Least Aligned' stocks. Here, the differences across all criteria (return, max. drawdown, resilience, Sharpe, and Sortino Ratio) show a distinct and considerable outperformance for the 'greener' stocks. **4)** A final look at the sector breakdown for the 'Most Aligned' and 'Least Aligned' shows a balanced mix of industries in both stock selections, confirming that the Climate Factor is not shaped by sector bias.

Our results show that greater alignment with the 'well below 2°C' goal set out in the Paris Agreement, correlates with stronger financial performance for the securities analysed. Non-Alignment, on the other hand, pairs with underperformance. This is true not only for returns, but also for risk (volatility), as well as resilience. All three subsets of the 2°C-Aligned securities considered in our analysis significantly outperformed both the market and the juxtaposed three subsets of the Non-Aligned stocks. While this correlation cannot be directly applied to an assessment of individual companies, the overall picture still shows that the further issuers move out of alignment with the Paris Goals and the greater their contribution to global temperature rise, the weaker their market performance becomes. This is especially obvious on the outer margins, when comparing the 'Most Aligned' to the 'Least Aligned' securities. A difference of +106.5% total return at 3.4% points lower volatility speaks for itself.

The XDC Gap ranges closest to zero, being the demarcation line between 2°C-Alignment and Non-Alignment, hold the largest number of constituents on both sides, as might be expected. Here, alignment still correlates to better performance, but the difference is much less pronounced. Investors seeking to leverage the Climate Factor and generate Climate Alpha would therefore benefit most from looking at stocks from issuers with a markedly lower climate impact.

Outlook

It is worth pointing out, that these correlations between Temperature Alignment, as measured by X-Degree Compatibility (XDC), and financial performance can already be observed today, while stricter regulation and oversight regarding greenhouse gas emissions and environmental impacts, e.g. as a result of the EU Green Deal, have not yet come into force. Correlation, of course, does not imply causation and further analysis (e.g. a statistical approach, such as multi-factor regression analysis) is needed, to classify the outperformance and to distinguish how much of it can be ascribed to a Climate Factor. It is also likely that there could be significant overlaps between the Climate Factor and other ESG criteria and integrating both may compound the positive effects on investments described here. In fact, a recent backtest conducted for a selection of securities from the *Solactive right. 2-Degree Aligned Europe Index*, to which additional ESG filters had been applied, showed a further increase in market outperformance.

However, as climate change rises to the position of the most urgent, complex, global issue of our time and as according regulation comes into force, material risks to companies that do not manage the transition to a <2°C economy will increase. It is likely, that such developments will further drive the bifurcation in the market, arguably increasing the edge that the 2°C-Aligned companies have over their Non-Aligned competitors and bringing the Climate Factor into sharper focus. At the same time, it can be expected that an increasing number of companies will transition towards 2°C-Alignment, so that the effect observed here may shift to favour those companies that take even more decisive climate action against those that just barely comply.

One important note here, is that forward-looking analyses of climate impact and Temperature Alignment are subject to uncertainties, e.g. where emissions data quality or scientific findings are concerned. Future developments could, therefore, impact the results and calculations in this paper. At the same time, scientific progress may well spark more ambitious international climate target-setting and stricter limits for CO_2e emissions that countries, industries, and companies will have to comply with – thus moving the goalposts and further amplifying the material risks for climate laggards and the opportunities for climate champions.

This analysis should be viewed as a first step. Other interesting explorations could include comparing various regions, such as the US, Europe, and Asia, as well as a look at transition companies (i.e. issuers who are putting measures in place to achieve Paris-Alignment). Investment managers may also be interested to test a long / short strategy based on the Aligned vs. Non-Aligned segmentation.

Nonetheless, the analysis conducted here shows very promising signs that the balancing act of generating reliable, attractive returns while minimising a portfolio‘s negative effects on the climate and planet we live on may just have become much easier – by *Capturing the Climate Factor.*

Authors

In alphabetical order:

Dominique Dare, CFA, CIPM

Joachim Klindworth

Dr. Sebastian Müller, LL.M.

Hannah Stringham

References

European Commission - Directorate-General for Financial Stability, Financial Services and Capital Markets Union (2019). Guidelines on reporting climate-related information. Brussels: European Union. Retrieved from https://ec.europa.eu/finance/docs/policy/190618-climate-related-information-reporting-guidelines_en.pdf

Fink, L. (2020, Jan 14). A Fundamental Reshaping of Finance – Annual Letter to CEOs. New York: BlackRock, Inc. Retrieved from https://www.blackrock.com/corporate/investor-relations/larry-fink-ceo-letter

Helmke, H. et al. (2020). Provision of Climate Services – The XDC Model. In: Filho, W. / Jacob, D. (eds.). Handbook of Climate Services. Cham: Springer Nature. pp. 223. Retrieved from https://link.springer.com/chapter/10.1007%2F978-3-030-36875-3_12

IEA (2017). Energy Technology Perspectives 2017. Paris: IEA. Retrieved from https://www.iea.org/reports/energy-technology-perspectives-2017

Mercator Research Institute on Global Commons and Climate Change (2020). Remaining Carbon Budget. Retrieved from https://www.mcc-berlin.net/en/research/co2-budget.html

Millar et al. (2017). FaIR. Retrieved from https://fair.readthedocs.io/en/latest/intro.html

National Geographic (2020, Oct 11). Reference: Effects of global warming. Retrieved from https://www.nationalgeographic.com/environment/global-warming/global-warming-effects/

O'Neill, B.C. et al. (2015). The roads ahead: Narratives for shared socioeconomic pathways describing world futures in the 21st century. In: Global Environmental Change (2017, Jan). Volume 42. pp. 169-180. Retrieved from https://doi.org/10.1016/j.gloenvcha.2015.01.004

Orsagh, Matt (2020). Climate Change Analysis in the Investment Process. Charlottesville, VA: CFA Institute. Retrieved from https://www.cfainstitute.org/-/media/documents/article/industry-research/climate-change-analyis.ashx

PRI / UNEP FI (undated). Fiduciary Duty in the 21st Century. Retrieved from https://www.unpri.org/download?ac=9792

Smith, C. J. et al. (2018). FAIR v1.3: a simple emissions-based impulse response and carbon cycle model. Geosci. Model Dev., 11. pp.2273–2297. Retrieved from https://doi.org/10.5194/gmd-11-2273-2018

UNEP FI (2019). United Nations-Convened Net-Zero Asset Owner Alliance. Retrieved from https://www.unepfi.org/net-zero-alliance/

Data Sources

Urgentem (emissions data; Scopes 1-3 according to GHG Gas Protocol).

FactSet Research Systems (GVA).

Disclaimer

right. based on science GmbH is not an investment adviser and makes no representation regarding the advisability of investing in any particular company, investment fund or other vehicle. A decision to invest in any such investment fund or other entity should not be made based on any of the statements set forth in this publication. While right. based on science GmbH has obtained information believed to be reliable, right. based on science GmbH shall not be liable for any claims or losses of any nature in connection with information contained in this publication, including but not limited to, lost profits or punitive or consequential damages.

The information used to compile this whitepaper has been collected from a number of sources, especially from FactSet Research Systems and Urgentem. Some of its content may be proprietary and belong to right. based on science GmbH.

The information contained in this whitepaper does not constitute an offer to sell securities or the solicitation of an offer to buy, or recommendation for investment in any securities within any jurisdiction. The information is not intended as financial advice. This whitepaper provides general information only. The information and opinions constitute a judgment as at the date indicated and are subject to change without notice. The information may therefore not be accurate or current. The information and opinions contained in this whitepaper have been compiled or derived from sources believed to be reliable and in good faith, but no representation or warranty, express or implied, is made by right. based on science GmbH as to their accuracy, completeness or correctness and finally right. based on science GmbH does not warrant that the information is up-to-date.

Photos: © Farideh Fotografie
Cover: right. based on science
Layout & Design: OrangeHive

right. based on science GmbH
Intzestraße 1 | 60314 Frankfurt am Main
CEO: Hannah Helmke
Registry Office: Amtsgericht Frankfurt am Main HRB 106032

www.right-basedonscience.de