



ASTORIA'S ETF INSIGHTS: A SURGICAL LOOK AT QUAL, DGRW, EDIV, DNL, AND GDX

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EXECUTIVE SUMMARY

- The key message from Astoria Portfolio Advisors is that **portfolio risk has increased** given 1) the significant YTD returns in US stocks (+21%) and US bonds (+6%) 2) global economic data has deteriorated 3) trade uncertainty remains high.
- For short term tactical portfolios, we suggest **reducing stocks & bonds** and **increasing exposure to alternatives, gold, and cash**.
- Is the Federal Reserve cutting because the global economy has meaningfully deteriorated or is this just an insurance cut? If it's the former, investors should reduce portfolio risk further in our view.
- We are concerned that too much faith rests on the Federal Reserve to inflict the global economy higher. Astoria believes other Central Banks need to do a better job of stimulating their economies.
- In Astoria's dynamic portfolios, the standout tilts are as follows: stocks with **above average quality, higher quality bonds, liquid alternatives, gold, and cash**.
- The forward 12-month PE ratio for the S&P 500 is 17.0x (the 10-year average is 14.8x). Research shows that when **starting valuations are high, future returns tend to be lower**.
- Q2 EPS estimates in the US appear high to us. For instance, Q4 2019 estimates are projected to be **7%** while 2020 estimates are expected to be in the **10%-12%** range. We believe companies will want clarity on supply chain economics, global trade, and the interest rate outlook to solidify future spending.
- There are pockets of ETFs which are **trading at a premium to the market multiple** : 1) minimum volatility 2) defensive equities 3) US high quality. The PE ratio for these ETFs are approximately **20x** while SPY is around **18x**. **Be careful here**.
- Astoria believes the overseas market offers investors a **more attractive risk/return**: 1) valuations are considerably lower than the US, offering investors with a **greater margin of safety** 2) EM Central Banks are **cutting rates** 3) the ECB has hinted about **implementing more stimulus** 4) China has been **injecting liquidity into its economy**.
- We recently went on **CNBC TV** and highlighted a few ETFs that Astoria currently utilizes ([click here to watch the interview](#)). In this report, we provide more detailed characteristics on these ETFs as well as a few others.

EXECUTIVE SUMMARY

DGRW & QUAL vs. SPY

- As per Portfolio Visualizer, **DGRW** has a **higher profitability factor loading** when compared to **QUAL & SPY** (RMW¹ of 0.29, 0.24, & 0.03 respectively).
- **QUAL**, however, has produced the **highest Sharpe Ratio** (1.03, 0.98, & 0.96 for QUAL, SPY, & DGRW respectively).
- As per Bloomberg PORT, QUAL has a higher projected portfolio risk when compared to DGRW (12.92% & 12.65% respectively).

EDIV vs. EEM

- **EDIV** has a **higher profitability factor loading** when compared to **EEM** (RMW of 0.46 & 0.11 respectively).
- **EEM**, however, has **produced a higher Sharpe Ratio** than **EDIV** (0.13 & 0.02 respectively).
- EEM has a higher projected portfolio risk when compared to EDIV (13.22% & 13.04% respectively).

DNL vs. ACWX

- **DNL** has a **higher profitability factor loading** when compared to **ACWX** (RMW of 0.20 & -0.16 respectively).
- **DNL** has also **produced double the Sharpe Ratio** of **ACWX** (0.27 & 0.13 respectively).
- DNL has a higher projected portfolio risk when compared to ACWX (12.52% & 11.41% respectively).

Benefits of Gold in a Portfolio

- Historically, multi-asset portfolios have benefited from an allocation to gold. As global rates have declined, the opportunity cost for owning gold has lowered.

1. Robust Minus Weak: The profitability premium.

We would like to thank Nick Cerbone for his valuable insights in this report.

ETF PORTFOLIO RISK ANALYTICS

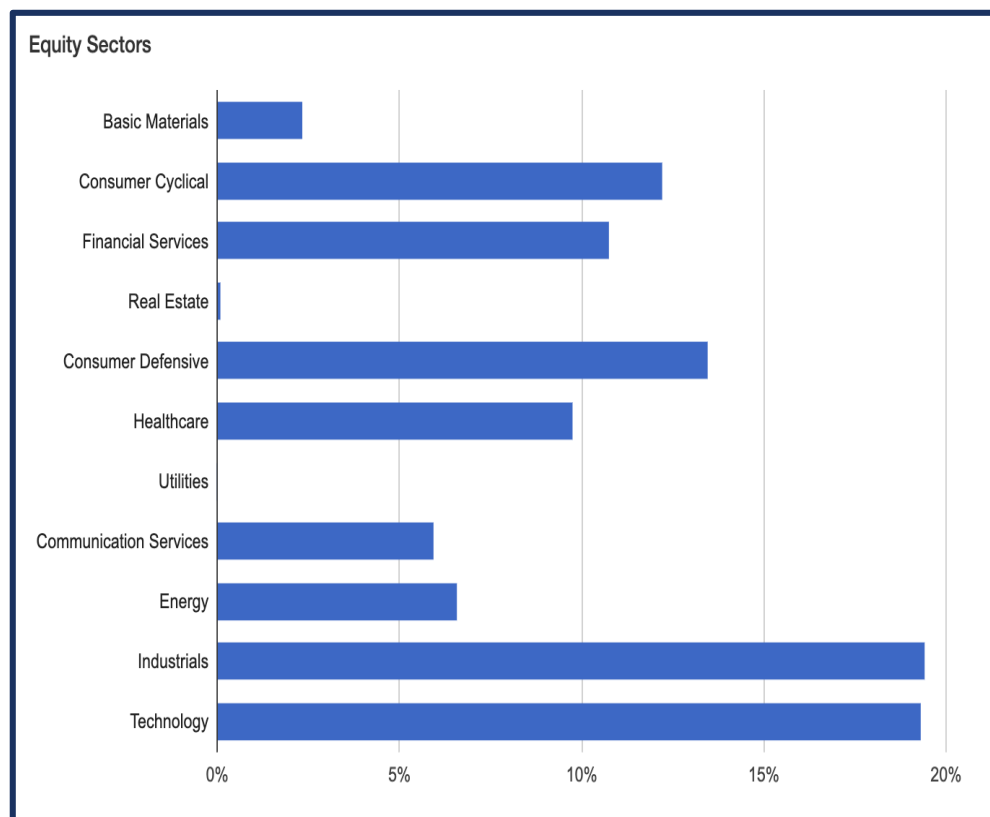
DGRW & QUAL VS. SPY

DGRW BLENDS QUALITY PLUS GROWTH CHARACTERISTICS

DGRW Methodology & Sector Weights

- DGRW applies a quality and a growth screen when constructing the portfolio. In Astoria's view, this is particularly **attractive** as we don't necessarily think investors should be ignoring growth stocks but instead picking securities which have both growth and quality characteristics.
- The **earnings growth ranking is 50% of the portfolio construction process** and is derived from companies' long-term earnings growth expectations.
- The **quality ranking is the remaining 50% of the screening process** and is split evenly between a three-year average return on assets (ROA) and the three-year average return on equity (ROE).
- DGRW removes companies with higher dividend yields. The logic here is that if companies are paying out more than they earn, companies may have to cut back their dividends in the future.

Source: [https://www.wisdomtree.com/-/media/us-media-files/documents/resource-library/investment-case/the-case-for-us-quality-dividend-growth-fund-\(dgrw\).pdf](https://www.wisdomtree.com/-/media/us-media-files/documents/resource-library/investment-case/the-case-for-us-quality-dividend-growth-fund-(dgrw).pdf)



Source: WisdomTree, Portfolio Visualizer. Data accessed on July 19, 2019.

BASED ON PORTFOLIO VISUALIZER'S FACTOR ANALYSIS, DGRW HAS A HIGHER PROFITABILITY FACTOR LOADING THAN QUAL AND SPY (RMW OF 0.29, 0.24, & 0.03 RESPECTIVELY)

DGRW Factor Analysis

Factor Performance Attribution in Basis Points

				Monthly Factor Premiums (BPS)						
				86.17	-17.97	-36.07	17.99	-27.19		
Name	Start Date	End Date	Annual Alpha	Rm-Rf	SMB	HML	RMW	CMA	Total	R ²
Portfolio	Aug 2013	May 2019	-0.44%	87.30	0.97	3.15	5.28	-5.71	87.33	97.4%

Portfolio Regression Results

Portfolio	100.00% WisdomTree US Quality Dividend Gr ETF (DGRW)				
Time Period	Aug 2013 - May 2019				
Coefficient of Determination (R ²)	97.4%				
Adjusted R ²	97.2%				
Regression F statistic	484.02 (p-value = 0.000)				
Autocorrelation	No autocorrelation confirmed (Durbin-Watson test value is 2.165 with p-value 0.763)				
Heteroskedasticity	No heteroscedasticity confirmed (Breusch-Pagan test value is 5.332 with p-value 0.377)				
Factor	Loading	Standard Error	t-stat	p-value	95% Confidence Interval
Market (Rm-Rf)	1.01	0.022	45.667	0.000	0.969...1.057
Size (SMB)	-0.05	0.033	-1.659	0.102	-0.120...0.011
Value (HML)	-0.09	0.038	-2.303	0.025	-0.163...-0.012
Profitability (RMW)	0.29	0.054	5.438	0.000	0.186...0.401
Investment (CMA)	0.21	0.062	3.403	0.001	0.087...0.334
Alpha (α)	-3.66bps	0.001	-0.508	0.613	-0.18%...0.11%
Annualized Alpha (α)	-0.44%				

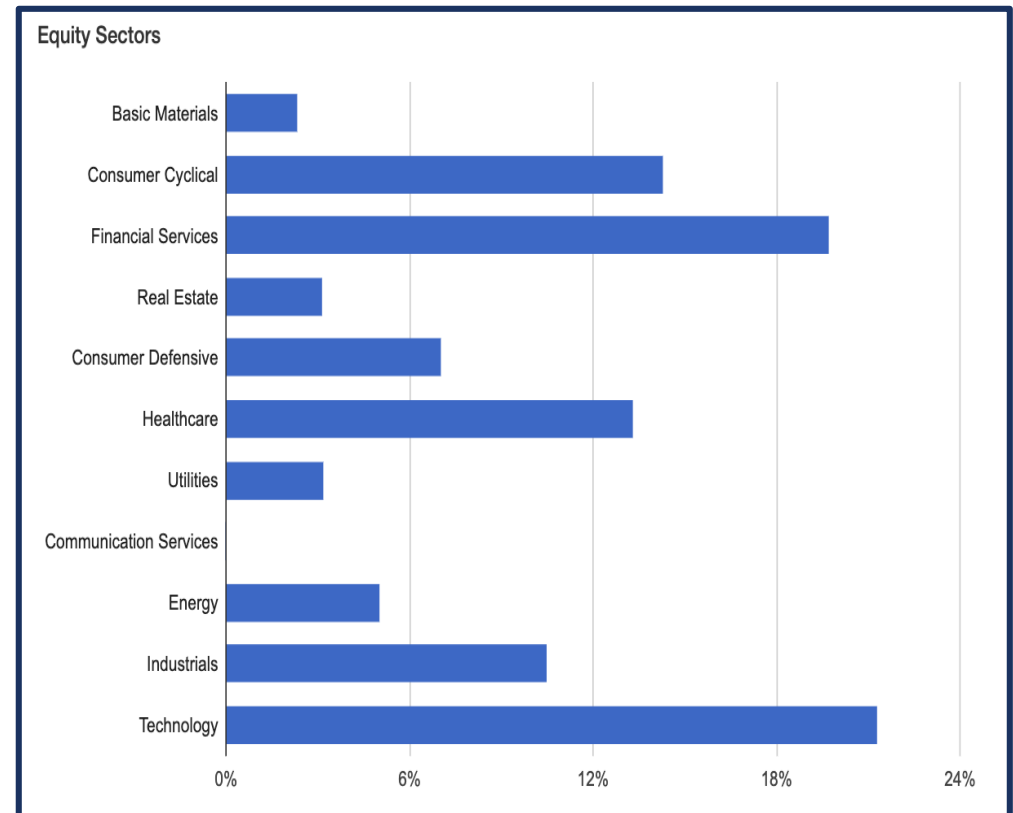


Source: Portfolio Visualizer. Data accessed on July 19, 2019.

QUAL CAPTURES QUALITY BY FOCUSING ON EQUITIES WITH HIGH ROE, STABLE YOY EARNINGS GROWTH, & LOW FINANCIAL LEVERAGE

QUAL Methodology & Sector Weights

- QUAL tracks an index of US large and mid-cap stocks. The stocks are selected and weighted by **high ROE, stable earnings growth, and low debt/equity**.
- In our view, QUAL also has a sound methodology and has been the clear leader so far with **\$11 bln** in assets in the Quality ETF space.
- QUAL tends to be more **concentrated** with only 120 stocks or so.
- There are some **notable differences** in the constituents and their weights for QUAL and DGRW so investors need to be comfortable with the portfolio risk characteristics when deciding between both ETFs.



Source: https://www.msci.com/eqb/methodology/meth_docs/MSCI_Quality_Indices_Methodology.pdf

Source: MSCI, Portfolio Visualizer. Data accessed on July 19, 2019.

BASED ON PORTFOLIO VISUALIZER'S FACTOR ANALYSIS, QUAL HAS A LOWER PROFITABILITY FACTOR LOADING THAN DGRW BUT A HIGHER PROFITABILITY FACTOR LOADING THAN SPY (RMW OF 0.24, 0.29, & 0.03 RESPECTIVELY)

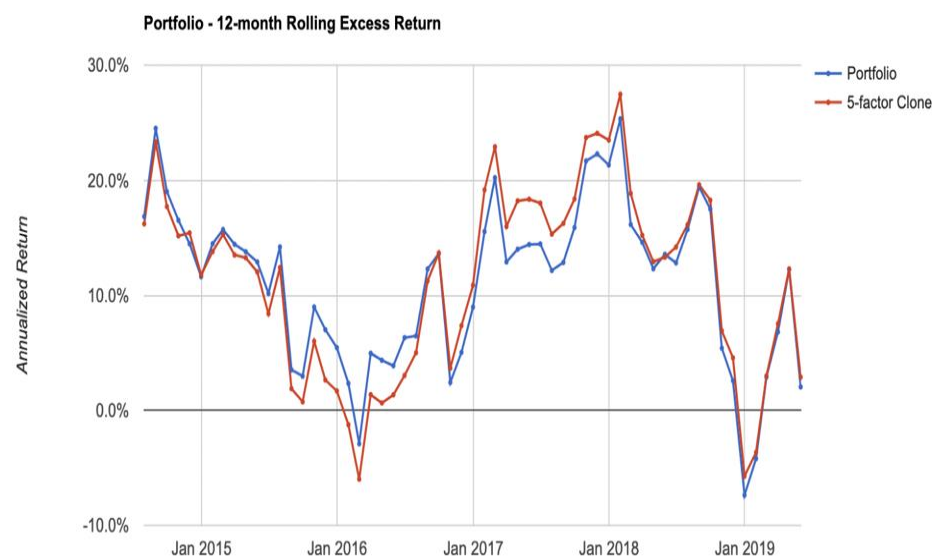
QUAL Factor Analysis

Factor Performance Attribution in Basis Points

Monthly Factor Premiums (BPS)				86.17	-17.97	-36.07	17.99	-27.19		
Name	Start Date	End Date	Annual Alpha	Rm-Rf	SMB	HML	RMW	CMA	Total	R ²
Portfolio	Aug 2013	May 2019	0.08%	81.33	0.77	3.44	4.30	0.69	91.24	96.5%

Portfolio Regression Results

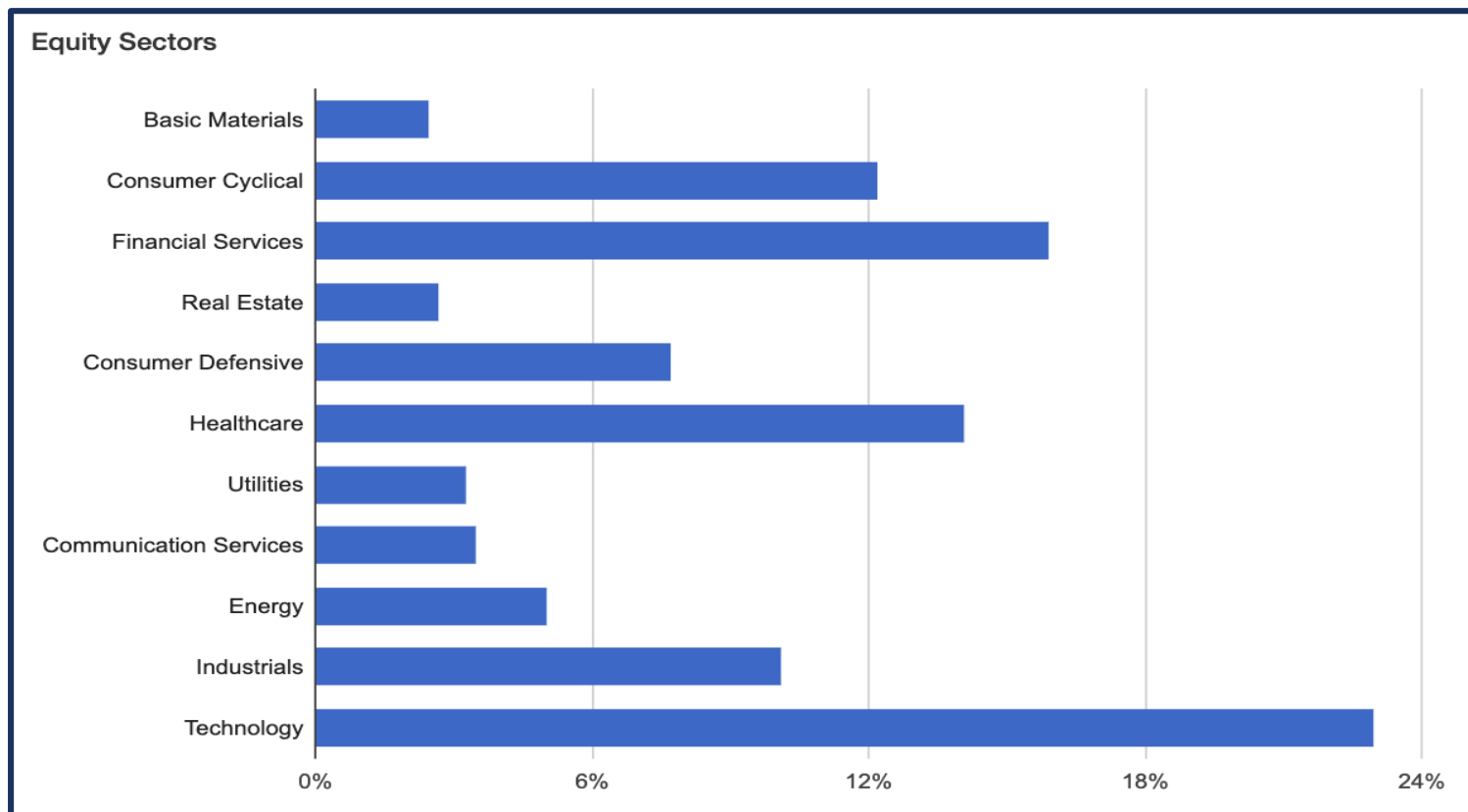
Portfolio	100.00% iShares Edge MSCI USA Quality Factor ETF (QUAL)				
Time Period	Aug 2013 - May 2019				
Coefficient of Determination (R ²)	96.5%				
Adjusted R ²	96.3%				
Regression F statistic	356.59 (p-value = 0.000)				
Autocorrelation	No autocorrelation confirmed (Durbin-Watson test value is 2.185 with p-value 0.788)				
Heteroskedasticity	No heteroskedasticity confirmed (Breusch-Pagan test value is 2.498 with p-value 0.777)				
Factor	Loading	Standard Error	t-stat	p-value	95% Confidence Interval
Market (Rm-Rf)	0.94	0.025	38.175	0.000	0.894...0.993
Size (SMB)	-0.04	0.036	-1.170	0.246	-0.115...0.030
Value (HML)	-0.10	0.042	-2.254	0.028	-0.180...-0.011
Profitability (RMW)	0.24	0.060	3.979	0.000	0.119...0.359
Investment (CMA)	-0.03	0.069	-0.371	0.712	-0.163...0.112
Alpha (α)	0.70bps	0.001	0.088	0.930	-0.15%...0.17%
Annualized Alpha (α)	0.08%				



Source: Portfolio Visualizer. Data accessed on July 19, 2019.

FROM A SECTOR WEIGHT STANDPOINT, SPY IS MOST EXPOSED TO TECHNOLOGY, FINANCIAL SERVICES, & HEALTHCARE

SPY Sector Weights



Source: S&P, Portfolio Visualizer. Data accessed on July 19, 2019.

AS PREVIOUSLY MENTIONED, SPY HAS A CONSIDERABLY LOW PROFITABILITY FACTOR LOADING (MAINLY BECAUSE OF ITS INCLUSION OF JUNKIER STOCKS)

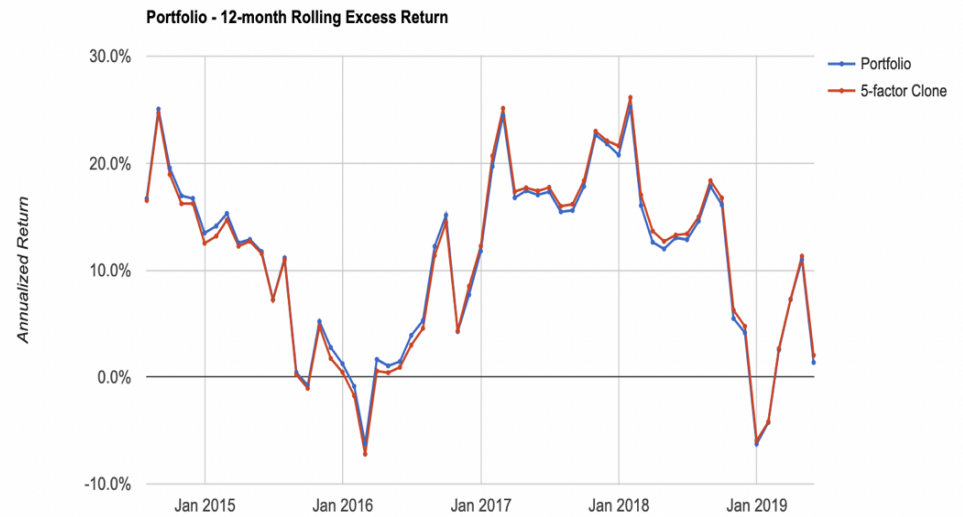
SPY Factor Analysis

Factor Performance Attribution in Basis Points

				Monthly Factor Premiums (BPS)						
				86.17	-17.97	-36.07	17.99	-27.19		
Name	Start Date	End Date	Annual Alpha	Rm-Rf	SMB	HML	RMW	CMA	Total	R ²
Portfolio	Aug 2013	May 2019	-0.08%	85.29	2.22	0.84	0.56	-1.69	86.54	99.7%

Portfolio Regression Results

Portfolio	100.00% SPDR S&P 500 ETF (SPY)				
Time Period	Aug 2013 - May 2019				
Coefficient of Determination (R ²)	99.7%				
Adjusted R ²	99.7%				
Regression F statistic	4,195.92 (p-value = 0.000)				
Autocorrelation	No autocorrelation confirmed (Durbin-Watson test value is 1.816 with p-value 0.230)				
Heteroscedasticity	Heteroscedasticity confirmed (Breusch-Pagan test value is 12.522 with p-value 0.028)				
Factor	Loading	Standard Error	t-stat	p-value	95% Confidence Interval
Market (Rm-Rf)	0.99	0.007	134.679	0.000	0.975...1.00
Size (SMB)	-0.12	0.011	-11.412	0.000	-0.145...-0.10
Value (HML)	-0.02	0.013	-1.844	0.070	-0.048...0.00
Profitability (RMW)	0.03	0.018	1.738	0.087	-0.005...0.06
Investment (CMA)	0.06	0.020	3.030	0.004	0.021...0.10
Alpha (α)	-0.68bps	0.000	-0.286	0.776	-0.05%...0.04%
Annualized Alpha (α)	-0.08%				



Source: Portfolio Visualizer. Data accessed on July 19, 2019.

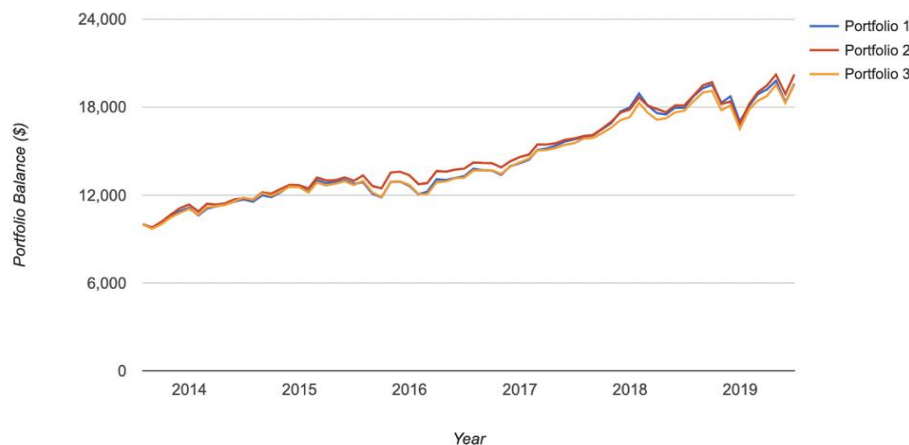
SINCE AUG 2013, QUAL HAS PRODUCED A SLIGHTLY HIGHER SHARPE RATIO THAN DGRW & SPY (1.03, 0.98, & 0.96 FOR QUAL, SPY, & DGRW RESPECTIVELY)

DGRW (Portfolio 1) & QUAL (Portfolio 2) vs. SPY (Portfolio 3) Risk/Return Analysis

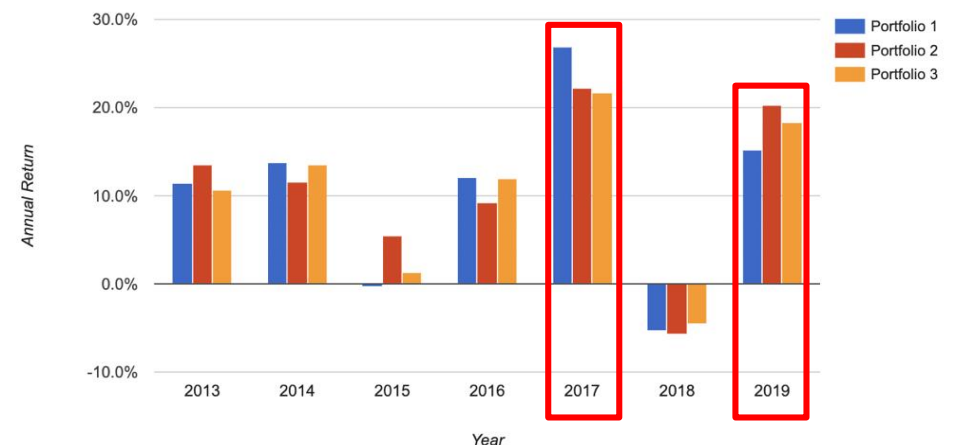
Portfolio Returns

Portfolio	Initial Balance	Final Balance	CAGR	Stdev	Best Year	Worst Year	Max. Drawdown	Sharpe Ratio	Sortino Ratio	US Mkt Correlation
Portfolio 1	\$10,000	\$19,610 ⓘ	12.05% ⓘ	12.00%	26.93%	-5.37%	-12.93% ⓘ	0.96	1.52	0.97
Portfolio 2	\$10,000	\$20,236 ⓘ	12.65% ⓘ	11.56%	22.27%	-5.68%	-14.61% ⓘ	1.03	1.72	0.98
Portfolio 3	\$10,000	\$19,560 ⓘ	12.01% ⓘ	11.59%	21.70%	-4.56%	-13.52% ⓘ	0.98	1.57	0.99

Portfolio Growth



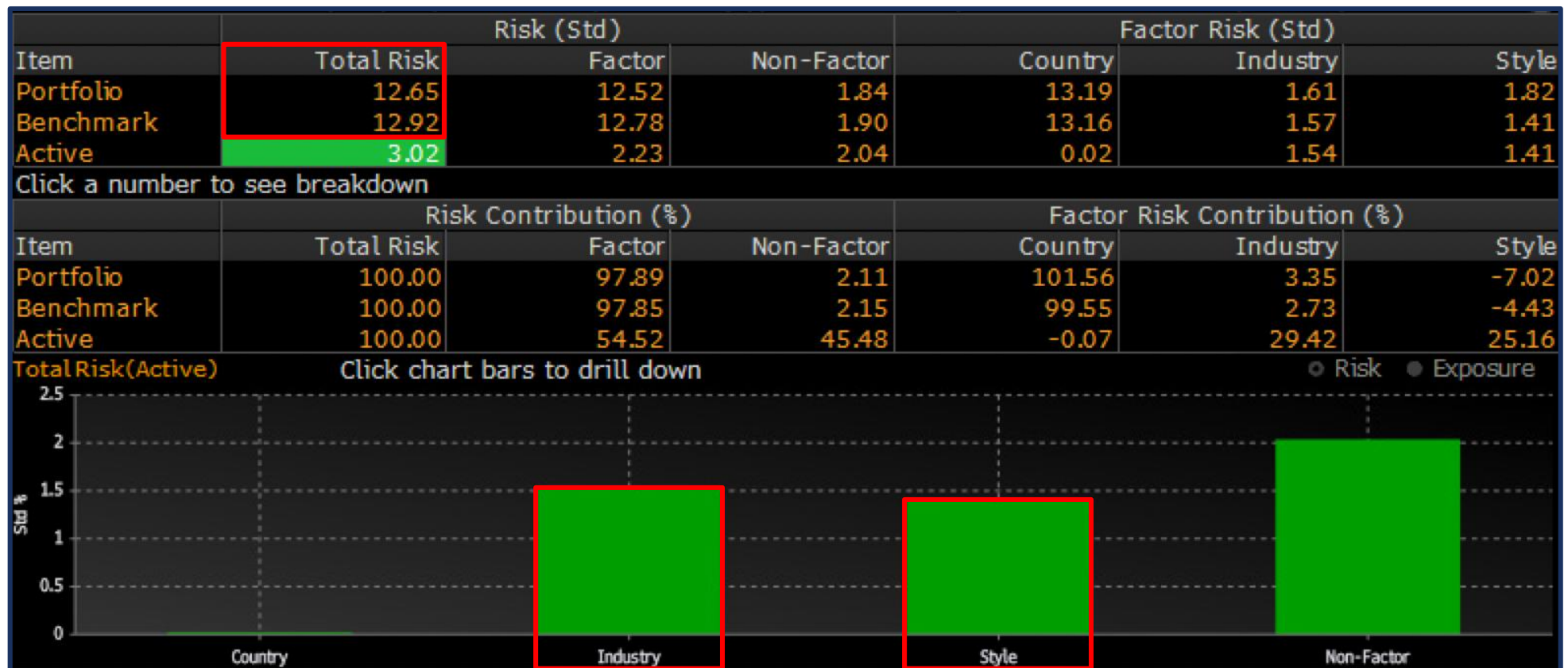
Annual Returns



Source: Portfolio Visualizer. Data accessed on July 19, 2019.

BLOOMBERG PROJECTS DGRW AND QUAL TO HAVE TOTAL PORTFOLIO RISKS OF 12.65% AND 12.92% RESPECTIVELY

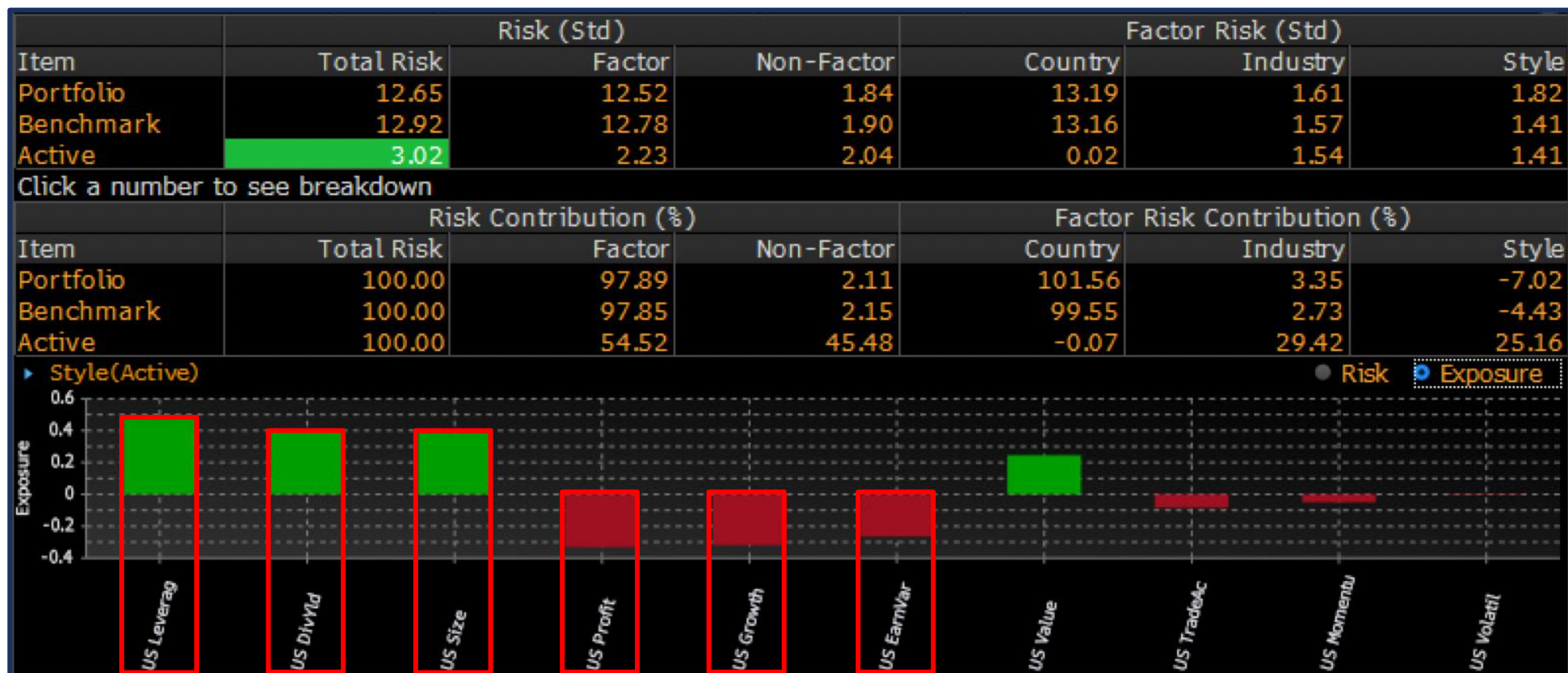
DGRW (Portfolio) vs. QUAL (Benchmark): Total Risk



Source: Bloomberg. Data accessed on July 19, 2019.

DGRW HAS GREATER EXPOSURE TO US LEVERAGE, US DIVIDENDS, & US SIZE QUAL HAS GREATER EXPOSURE TO US PROFIT, US GROWTH, & US EARNINGS

DGRW (Portfolio) vs. QUAL (Benchmark): Style Factor Exposures

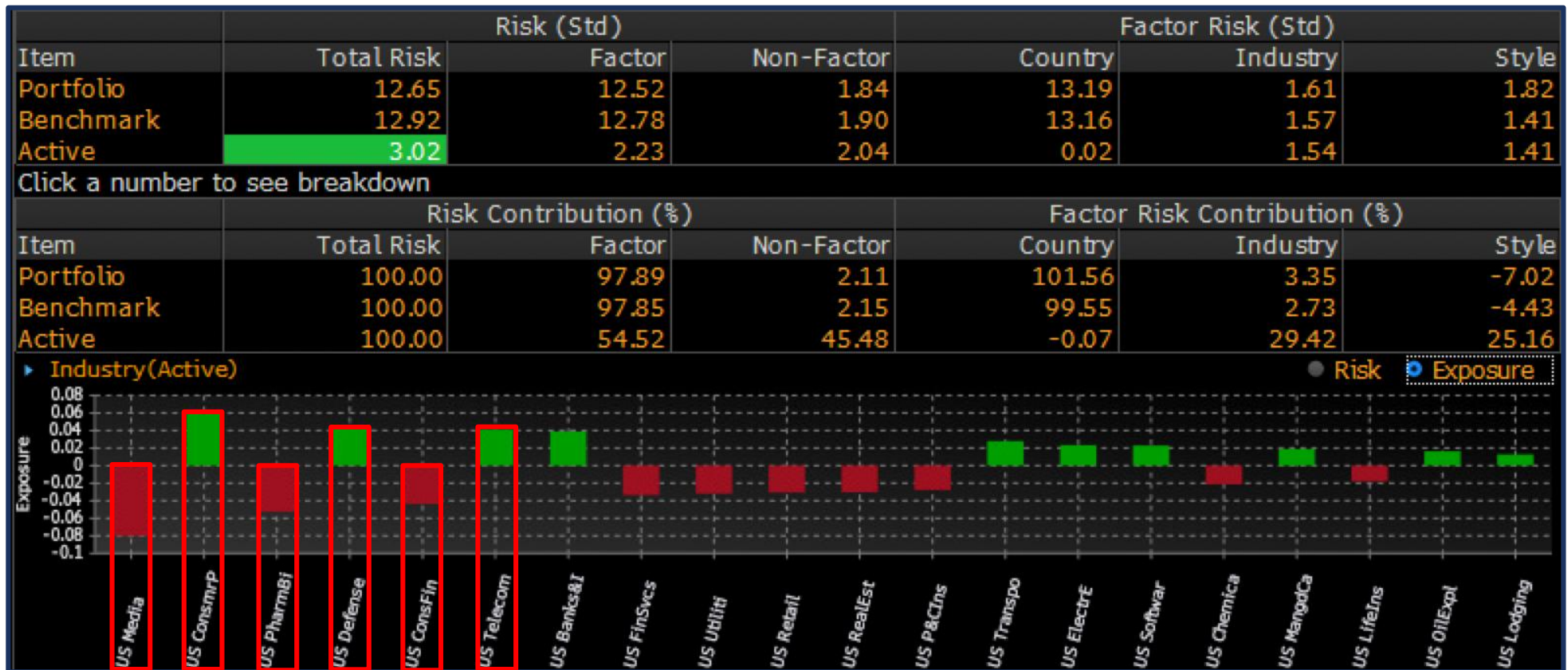


Source: Bloomberg. Data accessed on July 19, 2019.

DGRW HAS GREATER EXPOSURE TO US CONSUMER, US DEFENSIVES, & US TELECOMMUNICATIONS

QUAL HAS GREATER EXPOSURE TO US MEDIA, US PHARMA, & US CONSUMER

DGRW (Portfolio) vs. QUAL (Benchmark): Industry Factor Exposures



Source: Bloomberg. Data accessed on July 19, 2019.

ETF PORTFOLIO RISK ANALYTICS

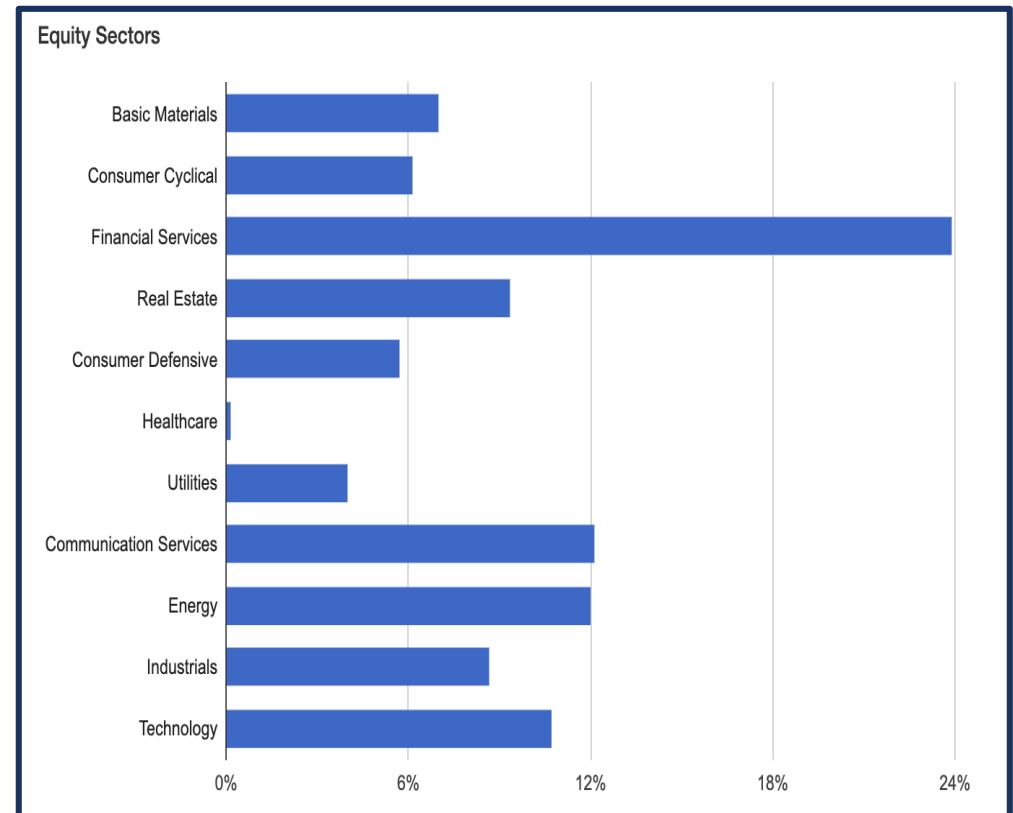
EDIV VS. EEM

EDIV SCREENS FOR EMERGING MARKET STOCKS WITH POSITIVE EARNINGS AND DIVIDEND GROWTH

EDIV Methodology & Sector Weights

- EDIV screens for stocks that have **positive earnings per share** for the most recent 12-month period, **positive 3-year earnings growth**, **stable or increasing 3-year dividend growth**, and a **dividend yield higher** than the median for the universe.
- Comprised of **100 stocks**
- EDIV only has a **7% overlap** with EEM.
- YTD performance through 7/22/2019:
 - EDIV +11.87, EEM +10.59%
 - EDIV has outperformed EEM by **128bps**
- In terms of valuations:
 - In 2019, EDIV has a PE of **10.36** while EEM has a PE of **13.11** (based on 2019 estimates; source: www.ETFaction.com)

Source: https://www.spindices.com/documents/methodologies/methodology-sp-dividend-opportunities.pdf?force_download=true



Source: S&P, Portfolio Visualizer. Data accessed on July 19, 2019.

BASED ON PORTFOLIO VISUALIZER'S FACTOR ANALYSIS, EDIV HAS A HIGHER PROFITABILITY FACTOR LOADING THAN EEM (RMW OF 0.46 & 0.11 RESPECTIVELY)

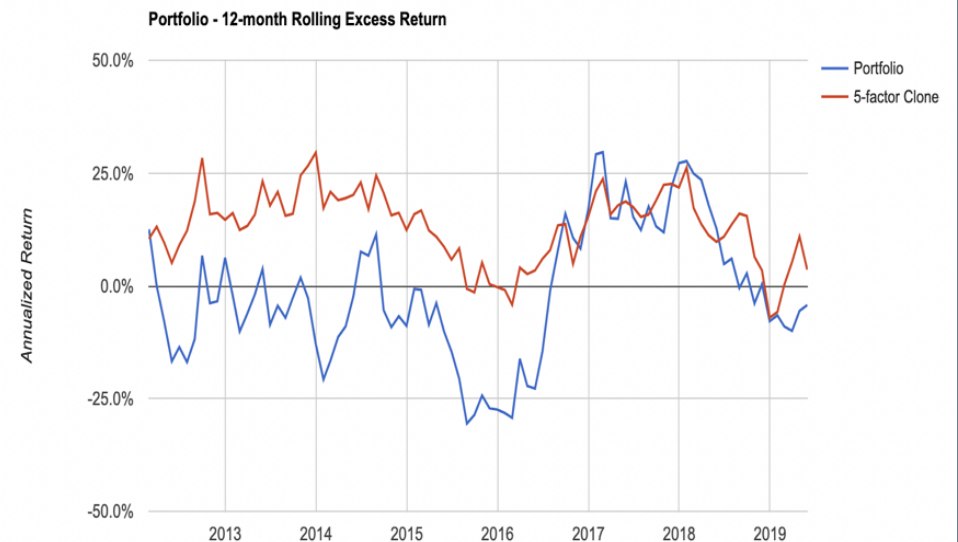
EDIV Factor Analysis

Factor Performance Attribution in Basis Points

Monthly Factor Premiums (BPS)				92.84	-12.34	-23.37	17.95	-10.51		
Name	Start Date	End Date	Annual Alpha	Rm-Rf	SMB	HML	RMW	CMA	Total	R ²
Portfolio	Mar 2011	May 2019	-11.74%	87.18	2.34	-1.74	8.28	-1.10	-2.88	35.5%

Portfolio Regression Results

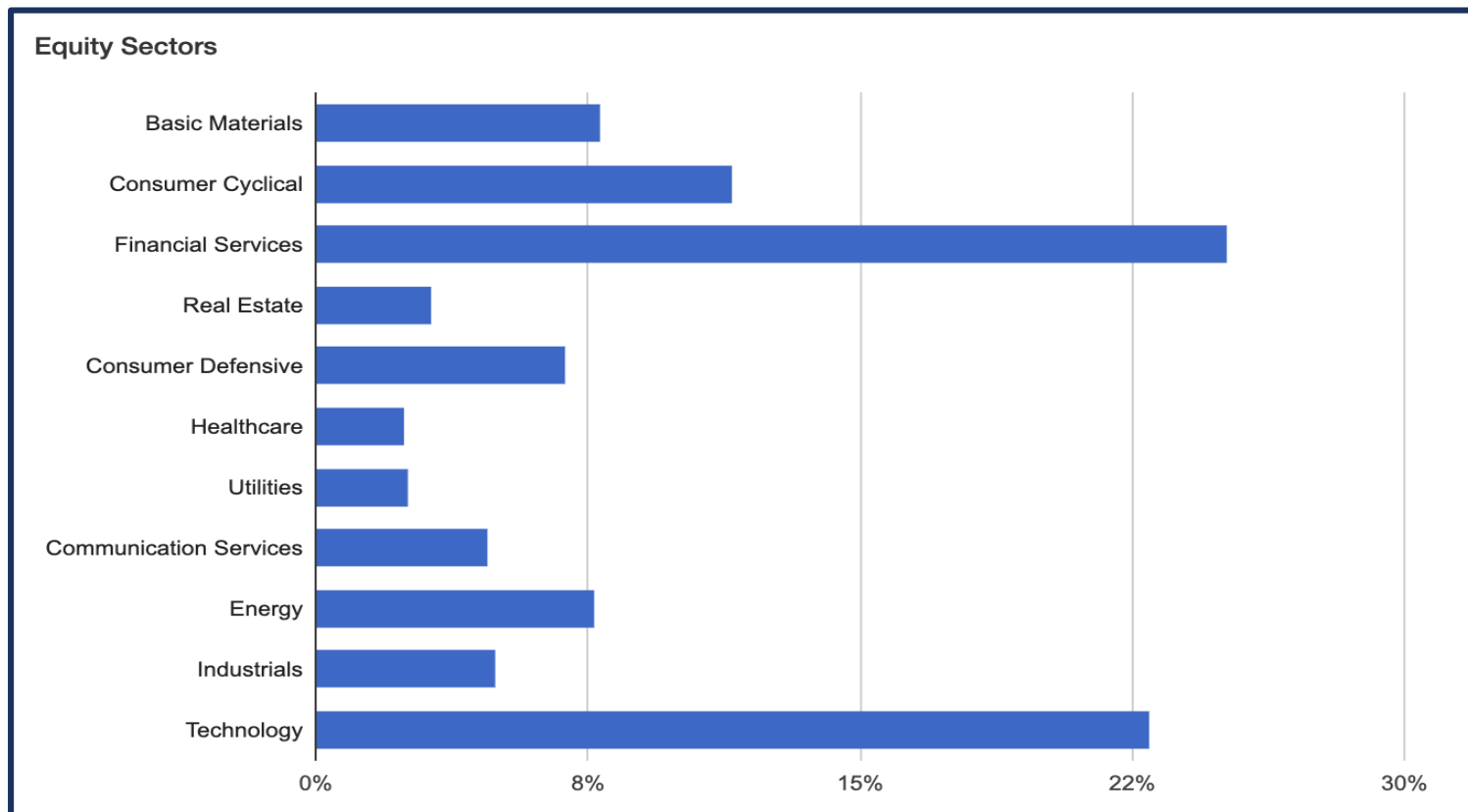
Portfolio	100.00% SPDR S&P Emerging Markets Dividend ETF (EDIV)				
Time Period	Mar 2011 - May 2019				
Coefficient of Determination (R ²)	35.5%				
Adjusted R ²	32.1%				
Regression F statistic	10.26 (p-value = 0.000)				
Autocorrelation	No autocorrelation confirmed (Durbin-Watson test value is 1.793 with p-value 0.147)				
Heteroscedasticity	No heteroscedasticity confirmed (Breusch-Pagan test value is 2.687 with p-value 0.748)				
Factor	Loading	Standard Error	t-stat	p-value	95% Confidence Interval
Market (Rm-Rf)	0.94	0.136	6.881	0.000	0.668...1.210
Size (SMB)	-0.19	0.223	-0.850	0.398	-0.632...0.253
Value (HML)	0.07	0.258	0.289	0.773	-0.438...0.587
Profitability (RMW)	0.46	0.334	1.380	0.171	-0.203...1.125
Investment (CMA)	0.10	0.394	0.266	0.791	-0.677...0.886
Alpha (α)	-97.84bps	0.005	-2.139	0.035	-1.89%...-0.07%
Annualized Alpha (α)	-11.74%				



Source: Portfolio Visualizer. Data accessed on July 19, 2019.

FROM A SECTOR WEIGHT STANDPOINT, EEM IS MOST EXPOSED TO FINANCIAL SERVICES, TECHNOLOGY, & CONSUMER CYCLICALS

EEM Sector Weights



Source: MSCI, Portfolio Visualizer. Data accessed on July 19, 2019.

BASED ON PORTFOLIO VISUALIZER'S FACTOR ANALYSIS, EEM HAS A LOWER PROFITABILITY FACTOR LOADING THAN EDIV (RMW OF 0.11 & 0.46 RESPECTIVELY)

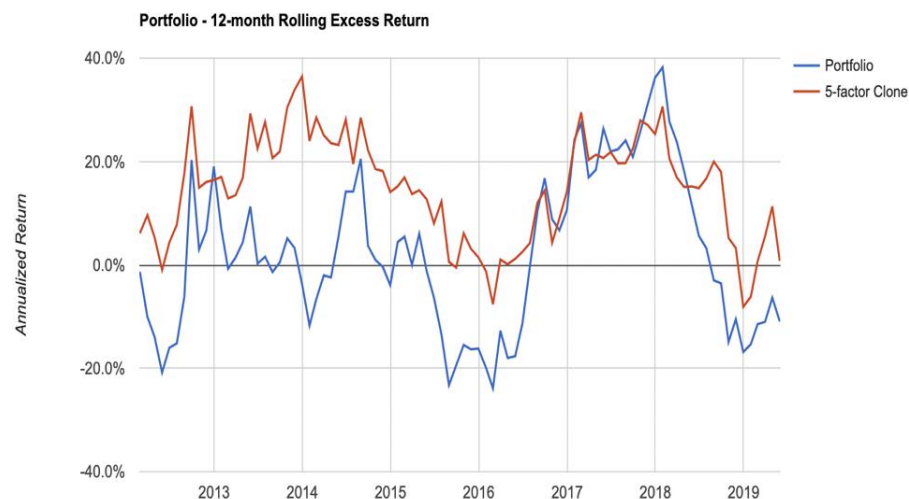
EEM Factor Analysis

Factor Performance Attribution in Basis Points

				Monthly Factor Premiums (BPS)						
				92.84	-12.34	-23.37	17.95	-10.51		
Name	Start Date	End Date	Annual Alpha	Rm-Rf	SMB	HML	RMW	CMA	Total	R ²
Portfolio	Mar 2011	May 2019	-10.65%	99.89	1.98	-2.90	1.89	2.01	14.15	52.4%

Portfolio Regression Results	
Portfolio	100.00% iShares MSCI Emerging Markets ETF (EEM)
Time Period	Mar 2011 - May 2019
Coefficient of Determination (R ²)	52.4%
Adjusted R ²	49.8%
Regression F statistic	20.48 (p-value = 0.000)
Autocorrelation	No autocorrelation confirmed (Durbin-Watson test value is 1.939 with p-value 0.294)
Heteroskedasticity	No heteroskedasticity confirmed (Breusch-Pagan test value is 1.848 with p-value 0.870)

Factor	Loading	Standard Error	t-stat	p-value	95% Confidence Interval
Market (Rm-Rf)	1.08	0.117	9.214	0.000	0.844...1.308
Size (SMB)	-0.16	0.191	-0.840	0.403	-0.539...0.218
Value (HML)	0.12	0.221	0.562	0.575	-0.314...0.563
Profitability (RMW)	0.11	0.286	0.368	0.714	-0.463...0.673
Investment (CMA)	-0.19	0.337	-0.568	0.572	-0.860...0.478
Alpha (α)	-88.72bps	0.004	-2.266	0.026	-1.66%...-0.11%
Annualized Alpha (α)	-10.65%				



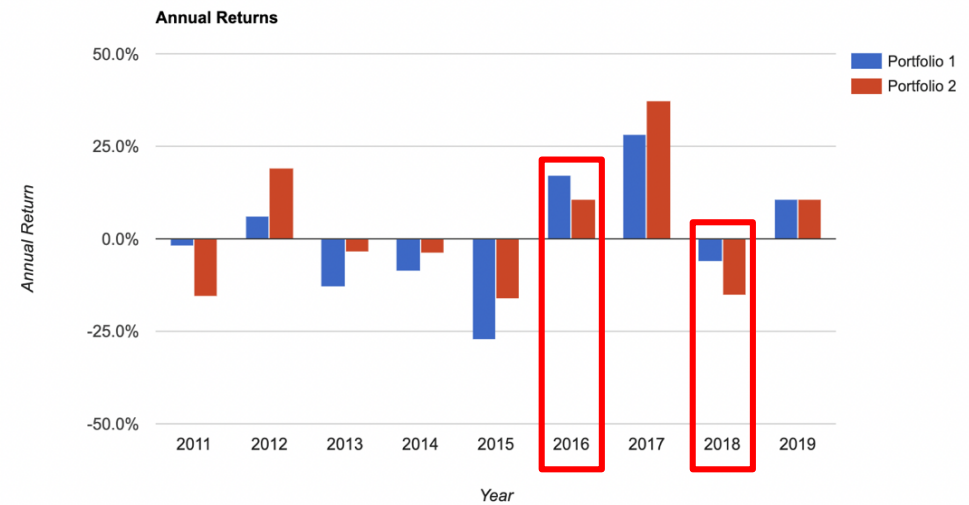
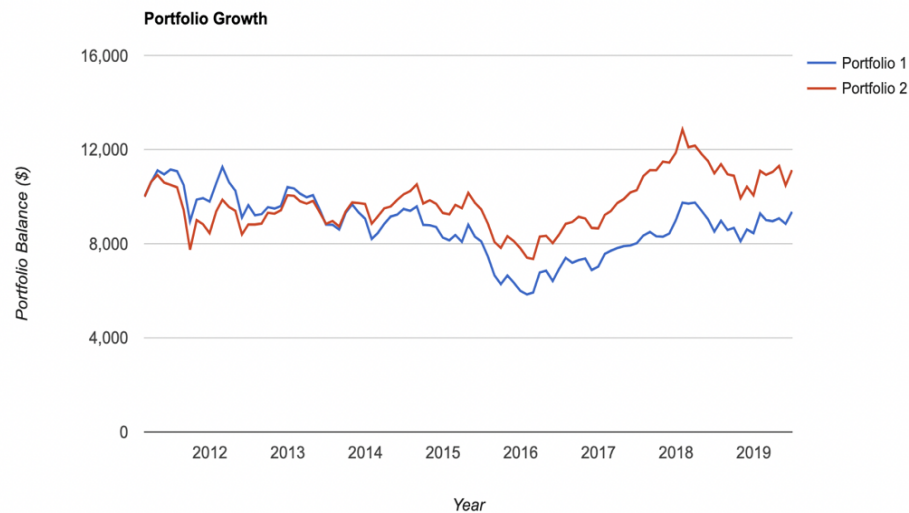
Source: Portfolio Visualizer. Data accessed on July 19, 2019.

SINCE MAR 2011, EEM HAS PRODUCED A SLIGHTLY HIGHER SHARPE RATIO THAN EDIV (0.13 & 0.02 RESPECTIVELY)

EDIV (Portfolio 1) vs. EEM (Portfolio 2) Risk/Return Analysis

Portfolio Returns

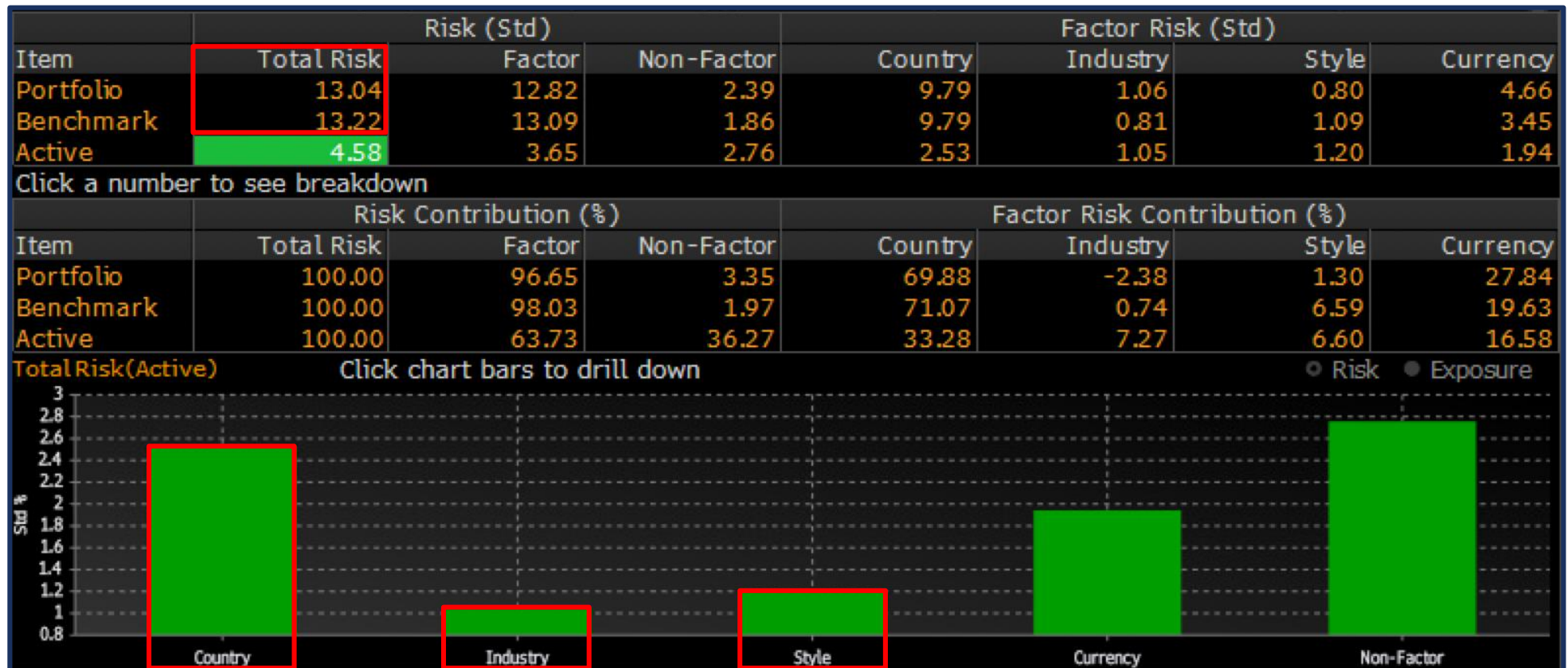
Portfolio	Initial Balance	Final Balance	CAGR	Stdev	Best Year	Worst Year	Max. Drawdown	Sharpe Ratio	Sortino Ratio	US Mkt Correlation
Portfolio 1	\$10,000	\$9,356 ⓘ	-0.80% ⓘ	18.04%	28.18%	-27.41%	-48.07% ⓘ	0.02	0.03	0.58
Portfolio 2	\$10,000	\$11,131 ⓘ	1.29% ⓘ	17.96%	37.28%	-16.18%	-32.71% ⓘ	0.13	0.19	0.73



Source: Portfolio Visualizer. Data accessed on July 19, 2019.

BLOOMBERG PROJECTS EDIV AND EEM TO HAVE TOTAL PORTFOLIO RISKS OF 13.04% AND 13.22% RESPECTIVELY

EDIV (Portfolio) vs. EEM (Benchmark): Total Risk

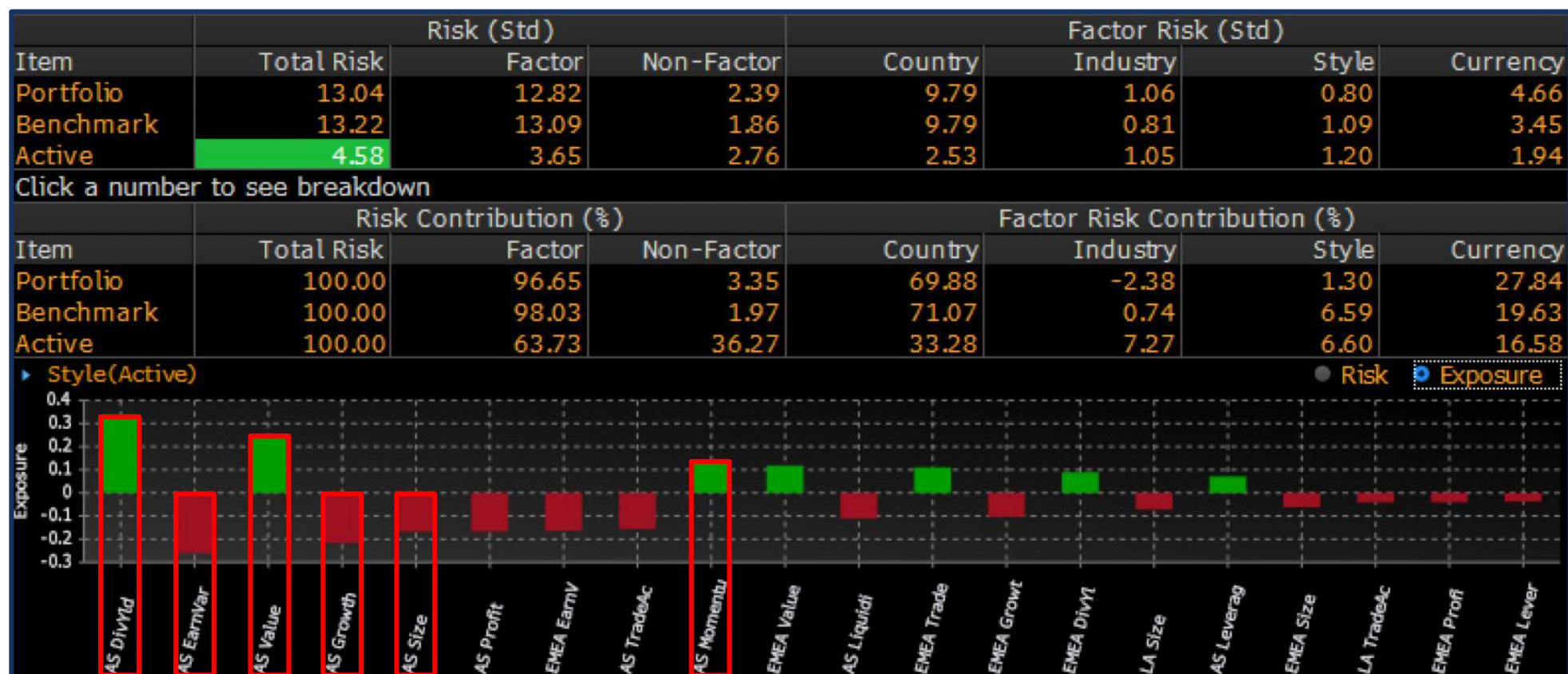


Source: Bloomberg. Data accessed on July 19, 2019.

EDIV HAS GREATER EXPOSURE TO AS DIVIDENDS, AS VALUE, & AS MOMENTUM

EEM HAS GREATER EXPOSURE TO AS EARNINGS, AS GROWTH, & AS SIZE

EDIV (Portfolio) vs. EEM (Benchmark): Style Factor Exposures

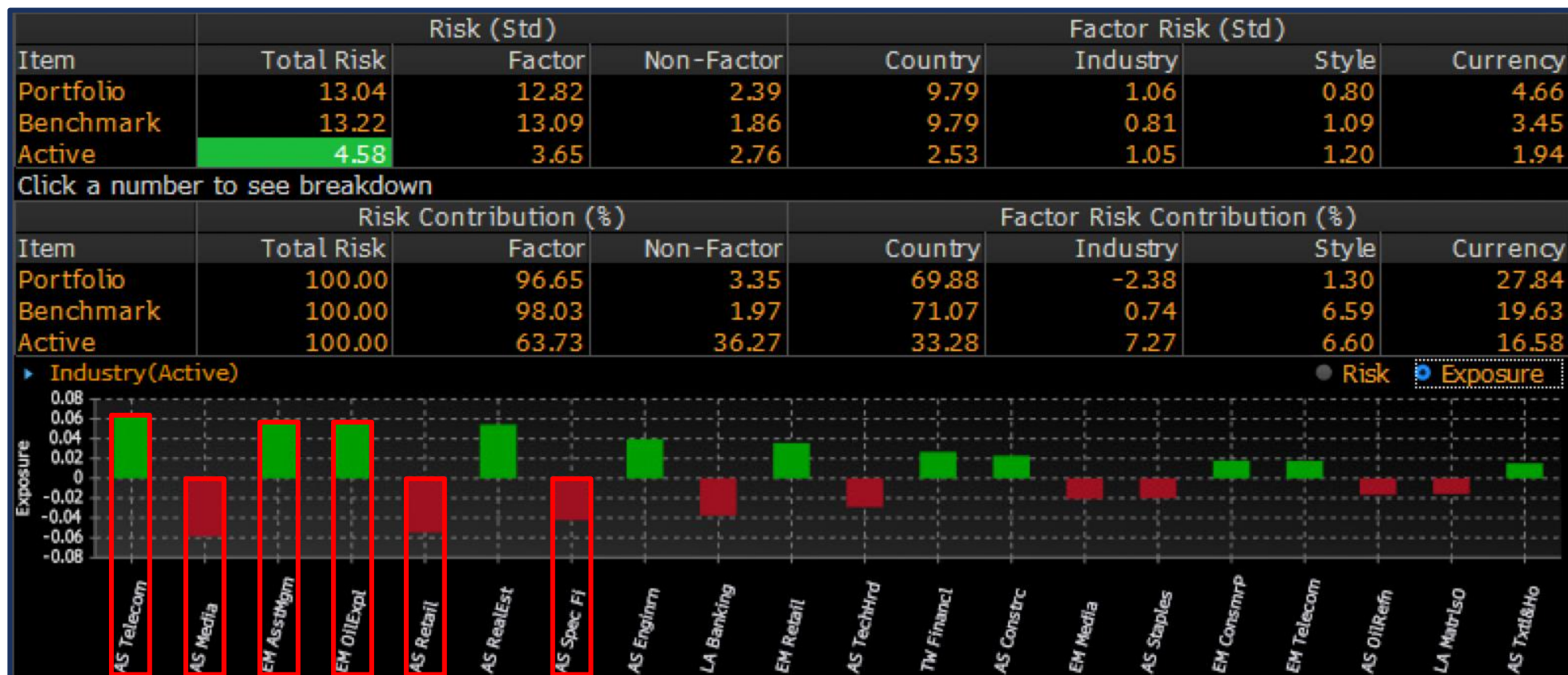


Source: Bloomberg. Data accessed on July 19, 2019.

EDIV HAS GREATER EXPOSURE TO AS TELECOMMUNICATIONS, EM ASSET MANAGEMENT, & EM OIL EXPLORATION

EEM HAS GREATER EXPOSURE TO AS MEDIA, AS RETAIL, & AS SPEC FI

EDIV (Portfolio) vs. EEM (Benchmark): Industry Factor Exposures



Source: Bloomberg. Data accessed on July 19, 2019.

ETF PORTFOLIO RISK ANALYTICS

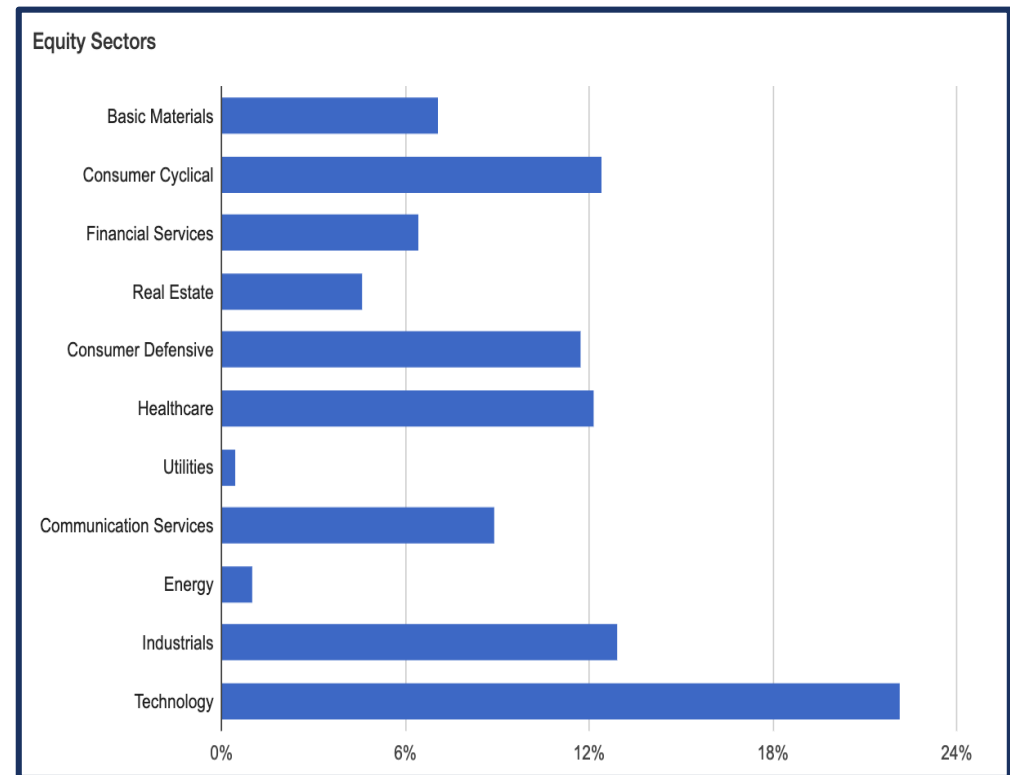
DNL VS. ACWX

DNL BLENDS QUALITY PLUS GROWTH CHARACTERISTICS WITH DEVELOPED INTERNATIONAL AND EMERGING MARKET STOCKS

DNL Methodology & Sector Weights

- DNL uses the **same methodology** as DGRW except it **targets developed international and emerging market stocks**.
- DNL has relatively **high active share** and is composed of **271 stocks** (ACWX includes 1334 stocks).
- YTD performance through 7/22/2019:
 - DNL +19.90%, ACWX +13.50%
 - DNL has outperformed ACWX by **641bps**

Source: <https://www.wisdomtree.com/-/media/us-media-files/documents/resource-library/pdf/research/methodologies/wisdomtree-global-ex-us-dividend-growth-index-methodology-961.pdf>



Source: WisdomTree, Portfolio Visualizer. Data accessed on July 19, 2019.

BASED ON PORTFOLIO VISUALIZER'S FACTOR ANALYSIS, DNL HAS A HIGHER PROFITABILITY FACTOR LOADING THAN ACWX (RMW OF 0.20 & -0.16 RESPECTIVELY)

DNL Factor Analysis

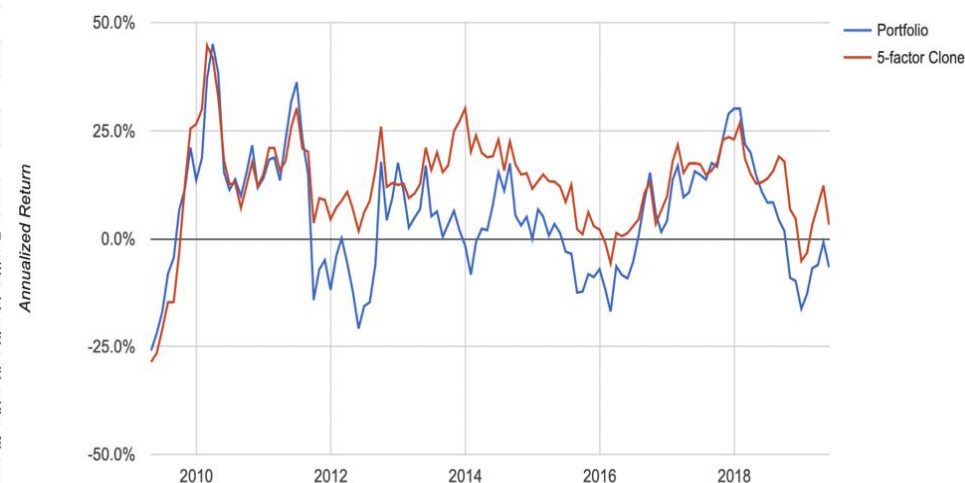
Factor Performance Attribution in Basis Points

		Monthly Factor Premiums (BPS)		78.41	11.43	-20.00	24.07	3.89		
Name	Start Date	End Date	Annual Alpha	Rm-Rf	SMB	HML	RMW	CMA	Total	R ²
Portfolio	May 2008	May 2019	-5.28%	71.41	-0.63	2.15	4.79	-0.18	33.58	63.5%

Portfolio Regression Results

Portfolio	100.00% WisdomTree Global ex-US Qual Div Gr ETF (DNL)					
Time Period	May 2008 - May 2019					
Coefficient of Determination (R ²)	63.5%					
Adjusted R ²	62.1%					
Regression F statistic	44.28 (p-value = 0.000)					
Autocorrelation	No autocorrelation confirmed (Durbin-Watson test value is 1.835 with p-value 0.161)					
Heteroskedasticity	No heteroscedasticity confirmed (Breusch-Pagan test value is 7.357 with p-value 0.195)					
Factor	Loading	Standard Error	t-stat	p-value	95% Confidence Interval	
Market (Rm-Rf)	0.91	0.069	13.119	0.000	0.773...	1.048...
Size (SMB)	-0.06	0.119	-0.465	0.643	-0.290...	0.180...
Value (HML)	-0.11	0.123	-0.874	0.384	-0.352...	0.130...
Profitability (RMW)	0.20	0.185	1.079	0.283	-0.166...	0.566...
Investment (CMA)	-0.05	0.217	-0.217	0.828	-0.476...	0.382...
Alpha (α)	-43.96bps	0.003	-1.608	0.110	-0.98%	0.10%
Annualized Alpha (α)	-5.28%					

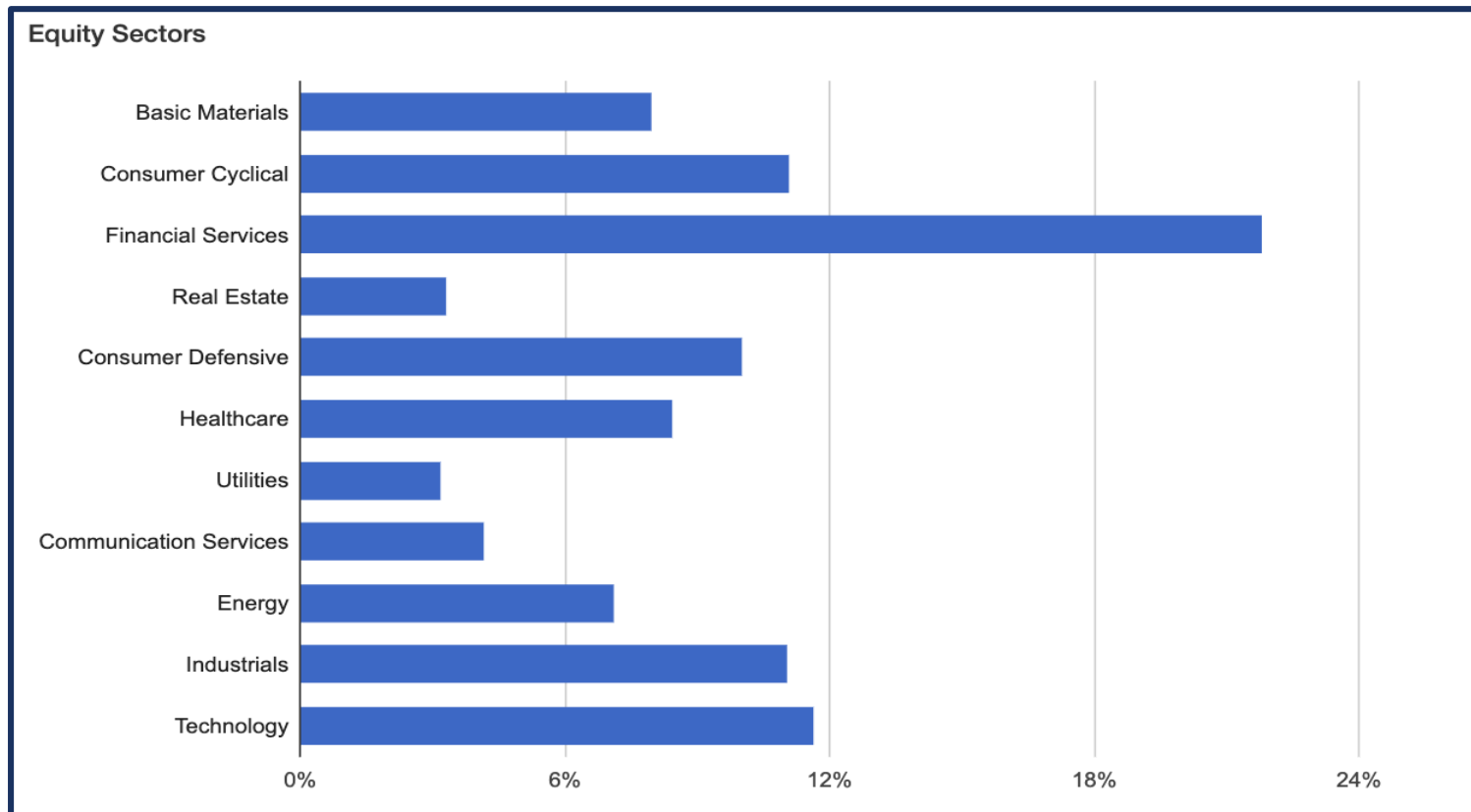
Portfolio - 12-month Rolling Excess Return



Source: Portfolio Visualizer. Data accessed on July 19, 2019.

FROM A SECTOR WEIGHT STANDPOINT, ACWX IS MOST EXPOSED TO FINANCIAL SERVICES, TECHNOLOGY, & CONSUMER CYCLICALS

ACWX Sector Weights



Source: MSCI, Portfolio Visualizer. Data accessed on July 19, 2019.

BASED ON PORTFOLIO VISUALIZER'S FACTOR ANALYSIS, ACWX HAS A LOWER PROFITABILITY FACTOR LOADING THAN DNL (RMW OF -0.16 & 0.20 RESPECTIVELY)

ACWX Factor Analysis

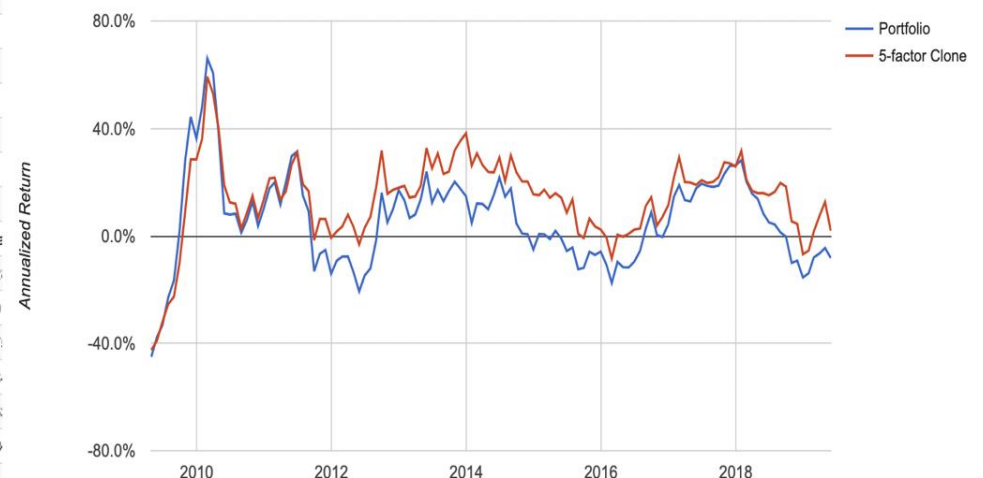
Factor Performance Attribution in Basis Points

				Monthly Factor Premiums (BPS)						
				78.41	11.43	-20.00	24.07	3.89		
Name	Start Date	End Date	Annual Alpha	Rm-Rf	SMB	HML	RMW	CMA	Total	R ²
Portfolio	May 2008	May 2019	-7.31%	87.56	-3.34	-1.54	-3.92	-0.72	17.15	81.5%

Portfolio Regression Results

Portfolio	100.00% iShares MSCI ACWI ex US ETF (ACWX)				
Time Period	May 2008 - May 2019				
Coefficient of Determination (R ²)	81.5%				
Adjusted R ²	80.7%				
Regression F statistic	111.59 (p-value = 0.000)				
Autocorrelation	No autocorrelation confirmed (Durbin-Watson test value is 1.888 with p-value 0.246)				
Heteroskedasticity	No heteroskedasticity confirmed (Breusch-Pagan test value is 3.286 with p-value 0.656)				
Factor	Loading	Standard Error	t-stat	p-value	95% Confidence Interval
Market (Rm-Rf)	1.12	0.056	19.777	0.000	1.005...1.22
Size (SMB)	-0.29	0.097	-3.022	0.003	-0.483...-0.10
Value (HML)	0.08	0.100	0.767	0.445	-0.122...0.27
Profitability (RMW)	-0.16	0.150	-1.085	0.280	-0.460...0.13
Investment (CMA)	-0.19	0.176	-1.053	0.294	-0.534...0.16
Alpha (α)	-60.89bps	0.002	-2.738	0.007	-1.05%...-0.17%
Annualized Alpha (α)	-7.31%				

Portfolio - 12-month Rolling Excess Return



Source: Portfolio Visualizer. Data accessed on July 19, 2019.

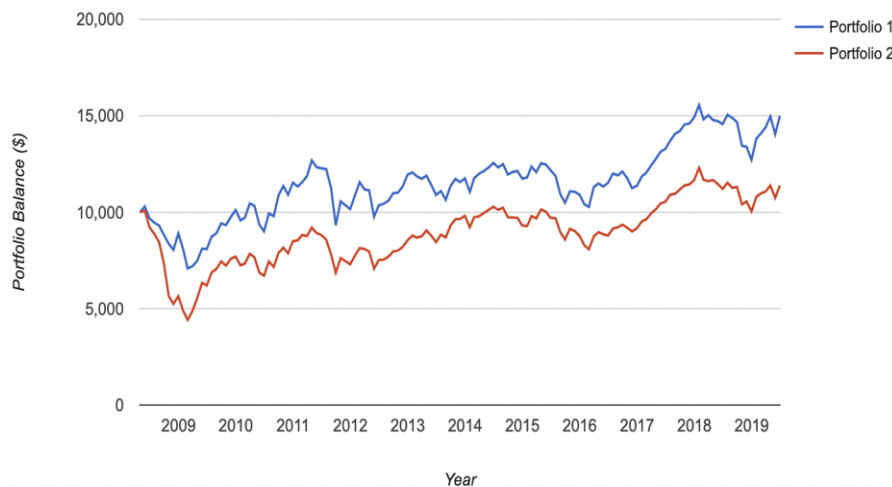
SINCE MAY 2008, DNL HAS PRODUCED DOUBLE THE SHARPE RATIO OF ACWX (0.27 & 0.13 RESPECTIVELY)

DNL (Portfolio 1) vs. ACWX (Portfolio 2) Risk/Return Analysis

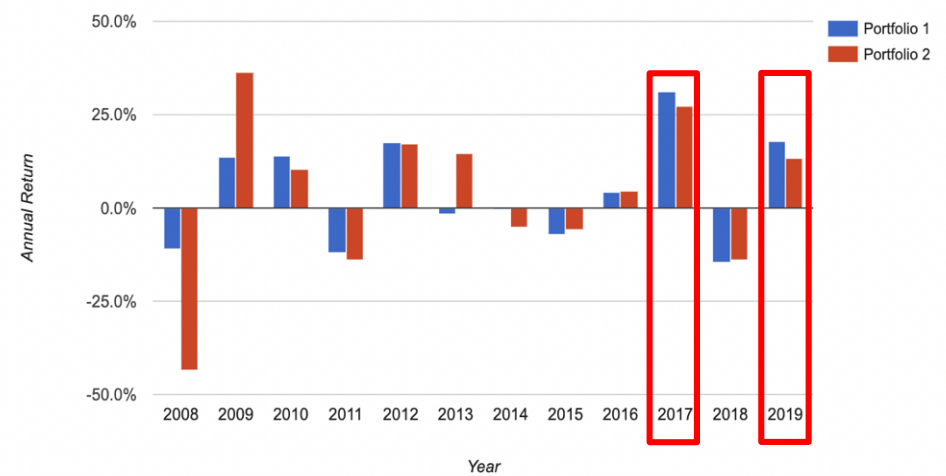
Portfolio Returns

Portfolio	Initial Balance	Final Balance	CAGR	Stdev	Best Year	Worst Year	Max. Drawdown	Sharpe Ratio	Sortino Ratio	US Mkt Correlation
Portfolio 1	\$10,000	\$14,994 ⓘ	3.69% ⓘ	16.81%	31.11%	-14.74%	-31.22% ⓘ	0.27	0.40	0.80
Portfolio 2	\$10,000	\$11,386 ⓘ	1.17% ⓘ	19.11%	36.37%	-43.56%	-56.18% ⓘ	0.13	0.18	0.90

Portfolio Growth



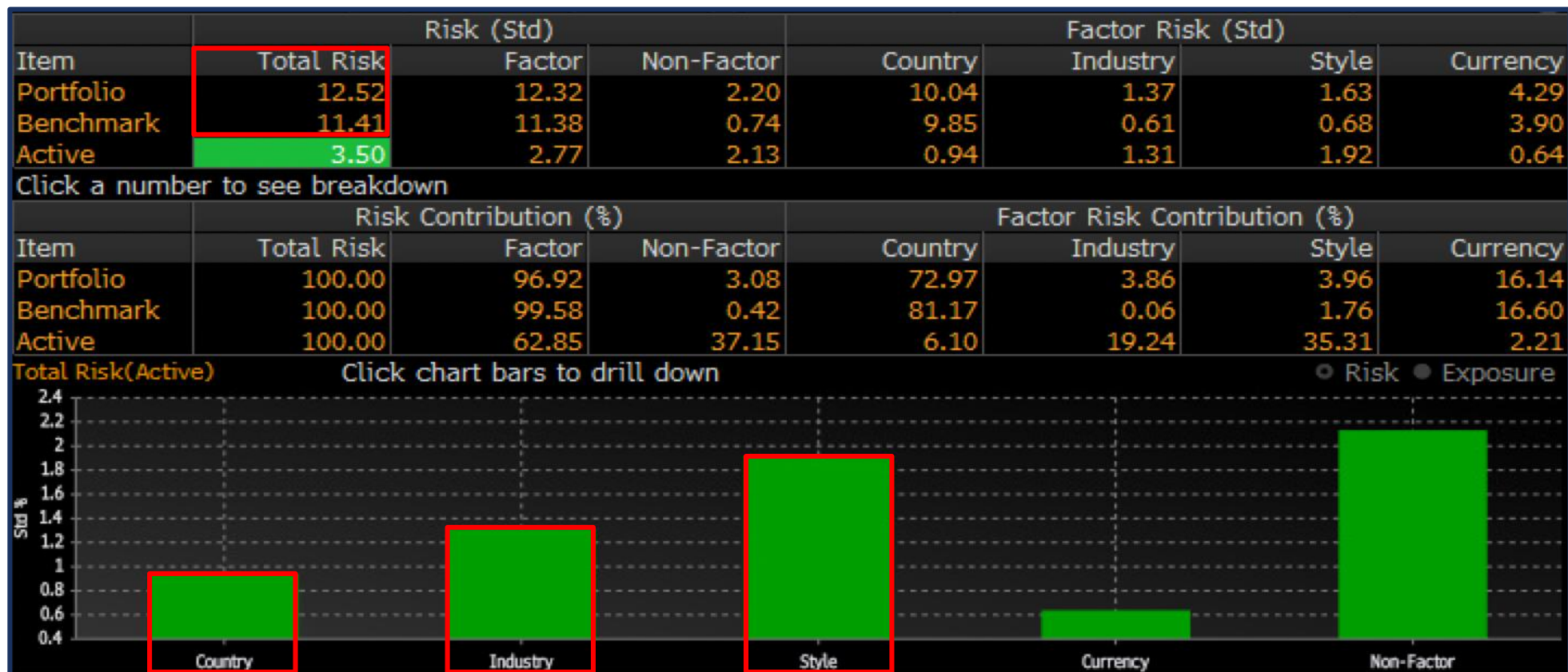
Annual Returns



Source: Portfolio Visualizer. Data accessed on July 19, 2019.

BLOOMBERG PROJECTS DNL AND ACWX TO HAVE TOTAL PORTFOLIO RISKS OF 12.52% AND 11.41% RESPECTIVELY

DNL (Portfolio) vs. ACWX (Benchmark): Total Risk

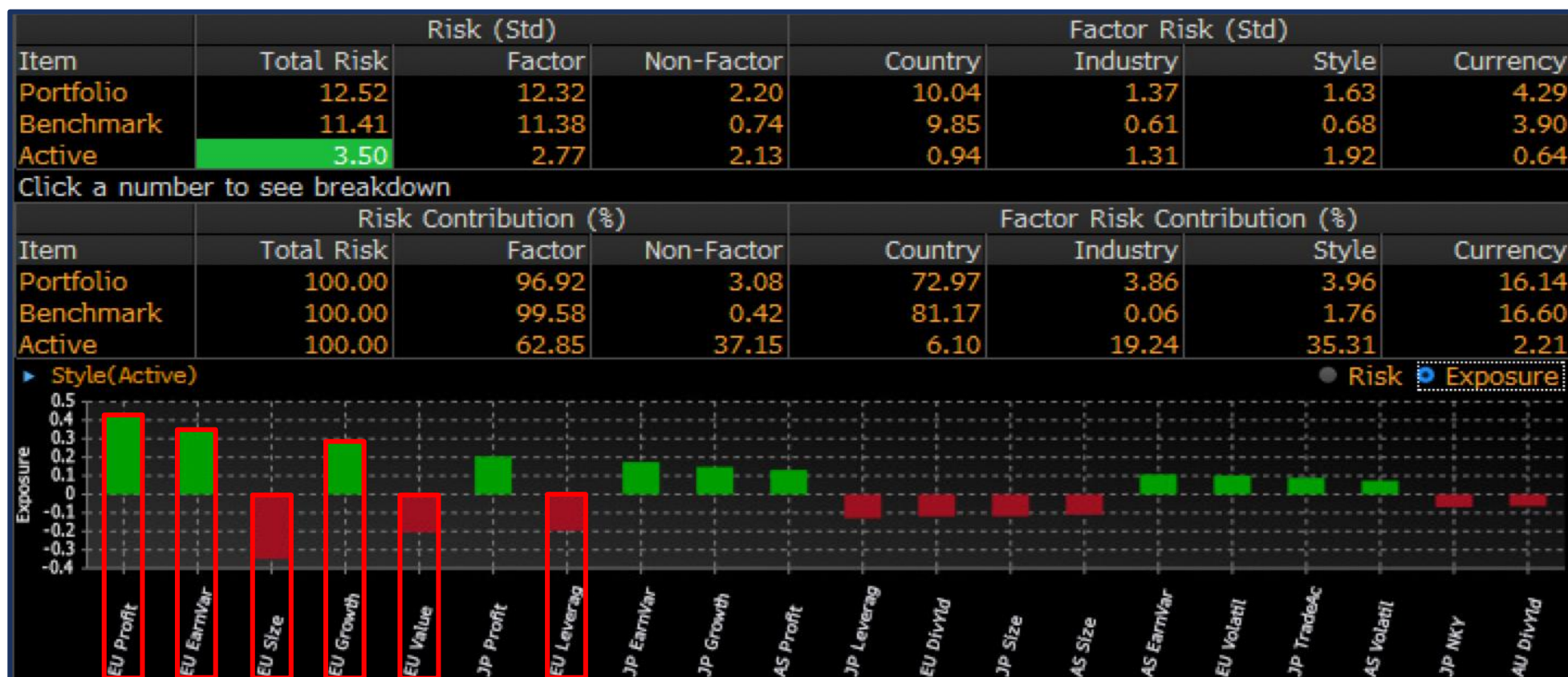


Source: Bloomberg. Data accessed on July 19, 2019.

DNL HAS GREATER EXPOSURE TO EU PROFIT, EU EARNINGS, & EU GROWTH

ACWX HAS GREATER EXPOSURE TO EU SIZE, EU VALUE, & EU LEVERAGE

DNL (Portfolio) vs. ACWX (Benchmark): Style Factor Exposures

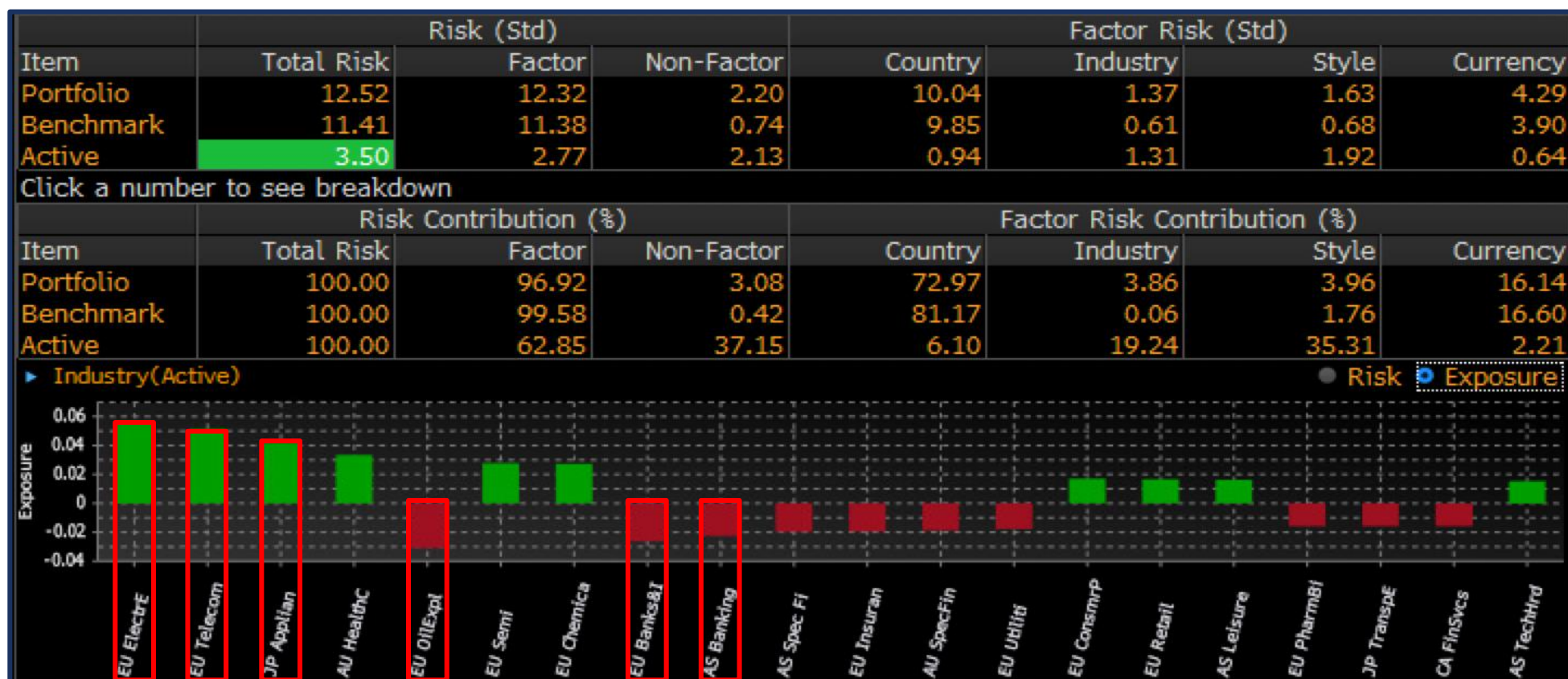


Source: Bloomberg. Data accessed on July 19, 2019.

DNL HAS GREATER EXPOSURE TO EU ELECTRIC, EU TELECOMMUNICATIONS, & JP APPLIANCES

ACWX HAS GREATER EXPOSURE TO EU OIL EXPLORATION, EU BANKS, & AS BANKS

DNL (Portfolio) vs. ACWX (Benchmark): Industry Factor Exposures



Source: Bloomberg. Data accessed on July 19, 2019.

ETF PORTFOLIO RISK ANALYTICS

GDX & BENEFITS OF GOLD IN A PORTFOLIO

ASTORIA'S INSIGHTS ON GOLD

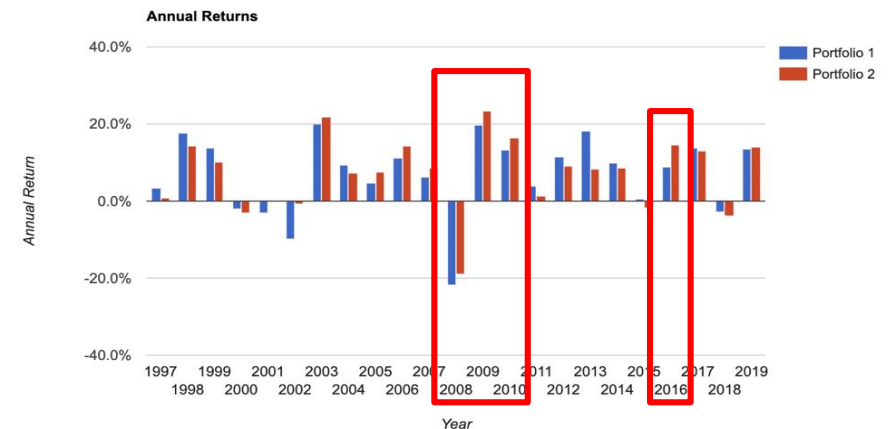
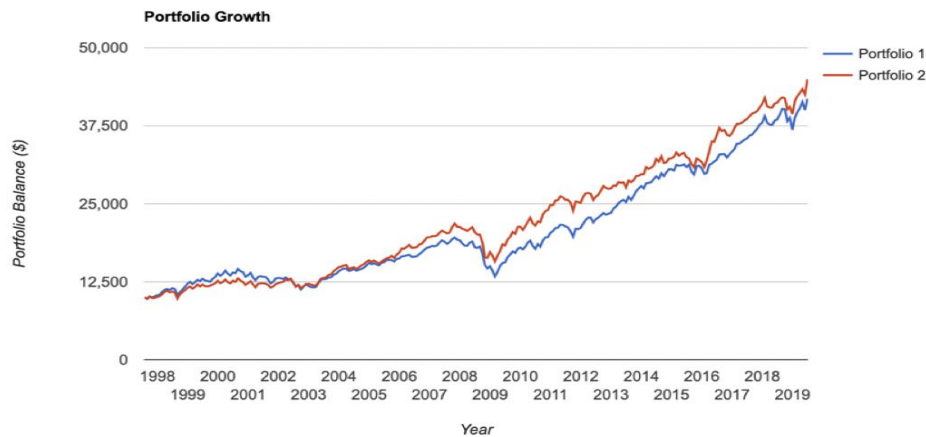
- Astoria believes that with global rates **trending lower**, the **opportunity cost** for owning gold **has declined**.
- 10-year *real* US yields have gone from **1.2% to 0.24%** since Sep 2018.
- In recent quarters, recession risks have **increased** which has made gold **more favorable** in our view.
- Gold has historically proven to be **uncorrelated** with stocks and has often **lowered the overall risk of a portfolio**. In our view, this **diversification benefit** is very valuable for multi-asset portfolios that aim for higher risk adjusted returns over varying economic cycles.
- Since the S&P 500's low in March 2009:
 - GDX -10%
 - GLD +45%
 - SPY +397%
- Moreover, we note the following:
 - GDX still 50% below all time highs in 2011
 - GLD still 25% below its all time high in 2011
- In the following pages, we highlight the risk/return of including an allocation to gold miners and the bullion in a 60% US equity and 40% US bond portfolio.

SINCE 1997, A PORTFOLIO OF 50% US STOCKS, 40% US BONDS, & 10% GOLD EQUITIES HAS PRODUCED A HIGHER SHARPE RATIO THAN A 60% US STOCKS & 40% US BONDS PORTFOLIO

Portfolio 1: 60% Vanguard Total Stock Market Index Fund (VITSX) & 40% Vanguard Total Bond Market Index Fund (VBMFX) vs. Portfolio 2: 50% VITSX & 40% VBMFX & 10% VanEck International Investors Gold Fund (INIVX) Risk/Return Analysis

Portfolio Returns

Portfolio	Initial Balance	Final Balance	CAGR	Stdev	Best Year	Worst Year	Max. Drawdown	Sharpe Ratio	Sortino Ratio	US Mkt Correlation
Portfolio 1	\$10,000	\$41,835 <i>i</i>	6.75% <i>i</i>	9.12%	20.05%	-21.72%	-31.93% <i>i</i>	0.55	0.79	0.99
Portfolio 2	\$10,000	\$44,945 <i>i</i>	7.10% <i>i</i>	9.25%	23.41%	-18.88%	-27.86% <i>i</i>	0.58	0.85	0.89



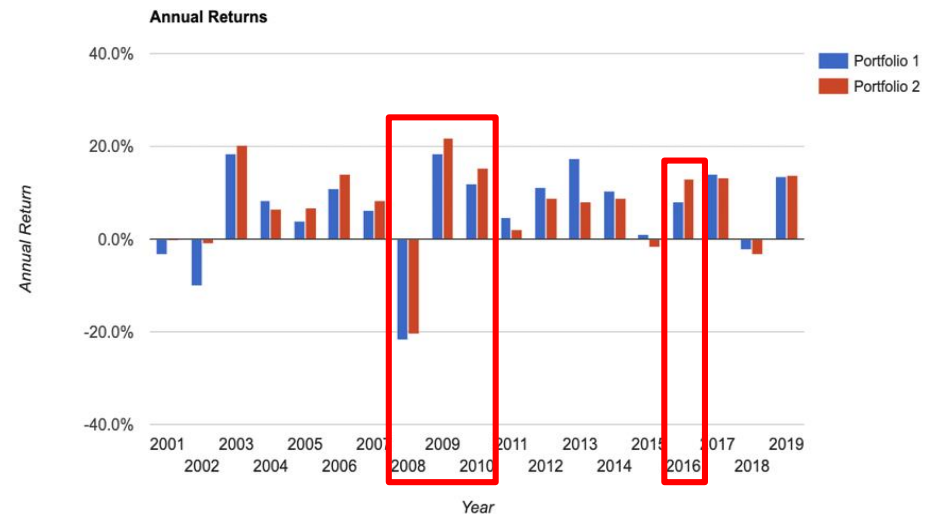
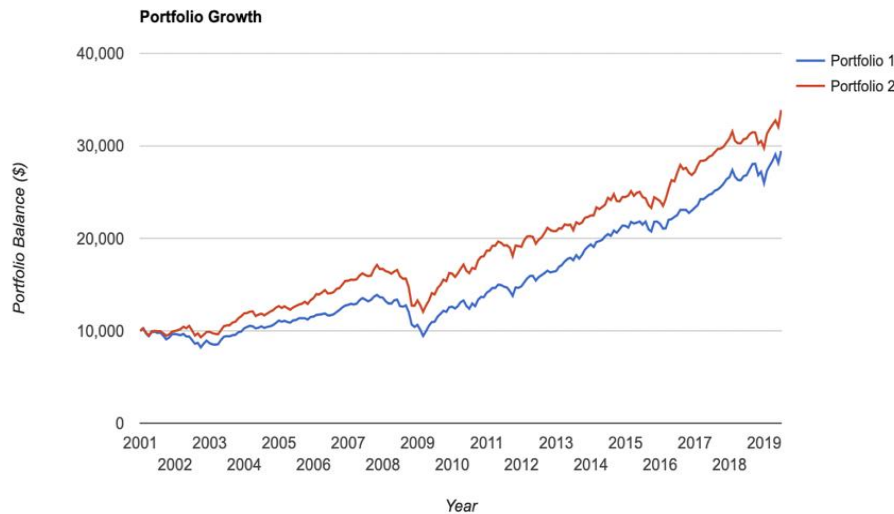
Source: Portfolio Visualizer. Data accessed on July 19, 2019.

SINCE 2001, A PORTFOLIO OF 50% US STOCKS, 40% US BONDS, & 10% GOLD EQUITIES HAS PRODUCED A HIGHER SHARPE RATIO THAN A 60% US STOCKS & 40% US BONDS PORTFOLIO

Portfolio 1: 60% Vanguard 500 Index Investor (VFINX) & 40% Vanguard Total Bond Market Index Fund (VBMFX) vs. Portfolio 2: 50% VFINX & 40% VBMFX & 10% VanEck International Investors Gold Fund (INIVX) Risk/Return Analysis

Portfolio Returns

Portfolio	Initial Balance	Final Balance	CAGR	Stdev	Best Year	Worst Year	Max. Drawdown	Sharpe Ratio	Sortino Ratio	US Mkt Correlation
Portfolio 1	\$10,000	\$29,465 ⓘ	6.02% ⓘ	8.62%	18.49%	-21.71%	-32.04% ⓘ	0.56	0.81	0.98
Portfolio 2	\$10,000	\$33,891 ⓘ	6.82% ⓘ	8.79%	21.81%	-20.42%	-29.63% ⓘ	0.64	0.95	0.88



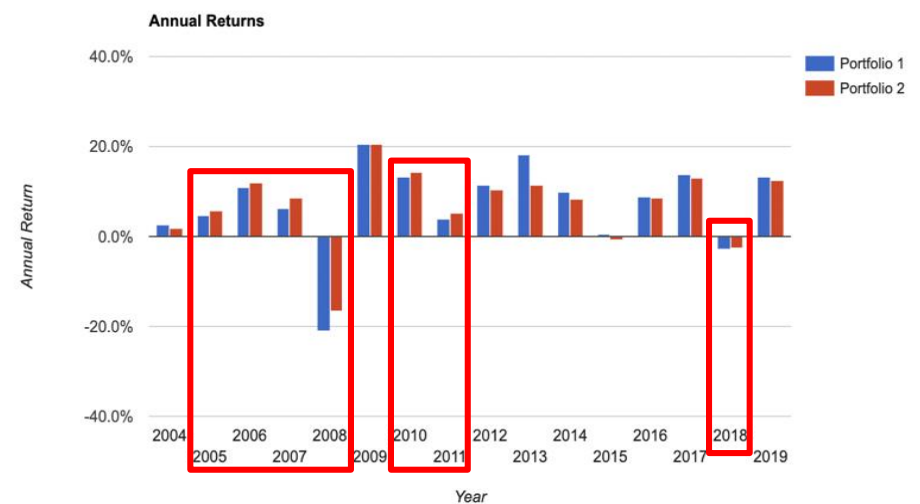
Source: Portfolio Visualizer. Data accessed on July 19, 2019.

SINCE 2004, A PORTFOLIO OF 50% US STOCKS, 40% US BONDS, & 10% GOLD BULLION HAS PRODUCED A HIGHER SHARPE RATIO THAN A 60% US STOCKS & 40% US BONDS PORTFOLIO

Portfolio 1: 60% Vanguard 500 Index Investor (VFINX) & 40% Vanguard Total Bond Market Index Fund (VBMFX) vs. Portfolio 2: 50% VFINX & 40% VBMFX & 10% SPDR Gold Shares (GLD) Risk/Return Analysis

Portfolio Returns

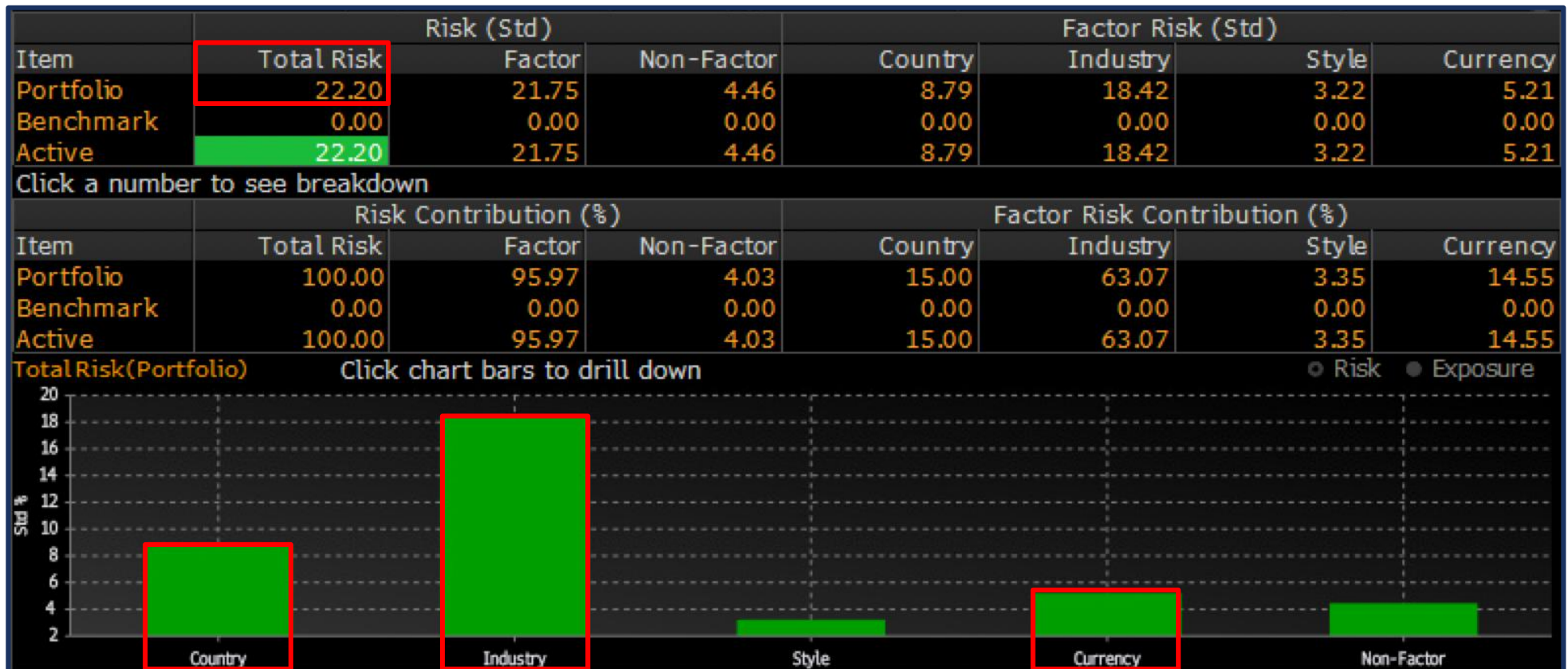
Portfolio	Initial Balance	Final Balance	CAGR	Stdev	Best Year	Worst Year	Max. Drawdown	Sharpe Ratio	Sortino Ratio	US Mkt Correlation
Portfolio 1	\$10,000	\$28,061	7.33%	8.66%	20.48%	-21.08%	-31.42%	0.72	1.06	0.99
Portfolio 2	\$10,000	\$28,213	7.37%	7.64%	20.52%	-16.65%	-24.72%	0.81	1.24	0.94



Source: Portfolio Visualizer. Data accessed on July 19, 2019.

BLOOMBERG PROJECTS GDX TO HAVE A TOTAL PORTFOLIO RISK OF 22.20%

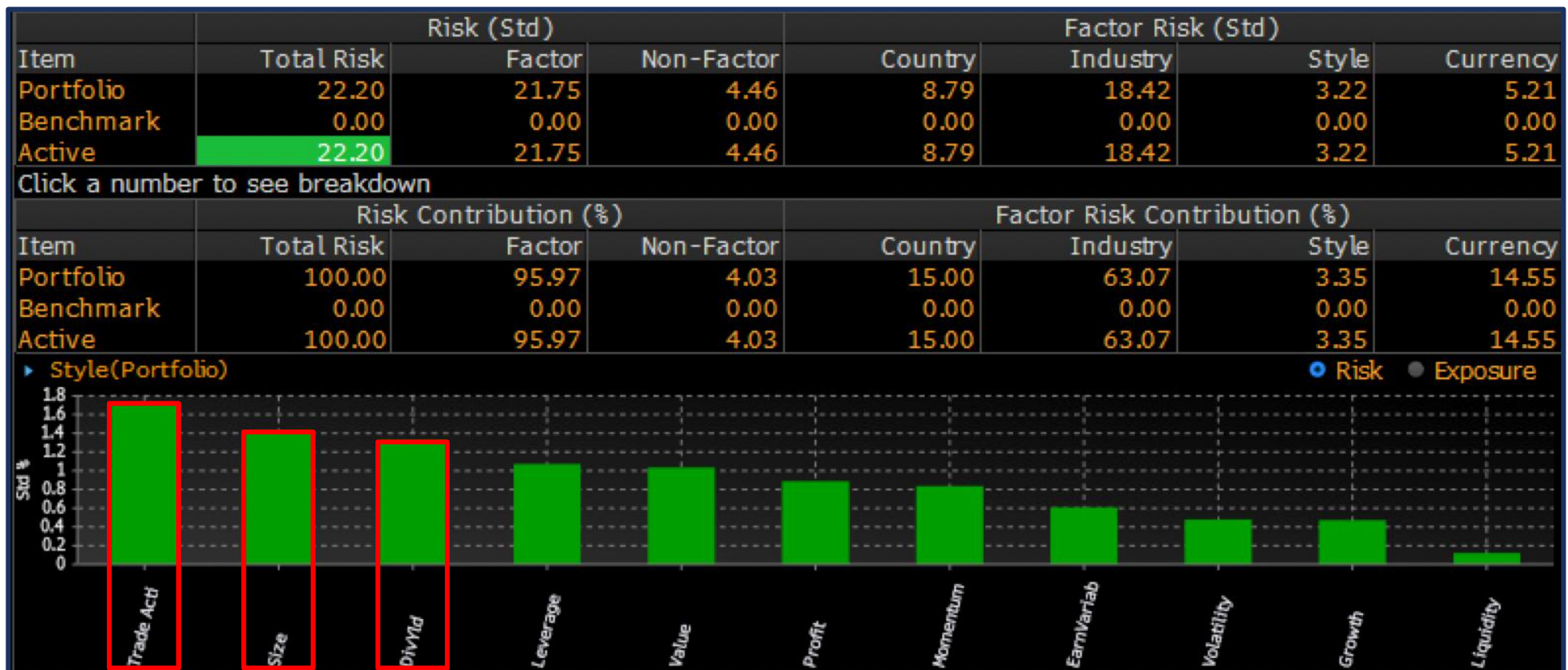
GDX: Total Risk



Source: Bloomberg. Data accessed on July 19, 2019.

GDX'S GREATEST STYLE FACTOR RISKS COME FROM TRADE ACTIVITY, SIZE, & DIVIDEND YIELDS

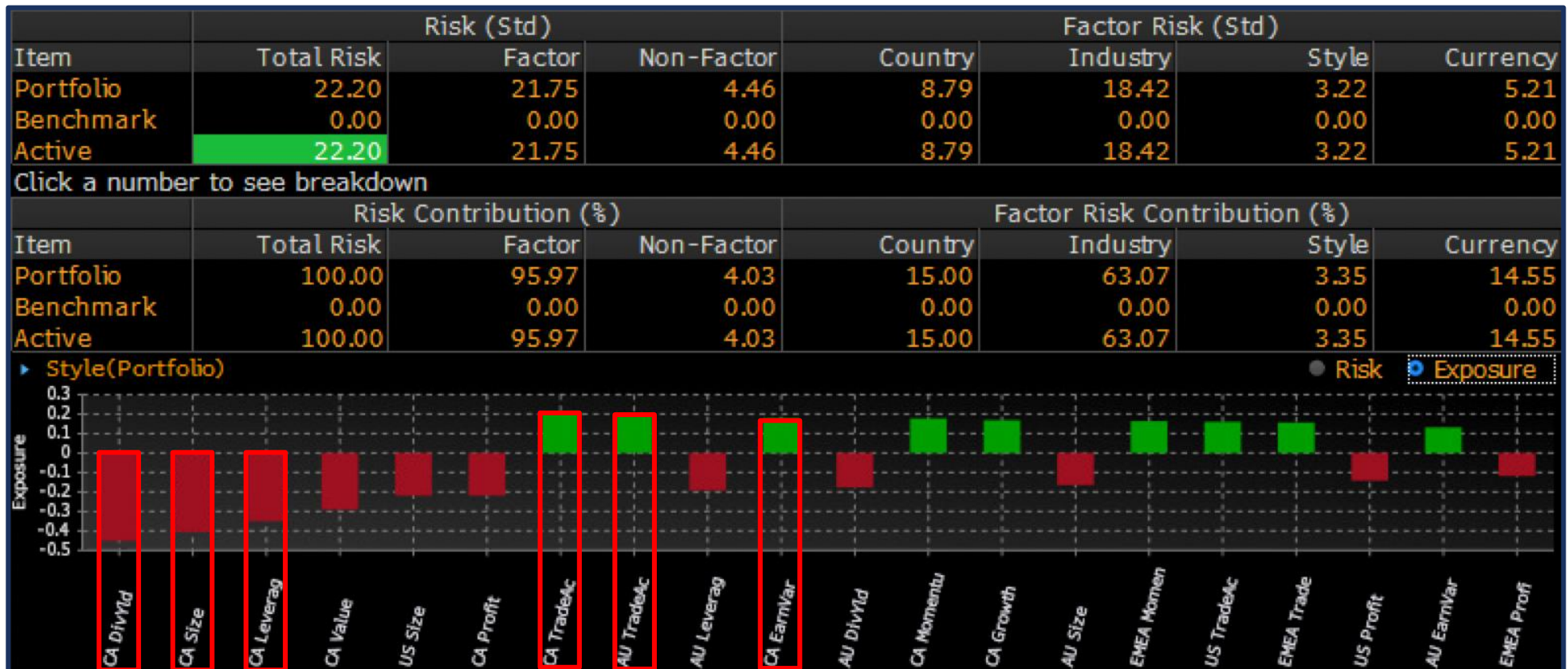
GDX: Style Factor Risks



Source: Bloomberg. Data accessed on July 19, 2019.

GDX IS UNDER EXPOSED TO CA DIVIDENDS, CA SIZE, & CA LEVERAGE AND OVER EXPOSED TO CA TRADE ACTIVITY, AU TRADE ACTIVITY, & CA EARNINGS

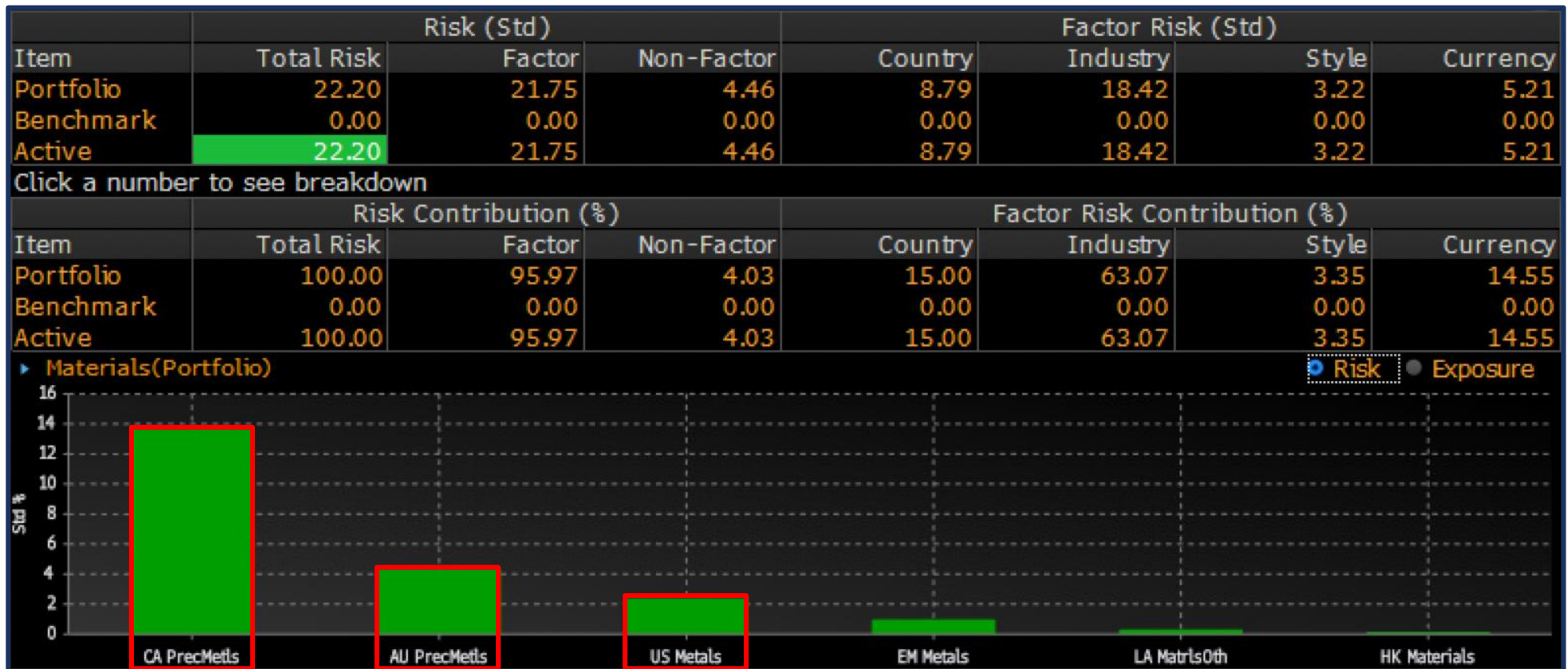
GDX: Style Factor Exposures



Source: Bloomberg. Data accessed on July 19, 2019.

GDX'S GREATEST INDUSTRY FACTOR RISKS COME FROM CA PRECIOUS METALS, AU PRECIOUS METALS, & US METALS

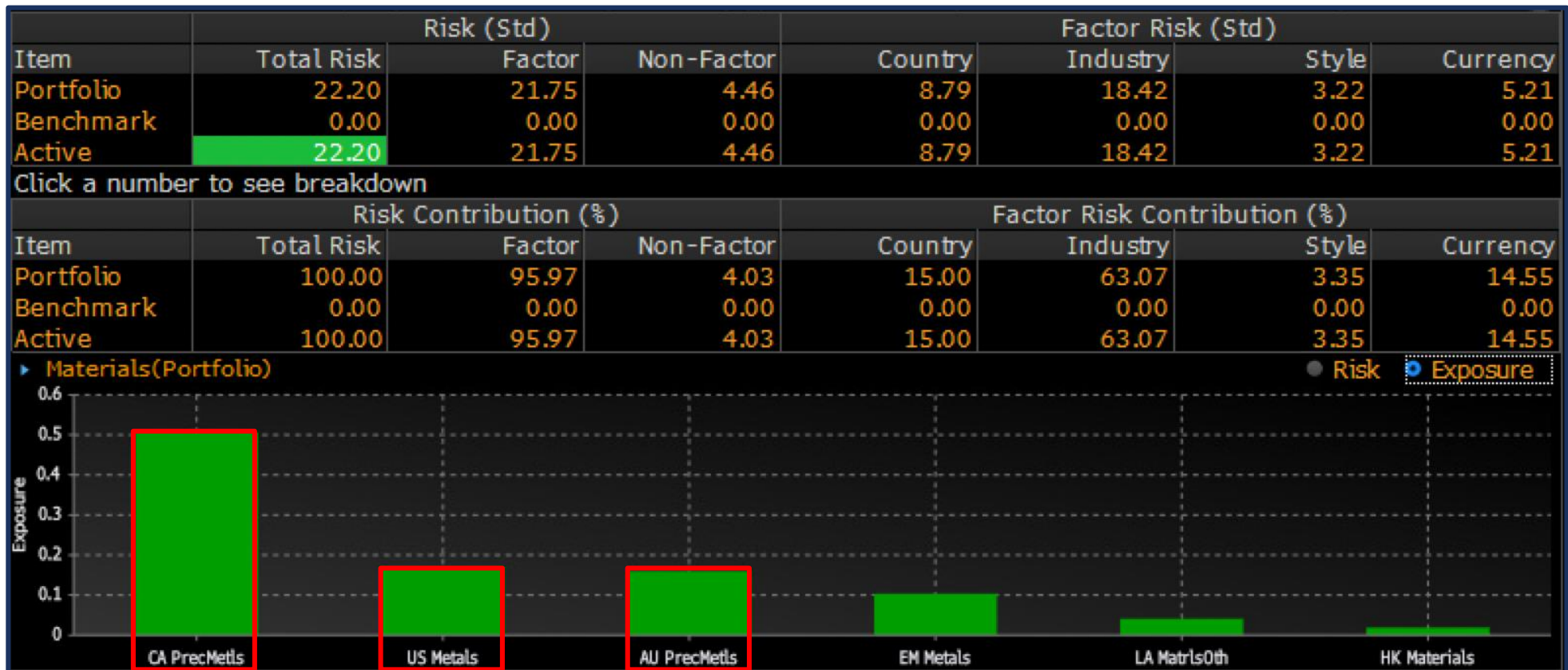
GDX: Industry Factor Risks (Materials)



Source: Bloomberg. Data accessed on July 19, 2019.

GDX'S GREATEST INDUSTRY FACTOR EXPOSURES COME FROM CA PRECIOUS METALS, US METALS, & AU PRECIOUS METALS

GDX: Industry Factor Exposures (Materials)



Source: Bloomberg. Data accessed on July 19, 2019.

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