

Beta Migration During the 2020 Crisis and Impact on Aperio Quality Strategy

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- In the turbulent period since the market peaked on February 19, 2020, returns to most of the factors that characterize Aperio Quality strategies were positive.
- Betas migrated toward 1.0, with betas of low-beta industries increasing dramatically as equity correlations rose with the market sell-off.
- This beta migration (the “Beta Migration”) dampened the positive impact of the quality factors on performance of Aperio Quality, especially in the United States.
- The Beta Migration also changed the industry exposures, tracking error, and diversification of the Aperio Quality portfolios.

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References to returns, risks, performance, tracking error, and other such characteristics describing portfolios in this paper are based on hypothetical analysis techniques (also known as back-testing) and do not represent actual portfolios. Since returns included herein are hypothetical and based on back-testing, it is important to note that they are for illustrative purposes only. Past performance, whether illustrative or actual, is not a guarantee of future performance. Please refer to the important disclosures within and at the end of this paper.

The first quarter of 2020 began with a market rally that abruptly disintegrated from its peak on February 19 in what is widely acknowledged as the market response to the COVID-19 pandemic and the oil price war between Russia and Saudi Arabia. Aperio Quality, which is Aperio's low-beta tilt on traditional quality factors, underperformed the S&P 500 Index in the United States and the MSCI ACWI Index in the global market by 2.12% and 0.84%,¹ respectively, gross of fees and transaction costs, during the rally preceding the market decline. During the turbulent period from February 19 through the end of March, Aperio Quality outperformed these benchmarks. The outperformance, however, fell somewhat short of our expectations, given that Aperio Quality is designed as a low-beta strategy. In the remainder of this study, we further examine the performance of Aperio Quality during this crisis period.

Performance of Aperio Quality Composites

Between February 19, when the US market peaked, and March 31, when the first quarter of 2020 ended, Aperio's US and Global Quality Composites outperformed their benchmarks by 2.02% and 3.69%,¹ respectively, gross of fees and transaction costs. Global Quality Composite performance was better than its US analog in both absolute and relative terms. The realized betas of the composites were 0.92 for US and 0.85 for global. This is above the standard forecast of 0.75 for Aperio Quality portfolios.

The attribution of the active returns shows that style factors made the largest positive contribution in both composites, followed by industries, and countries in the Global Composite. The company-specific attribution was negative in both composites, and the magnitude was larger in the US than in the Global Composite. Not surprisingly, beta and leverage were the factors with the largest positive contributions. Detailed attributions of Aperio's Quality Composites during the crisis period are in the Appendix.

Security Correlations, Beta Migration, and Industry Effects

The performance of Aperio Quality during the crisis period was driven by secular changes in the market, which we outline here.

Security Correlations

Historically, correlations between stocks have tended to rise in turbulent markets, and this time is not different. Figure 1 shows time series of average pairwise correlations in the S&P 500 and MSCI ACWI. In both the US and global markets, average forecast correlation between stocks neared high-water marks over the history of the model at 0.49 and 0.37 in March 2020. The speed at which the correlation spiked is unprecedented in the model history.

¹ The attribution system makes certain simplifying assumptions, and returns do not match official composite numbers.

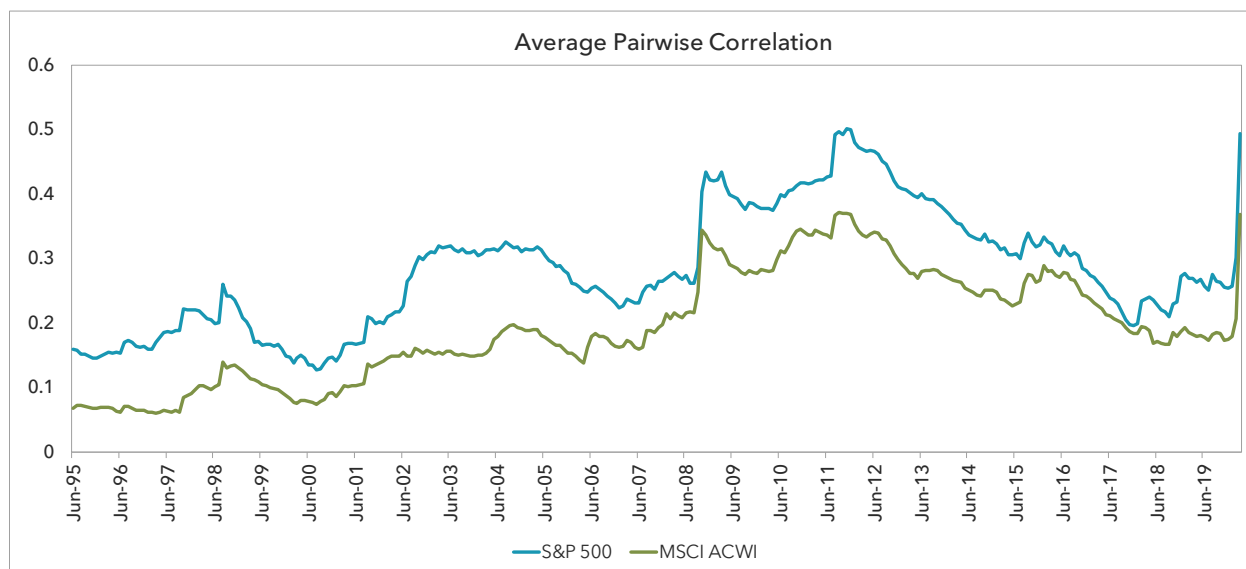


Figure 1: Average forecast security correlation for the S&P 500 Index and the MSCI ACWI Index from June 1995 - March 2020. Source: Barra USSLOWL and Barra GEMLT risk models.

Beta Migration and Industry Effects

To a large extent, market betas are driven by correlations. During the crisis period, the spike in security correlations led to a migration of industry betas toward 1.0. This migration can help to explain why the realized betas were higher than forecast.

Dramatic changes in beta behavior were also evident amongst industries. Historically, different sectors and industries have tended to have characteristically low or high market betas. Utilities and Consumer Staples, for example, have generally had low market betas, while Energy and Financials have generally had high market betas.

Figure 2 shows the evolution of sector index betas to their parent indexes since the beginning of 2020. In the calm period at the start of 2020, industry betas were relatively stable. With the onset of turbulence on February 20, all industry betas except Energy and Financials trended toward 1.0. The most striking effect was the increase in betas for the lowest-beta sectors: Utilities, Consumer Staples, and Real Estate. In the next section, we examine the impact of this Beta Migration on hypothetical Aperio Quality portfolios.

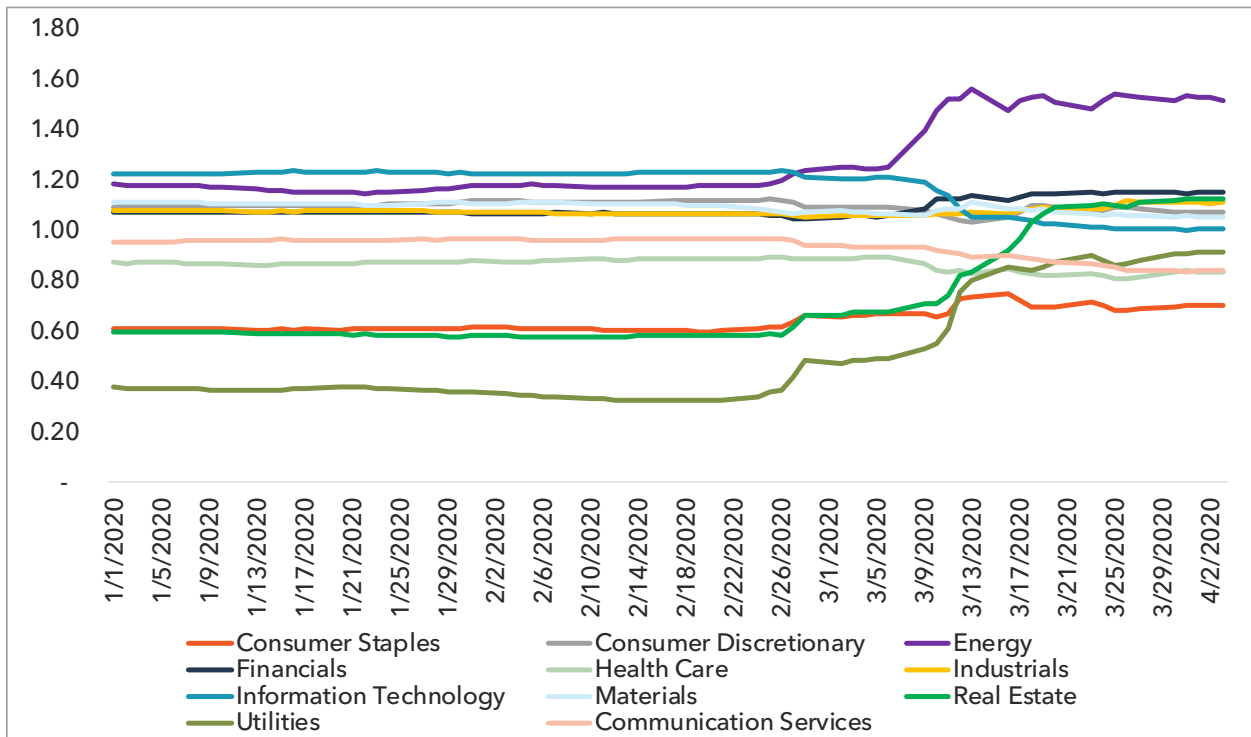
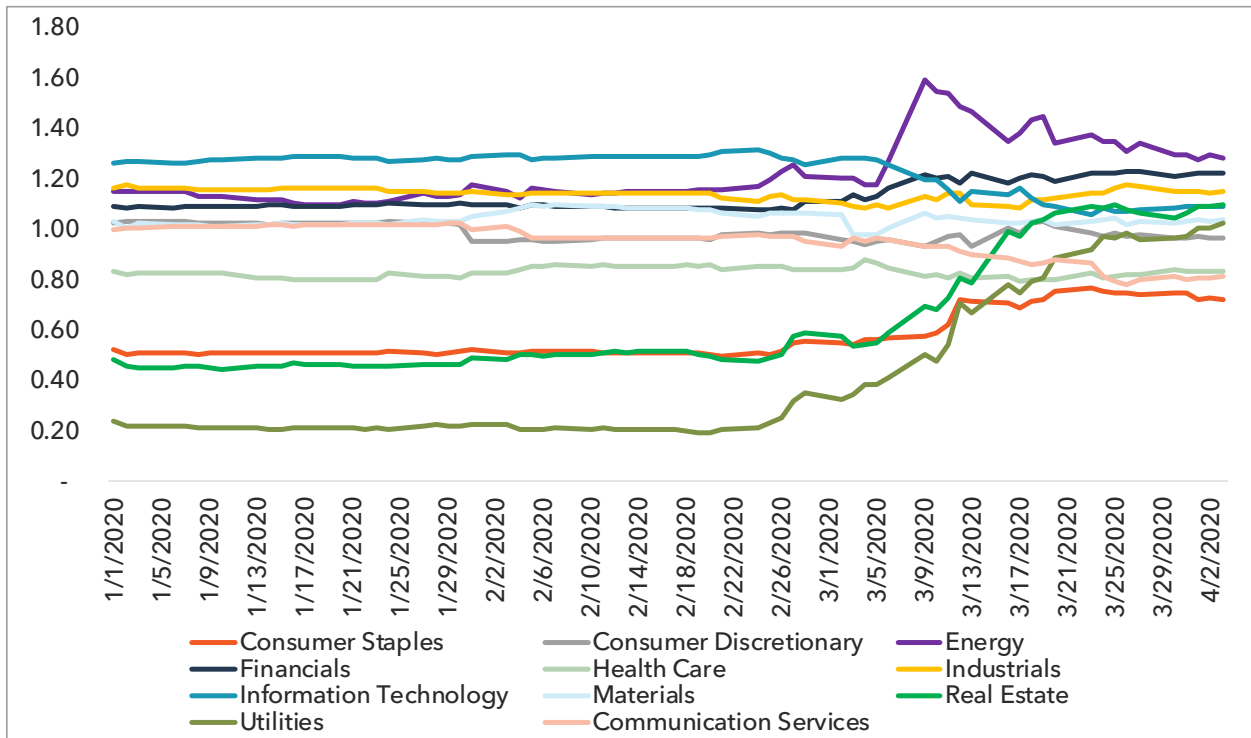


Figure 2: Forecast betas of sector indexes against the parent index from January 1, 2020 - March 31, 2020. Top Panel: S&P 500 Index. Bottom Panel: MSCI ACWI Index. Source: Barra USSLOWL and GEMTL.

Impact of the Beta Migration on Aperio Quality

In both the US and global markets, we construct Aperio Quality portfolios to have a forecast market beta of 0.75, so Aperio Quality portfolios are necessarily composed mainly of low-beta stocks. Greater dispersion on the low end of the range of market betas provides a larger pool of securities that are suitable for the Aperio Quality portfolios.

We illustrate the impact of the Beta Migration documented above on Aperio Quality portfolios. To do this, we constructed hypothetical Aperio Quality portfolios in the US and global markets at month end in January and March 2020. We benchmarked the portfolios to the S&P 500 Index and the MSCI ACWI Index. We followed our standard process for constructing client Aperio Quality portfolios,² and we launched the portfolios with cash. A summary of the characteristics of these hypothetical portfolios is in Figure 3.

	1/31/2020		3/31/2020	
	BENCHMARK	PORTFOLIO	BENCHMARK	PORTFOLIO
	S&P 500	US Quality as of 1/31/2020	S&P 500	US Quality as of 3/31/2020
Forecast Tracking Error (%)	0.00	3.97	0.00	7.20
Forecast Beta	1.00	0.75	1.00	0.75
Forecast Volatility (%)	11.96	9.34	23.34	18.01
Number of Stocks	505	156	505	158
Effective Holdings	96	71	84	63
Dividend Yield (%)	2.11	2.44	2.00	1.87

	1/31/2020		3/31/2020	
	BENCHMARK	PORTFOLIO	BENCHMARK	PORTFOLIO
	MSCI ACWI	Global Quality as of 1/31/2020	MSCI ACWI	Global Quality as of 3/31/2020
Forecast Tracking Error (%)	0.00	3.36	0.00	8.21
Forecast Beta	1.00	0.75	1.00	0.75
Forecast Volatility (%)	11.06	8.51	29.04	22.11
Number of Stocks	3,046	405	3,047	268
Effective Holdings	287	190	249	119
Dividend Yield (%)	2.38	2.62	2.97	2.91

Figure 3: Characteristics of hypothetical Aperio Quality portfolios launched from cash on January 31, 2020, and March 31, 2020. Top Panel: Aperio US Quality. The benchmark is the S&P 500 Index, and securities were drawn from Aperio's large- to midcap universe, consisting of roughly 1,000 stocks. Bottom Panel: Aperio Global Quality. The benchmark is the MSCI ACWI Index, and securities were drawn from Aperio's large- to midcap American depositary receipt (ADR) universe, consisting of roughly 1,600 stocks. Source: Barra USSLOWL and GEMTLT.

² See our presentation deck [Aperio Quality Strategy](#) for details on strategy construction.

We observed that forecast tracking error and volatility forecasts of Aperio Quality doubled between January 31 and March 31. The concentration of the portfolios also increased. At inception, the effective number of securities³ of the two hypothetical US quality portfolios were 71 at the end of January 2020, just prior to the crisis, and 63 at the end of March, when the crisis was underway. For the hypothetical global portfolios, the effective number of securities at the end of January was 190, and it had decreased to 119 by March 31. This may reflect the decreased availability of low-beta securities observed during the crisis period.

	Active Weight (%)			Forecast Beta		
	1/31/2020	3/31/2020	Difference	1/31/2020	3/31/2020	Difference
Communication Services	(2.0)	5.7	7.7	1.00	0.80	(0.19)
Consumer Discretionary	(1.8)	(0.5)	1.2	0.96	0.97	0.01
Consumer Staples	6.9	5.9	(1.0)	0.52	0.75	0.22
Energy	(1.9)	(2.2)	(0.2)	1.18	1.30	0.12
Financials	1.3	(0.1)	(1.4)	1.10	1.22	0.12
Health Care	0.7	3.6	2.9	0.83	0.84	0.01
Industrials	(3.5)	(2.4)	1.1	1.15	1.15	0.00
Information Technology	(4.8)	(4.4)	0.5	1.29	1.09	(0.20)
Materials	0.4	0.5	0.1	1.05	1.04	(0.01)
Real Estate	1.6	(2.6)	(4.2)	0.49	1.06	0.57
Utilities	3.1	(3.6)	(6.7)	0.23	0.97	0.75

	Active Weight (%)			Forecast Betas		
	1/31/2020	3/31/2020	Difference	1/31/2020	3/31/2020	Difference
Communication Services	5.8	9.2	3.4	0.97	0.83	(0.13)
Consumer Discretionary	1.6	(1.7)	(3.3)	1.12	1.07	(0.05)
Consumer Staples	1.6	5.9	4.2	0.60	0.70	0.10
Energy	(2.2)	(3.1)	(0.8)	1.18	1.54	0.36
Financials	(1.3)	(2.4)	(1.2)	1.07	1.15	0.08
Health Care	1.0	0.4	(0.6)	0.89	0.84	(0.05)
Industrials	(5.4)	(2.8)	2.6	1.06	1.11	0.05
Information Technology	(3.2)	(1.4)	1.8	1.23	1.00	(0.23)
Materials	(0.4)	0.3	0.7	1.10	1.06	(0.04)
Real Estate	(0.1)	(0.8)	(0.7)	0.58	1.13	0.54
Utilities	2.6	(3.5)	(6.1)	0.33	0.91	0.58

Figure 4: Active sector weights of hypothetical Aperio Quality portfolios and sector betas. The hypothetical Aperio Quality portfolios were launched from cash on January 31, 2020, and March 31, 2020. Top Panel: The benchmark is the S&P 500 Index, and securities were drawn from Aperio’s large- to midcap universe, consisting of roughly 1,000 stocks. The betas are Barra USSLOWL forecast betas of the S&P 500 sector indexes against the S&P 500 Index. Bottom Panel: The benchmark is the MSCI ACWI Index, and securities were drawn from Aperio’s large- to midcap American depositary receipt (ADR) universe, consisting of roughly 1,600 stocks. The betas are Barra GEMTLT forecast betas of the MSCI ACWI sector indexes against the MSCI ACWI Index. Source: Barra USSLOWL and GEMTLT.

³ The effective number of securities is the multiplicative inverse of the Herfindahl index, which is the sum of the squared security weights. For an equally weighted portfolio, the effective number of securities is equal to the usual security count. When weights are unbalanced, however, the effective number of securities gives a more accurate picture of diversification.

Figure 4 shows active sector weights of hypothetical Aperio Quality portfolios newly launched from cash on January 31 and March 31, 2020, alongside betas of corresponding sector indexes. The largest positive and negative changes are highlighted in blue and red. In the US portfolio (top panel), Utilities, Consumer Staples, and Real Estate betas increased in tandem with substantial declines in their active portfolio weights. At the same time, the beta of the Communication Services⁴ sector decreased from 1.0 to 0.8, making Communication Services stocks plausible candidates for Aperio Quality. At the end of January, the sector was underweight with an active exposure of -2.0, and by the end of March, it was overweight with an active exposure of 5.7. The decrease in active weight in Financials corresponds to an increase in sector beta of 0.12, from 1.10 to 1.22. The large increase in weight in the Health Care sector is not accompanied by a large absolute change in beta. It may, perhaps, be understood by looking at the relative changes in betas between industries. A deeper investigation is required to fully understand the effect.

A similar narrative was apparent in the global portfolio, although, relative to the US, the increase in the Energy beta was more sustained in the global market, leading to a lower active weight in that sector. At the same time, relative to the US, the decrease in the Information Technology beta in the global portfolio led to a higher active weight in that sector. These two effects may have contributed to the difference in Aperio Quality performance in the US and global markets.

Summary

Equity markets have been turbulent since the peak on February 19, with security correlations spiking to near all-time highs. The spike led to a Beta Migration that dampened the positive impact of the quality factors on the active return of Aperio Quality and led to unusual sector allocations. The Beta Migration may explain why the outperformance of Aperio Quality was less robust than we had expected.

⁴ The Communication Services sector was launched in 2018 by adding Facebook, Google's parent company Alphabet, and other stocks that had previously belonged to the Information Technology sector to the Telecommunications Services sector. More information can be found in our blog, [Hotly Revamped GICS Communications Sector Gets Some FAANGs](#).

Appendix: Attribution of Aperio Quality Composites: February 19-March 31, 2020

Figure 5 shows returns of Aperio’s Quality Composites and their benchmarks between February 19 and March 31, 2020.

	Portfolio	Benchmark	Difference
Domestic	-21.46%	-23.48%	2.02%
Global	-19.72%	-23.41%	3.69%

Figure 5: Returns to Aperio’s Quality Composites between February 19 and March 31, 2020. Left Panel: Aperio US Quality benchmarked against the S&P 500 Index. Right Panel: Aperio Global Quality benchmarked against MSCI ACWI Index. Source: Barra USSLOWL and GEMTL.

Figure 6 shows a high-level attribution of the active return of the US Composite to style factors, industries, and company-specific return. The return attribution to the Global Composite includes currencies and countries as well. Style factors made the largest contribution in both composites, although the magnitude of the company-specific return for the US Composite was unusually high.

Style Factors		Industries		Company Specific		Countries	Currencies
Domestic	Global	Domestic	Global	Domestic	Global	Global	Global
4.00%	3.29%	0.97%	1.28%	-2.96%	-1.70%	0.55%	0.27%

Figure 6: Active return attribution of Aperio’s Quality Composites between February 19 and March 31, 2020. Left Panel: Aperio US Quality benchmarked against the S&P 500 Index. Right Panel: Aperio Global Quality benchmarked against MSCI ACWI Index. Source: Barra USSLOWL and GEMTL.

Figure 7 shows contributions of Quality factors to active return of Aperio Quality composites between February 19 and March 31, 2020. With the exception of earnings yield and value in the US, and book-to-price in the Global Composite, all contributions were positive.

Tilted Factor	Active Exposure		Factor Return		Contribution	
	Domestic	Global	Domestic	Global	Domestic	Global
Beta	(0.49)	(0.49)	-4.9%	-2.7%	2.9%	2.0%
Book-to-Price	–	0.21	–	-0.6%	–	-0.1%
Earnings Quality	0.13	0.08	1.7%	0.5%	0.2%	0.0%
Earnings Variability	–	(0.29)	–	-0.2%	–	0.0%
Earnings Yield	0.18	0.23	-1.7%	0.3%	-0.2%	0.0%
Leverage	(0.20)	(0.48)	-5.3%	-2.9%	0.9%	1.1%
Profitability	0.04	0.12	2.8%	1.6%	0.1%	0.1%
Residual Volatility	(0.09)	(0.15)	-1.2%	-2.9%	0.3%	0.4%
Value	0.10	–	-0.9%	–	-0.1%	–

Figure 7: Contributions of quality factors to Aperio Quality Composites between February 19 and March 31, 2020. Left Panel: Aperio US Quality benchmarked against the S&P 500 Index. Right Panel: Aperio Global Quality benchmarked against MSCI ACWI Index. Sources: Barra USSLOWL and GEMTL models. Source: Barra USSLOWL and GEMTL.

Disclosures

The information contained within this presentation was carefully compiled from sources Aperio believes to be reliable, but we cannot guarantee accuracy. We provide this information with the understanding that we are not engaged in rendering legal, accounting, or tax services. In particular, none of the examples should be considered advice tailored to the needs of any specific investor. We recommend that all investors seek out the services of competent professionals in any of the aforementioned areas.

With respect to the description of any investment strategies, simulations, or investment recommendations, we cannot provide any assurances that they will perform as expected and as described in our materials. Past performance is not indicative of future results. Every investment program has the potential for loss as well as gain.

The composite results are time-weighted rates of return, and are presented gross of the highest applicable investment advisory fees for this strategy. Returns reflect the deduction of actual trading expenses incurred during the period. These expenses include fees on purchases and sales of securities, such as brokerage commissions, bid-ask spreads, exchange fees, and/or taxes. For those portfolios with asset-based pricing (ABP) fees where actual, direct trading expenses cannot be identified and segregated (e.g., asset-based custody/trading/administrative expenses), returns reflect the deduction of the entire fee. Composite returns do not reflect custodial or other intermediary fees. Valuations and returns are calculated and expressed in US dollars. If applicable, composite and benchmark returns are presented net of all foreign withholding taxes.

The S&P 500® Index is an equity benchmark for US stock performance. It is a capitalization-weighted index covering 500 large US companies chosen by Standard & Poor's for market size, liquidity, and industry group representation.

The MSCI ACWI is an equity benchmark for global stock performance. It is a capitalization-weighted index covering large and midsize companies. The index includes approximately 3,000 stocks from 23 developed-market countries and 26 emerging-market countries.

You cannot invest in an index.