

Transitioning to Climate Investing

Quantifying the Market Impact You Get For the Climate Impact You Had

December 9, 2020

Qontigo Investment Intelligence Summit

Polling

Question: When do you plan to shift your portfolio holdings to be more climate-aligned?

Answer 1: I do not plan to do this

Answer 2: By the end of Q1 2021

Answer 3: Later in 2021

Answer 4: 2022 or later

Answer 5: I have already done so

BlackRock Global Sustainable Investing Survey - 2020

- > In January, BlackRock's CEO Larry Fink wrote about a fundamental reshaping of finance as investors significantly reallocate capital toward sustainable strategies.
- > 425 investors in 27 countries were surveyed, representing an estimated US\$25 trillion in assets under management.
- > 54% of global respondents consider sustainable investing to be fundamental to their investment processes and outcomes.
- > 88% of respondents ranked the environment as their top priority when comparing focus on Environmental, Social, and Governance factors.
- > Over the next 3-5 years, Social issues are likely to grow the most in terms of client concerns.

As we noted in our recent blog...

***“Climate impact investing is not a fad,
it is a regulatory reality hurtling towards
non-compliant portfolios...”***

***And it represents a thematic risk premium
that investors can harvest between now
and when regulations come into effect.”***

Introductions



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Agenda

- 1 The size and nature of the transition gap between cap-weighted and Paris-Aligned benchmarks
- 2 Downside risk from stress testing on a variety of scenarios, as well as sensitivity analysis against individual risk and macro factors
- 3 Feasibility of disciplined transition using ADV and Market Impact constraints for varying AUM levels
- 4 Potential market impact from a crowded and undisciplined transition
- 5 Q & A

Section 1:

Description of Transition Gap

Active Risk, Active Style & Sector Exposures

Source: Axioma Portfolio

Analysis date: September 30, 2020

Active Risk Analysis – Decomposition

STOXX USA 900 PAB Active Risk Decomposition	Active Risk (SD)	% of Active Risk
Total Active Risk	2.5	100
Specific Active Risk	1.4	31.5
Factor Active Risk	2.0	68.5
US4AxiomaMH.Style	1.3	36.9
US4AxiomaMH.Industry	1.2	31.6
US4AxiomaMH.Market	0.0	0.0

- > Active Risk = 2.47%
- > Active Style Exposures = 37% of Active Risk
- > Active Industry Exposures = 32% of Active Risk
- > Active Share = 0.35
- > Two-Way Turnover = 69%

Active Risk Analysis – Style Factor Decomposition

STOXX USA 900 PAB Active Style Risk Decomposition	Factor Volatility	Active Exposure	% of Active Risk
Sub-Total Style Factors	N/A	N/A	36.9
Market Sensitivity	9.2	-0.0588	13.3
Size	9.6	0.0465	6.5
Volatility	7.7	-0.0502	5.5
Profitability	4.4	0.0746	4.0
Liquidity	3.3	-0.0703	3.0
Exchange Rate Sensitivity	3.1	0.0764	2.8
Leverage	2.3	-0.0515	2.1
Value	4.5	-0.0186	1.2
MidCap	2.6	-0.0476	0.7
Dividend Yield	2.6	-0.0048	0.1
Growth	2.9	0.0171	-0.2
Medium-Term Momentum	8.5	-0.0106	-0.7
Earnings Yield	4.0	0.0497	-1.6

- > Lower exposure to Market Sensitivity & Volatility
- > Higher exposure to Size & Profitability
- > PAB stocks are more likely to move in line with their home currency relative to a basket of currencies More exposed to illiquidity risk
- > Overall, slightly more defensive characteristics

Active Risk Analysis – GICS Sector Decomposition

Sector Weights / Active Weights	STOXX USA 900	STOXX USA 900 PAB	PAB ACTIVE WEIGHT	% of ACTIVE RISK
Industrials	8.8%	2.9%	-5.9%	13.4%
Energy	1.9%	0.0%	-1.9%	6.6%
Consumer Discretionary	12.8%	11.3%	-1.4%	4.2%
Utilities	2.9%	0.5%	-2.4%	3.5%
Consumer Staples	6.6%	9.5%	2.9%	2.0%
Real Estate	3.1%	2.5%	-0.6%	1.5%
Communication Services	8.9%	8.7%	-0.2%	1.2%
Financials	9.1%	8.5%	-0.6%	0.5%
Information Technology	29.2%	32.7%	3.5%	0.2%
Materials	2.3%	2.3%	0.1%	0.2%
Health Care	14.4%	20.9%	6.5%	-1.8%

- > Under-weight in Industrials is biggest contributor to Active Risk
- > Exclusion of entire Energy sector is second-biggest contributor to Active Risk
- > Large underweights in Utilities and Consumer Discretionary
- > Large overweights in Health Care, Info Tech, and Consumer Staples
- > Note that FAANGs + MSFT is underweight in PAB

Summary of Section 1 – Active Risk Analysis

- > As of now the active risk between the STOXX USA 900 and STOXX USA 900 PAB portfolios is already 2.5%, which is quite active.
- > The Active share of the PAB versus the parent index is 0.35 and the two-way turnover to transition from one to the other is 69%.
- > The PAB variant has a slight tilt towards companies that are more sensitive to exchange-rate movements, are more profitable, have a higher Earnings Yield (i.e., lower PER), have larger market caps, and are more growth oriented than the parent index.
- > Conversely, PAB constituents on average tend to be less liquid, have lower Betas, less debt, are less volatile, have negative active exposures to Value and Momentum, and pay a lower dividend than those of the parent index.

Summary of Section 1 – Active Risk Analysis (Cont.)

- > Energy sector, in its current form, is completely absent from the PAB portfolios.
- > Health Care, Information Technology, and Consumer Staples get the biggest increases in weights, while Industrials, Utilities, Energy, and Consumer Discretionary get the biggest decreases in absolute terms.
- > Interestingly, the FAANGs + MSFT, which accounted for 19.7% of the parent index's weight and 18% of its risk on September 30, 2020, have a smaller weight of 16.5% in the PAB portfolio and contribute only 16% to its risk.
- > The bad news is, this gap is already big and is only going to get bigger with time as the PAB variant includes an incremental decarbonization rate of 7% YoY, meaning today's constituents who cannot deliver this incremental rate will be down weighted in the PAB making the active risk even larger with the parent index.

Section 2:

Stress Testing & Sensitivity Analysis

Scenario Analysis, Downside Risks, Risk Factor Sensitivities

Source: Axioma Risk

Analysis date: September 30, 2020

Stress Testing – Part 1

THEME	STRESS TEST NAME	STRESS TEST TYPE	STRESS TEST DESCRIPTION	STOXX USA 900	STOXX USA 900 PAB
	PANDEMIC HISTORY	SARS Q4 2002	Historical	Oct 01 - Dec 31, 2002	5.4
SARS Jan 2003		Historical	Jan 01 - Jan 31, 2003	-5.5	-5.3
SARS Jan-Mar 2003		Historical	Jan 01 - Mar 12, 2003	-10.8	-10.3
SARS Q2-2003		Historical	Apr 01 - Jun 30, 2003	15.7	14.2
COVID-19 CRASH		Historical	Feb 20 - Mar 23, 2020	-33.4	-31.2
COVID-19 REBOUND		Historical	Mar 24 - Jun 08, 2020	47.2	44.2
US ELECTIONS	9/11	Historical	Sep 17 - Sep 21, 2001	-8.2	-8.9
	Obama Reelection	Historical	Nov 01 2012 - Jan 31, 2013	7.5	8.6
	Trump Surprise Win	Historical	Nov 01 2016 - Jan 31, 2017	9.7	9.1
	BP/RS	Transitive	SPX +10%, DXY +20%,USTB 10Y +20bps	10.3	9.9
	BP/DS	Transitive	SPX -10%, DXY -10%,USTB 10Y +20bps	-12.2	-11.9
	TP/RS	Transitive	SPX +10%, DXY +10%,USTB 10Y +20bps	10.8	10.7
	TP/DS	Transitive	SPX -10%, DXY -10%,USTB 10Y -20bps	-9.5	-9.7

Stress Testing – Part 2

THEME	STRESS TEST NAME	STRESS TEST TYPE	DESCRIPTION	STOXX USA 900	STOXX USA 900 PAB
BIG TECH	FAANG + M + T	Transitive (3M)	FAANG + MS + Tesla down 20%	-9.9	-9.9
SECTOR SHOCKS (SPDR SECTOR ETFs)	Comm Servcs	Transitive (3M)	SPDR Comm Servcs -20%	-1.1	-1.0
	Cons Disc	Transitive (3M)	SPDR Cons Disc -20%	-4.0	-3.9
	Cons Staple	Transitive (3M)	SPDR Cons Staple -20%	-0.1	-0.7
	Energy	Transitive (3M)	SPDR Energy -20%	-0.4	0.0
	Financials	Transitive (3M)	SPDR Financials -20%	-1.3	-1.2
	Health Care	Transitive (3M)	SPDR Health Care -20%	-5.0	-6.3
	Industrials	Transitive (3M)	SPDR Industrials -20%	0.0	0.7
	Info Tech	Transitive (3M)	SPDR Info Tech -20%	-5.1	-4.9
	Materials	Transitive (3M)	SPDR Materials -20%	-1.2	-1.3
	Real Estate	Transitive (3M)	SPDR Real Estate -20%	-0.9	-0.8
Utilities	Transitive (3M)	SPDR Utilities -20%	-0.4	-0.2	

Stress Testing Part 3 – Extreme Weather Stress Tests

Historical Event	STOXX USA 900	STOXX USA 900 PAB	DELTA
Hurricane Katrina - 08/29 2005	0.37	0.43	0.06
Hurricane Sandy - 10/30 2012	1.10	1.01	-0.09
Hurricane Harvey - 08/27 2017	1.82	1.97	0.15
Hurricane Irma - 09/10 2017	1.90	2.22	0.32
SPDR Insurance -20%	-8.92	-8.44	0.49
Deepwater Horizon - 04/20 2010	-7.87	-8.82	-0.95
EU Heatwave - 06/07 2019	1.77	2.00	0.22
EU Floods - 10/11 2018	-3.57	-2.94	0.63

- > These stress tests represent physical risks to constituents, not climate risk.
- > Only the Deepwater Horizon Oil spill was more damaging to the PAB index:
 - > Biggest contributors to expected loss were overweight in Health Care and Info Tech sectors
 - > Underweight in Industrials was biggest contributor to gain
 - > Lack of Energy sector exposure was second biggest contributor to gain

Sensitivity Analysis – (reported as betas to target timeseries)

SENSITIVITY ANALYSIS	DESCRIPTION	STOXX USA 900	STOXX USA 900 PAB	DELTA
US Equities	S&P500 Index	0.95	0.93	-0.02
Global Market	Global Market Factor	1.24	1.21	-0.03
Exchange Rate Sensitivity	ERS Factor	0.13	0.34	0.21
Value	Value Factor	0.00	0.00	0.00
Growth	Growth factor	1.54	1.72	0.18
Medium-term Momentum	MTM Factor	1.37	1.45	0.08
Short-term Momentum	STM Factor	0.26	0.39	0.13
Liquidity	Liquidity Factor	1.02	1.01	-0.01
Volatility	Volatility Factor	1.00	0.79	-0.21
Size	Size Factor	1.02	1.03	0.01
Leverage	Leverage Factor	2.02	2.30	0.28
DXY	Dollar Index	-0.80	-0.76	0.03
Oil	Oil Prices	0.27	0.26	-0.02
GSCI Commodity Index	GSCI Index	0.45	0.42	-0.03
US Long Rate (30Y)	BBG Barclays US Treasuries: 25+ YR	-0.20	-0.18	0.02
US Inflation Rate (5Y)	BBG Barclays US TB Inflation Notes 1-10Y	2.69	2.59	-0.10
US SUBIG Credit Spread (5Y)	BBG Barclays US Corporate HY	1.58	1.52	-0.06

Summary of Section 2 – Stress Testing and Sensitivity Analysis

- > Goal is to identify market conditions that could yield a significant difference in outcomes for our two benchmarks.
- > Only seven of the 25 scenarios produced a meaningful difference in the expected impact to the portfolio:
 - > In only four was that difference material
 - > Of those four, one was the 20% shock to the Health Care sector
 - > The other three involved historical pandemic scenarios, where the PAB portfolio would be expected to underperform during the post-pandemic rebound, due to its slightly defensive style factor exposures and the underweight in cyclical sectors, such as Industrials, Consumer Discretionary, and Energy
- > Overall, across all 25 stress test scenarios, the average difference in expected outcomes was a negligible 0.1%.

Summary of Section 2 – Stress Testing and Sensitivity Analysis (Cont.)

- > None of the extreme weather scenarios—except Deepwater Horizon—resulted in a difference in expected gain/loss for the portfolios.
- > The average difference between the two portfolios across all eight extreme weather scenarios was just 0.1%.
- > The PAB portfolio was moderately more sensitive to only four factors and less sensitive to one out of our tests on 17 factors.
- > The average difference between the two portfolios across all 17 sensitivity tests was about zero (0.03).
- > In short, this analysis suggests that an investor adopting the PAB portfolio would not be taking on more risks than the parent market portfolio.

Section 3:

Modeling a Disciplined Transition

Turnover Completion, ADV & Market Impact Constraints

Source: Axioma Portfolio

Analysis date: September 30, 2020

Disciplined Transition with ADV Trading Constraint

TURNOVER SUMMARY STRATEGY (AUM,%ADV)	HOLDINGS		DELTA	ACTIVE RISK	TWO-WAY TURNOVER	TOTAL BUY	BUY MORE	BUY NEW	TOTAL SELL	SELL SOME	SELL ALL
	INITIAL	FINAL									
CWB - PAB (FULL)	900	679	-221	0%	69%	232	213	19	687	447	240
CWB - PAB (100M, 5%ADV)	900	679	-221	0%	69%	232	213	19	687	447	240
CWB - PAB (100M, 2%ADV)	900	679	-221	0%	69%	232	213	19	687	447	240
CWB - PAB (100M, 1%ADV)	900	679	-221	0%	69%	232	213	19	687	447	240
CWB - PAB (500M, 5%ADV)	900	679	-221	0%	69%	232	213	19	687	447	240
CWB - PAB (500M, 2%ADV)	900	679	-221	0%	69%	232	213	19	687	447	240
CWB - PAB (500M, 1%ADV)	900	752	-148	0.1%	69%	229	212	17	688	523	165
CWB - PAB (1B, 5%ADV)	900	679	-221	0%	69%	232	213	19	687	447	240
CWB - PAB (1B, 2%ADV)	900	752	-148	0.1%	69%	229	212	17	688	523	165
CWB - PAB (1B, 1%ADV)	900	693	-207	0.4%	65%	242	233	9	667	451	216
CWB - PAB (5B, 5%ADV)	900	693	-207	0.4%	65%	242	233	9	667	451	216
CWB - PAB (5B, 2%ADV)	900	688	-212	0.8%	53%	296	292	4	608	392	216
CWB - PAB (5B, 1%ADV)	900	818	-82	1.1%	38%	324	322	2	578	494	84

Summary of Section 3 – Disciplined Transition with tight ADV Constraints

- > Rebalancing with very tight trading constraints on % of ADV for a range of AUM to identify the cutoff AUM for a single day (orderly) transition.
- > For portfolios up to and including AUM levels of USD 500 million, this benchmark switch is feasible with no or very little (0.1%) active risk in a single day.
- > For portfolio sizes of USD 1 billion or more, a tight trading threshold starts to impact the manager's ability to switch benchmarks without incurring active risk for a day.
- > Even at USD 5 billion and with a 1% of ADV trading constraint, the TE carried over on that second trading day is just 1.1% annualized (i.e., 0.074% for that day).
- > Waiting to transition increases both the number of trades to be done as the two benchmarks deviate from each other over time, and the probability that these same trades will become more crowded (see section 4).

Section 4:

Modeling an Undisciplined Transition

Market Impact Costs of Crowded Trades

Source: Axioma Portfolio & Goldman Sachs Shortfall Model

Analysis date: September 30, 2020

Turnover Achieved with a Max 10 bps of Market Impact Constraint – 09/30/2020

MARKET IMPACT (MAX 10 BPS)	TURNOVER ACHIEVED	% OF TARGET
TARGET	69%	100%
USD 100M	69%	100%
USD 500M	69%	100%
USD 1B	69%	100%
USD 5B	51%	74%
USD 10B	39%	57%
USD 50B	22%	32%
USD 100B	18%	25%
USD 200B	14%	20%

- > Aggregate AUM of USD 1 billion can be executed in a single day.
- > From aggregate AUM of USD 5 billion, 10 bps market impact constraint becomes binding and only 51% turnover, 74% of the target turnover can be achieved.
- > AUM of USD 100 billion will take four days to fully transition.
- > AUM of USD 200 billion would take five days to fully transition.

Market Impact from Unconstrained Rebalancing – 09/30/2020 (Vol. = 21% AXUS4-MH)

UNCONSTRAINED REBALANCING	MARKET IMPACT (BPS)	MARKET IMPACT (USD)
TARGET	0.0%	N/A
USD 100M	0.0%	\$ 249,121
USD 500M	0.0%	\$ 464,943
USD 1B	0.1%	\$ 658,348
USD 5B	0.2%	\$ 7,587,435
USD 10B	0.2%	\$ 21,648,184
USD 50B	0.5%	\$ 244,942,744
USD 100B	0.6%	\$ 627,087,650
USD 200B	0.7%	\$ 1,339,175,394

- > AUM of USD 5 billion will have a market impact of 0.2% and cost USD 7.6 million.
- > AUM of USD 100 billion will have a market impact of 0.6% and cost USD 627 million.

Market Impact from Unconstrained Rebalancing – 06/22/2020 (Vol. = 32% AXUS4-MH)

UNCONSTRAINED REBALANCING	MARKET IMPACT (BPS)	MARKET IMPACT (USD)
TARGET	0.0%	N/A
USD 100M	0.0%	\$ 266,280
USD 500M	0.1%	\$ 501,984
USD 1B	0.1%	\$ 708,808
USD 5B	0.2%	\$ 8,161,846
USD 10B	0.2%	\$ 23,306,230
USD 50B	0.5%	\$ 264,043,342
USD 100B	0.7%	\$ 749,158,156
USD 200B	1.1%	\$ 2,123,600,863

- > AUM of USD 5 billion will have a market impact of 0.2% and cost USD 8.1 million.
- > AUM of USD 100 billion will have a market impact of 0.7% and cost USD 749 million.

Summary of Section 4 – Market Impact from Undisciplined Transition

- > Goal is to quantify worst-case scenario market impact from having large number of portfolios implement this transition on a single day.
- > We first quantify how much of the 69% turnover can be achieved by limiting the market impact to 10 bps for varying aggregate AUM levels (\$100M, \$500M, \$1B, \$5B, \$10B, \$50B, \$100B, \$200B).
- > 100% of the target two-way turnover can be achieved, without breaching the 0.1% market impact constraint for aggregate portfolio value up to USD 1 billion.
- > It would take a minimum of four days for an aggregate AUM of USD 100 billion to execute this trade at the cost of 0.1% of market impact each day.
- > And a minimum of five days for an aggregate AUM of USD 200 billion.

Summary of Section 4 – Market Impact from Undisciplined Transition (Cont.)

- > Next, we measure the full market impact of an unconstrained, single-day transition for varying aggregate AUM levels (\$100M, \$500M, \$1B, \$5B, \$10B, \$50B, \$100B, \$200B).
- > Again, we see that the market impact costs are negligible for aggregate AUM below USD 1 billion, but above that level, costs start to rise rapidly.
- > Trying to rebalance an aggregate AUM of USD 100 billion in a single day would cost over USD 627 million in market impact, representing a loss of 0.6% of the aggregate portfolio's value.
- > On June 22, 2020, predicted volatility was 32% and the Active Risk of the PAB was 3.1%. In those volatility conditions, an aggregate AUM of USD 100 billion would now cost USD 750 million in market impact, representing a loss of 0.75%.

Final Thoughts

“No portfolio is an island...”

Summary of Findings

- > The transition trades are known to all, and all trades will be in the same direction (i.e., no one will go from PAB to Cap-Weighted).
- > The active risk and turnover involved in executing this climate transition will gradually increase each year.
- > As climate regulations increase, the demand for 'brown' industry stocks will decline making these market-impact estimates seem far lower than they will be in practice, if you wait until the last regulatory minute.
- > On the bright side, a switch to a climate-aligned benchmark today does not seem to come with any hidden (bad) surprises in terms of downside or tail risk.
- > In conclusion, investors considering a move to a climate-aligned benchmark should do it slowly, but do it early.

Thank You

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