



## ASTORIA'S INVESTMENT COMMITTEE ETF INSIGHTS

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# GLOBAL GROWTH SLOWDOWN + DOWNSIDE RISK FROM TRADE = MORE DEFENSIVE POSITIONING ACROSS STOCKS AND BONDS

## Executive Summary

- Increased concerns about **global growth slowing** and **downtside risks from trade** resulted in **deteriorating macro-economic conditions** in the first half of 2019. As a result of the prevailing financial conditions, the U.S. Federal Reserve has **signaled** it is open to **cutting interest rates** to stimulate growth and sustain the current economic expansion.
- The S&P 500 index produced a return of **17.35%** in the first half of 2019, its **best first half since 1997**. In our view, the current year to date index returns in the U.S. are unlikely to continue at this rapid pace.
- We continue to **advocate a globally diversified, multi-factor, multi-asset ETF**. Moreover, we strongly believe sticking with a long-term investing plan will increase the probability of accomplishing one's financial goals.

## U.S. Federal Reserve

- At its June meeting, the U.S. Federal Reserve Chairman, Jerome Powell, announced that the committee would **keep** the U.S. federal funds rate target range **steady** at **2.25-2.50%**. However, the Federal Reserve provided a **strong indication** that it is open to **cutting interest rates** in order to sustain the current economic expansion.
- A significant number of the committee members now favor an interest rate cut of 50bps before year end. Seven members now see 50bps of rate cuts in 2019, one sees a 25bps rate cut, and eight members see interest rates on hold. That's a **significant shift** from the March FOMC meeting where eleven members saw rates on hold this year.
- In our view, the Federal Reserve is **reacting to a weaker global growth environment**, rising uncertainty about trade policy, and negative sentiment about the global economic outlook.

# THERE IS NO CLEAR PATH TOWARDS A COMPREHENSIVE TRADE RESOLUTION

## Yield Curve

- The **inversion of the U.S. yield curve** is a topic that the financial media continues to caution followers. Historically, a negative yield curve implies investors expect future short-term rates to be lower as the Federal Reserve eases policy in response to a potential recession. According to J.P. Morgan Research, **7** out of the **8** U.S. yield curve inversions **since 1960** were followed by a recession.
- While the media has been focusing on the 3-month Treasury bill vs. 10-year Treasury inverted yield curve, not all parts of the U.S. interest rate yield curve are inverted. For instance, the 2-year vs. 10-year spread **remains positive** at **24.82bps** as of June 28, 2019. In fact, the 2-year vs. 10-year spread has historically been more of a bellwether for predicting economic recessions and has been **steadily steepening** since the 4th quarter of 2018.
- According to J.P. Morgan Research, the number of months between the 2-year vs. 10-year inversion and the subsequent recession has increased (**17 months**) for the prior 3 yield curve inversions compared to the prior four inversions (**9 months**). Moreover, J.P. Morgan's Research group notes that there was a **22-month lag** between the time the yield curve inverted in 2008 and the subsequent recession.
- The NY Federal Reserve Bank maintains a Recession Probability Index for the **next 12 months** ahead. As of May 31, 2019, the NY Federal Reserve's Recession Probability Index for 2020 stands at **29.62%**.

## Tariffs

- The G20 summit took place on June 28, 2019. The U.S. administration announced that it will **hold off** on 25% tariffs on the remaining US\$300 billion U.S. imports from China. China announced that it would continue to purchase agricultural products from the U.S. Moreover, both countries announced it will roll back some non-tariff barriers such as restrictions on high-tech exports by U.S. companies.
- The bad news is that uncertainty remains as there is no clear path towards a comprehensive resolution. From Astoria's perch, we believe that lingering uncertainty will continue to provide an overhang on the global economic outlook and trade and will lead a drag on global growth in the second half of 2019 and into 2020.



# ECONOMIC DATA CONTINUES TO GET WORSE

## Economic Data, Valuations, and Portfolio Construction

- Global economic data has **deteriorated in 2019**. The J.P. Morgan Global Manufacturing Purchase Managers Index, which is a measure of economic health for the manufacturing and service sector, **has steadily declined since early 2018**. A slowdown in various economies globally along with trade concerns have been the key drivers behind the weakness in manufacturing data.
- The U.S. economy **isn't immune** to the global growth slowdown. The Atlanta Fed GDPNow Forecast Model is **1.50%** as of June 28, 2019. On August 1, 2018, this model was forecasting GDP to be **4.95%**.
- Meanwhile, Morgan Stanley's Business Conditions Index recently had its **largest one-month decline** since 2002 and is **near its 2008 Great Financial Crisis level**.
- U.S. stock valuations are **neither cheap nor expensive**. According to FactSet Research Systems, the S&P 500 Index forward P/E ratio is **16.6x** as of June 28, 2019 and is slightly above the 5-year average (**16.5x**) and the 10-year average (**14.8x**).
- From a long only ETF factor perspective, **Quality, Size, and Momentum** have outperformed the most thus far in 2019.

## International Equities

- On the back of the U.S. Federal Reserve's more accommodative stance in the 1st quarter, International Developed and Emerging Markets equities posted **strong returns** in the 1st half of 2019. The Shanghai Stock Exchange Composite Index (China) **increased by 20.96%** (in CNY terms), the Euro STOXX 50 Index (Europe) **rose by 19.81%** (in Euro terms), the MSCI Emerging Markets Index **was up 11.06%** (in USD terms), and the Nikkei 225 Index (Japan) **increased by 7.53%** (in Japanese Yen terms).
- The Bloomberg Dollar Spot Index (BBDXY) **decreased by 0.75%** in the 1st half of 2019.
- According to [ETFAction.com](http://ETFAction.com), the iShares MSCI ACWI ex U.S. ETF (**ACWX**) currently has a P/E ratio of **13.60x** based on 2019 analyst estimates. This is significantly lower than the SPDR S&P 500 ETF (**SPY**) which has a P/E ratio of **17.47x** based on 2019 analyst estimates.
- In our view, Emerging Market equities (China in particular) **remain attractive** for long term investors as they are trading at a **substantial valuation discount** compared to the U.S. stock market. According to [ETFAction.com](http://ETFAction.com), the iShares MSCI China ETF (MCHI) is projected to have **15.00%** EPS growth based on 2019 analyst estimates whereas the S&P 500 ETF (SPY) is projected to have only **3.75%**.

# ASTORIA'S ETF POSITIONING ACROSS FIXED INCOME

## Fixed Income

- U.S. interest rates **declined across various maturities** in the 1st quarter. Yields on the **2-year, 10-year, and 30-year** U.S. Treasury Bonds were **1.75%, 2.01%, and 2.53% respectively** as of June 28, 2019. Given that the **U.S. yield curve is relatively flat**, we believe ultra-short duration bond funds are providing investors with a more attractive opportunity compared to longer duration bond funds.
- The Bloomberg Barclays U.S. Aggregate Bond Index is up **6.11%** as of the end of the 1st half. We continue to prefer owning **higher quality U.S. bonds** across our portfolios. We maintain an **overweight position** in **U.S. municipal bonds** and **U.S. mortgage-backed securities**, both of which are highly rated. In fact, between **75-80%** of our fixed income bonds across both Astoria's strategic and dynamic ETF portfolios are rated either **AAA or AA**.

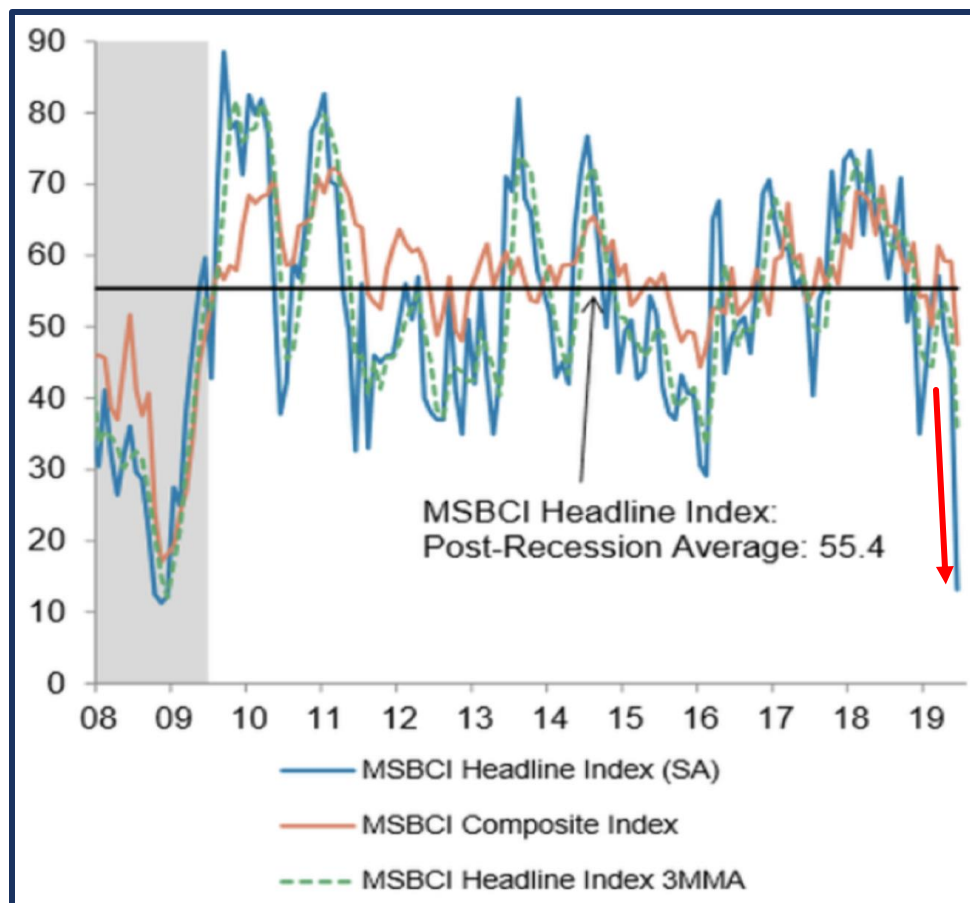
## Commodities

- Along with stocks and bonds, commodities posted **positive returns** in the 1st half. The Bloomberg Commodity Index **increased by 3.83%** although, once again, there were notable divergences across the complex. The United States Oil ETF (USO) **increased by 24.64%**, Invesco the SPDR Gold ETF (GLD) **rose by 9.86%**, DB Base Metals ETF (DBB) **climbed by 0.71%**, and the Invesco DB Agriculture ETF (DBA) **declined by 2.18%**.
- We do not think **rising inflation is a major risk for the economy**. This is in fact a key reason why the U.S. Federal Reserve stopped raising interest rates. We are closely monitoring the New York Federal Reserve Underlying Inflation Gauge Index which has **steadily declined since June 2018**.
- We have written that **gold was attractive** in a multi-asset portfolio as it serves as a **valuable diversifier** during times of stress. As a reminder, our gold allocation helped soften our portfolio volatility in the 4th quarter of 2018 as gold **rose 7.53%** while the S&P 500 Index **declined 13.52%**.

## Market Timing

- Our long-standing view is that **timing the market top and bottom is extremely difficult** and that investors are incentivized to **stay fully invested**. The past 3 quarters have proved our point. The S&P 500 Index declined **13.52%** in the 4th quarter of 2018 and then rallied **17.35%** in the 1st half of 2019. We continue to advocate **not only to stay fully invested** but to **maintain a globally diversified, multi-asset portfolio**.

# MORGAN STANLEY'S BUSINESS CONDITIONS INDEX IS NEAR IT'S 2008 GREAT FINANCIAL CRISIS LEVEL



Source: Morgan Stanley Research.

There has been a significant drop in Morgan Stanley's Business Conditions Index.

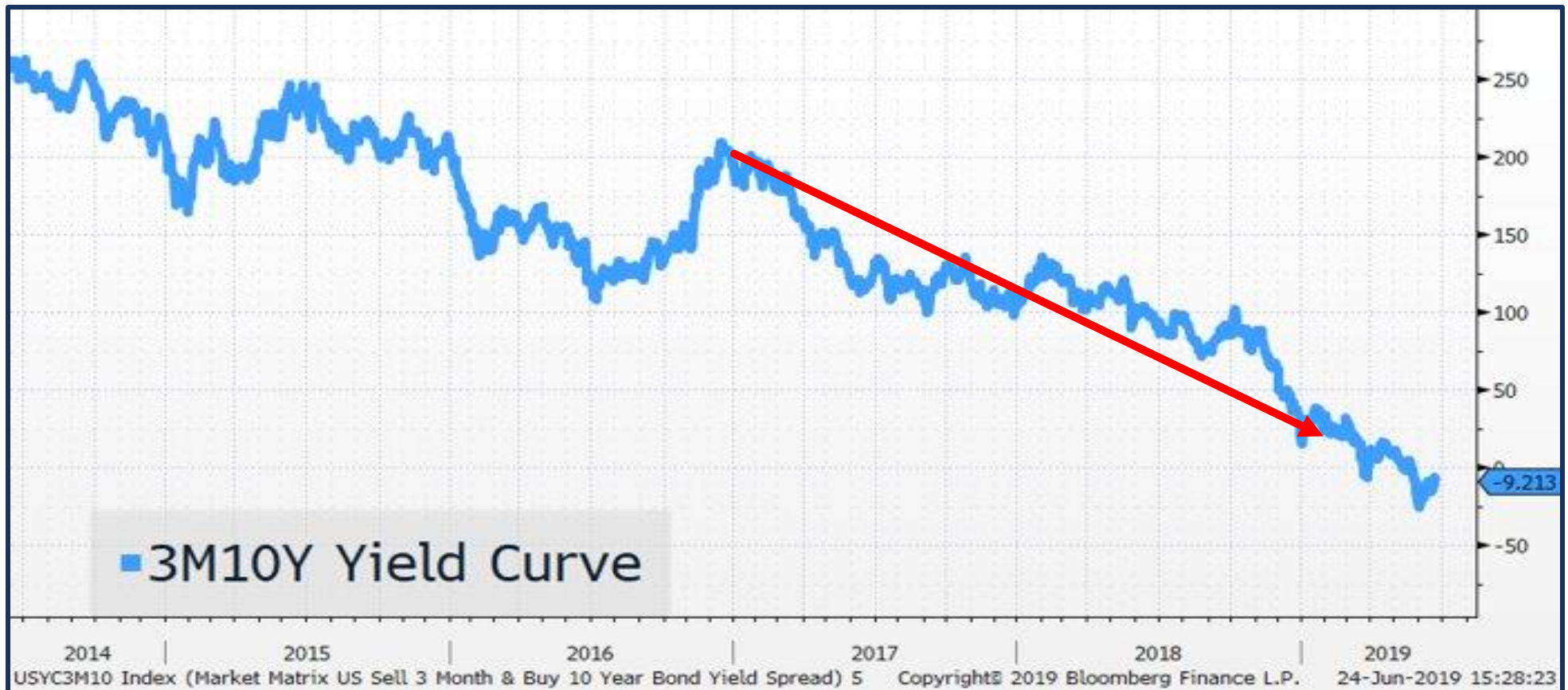
# CHINA'S 5 YEAR CDS LEVEL IS CURRENTLY AMONGST THE LOWEST IN ALL OF EMERGING MARKETS

Is China as risky as market pundits claim?

Country	Weight in MSCI EM Index	5 Yr CDS Price	
Argentina	0.35%	9.71%	MOST RISK
Turkey	0.50%	4.14%	
Greece	0.31%	2.72%	
South Africa	5.78%	1.75%	
Brazil	7.66%	1.52%	
UAE	0.71%	1.39%	
Russia	4.09%	1.17%	
Mexico	2.58%	1.14%	
Indonesia	2.13%	1.02%	
Saudi Arabia	1.44%	0.83%	
Hungary	0.29%	0.77%	
India	9.07%	0.76%	
Poland	1.12%	0.64%	
Qatar	0.18%	0.63%	
Malaysia	2.14%	0.57%	
Peru	0.41%	0.53%	LEAST RISK
Philippines	1.14%	0.51%	
<b>China</b>	<b>27.91%</b>	<b>0.44%</b>	
Czech Republic	0.16%	0.42%	
Chile	0.93%	0.40%	
Thailand	3.01%	0.36%	
Korea	12.44%	0.33%	
Hong Kong	3.88%	0.31%	
Taiwan	10.97%	N/A	
Other Nations	0.80%	N/A	
<b>Total</b>	<b>100.00%</b>		
<b>Median</b>		<b>0.76%</b>	

Source: WisdomTree,  
<https://mobile.twitter.com/JeffWeniger/status/1144344707599929345/photo/1>

HISTORICALLY, AN INVERTED YIELD CURVE HAS PRECEDED A RECESSION. THE 3-MONTH 10YEAR CURVE HAS INVERTED.



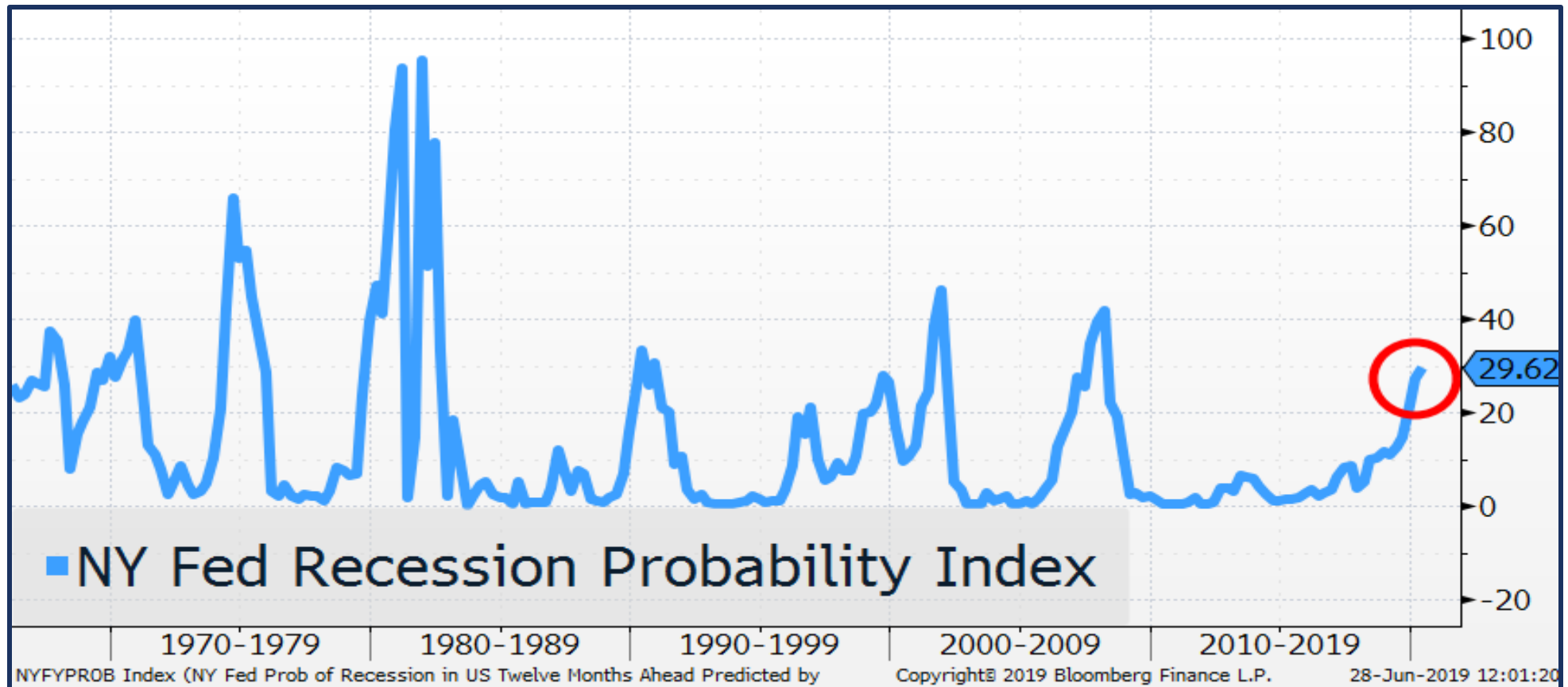
Source: Bloomberg, Astoria Portfolio Advisors. Data accessed on June 28, 2019.

WHILE THE 3-MONTH 10 YEAR CURVE HAS INVERTED, THE 2 YEAR 10 YEAR HAS BEEN STEEPENING.



Source: Bloomberg, Astoria Portfolio Advisors. Data accessed on June 28, 2019.

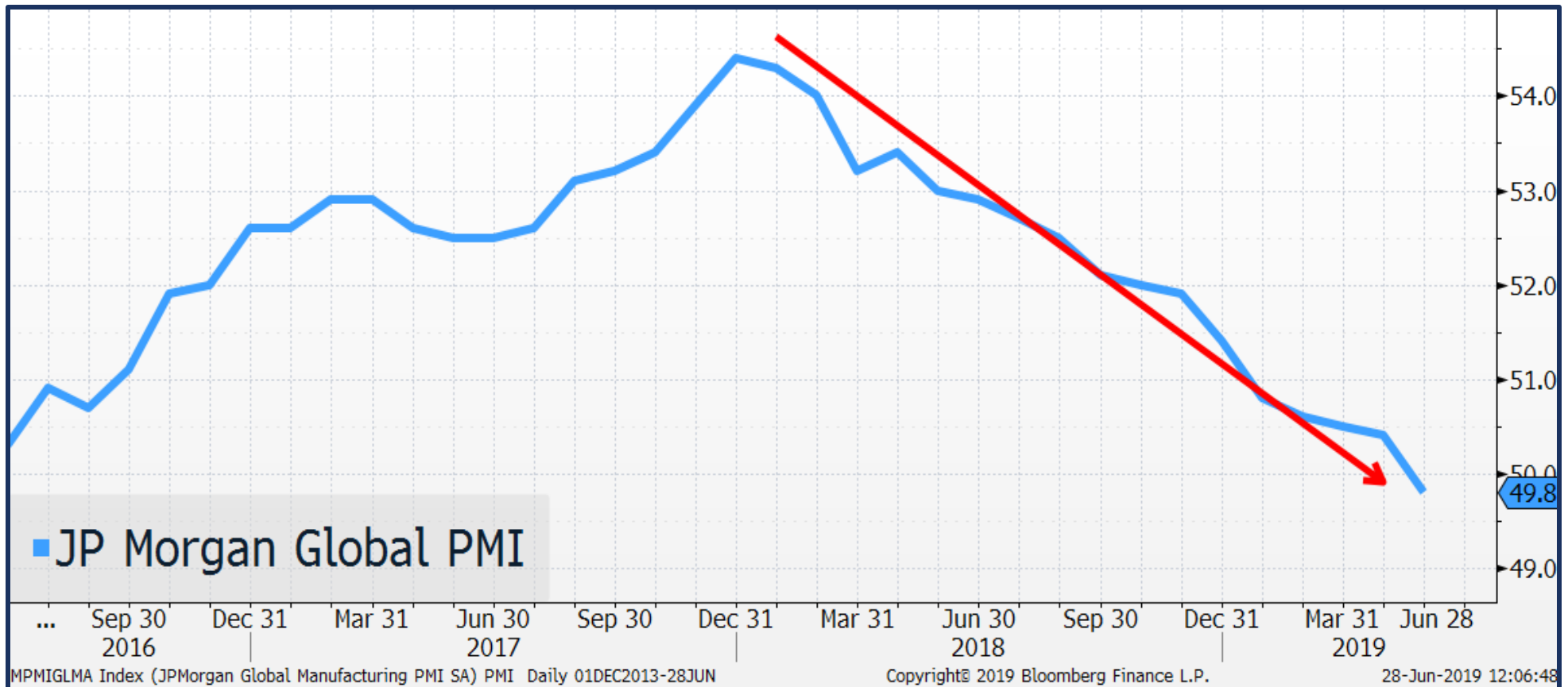
THE NY FEDERAL RESERVE BANK MAINTAINS A RECESSION PROBABILITY INDEX FOR THE NEXT 12 MONTHS AHEAD. CURRENTLY, THE NY FEDERAL RESERVE'S RECESSION PROBABILITY INDEX FOR 2020 STANDS AT 29%.



Source: Bloomberg, Astoria Portfolio Advisors. Data accessed on June 28, 2019.



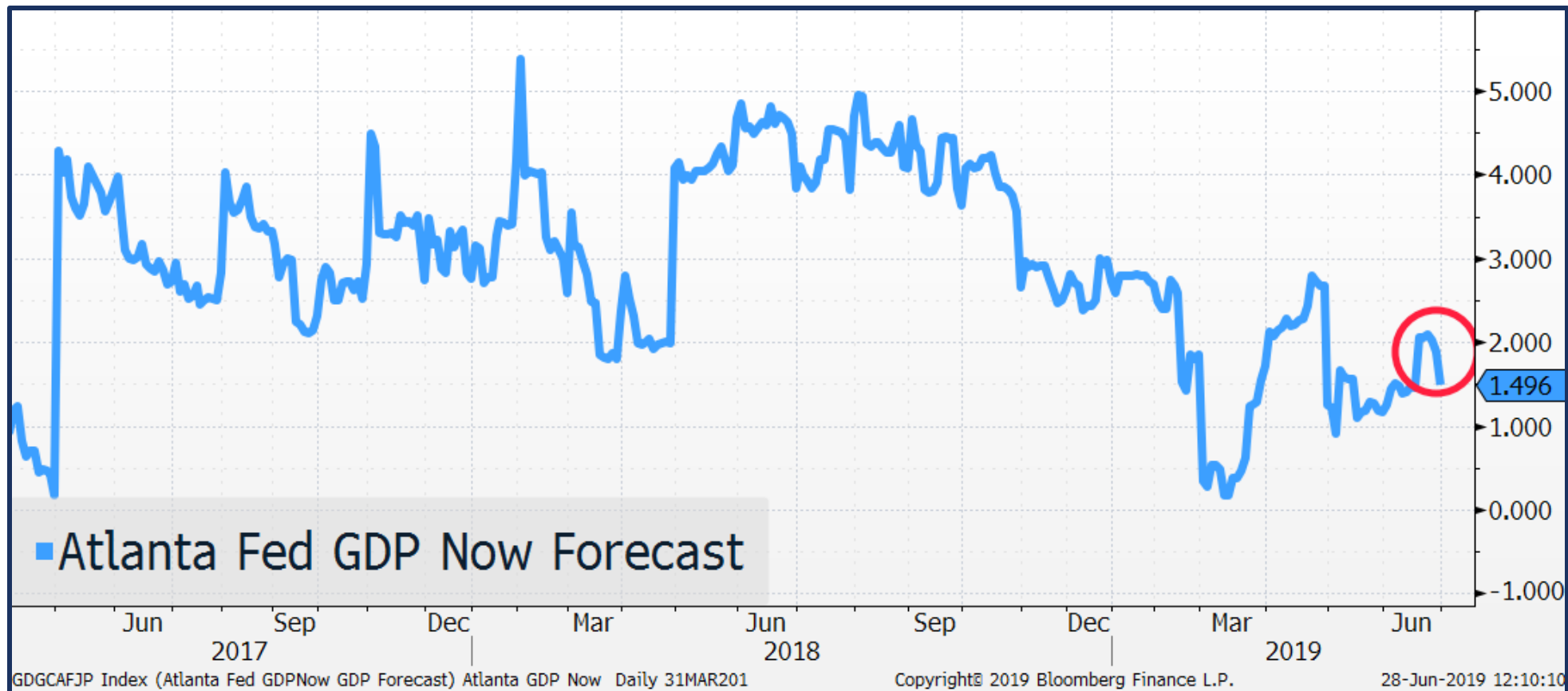
GLOBAL ECONOMIC DATA REMAINS WEAK IN 2019. THE J.P. MORGAN GLOBAL MANUFACTURING PURCHASE MANAGERS INDEX, WHICH IS A MEASURE OF ECONOMIC HEALTH FOR THE MANUFACTURING AND SERVICE SECTOR, HAS STEADILY DECLINED SINCE EARLY 2018.



Source: Bloomberg, Astoria Portfolio Advisors. Data accessed on June 28, 2019.

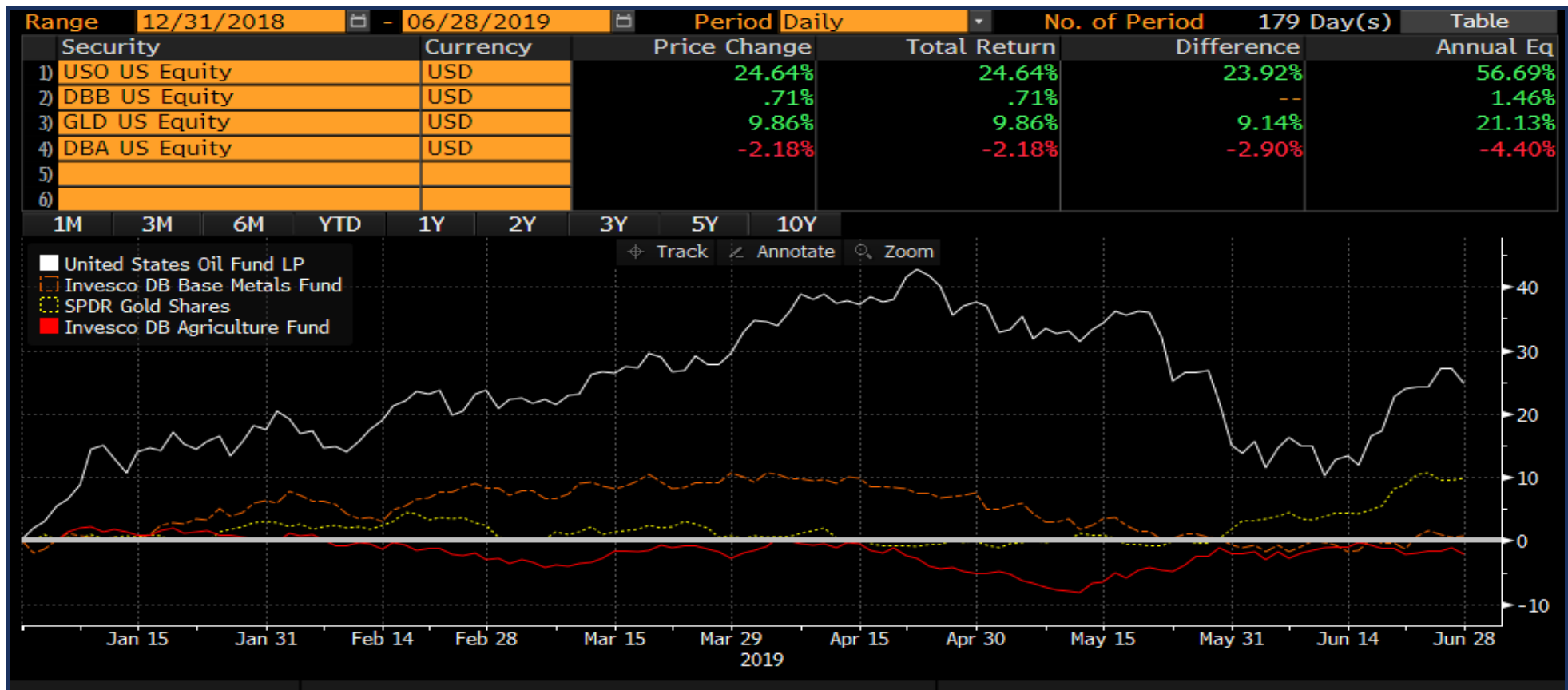


THE ATLANTA FED GDPNOW FORECAST IS CURRENTLY 1.49%, WHICH IS UP FROM A CYCLE LOW OF 0.17% ON MAR 11, 2019.



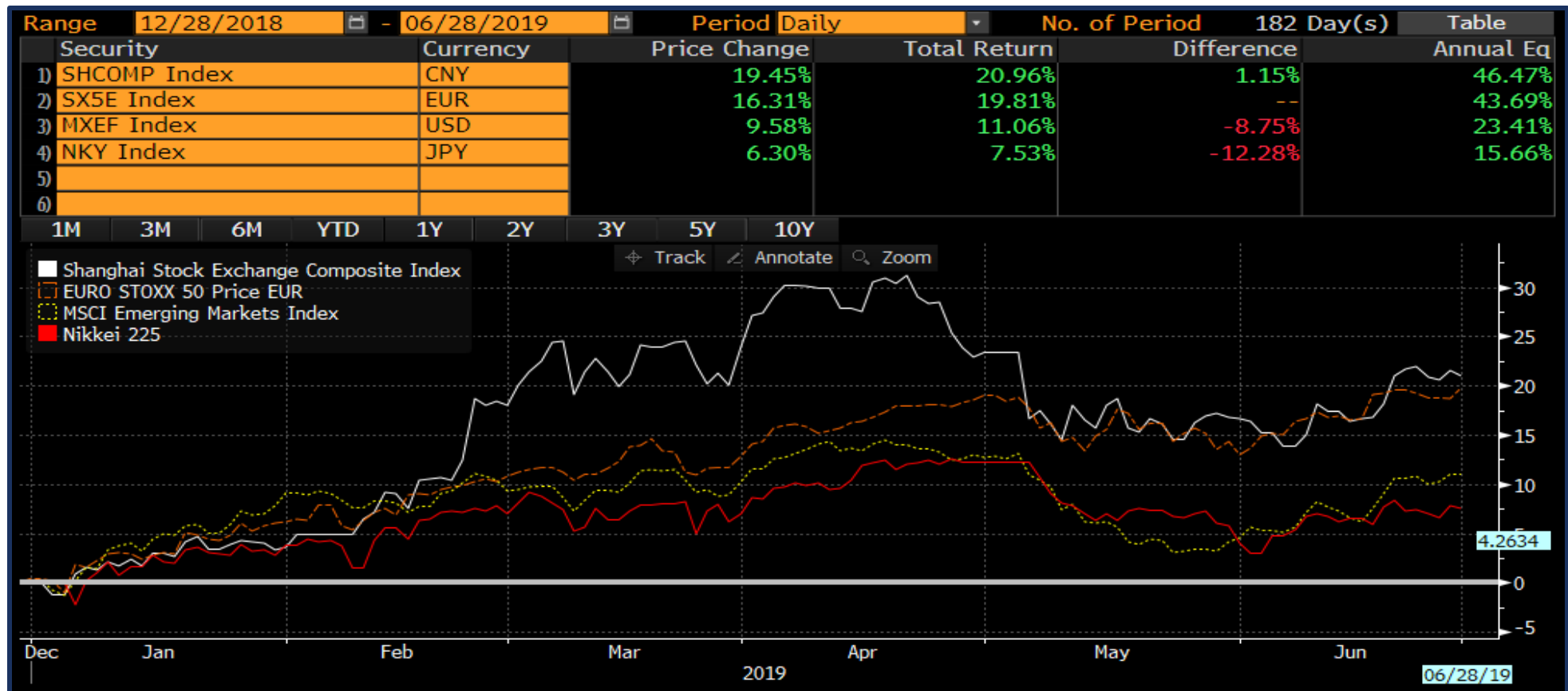
Source: Atlanta Federal Reserve Bank, Bloomberg, Astoria Portfolio Advisors. Data accessed on June 28, 2019.

ALONG WITH STOCKS AND BONDS, COMMODITIES POSTED POSITIVE RETURNS IN THE 1<sup>ST</sup> HALF. THE BLOOMBERG COMMODITY INDEX INCREASED BY 3.83% ALTHOUGH, ONCE AGAIN, THERE WERE NOTABLE DIVERGENCES ACROSS THE COMPLEX. THE UNITED STATES OIL ETF (USO) INCREASED BY 24.64%, INVESCO THE SPDR GOLD ETF (GLD) ROSE BY 9.86%, DB BASE METALS ETF (DBB) CLIMBED BY 0.71%, AND THE INVESCO DB AGRICULTURE ETF (DBA) DECLINED BY 2.18%.



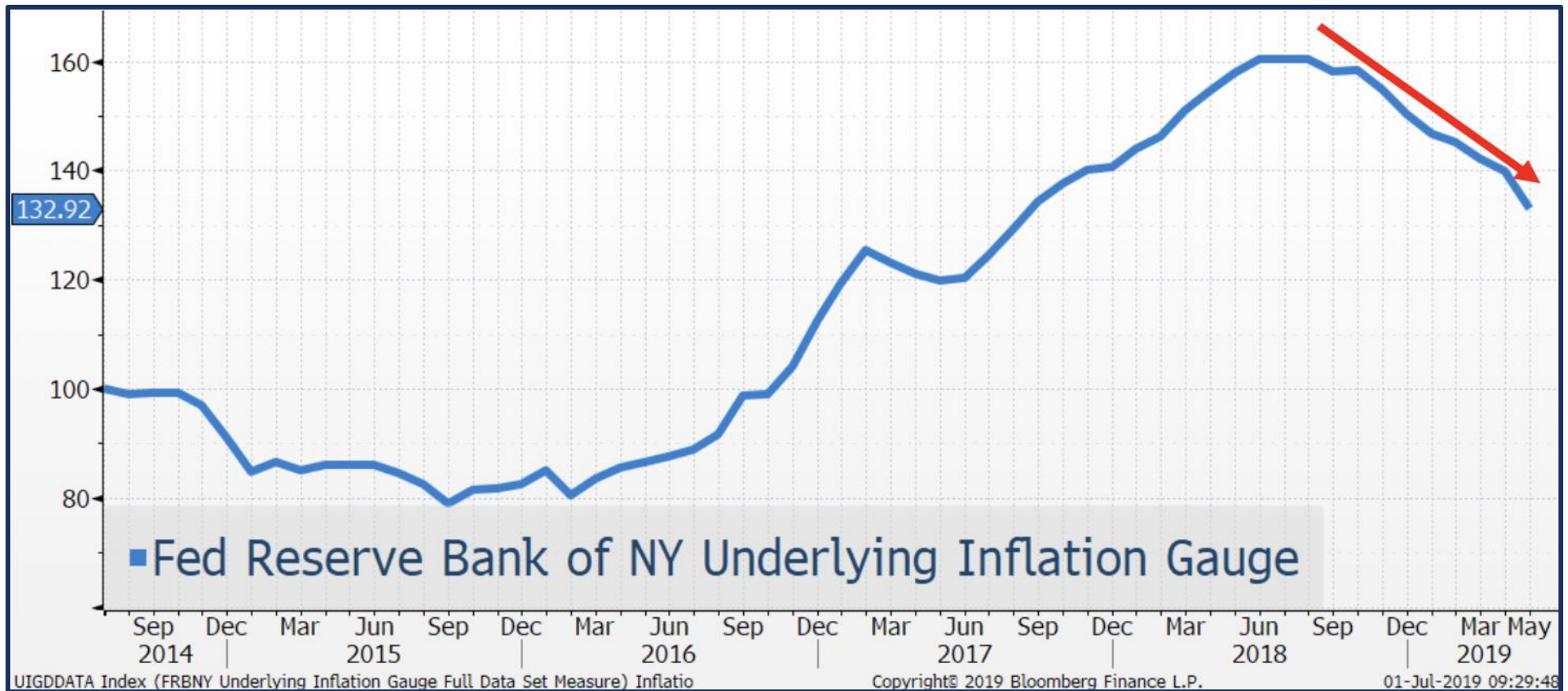
Source: Bloomberg, Astoria Portfolio Advisors. Data accessed on June 28, 2019.

ON THE BACK OF THE U.S. FEDERAL RESERVE'S MORE ACCOMMODATIVE STANCE IN THE 1<sup>ST</sup> QUARTER, INTERNATIONAL DEVELOPED AND EMERGING MARKETS EQUITIES POSTED STRONG RETURNS IN THE 1<sup>ST</sup> HALF OF 2019. THE SHANGHAI STOCK EXCHANGE COMPOSITE INDEX (CHINA) INCREASED BY 20.96% (IN CNY TERMS), THE EURO STOXX 50 INDEX (EUROPE) ROSE BY 19.81% (IN EURO TERMS), THE MSCI EMERGING MARKETS INDEX WAS UP 11.06% (IN USD TERMS), AND THE NIKKEI 225 INDEX (JAPAN) INCREASED BY 7.53% (IN JAPANESE YEN TERMS).



Source: Bloomberg, Astoria Portfolio Advisors. Data accessed on June 28, 2019.

# THE NEWYORK FEDERAL RESERVE UNDERLYING INFLATION GAUGE INDEX WHICH HAS STEADILY DECLINED SINCE JUNE 2018.



Source: Federal Reserve Bank of NY, Bloomberg, Astoria Portfolio Advisors. Data accessed on June 28, 2019.

# FROM A LONG ONLY ETF FACTOR PERSPECTIVE, QUALITY AND MOMENTUM HAVE OUTPERFORMED THE MOST THUS FAR.

Factor (as of 2019-06-26)

Updated June 27, 2019		Live Daily*	1 Wk Return	YTD Return	1 YR Return	52 Wk Low	50 DMA 52 Wk Price Meter	200 DMA	52 Wk High	% Above (Below) 50 DMA	% Above (Below) 200 DMA
Momentum	<a href="#">MTUM</a>	0.34%	-1.28%	18.02%	8.39%	\$92.8			\$120.45	2.52%	6.76%
Value	<a href="#">VLUE</a>	0.80%	0.43%	10.75%	-2.52%	\$68.64			\$89.31	0.02%	-1.20%
Size	<a href="#">SIZE</a>	0.74%	-0.84%	17.11%	7.72%	\$72.15			\$91.35	0.47%	4.37%
Quality	<a href="#">QUAL</a>	0.33%	-0.46%	18.73%	10.03%	\$71.91			\$92.22	0.93%	5.50%
Dividend	<a href="#">DVY</a>	0.58%	-0.10%	10.80%	2.84%	\$85.2			\$102.32	-0.30%	1.06%
Low Volatility	<a href="#">USMV</a>	0.38%	-1.23%	17.34%	17.00%	\$49.77			\$62.47	1.79%	7.51%

Source: ETFAction.com, Astoria Portfolio Advisors. Data accessed on June 27, 2019.

# APPENDIX I

## PORTFOLIO CONSTRUCTION SUMMARY STATISTICS

# WE ARE UW EQUITIES AND BONDS AND OW ALTERNATIVES ACROSS THE MAJORITY OF OUR ETF MODELS.

## Asset Allocation Bands

Model	Bonds	Cash	US Stocks	Non-US Stocks	Other
US Thematic Equity	0%	9%	87%	4%	0%
Benchmark (100 IWV)	0%	0%	99%	1%	0%
Retirement Asset Allocation Strategy	19%	6%	40%	35%	0%
Benchmark (80/20 ACWI AGG)	19%	1%	44%	36%	0%
Dynamic Aggressive	16%	6%	52%	21%	5%
Benchmark (80/20 ACWI AGG)	19%	1%	44%	36%	0%
MARS US	20%	9%	64%	3%	5%
Benchmark (70/30 IWV AGG)	29%	1%	69%	1%	0%
Dynamic Growth	24%	6%	47%	17%	5%
Benchmark (70/30 ACWI AGG)	29%	1%	38%	31%	0%
Multi Asset Risk Strategy	24%	9%	48%	14%	5%
Benchmark (60/40 ACWI AGG)	39%	1%	33%	27%	0%
Dynamic Growth & Income	34%	6%	41%	14%	5%
Benchmark (60/40 ACWI AGG)	39%	1%	33%	27%	0%
Dynamic Conservative	53%	7%	25%	10%	5%
Benchmark (40/60 ACWI AGG)	58%	2%	22%	18%	0%
Risk Managed Dynamic Income	75%	5%	11%	6%	3%
Benchmark (20/80 ACWI AGG)	78%	2%	11%	9%	0%

Source: Astoria Portfolio Advisors, Bloomberg. ETF holdings and weights as of June 17, 2019.



# IN ASTORIA'S DYNAMIC ETF MODELS, THE PE RATIOS ARE SLIGHTLY CHEAPER THAN THE BENCHMARK ACROSS ALL MODELS EXCEPT THE MULTI-ASSET RISK STRATEGY (MARS).

## Valuations & Profitability

Model	Price/Earnings	Price/Book	Price/Sales	Net margin	ROE	ROA
US Thematic Equity	17.3	2.8	2.0	18%	27%	9%
Benchmark (100 IWV)	18.7	2.8	1.9	16%	23%	8%
Retirement Asset Allocation Strategy	15.1	2.0	1.3	16%	21%	8%
Benchmark (80/20 ACWI AGG)	16.3	2.1	1.6	17%	21%	8%
Dynamic Aggressive	15.6	2.8	1.7	18%	28%	10%
Benchmark (80/20 ACWI AGG)	16.3	2.1	1.6	17%	21%	8%
MARS US	18.6	3.3	1.9	16%	29%	10%
Benchmark (70/30 IWV AGG)	18.7	2.8	1.9	16%	23%	8%
Dynamic Growth	15.9	2.9	1.7	18%	29%	10%
Benchmark (70/30 ACWI AGG)	16.3	2.1	1.6	17%	21%	8%
Multi Asset Risk Strategy	16.5	2.6	1.7	17%	26%	9%
Benchmark (60/40 ACWI AGG)	16.3	2.1	1.6	17%	21%	8%
Dynamic Growth & Income	16.1	3.0	1.7	18%	29%	10%
Benchmark (60/40 ACWI AGG)	16.3	2.1	1.6	17%	21%	8%
Dynamic Conservative	16.0	2.8	1.6	17%	27%	10%
Benchmark (40/60 ACWI AGG)	16.3	2.1	1.6	17%	21%	8%
Risk Managed Dynamic Income	16.1	3.1	1.7	17%	30%	11%
Benchmark (20/80 ACWI AGG)	16.3	2.1	1.6	17%	21%	8%

Source: Astoria Portfolio Advisors, Portfolio Visualizer, Bloomberg. Fundamental data as of June 30, 2019.



# ASTORIA'S DYNAMIC ETF MODELS ARE UW AAA CREDITS AND UW BBB CREDITS. WE HAVE A SIGNIFICANT OW TO AA CREDITS.

Credit Quality Breakdown

Model	AAA	AA	A	BBB	BB	B	Below B	NR/NA
US Thematic Equity Benchmark (100 IWV)								
Retirement Asset Allocation Strategy Benchmark (80/20 ACWI AGG)	72%	3%	10%	14%	0%	0%	0%	0%
Dynamic Aggressive Benchmark (80/20 ACWI AGG)	73%	3%	10%	14%	0%	0%	0%	0%
MARS US Benchmark (70/30 IWV AGG)	57%	23%	9%	11%	0%	0%	0%	0%
Dynamic Growth Benchmark (70/30 ACWI AGG)	66%	16%	9%	9%	0%	0%	0%	0%
Multi Asset Risk Strategy Benchmark (60/40 ACWI AGG)	58%	22%	9%	11%	0%	0%	0%	0%
Dynamic Growth & Income Benchmark (60/40 ACWI AGG)	66%	15%	9%	9%	0%	0%	0%	0%
Dynamic Conservative Benchmark (40/60 ACWI AGG)	67%	13%	10%	10%	0%	0%	0%	0%
Risk Managed Dynamic Income Benchmark (20/80 ACWI AGG)	67%	15%	9%	9%	0%	0%	0%	0%

Source: Astoria Portfolio Advisors, Portfolio Visualizer, Bloomberg. Fundamental data as of June 30, 2019.

ASTORIA IS UW DURATION ACROSS ALL ITS MODELS EXCEPT THE RETIREMENT ASSET ALLOCATION STRATEGY. THE UW RANGES FROM 0.1 TO 0.7.

### Interest Rate Risk

Model	Average effective maturity	Average effective duration	Average weighted coupon
US Thematic Equity Benchmark (100 IWV)			
Retirement Asset Allocation Strategy	7.88	5.70	3.35%
Benchmark (80/20 ACWI AGG)	7.93	5.51	3.36%
Dynamic Aggressive	6.29	5.22	3.95%
Benchmark (80/20 ACWI AGG)	7.93	5.51	3.36%
MARS US	5.85	4.78	3.81%
Benchmark (70/30 IWV AGG)	7.93	5.51	3.36%
Dynamic Growth	6.61	5.31	4.05%
Benchmark (70/30 ACWI AGG)	7.93	5.51	3.36%
Multi Asset Risk Strategy	6.00	4.89	3.81%
Benchmark (60/40 ACWI AGG)	7.93	5.51	3.36%
Dynamic Growth & Income	6.69	5.34	3.96%
Benchmark (60/40 ACWI AGG)	7.93	5.51	3.36%
Dynamic Conservative	6.86	5.39	3.84%
Benchmark (40/60 ACWI AGG)	7.93	5.51	3.36%
Risk Managed Dynamic Income	6.71	5.24	3.98%
Benchmark (20/80 ACWI AGG)	7.93	5.51	3.36%

Source: Astoria Portfolio Advisors, Portfolio Visualizer, Bloomberg. Fundamental data as of June 30, 2019.

# THE 20-30 YEAR PART OF THE CURVE IS WHERE THE GREATEST DIFFERENCE LIES

## Effective Maturity

Model	1-3 years	3-5 years	5-7 years	7-10 years	10-15 years	15-20 years	20-30 years	>30 years
US Thematic Equity Benchmark (100 IWV)								
Retirement Asset Allocation Strategy Benchmark (80/20 ACWI AGG)	19%	15%	11%	9%	4%	4%	36%	2%
Dynamic Aggressive Benchmark (80/20 ACWI AGG)	20%	16%	9%	10%	4%	3%	37%	1%
MARS US Benchmark (70/30 IWV AGG)	9%	8%	7%	8%	10%	8%	47%	2%
Dynamic Growth Benchmark (80/20 ACWI AGG)	20%	16%	9%	10%	4%	3%	37%	1%
MARS US Benchmark (70/30 IWV AGG)	17%	9%	7%	9%	9%	8%	40%	2%
Dynamic Growth Benchmark (70/30 ACWI AGG)	20%	16%	9%	10%	4%	3%	37%	1%
Dynamic Growth Benchmark (70/30 ACWI AGG)	9%	8%	6%	7%	8%	9%	50%	5%
Multi Asset Risk Strategy Benchmark (60/40 ACWI AGG)	20%	16%	9%	10%	4%	3%	37%	1%
Dynamic Growth & Income Benchmark (60/40 ACWI AGG)	16%	9%	7%	9%	9%	8%	41%	2%
Dynamic Growth & Income Benchmark (60/40 ACWI AGG)	10%	9%	7%	7%	8%	9%	48%	3%
Dynamic Conservative Benchmark (40/60 ACWI AGG)	20%	16%	9%	10%	4%	3%	37%	1%
Dynamic Conservative Benchmark (40/60 ACWI AGG)	12%	10%	7%	8%	7%	8%	46%	3%
Risk Managed Dynamic Income Benchmark (20/80 ACWI AGG)	20%	16%	9%	10%	4%	3%	37%	1%
Risk Managed Dynamic Income Benchmark (20/80 ACWI AGG)	10%	9%	6%	7%	8%	8%	49%	3%
Risk Managed Dynamic Income Benchmark (20/80 ACWI AGG)	20%	16%	9%	10%	4%	3%	37%	1%

Source: Astoria Portfolio Advisors, Portfolio Visualizer, Bloomberg. Fundamental data as of June 30, 2019.

# ASTORIA'S MODELS ARE MOST OW TO MUNICIPAL (26-39%) AND MOST UW TO GOVERNMENT (1-27%)

## Fixed Income Sectors

Model	Government	Municipal	Corporate	Securitized	Cash & Equivalents	Derivative
US Thematic Equity	0%	0%	0%	0%	0%	0%
Benchmark (100 IWV)	0%	0%	0%	0%	100%	0%
Retirement Asset Allocation Strategy	42%	0%	24%	28%	5%	0%
Benchmark (80/20 ACWI AGG)	43%	1%	24%	26%	6%	0%
Dynamic Aggressive	16%	31%	9%	41%	3%	0%
Benchmark (80/20 ACWI AGG)	43%	1%	24%	26%	6%	0%
MARS US	17%	29%	17%	33%	3%	0%
Benchmark (70/30 IWV AGG)	43%	1%	24%	26%	6%	0%
Dynamic Growth	17%	40%	10%	30%	3%	0%
Benchmark (70/30 ACWI AGG)	43%	1%	24%	26%	6%	0%
Multi Asset Risk Strategy	18%	28%	17%	34%	3%	0%
Benchmark (60/40 ACWI AGG)	43%	1%	24%	26%	6%	0%
Dynamic Growth & Income	19%	34%	11%	32%	3%	0%
Benchmark (60/40 ACWI AGG)	43%	1%	24%	26%	6%	0%
Dynamic Conservative	23%	27%	13%	33%	3%	0%
Benchmark (40/60 ACWI AGG)	43%	1%	24%	26%	6%	0%
Risk Managed Dynamic Income	19%	36%	11%	31%	4%	0%
Benchmark (20/80 ACWI AGG)	43%	1%	24%	26%	6%	0%

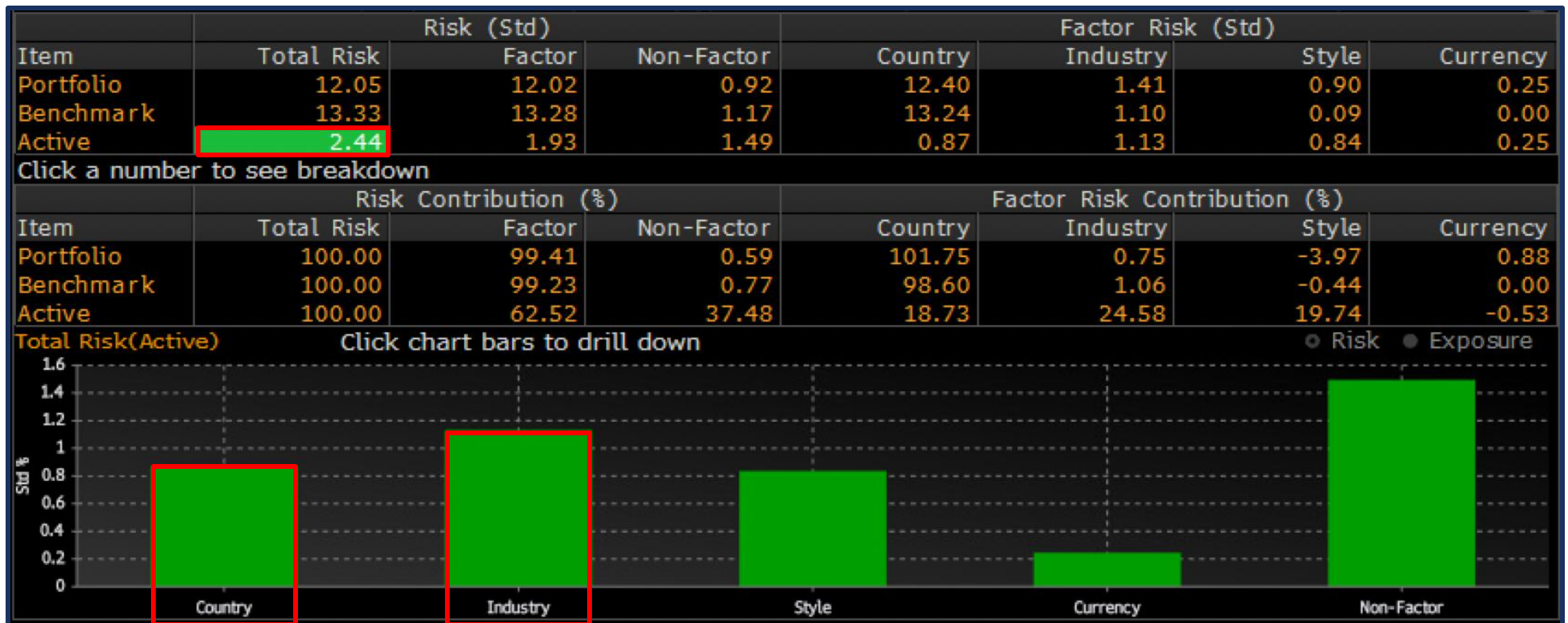
Source: Astoria Portfolio Advisors, Portfolio Visualizer, Bloomberg. Fundamental data as of June 30, 2019.

## APPENDIX 2

# PORTFOLIO RISK ANALYTICS

# BLOOMBERG PROJECTS A 2.44% TRACKING ERROR. THE BIGGEST DIVERSIFIABLE RISK IS DRIVEN BY INDUSTRY & COUNTRY RISK

US Thematic Equity Model vs. 100 IWV: Total Equity Risk

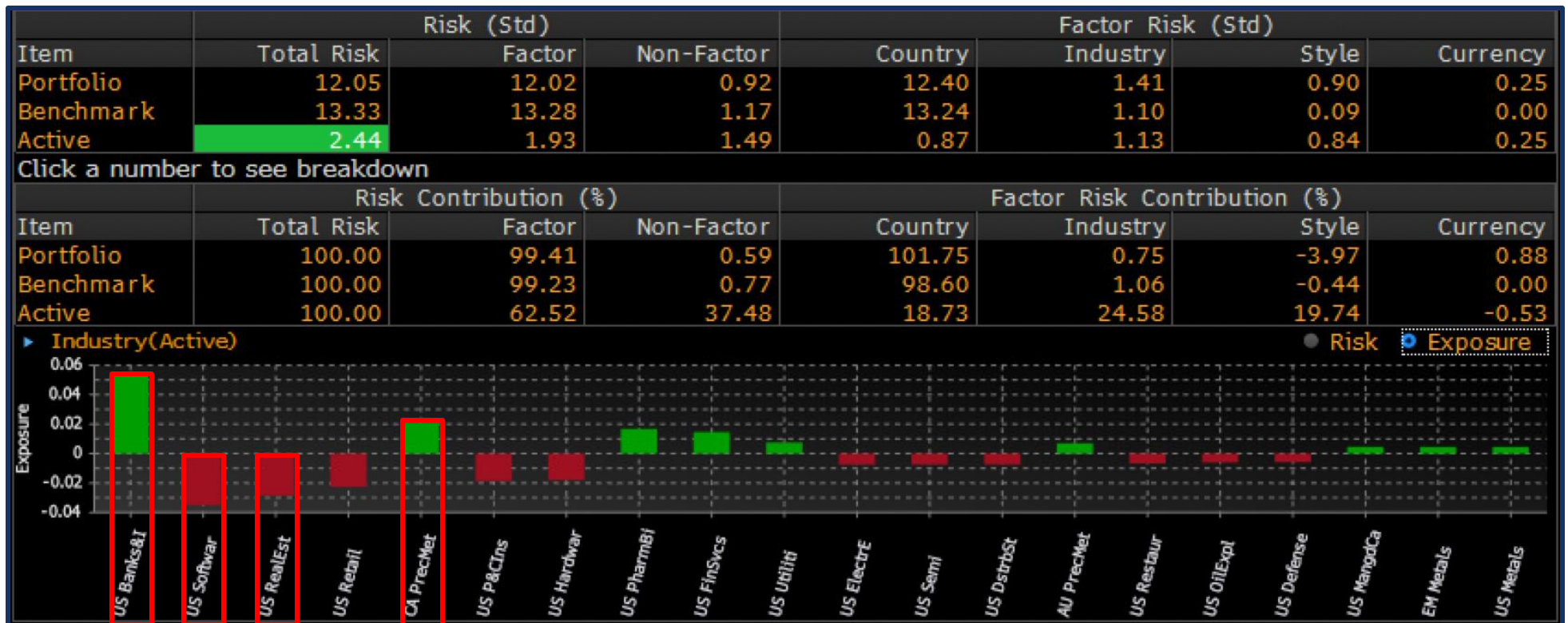


Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.



# THE MODEL IS UNDER EXPOSED TO US SOFTWARE & US REAL ESTATE AND OVER EXPOSED TO US BANKS & CA PRECIOUS METALS

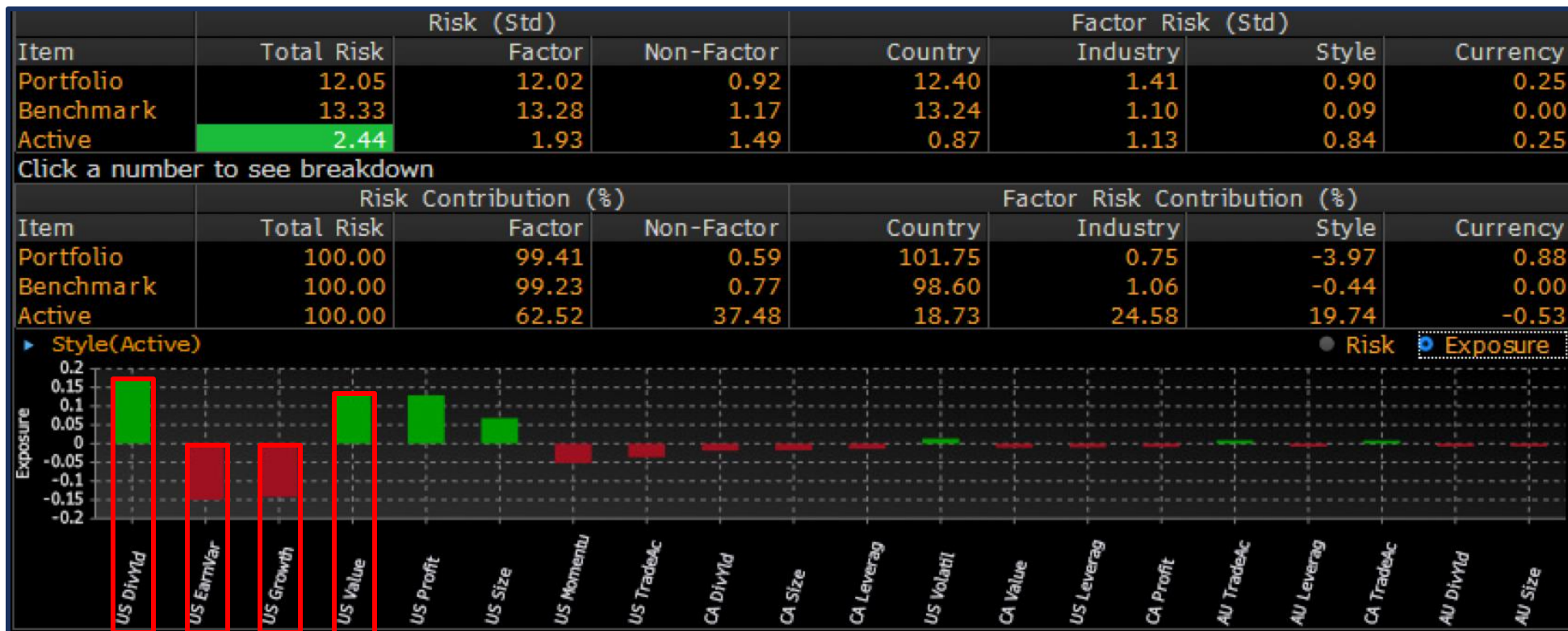
US Thematic Equity Model vs. 100 IWW: Industry Factor Exposures



Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.

# THE MODEL IS UNDER EXPOSED TO US EARNINGS & US GROWTH AND OVER EXPOSED TO US DIVIDENDS & US VALUE

US Thematic Equity Model vs. 100 IWW: Style Factor Exposures

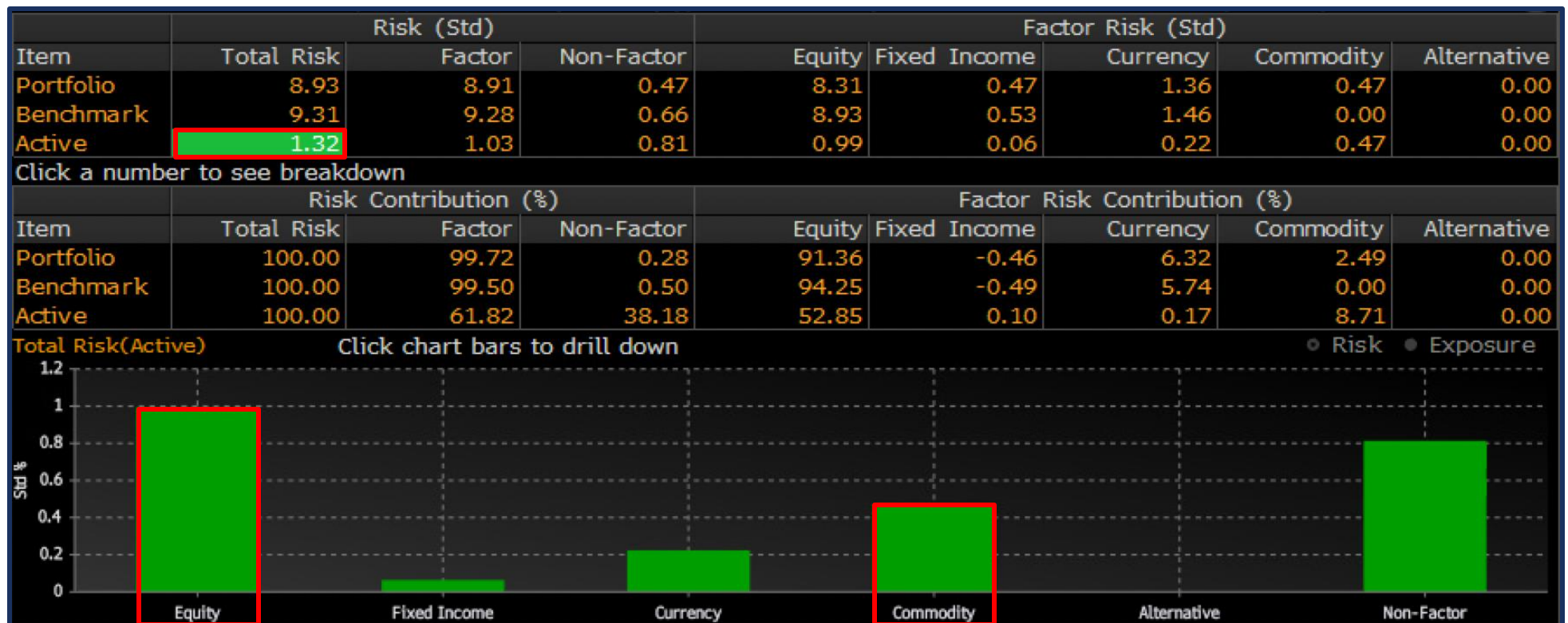


Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.



# BLOOMBERG PROJECTS A 1.32% TRACKING ERROR. THE BIGGEST DIVERSIFIABLE RISK IS DRIVEN BY EQUITY & COMMODITY RISK

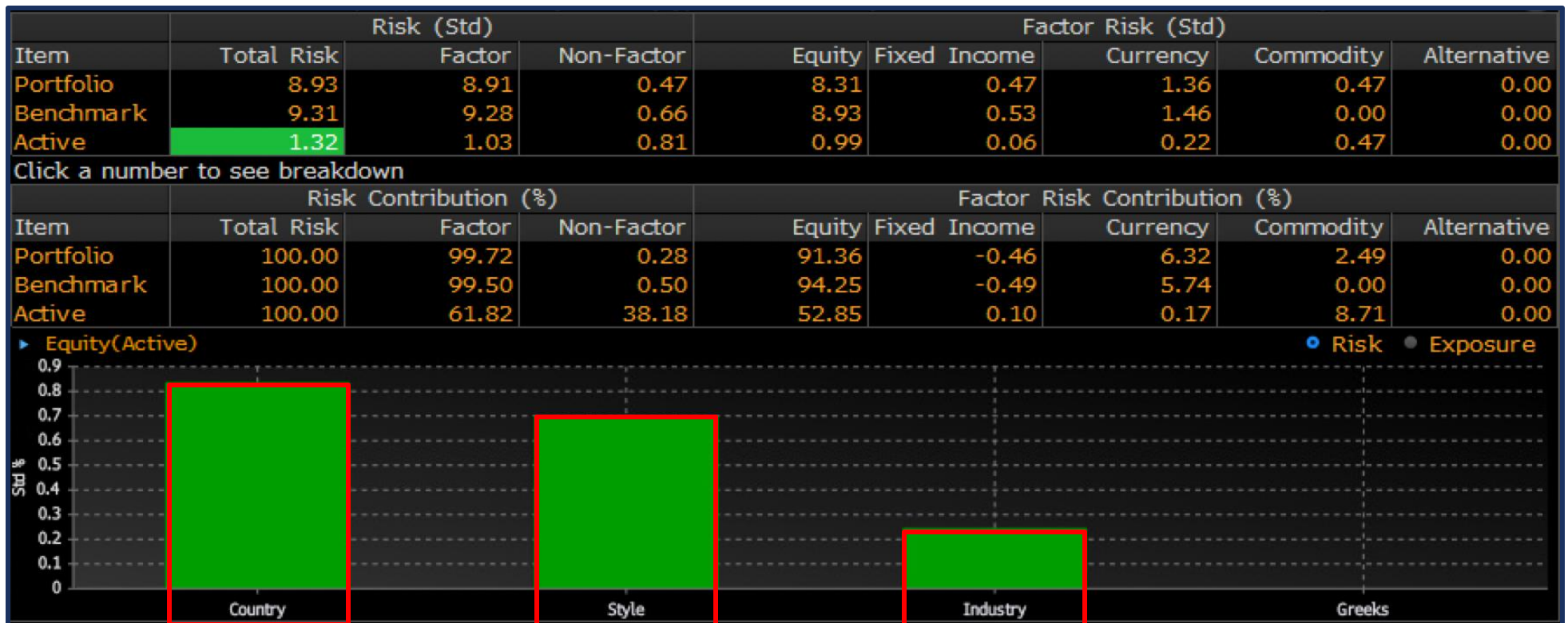
Retirement Asset Allocation Strategy (RAAS) vs. 80/20 ACWI/AGG: Total Risk



Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.

# COUNTRY, STYLE, & INDUSTRY ARE THE BIGGEST DRIVERS OF EQUITY RISK

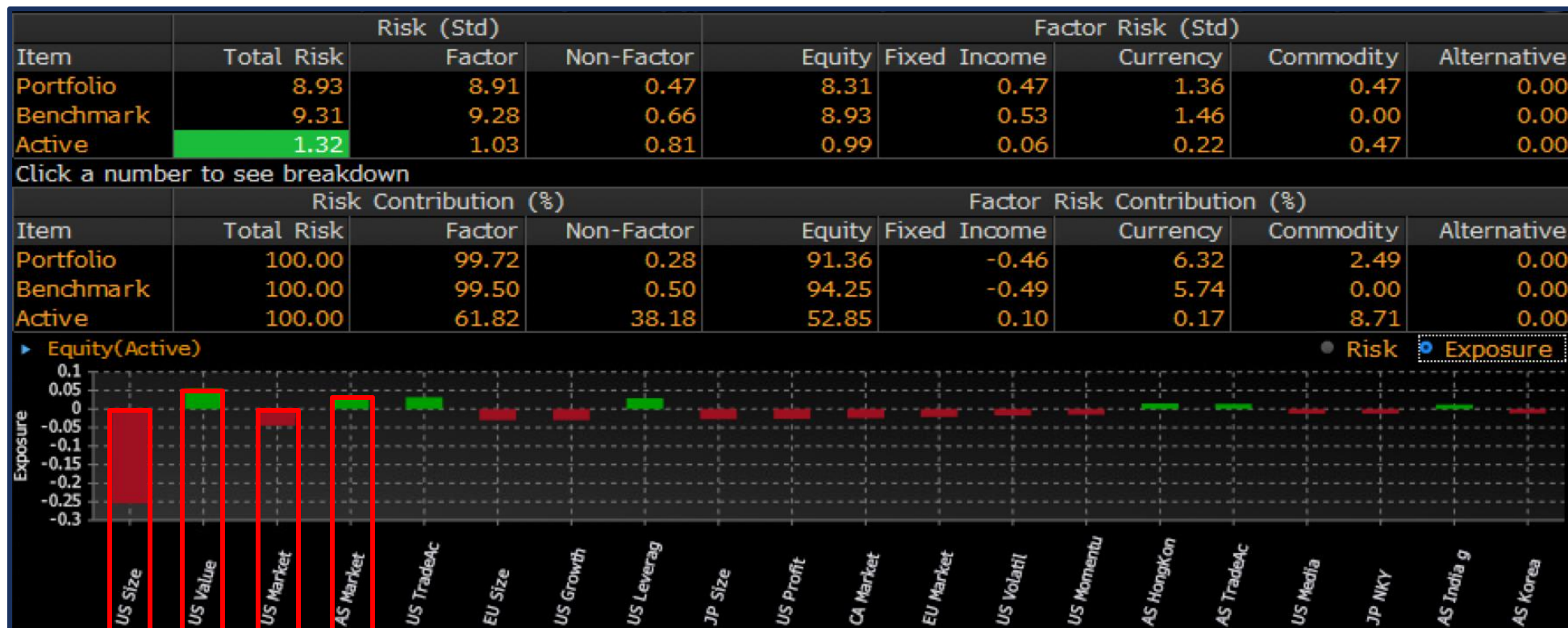
Retirement Asset Allocation Strategy (RAAS) vs. 80/20 ACWI/AGG: Equity Risk



Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.

# THE MODEL IS UNDER EXPOSED TO US SIZE & US MARKET AND OVER EXPOSED TO US VALUE & AS MARKET

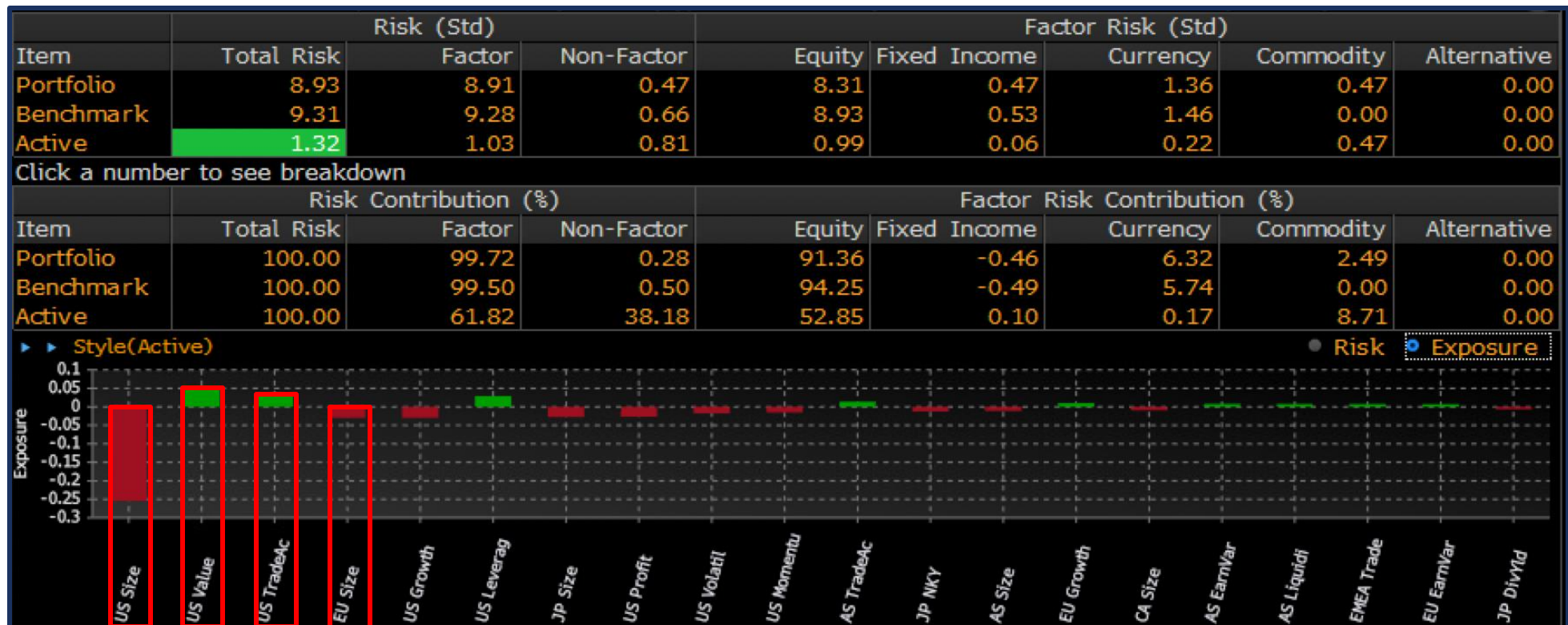
Retirement Asset Allocation Strategy (RAAS) vs. 80/20 ACWI/AGG: Equity Factor Exposures



Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.

# THE MODEL IS UNDER EXPOSED TO US SIZE & EU SIZE AND OVER EXPOSED TO US VALUE AND US TRADE ACTIVITY

Retirement Asset Allocation Strategy (RAAS) vs. 80/20 ACWI/AGG: Style Factor Exposures

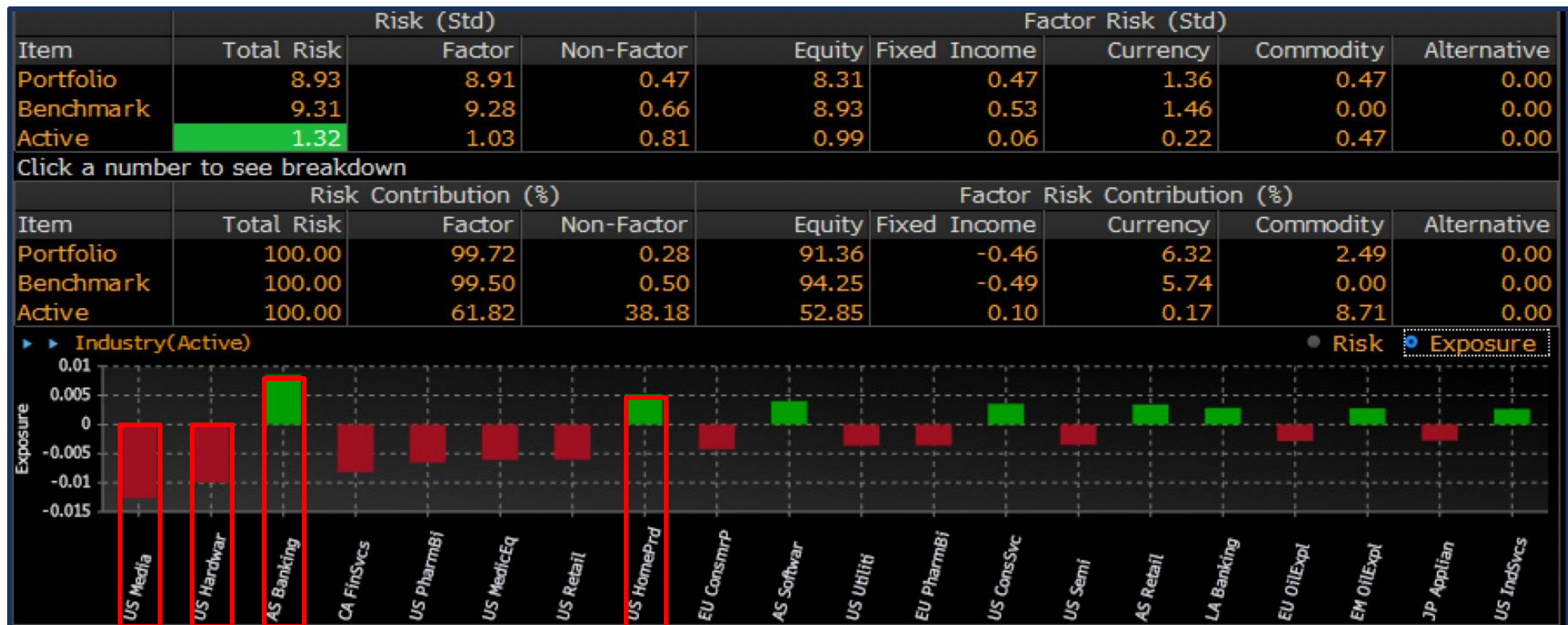


Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.



# THE MODEL IS UNDER EXPOSED TO US MEDIA & US HARDWARE AND OVER EXPOSED TO AS BANKS & US HOME PRODUCTS

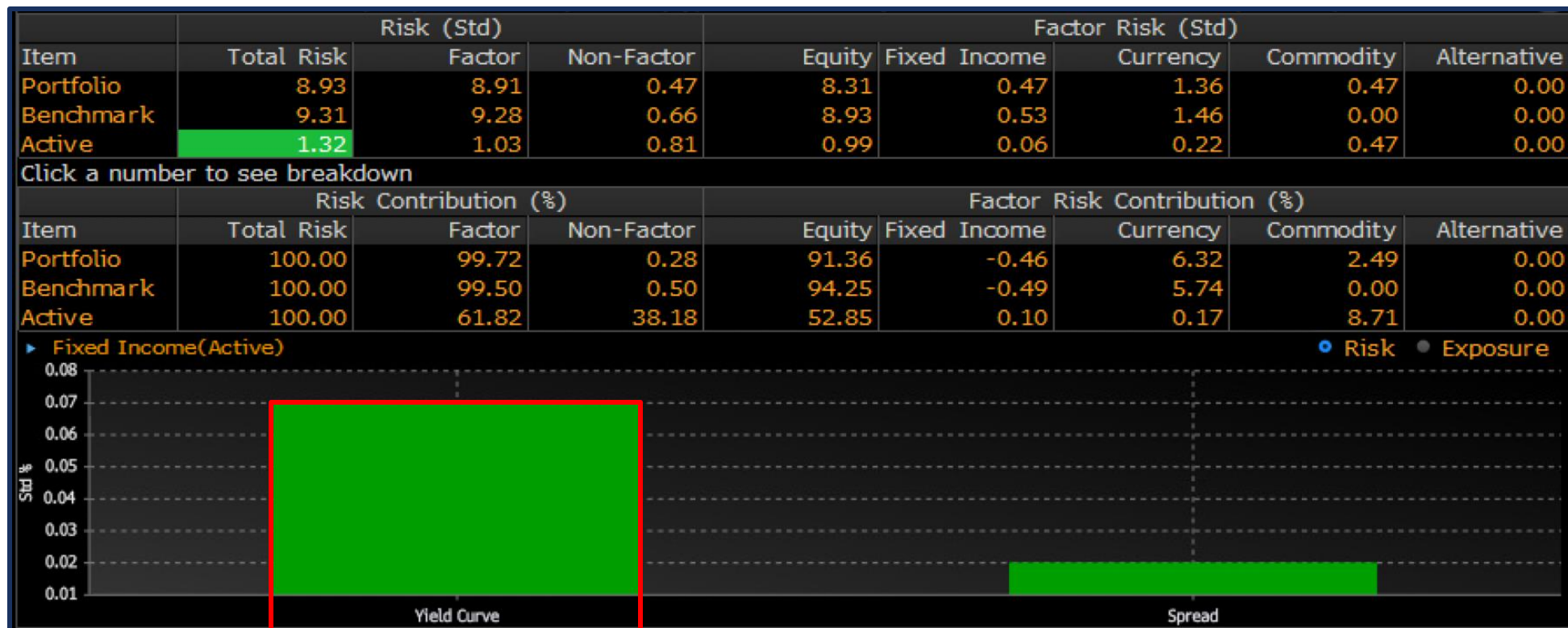
Retirement Asset Allocation Strategy (RAAS) vs. 80/20 ACWI/AGG: Industry Factor Exposures



Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.

# YIELD CURVE IS THE BIGGEST DRIVER OF FIXED INCOME RISK

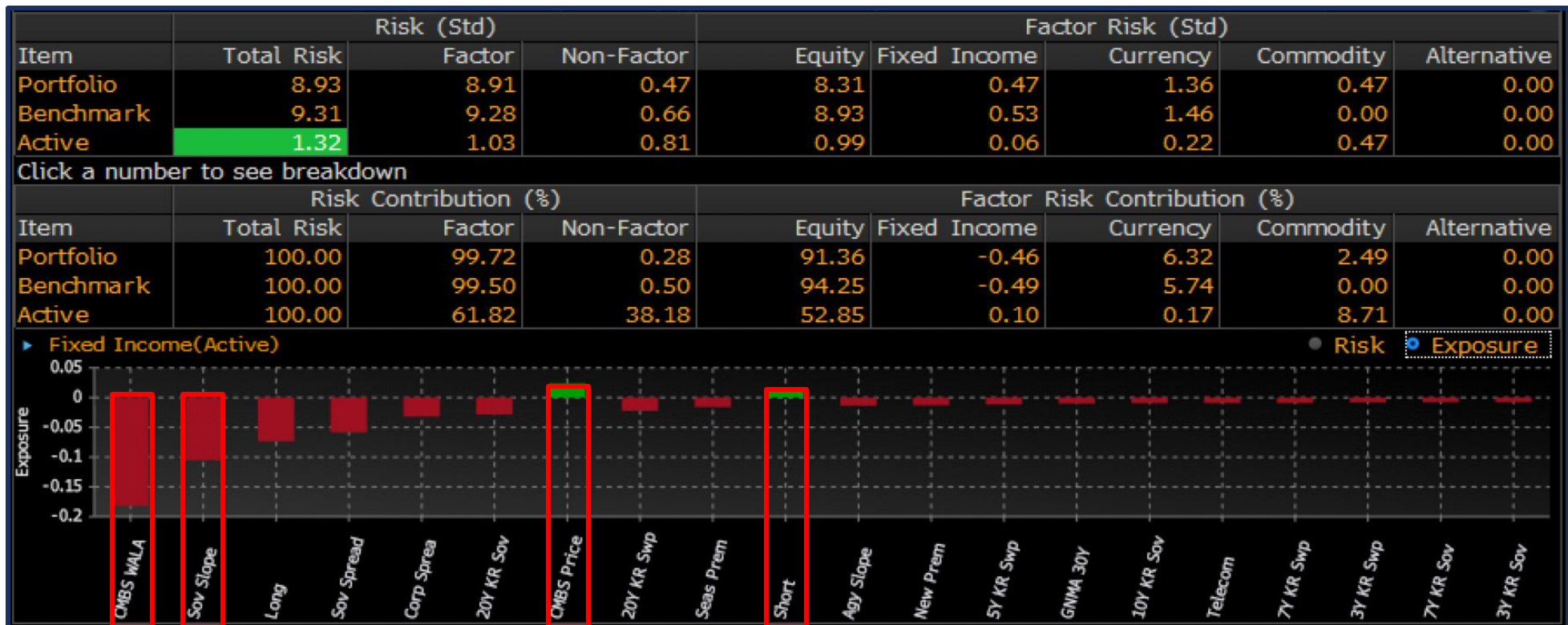
Retirement Asset Allocation Strategy (RAAS) vs. 80/20 ACWI/AGG: Fixed Income Risk



Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.

# THE MODEL IS UNDER EXPOSED TO CMBS WEIGHTED AVERAGE LOAN AGE & SOVEREIGN SLOPES AND OVER EXPOSED TO CMBS PRICE & SHORT DURATION

Retirement Asset Allocation Strategy (RAAS) vs. 80/20 ACWI/AGG: Fixed Income Factor Exposures

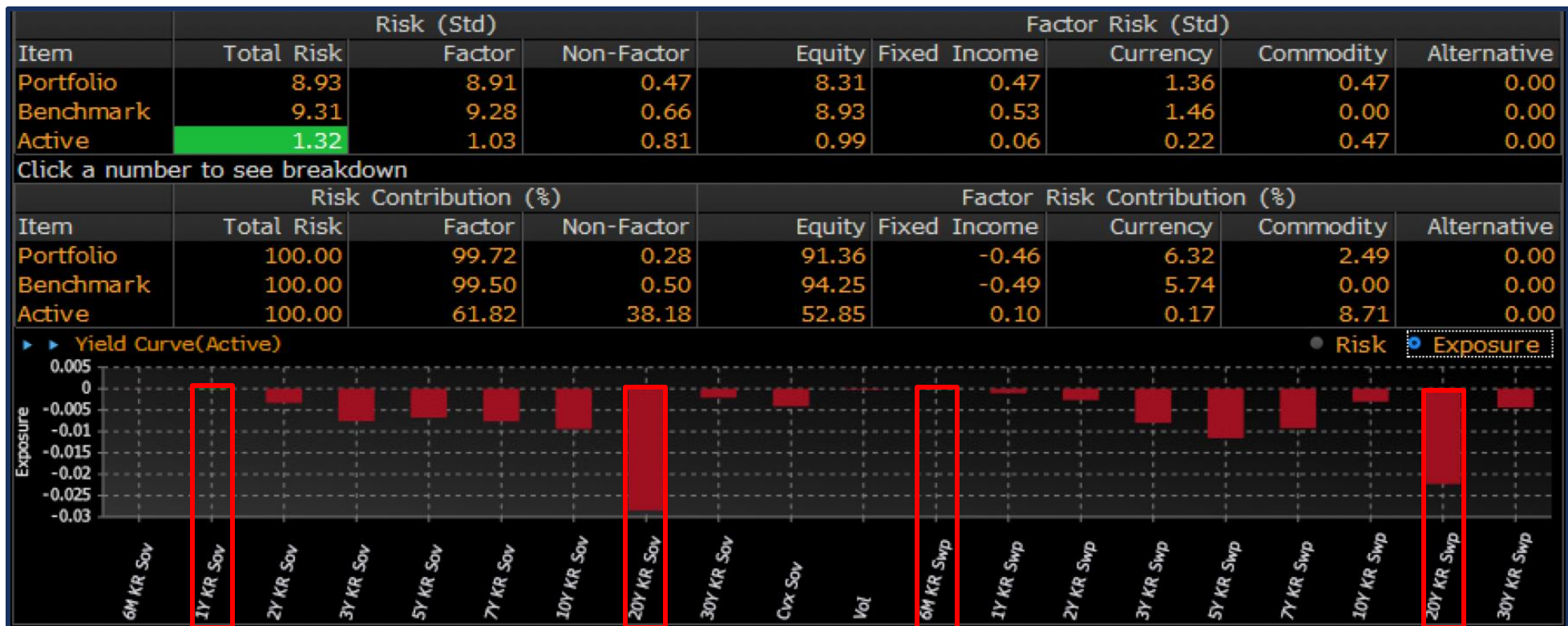


Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.



# THE MODEL IS UNDER EXPOSED TO 20Y KR SOVEREIGNS & 20Y KR SWAPS AND OVER EXPOSED TO 1Y KR SOVEREIGNS & 6M KR SWAPS

Retirement Asset Allocation Strategy (RAAS) vs. 80/20 ACWI/AGG: Yield Curve Factor Exposures

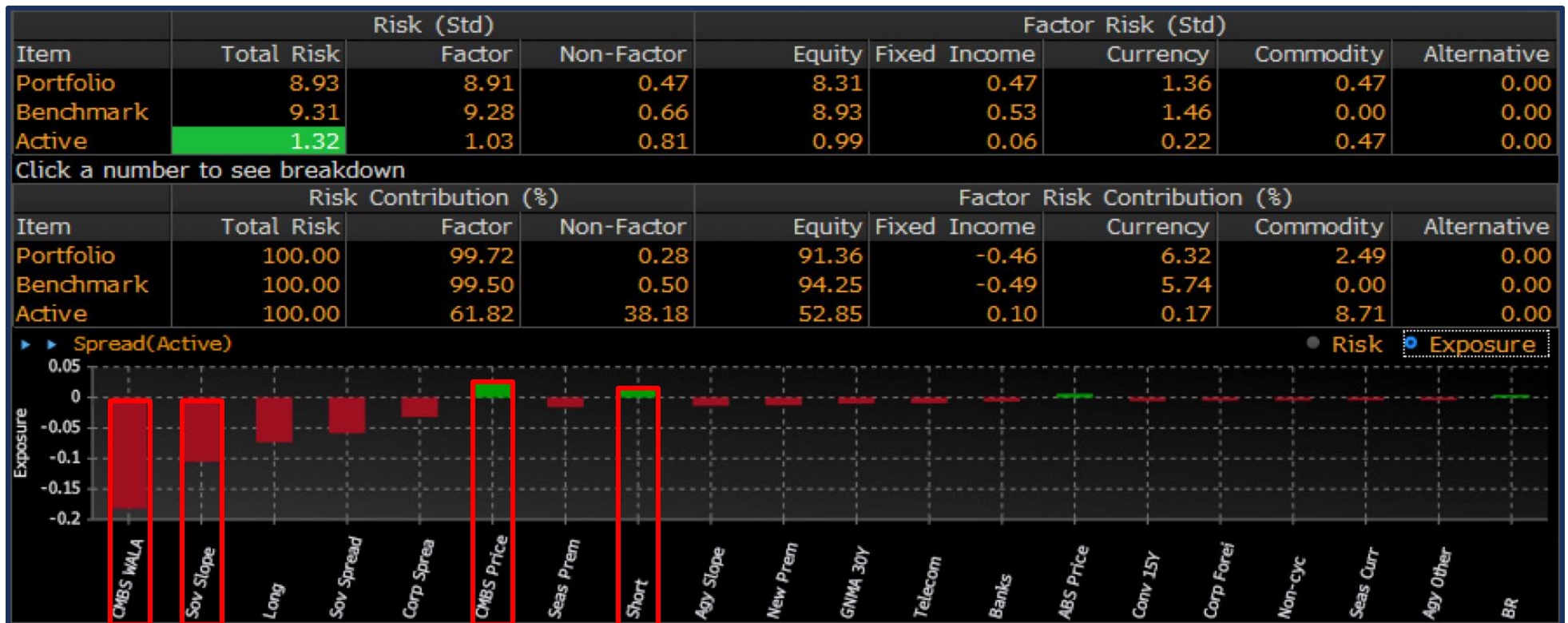


Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.



# THE MODEL IS UNDER EXPOSED TO CMBS WEIGHTED AVERAGE LOAN AGE & SOVEREIGN SLOPES AND OVER EXPOSED TO CMBS PRICE & SHORT DURATION

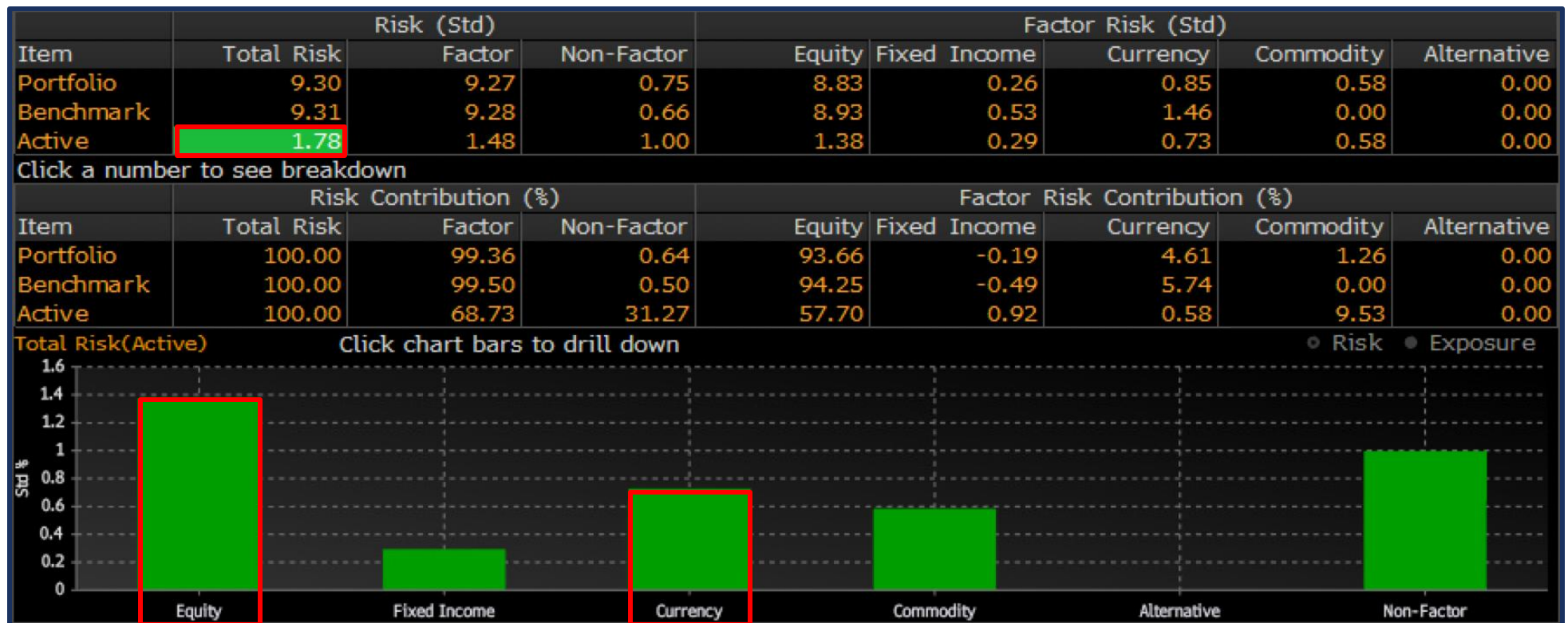
Retirement Asset Allocation Strategy (RAAS) vs. 80/20 ACWI/AGG: Spread Factor Exposures



Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.

# BLOOMBERG PROJECTS A 1.78% TRACKING ERROR. THE BIGGEST DIVERSIFIABLE RISK IS DRIVEN BY EQUITY & CURRENCY RISK

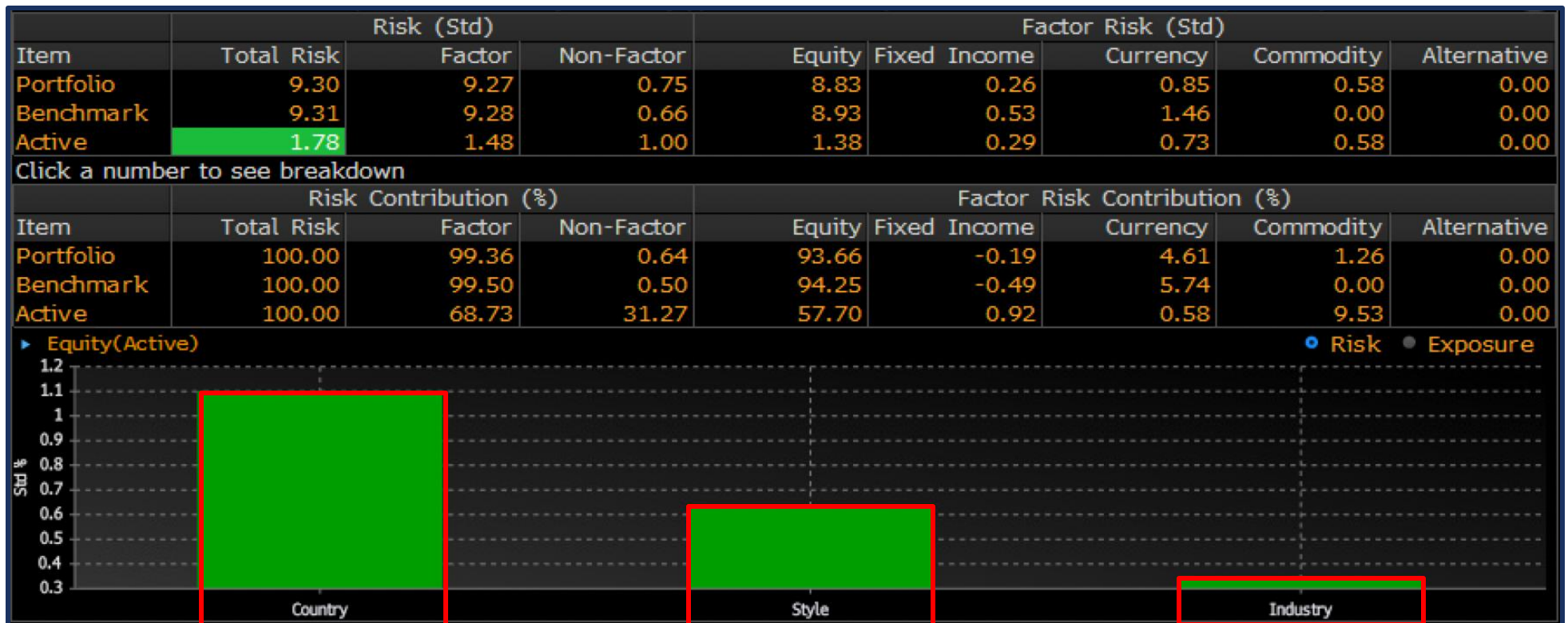
Dynamic Aggressive Model vs. 80/20 ACWI/AGG: Total Risk



Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.

# COUNTRY, STYLE, & INDUSTRY ARE THE BIGGEST DRIVERS OF EQUITY RISK

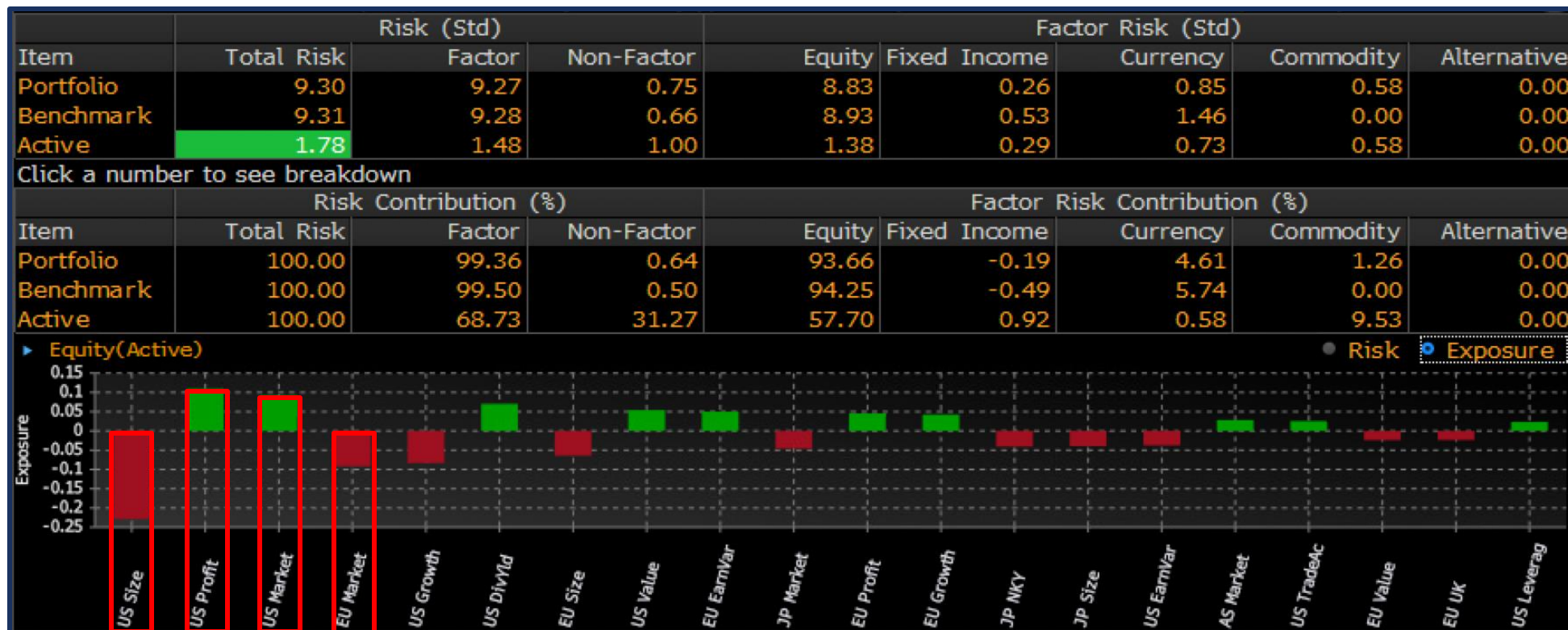
Dynamic Aggressive Model vs. 80/20 ACWI/AGG: Equity Risk



Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.

# THE MODEL IS UNDER EXPOSED TO US SIZE & EU MARKET AND OVER EXPOSED TO US PROFIT & US MARKET

Dynamic Aggressive Model vs. 80/20 ACWI/AGG: Equity Factor Exposures

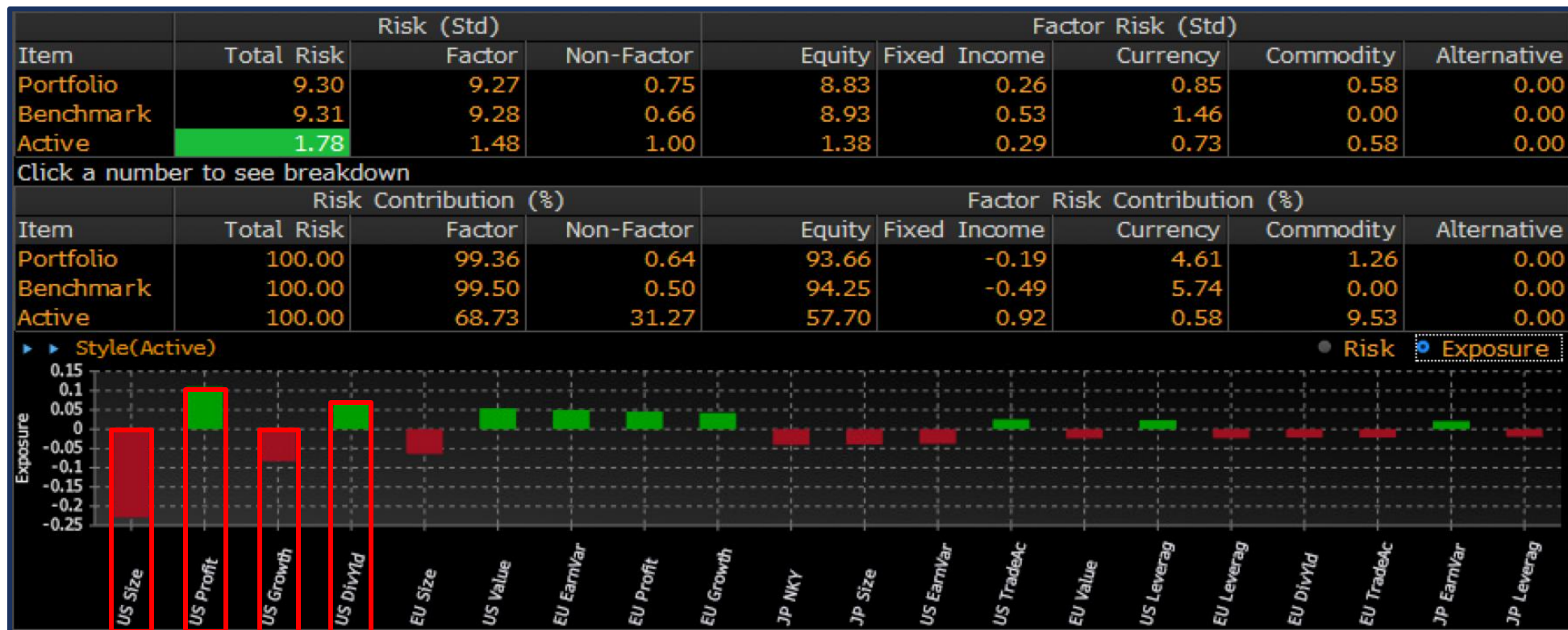


Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.



# THE MODEL IS UNDER EXPOSED TO US SIZE & US GROWTH AND OVER EXPOSED TO US PROFIT AND US DIVIDENDS

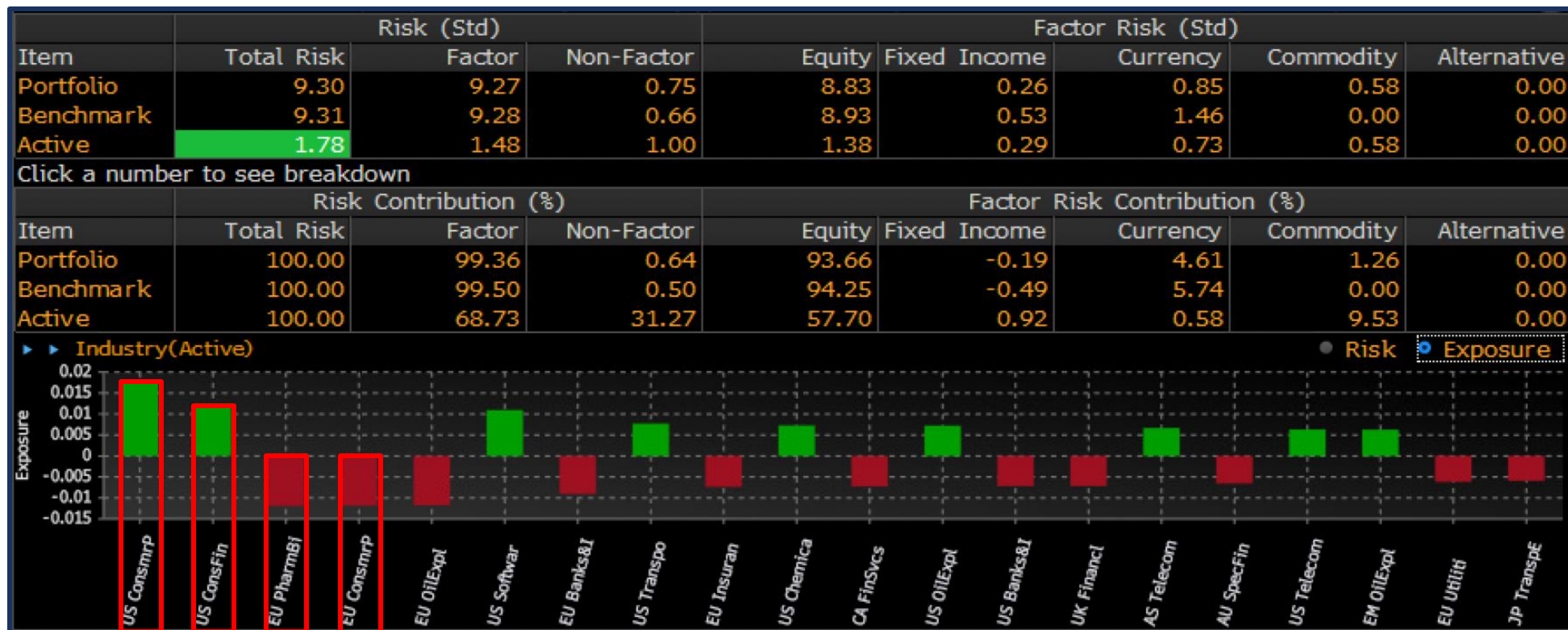
Dynamic Aggressive Model vs. 80/20 ACWI/AGG: Style Factor Exposures



Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.

# THE MODEL IS UNDER EXPOSED TO EU PHARMA & EU CONSUMER AND OVER EXPOSED TO US CONSUMER & US CONS FIN

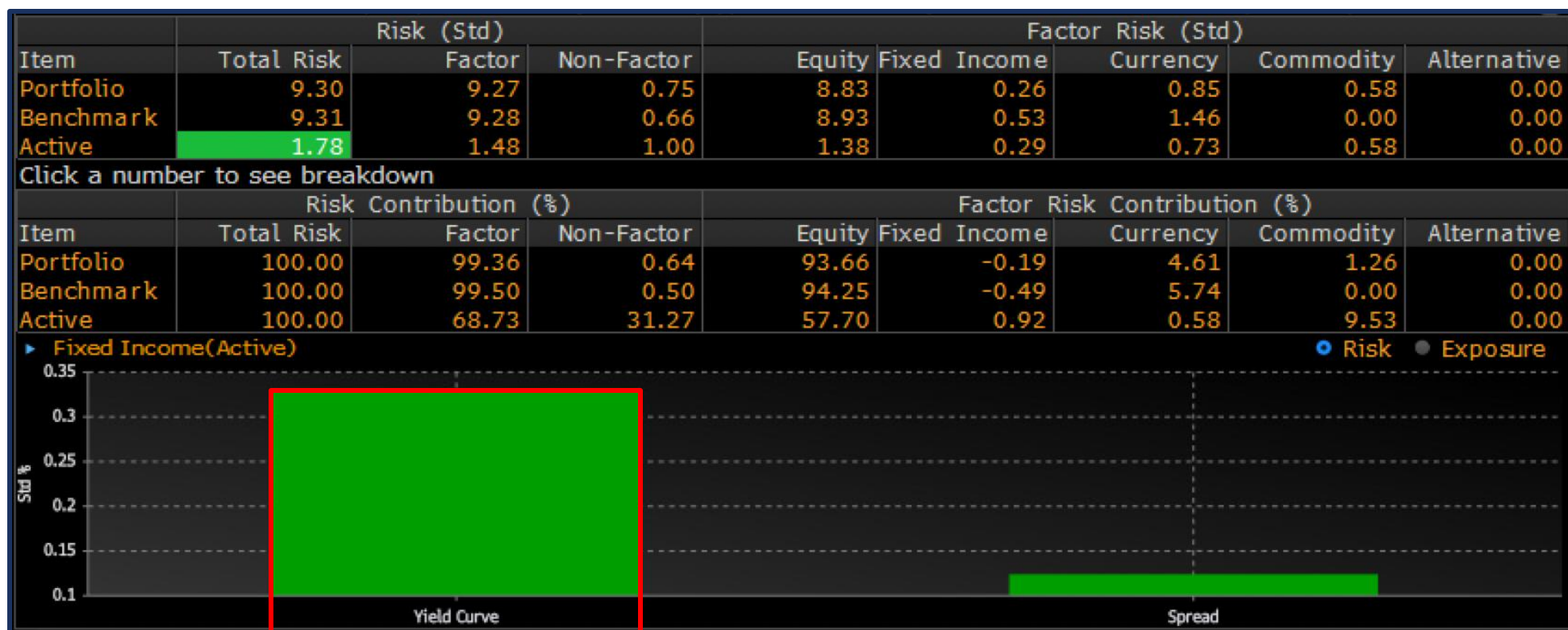
Dynamic Aggressive Model vs. 80/20 ACWI/AGG: Industry Factor Exposures



Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.

# YIELD CURVE IS THE BIGGEST DRIVER OF FIXED INCOME RISK

Dynamic Aggressive Model vs. 80/20 ACWI/AGG: Fixed Income Risk

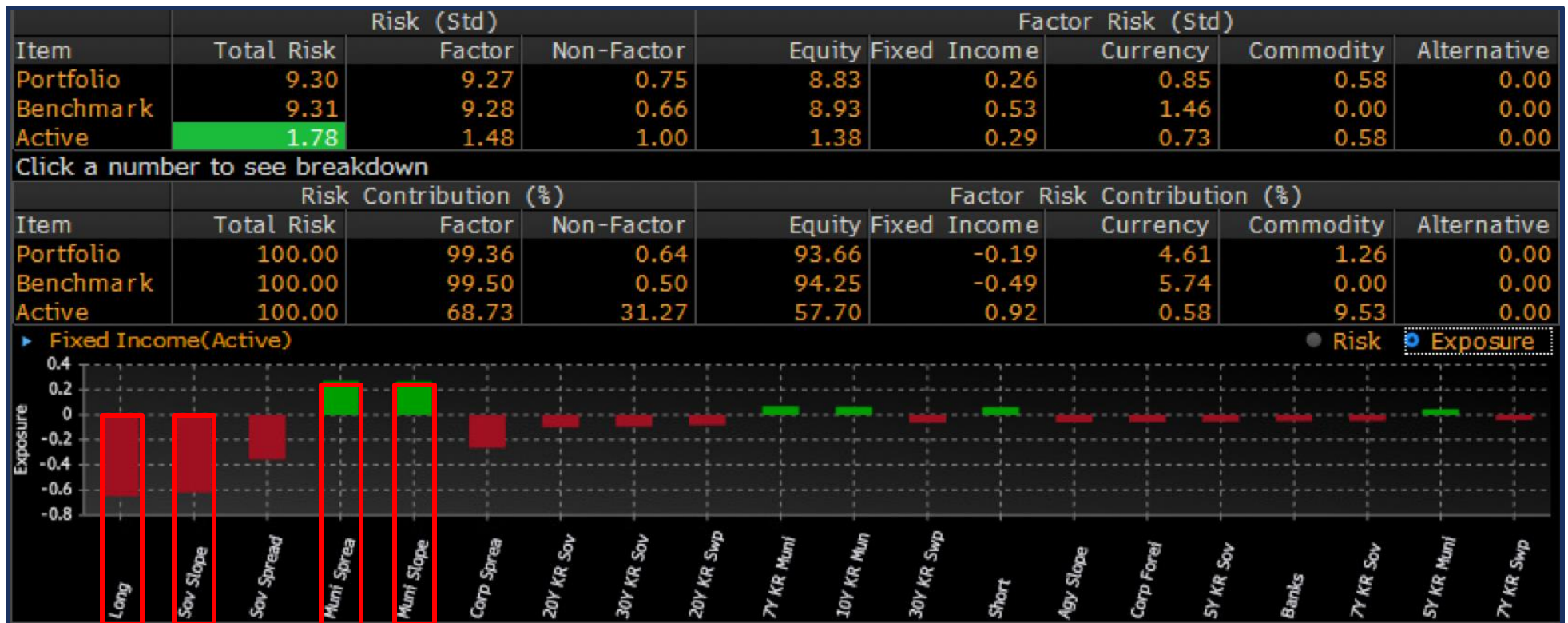


Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.



# THE MODEL IS UNDER EXPOSED TO LONG DURATION & SOVEREIGN SLOPES AND OVER EXPOSED TO MUNI SPREADS & MUNI SLOPES

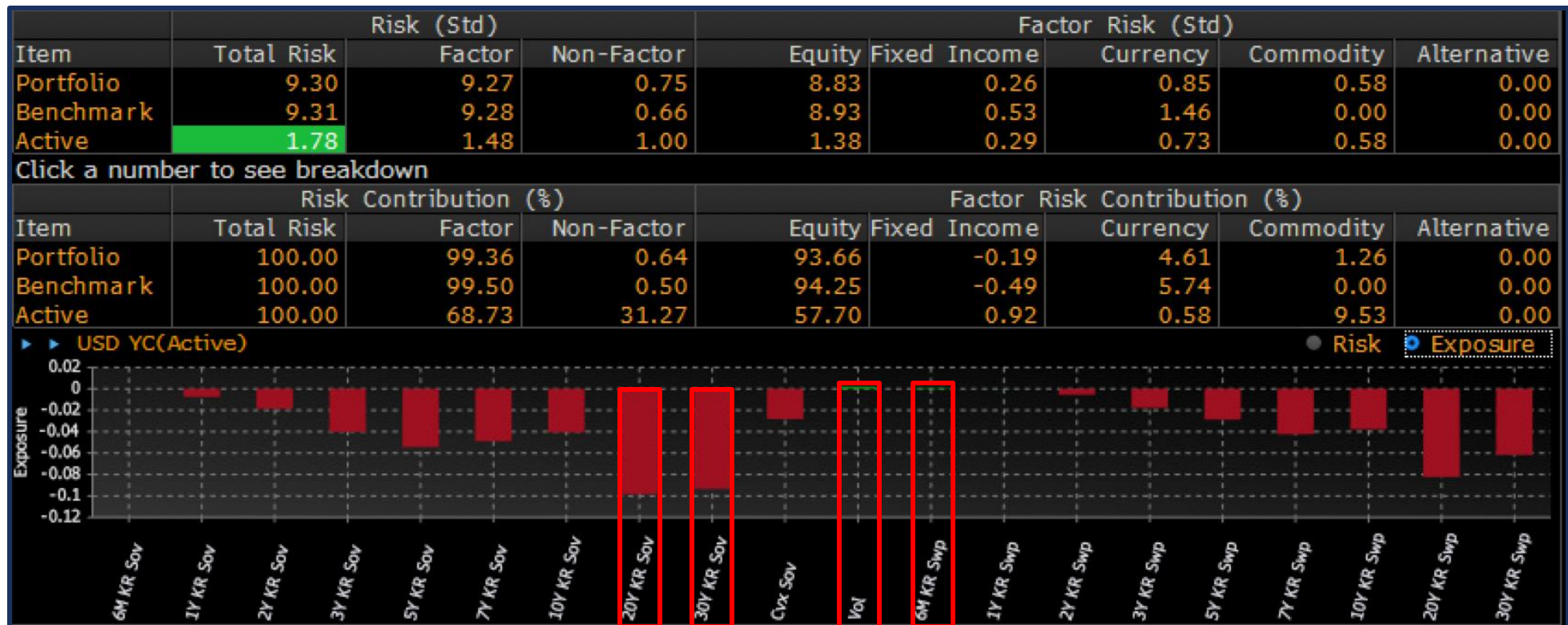
Dynamic Aggressive Model vs. 80/20 ACWI/AGG: Fixed Income Factor Exposures



Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.

# THE MODEL IS UNDER EXPOSED TO 20Y KR SOVEREIGNS & 30Y KR SOVEREIGNS AND OVER EXPOSED TO VOL & 6M KR SWAPS

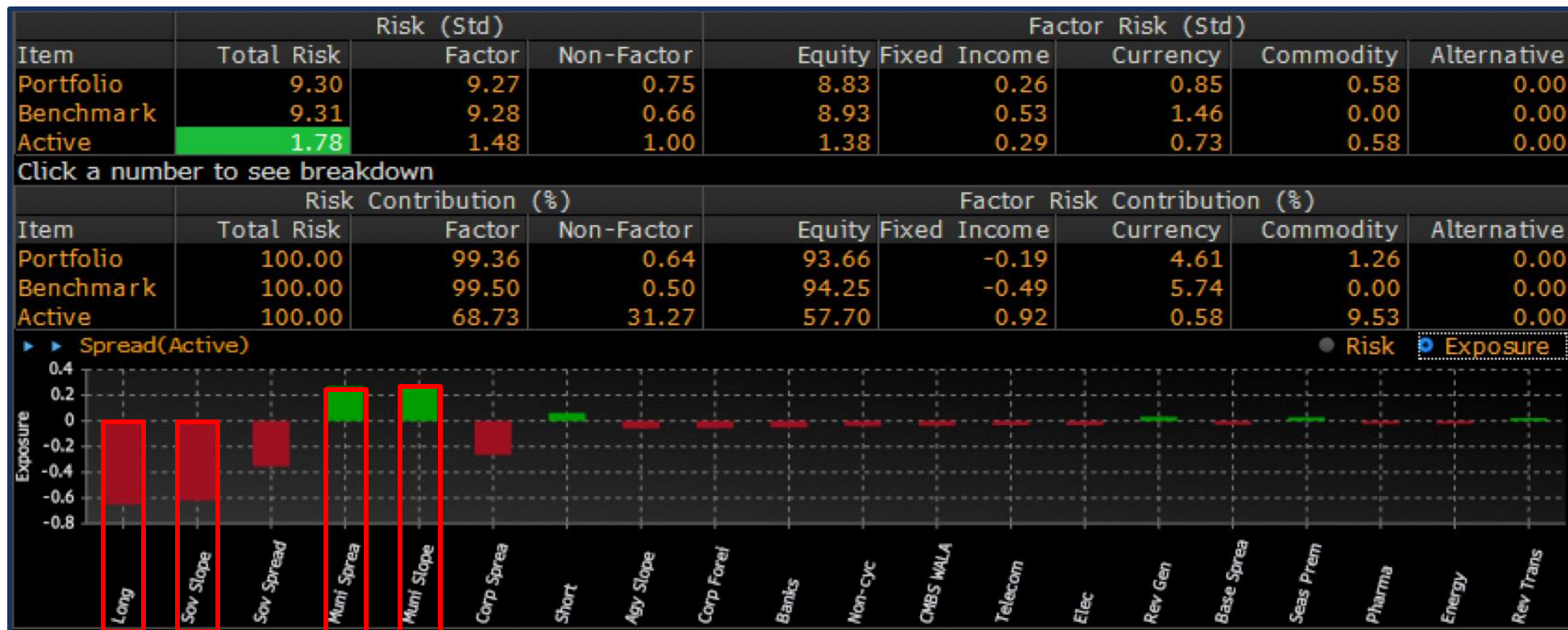
Dynamic Aggressive Model vs. 80/20 ACWI/AGG: Yield Curve Factor Exposures



Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.

# THE MODEL IS UNDER EXPOSED TO LONG DURATION & SOVEREIGN SLOPES AND OVER EXPOSED TO MUNI SLOPES & MUNI SPREADS

Dynamic Aggressive Model vs. 80/20 ACWI/AGG: Spread Factor Exposures

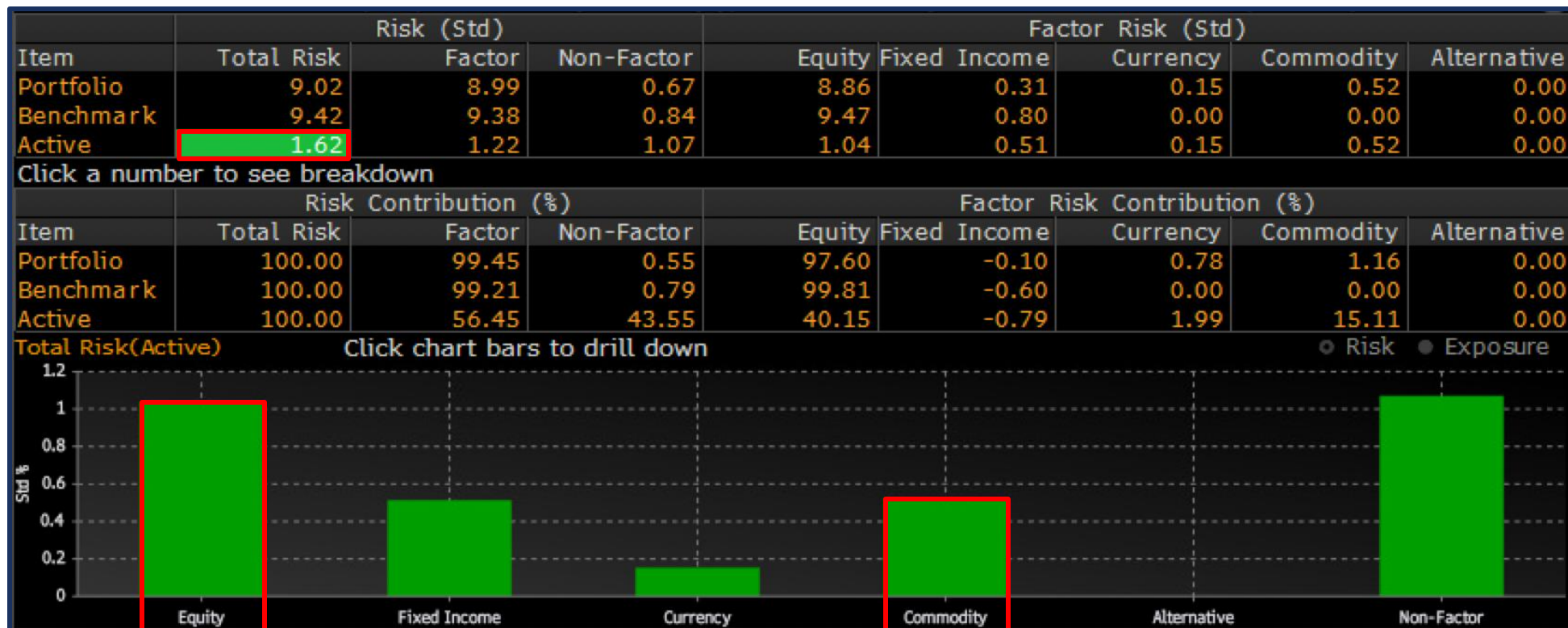


Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.



# BLOOMBERG PROJECTS A 1.62% TRACKING ERROR. THE BIGGEST DIVERSIFIABLE RISK IS DRIVEN BY EQUITY & COMMODITY RISK

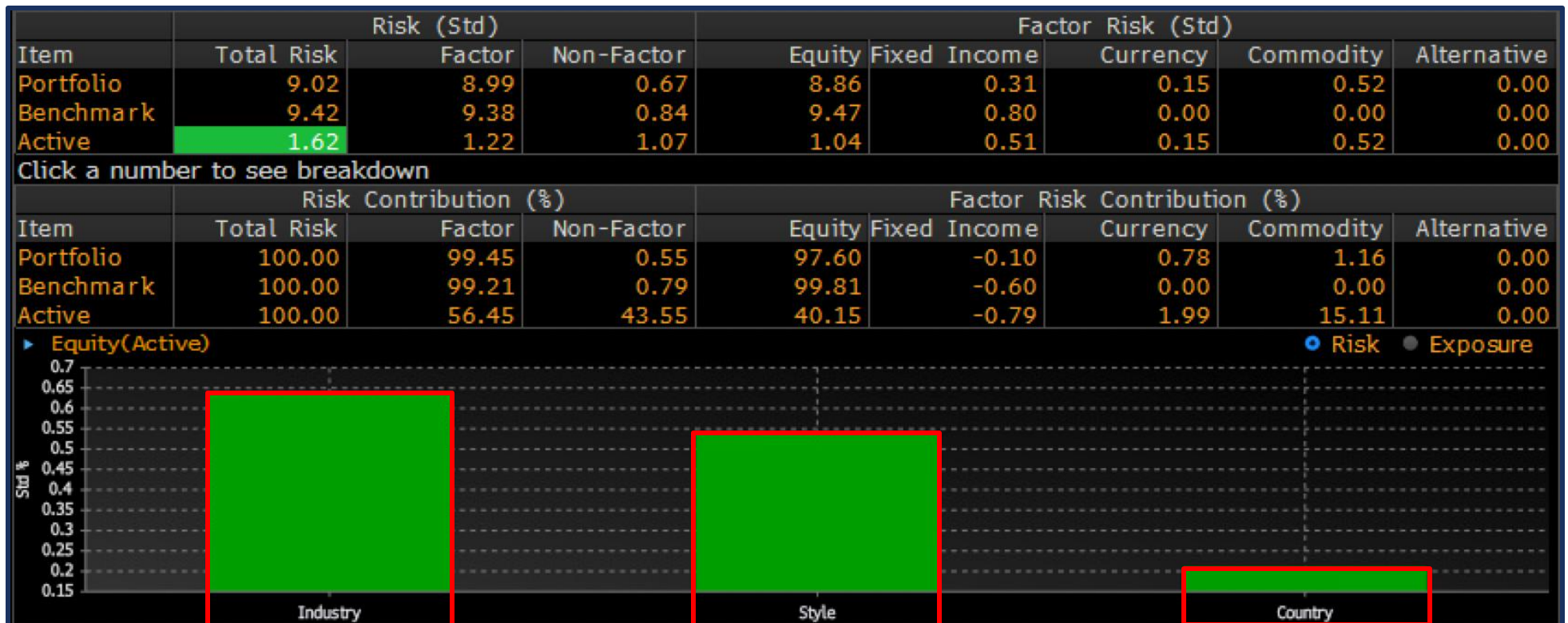
Multi-Asset Risk Strategy (MARS) US vs. 70/30 IWV/AGG: Total Risk



Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.

# INDUSTRY, STYLE, AND COUNTRY ARE THE BIGGEST DRIVERS OF EQUITY RISK

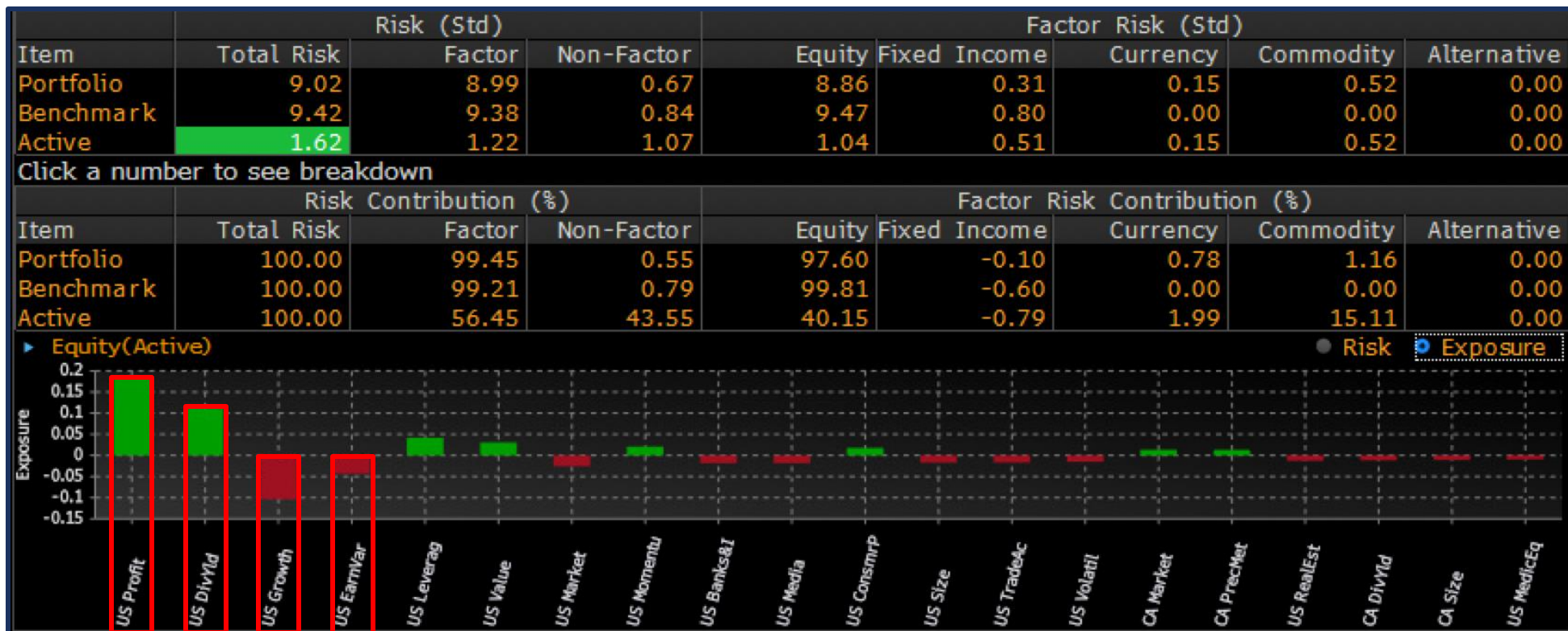
Multi-Asset Risk Strategy (MARS) US vs. 70/30 IWV/AGG: Equity Risk



Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.

# THE MODEL IS UNDER EXPOSED TO US GROWTH & US EARNINGS AND OVER EXPOSED TO US PROFIT & US DIVIDENDS

Multi-Asset Risk Strategy (MARS) US vs. 70/30 IWV/AGG: Equity Factor Exposures

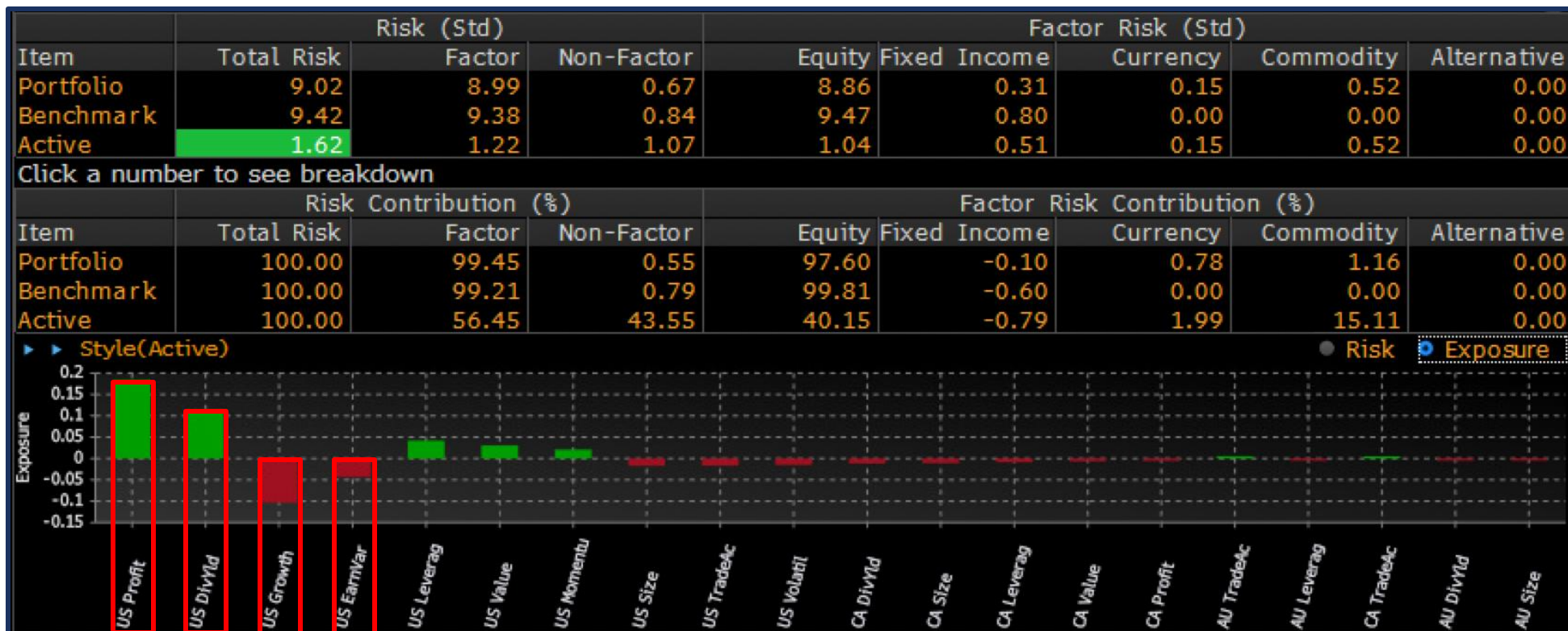


Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.



# THE MODEL IS UNDER EXPOSED TO US GROWTH & US EARNINGS AND OVER EXPOSED TO US PROFIT & US DIVIDENDS

Multi-Asset Risk Strategy (MARS) US vs. 70/30 IWV/AGG: Style Factor Exposures

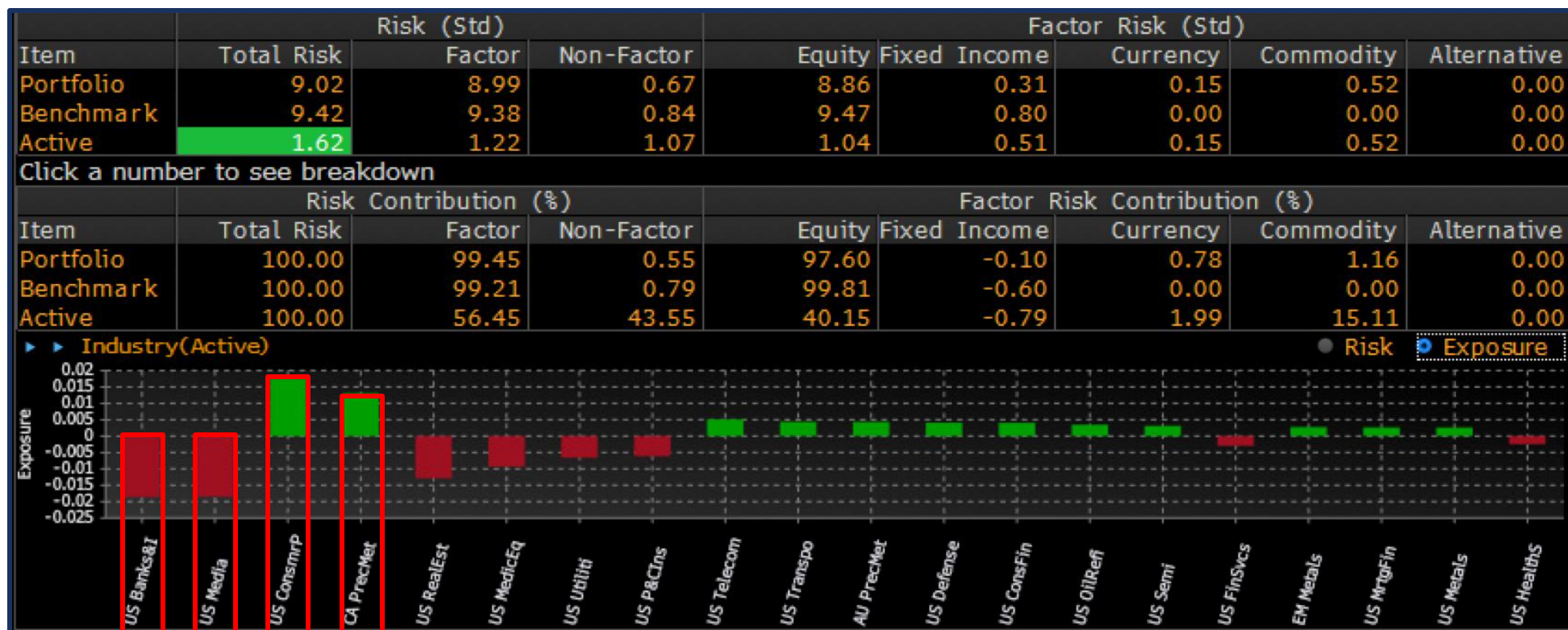


Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.



# THE MODEL IS UNDER EXPOSED TO US BANKS & US MEDIA AND OVER EXPOSED TO US CONSUMER AND CA PRECIOUS METALS

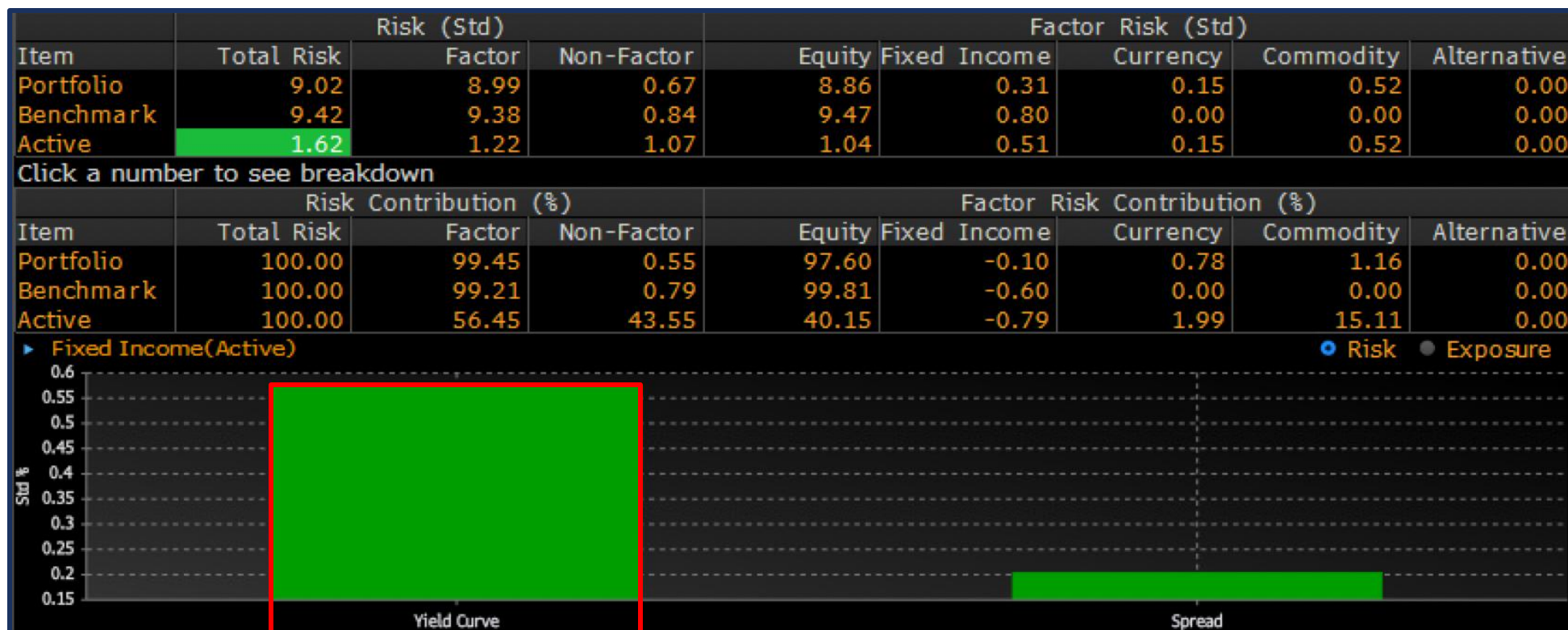
Multi-Asset Risk Strategy (MARS) US vs. 70/30 IWV/AGG: Industry Factor Exposures



Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.

# YIELD CURVE IS THE BIGGEST DRIVER OF FIXED INCOME RISK

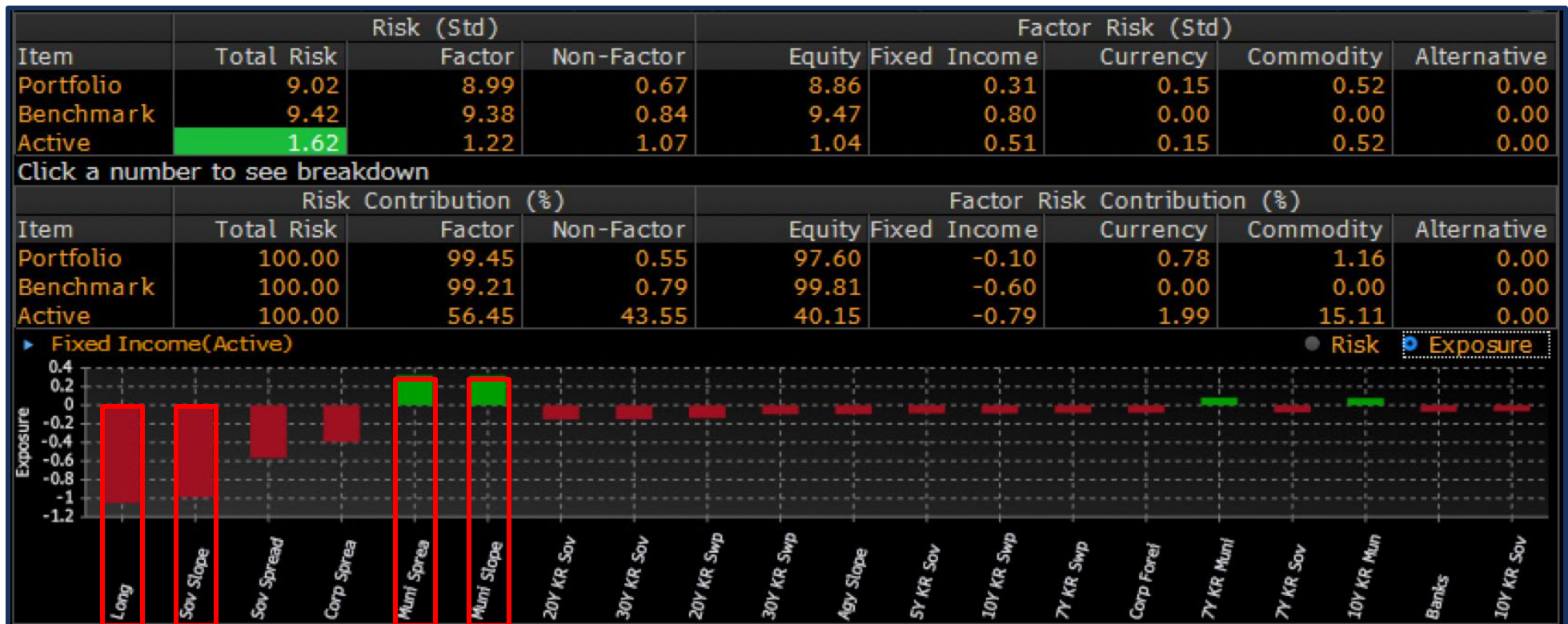
Multi-Asset Risk Strategy (MARS) US vs. 70/30 IWV/AGG: Fixed Income Risk



Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.

# THE MODEL IS UNDER EXPOSED TO LONG DURATION & SOVEREIGN SLOPES AND OVER EXPOSED TO MUNI SPREADS & MUNI SLOPES

Multi-Asset Risk Strategy (MARS) US vs. 70/30 IWV/AGG: Fixed Income Factor Exposures

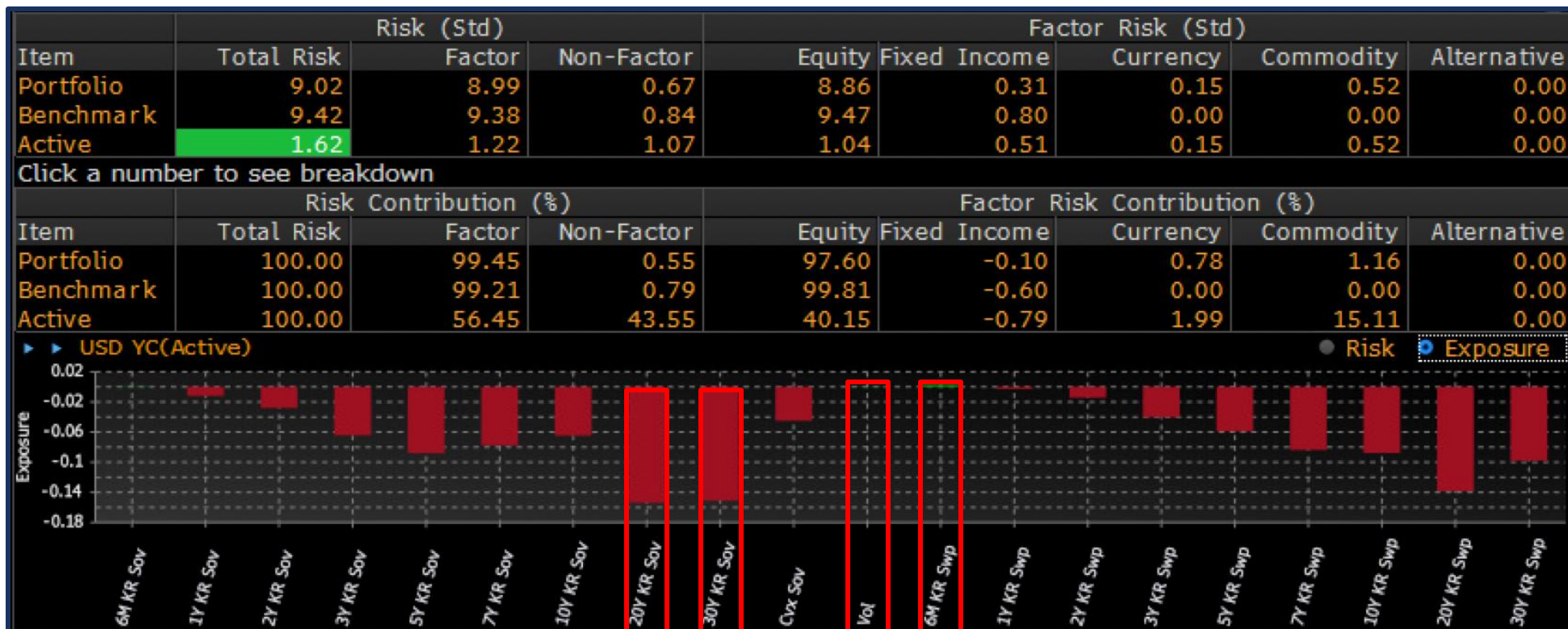


Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.



# THE MODEL IS UNDER EXPOSED TO 20Y KR SOVEREIGNS & 30Y KR SOVEREIGNS AND OVER EXPOSED TO 6M KR SWAPS & VOL

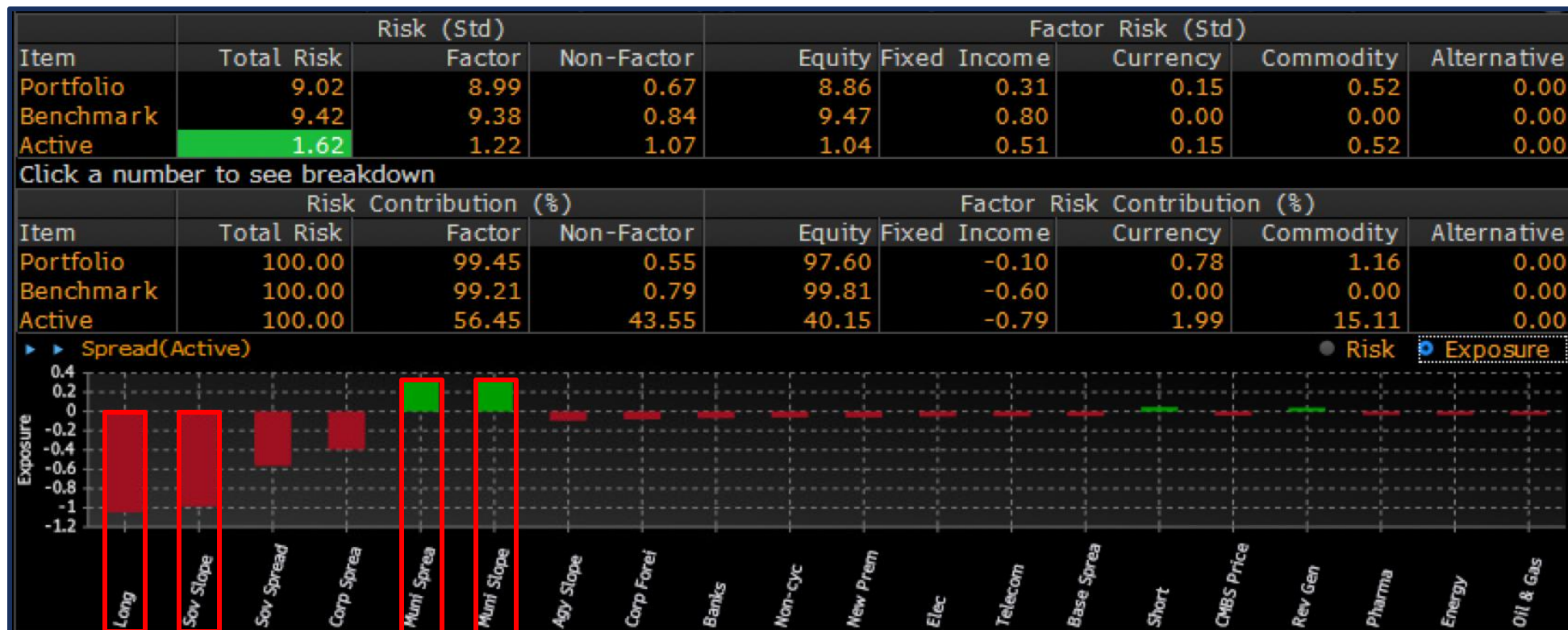
Multi-Asset Risk Strategy (MARS) US vs. 70/30 IWW/AGG: Yield Curve Factor Exposures



Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.

# THE MODEL IS UNDER EXPOSED TO LONG DURATION & SOVEREIGN SLOPES AND OVER EXPOSED TO MUNI SPREADS & MUNI SLOPES

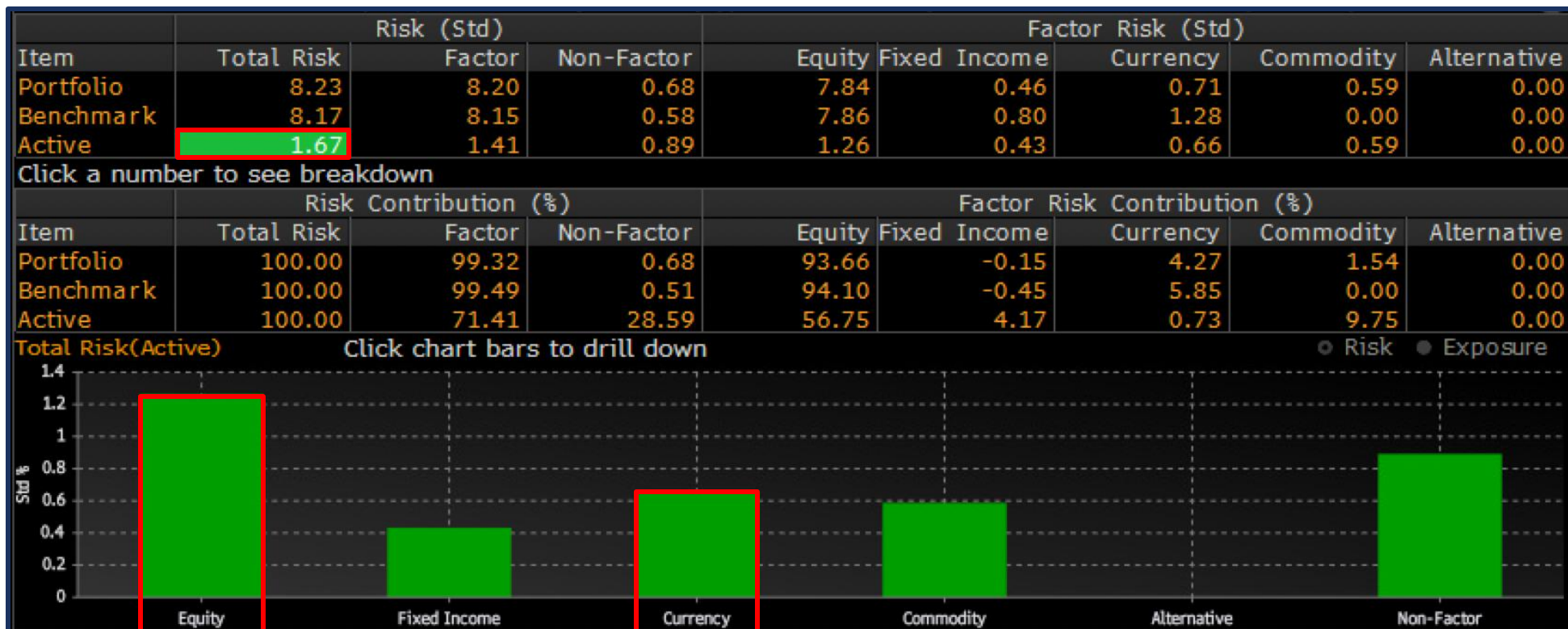
Multi-Asset Risk Strategy (MARS) US vs. 70/30 IWW/AGG: Spread Factor Exposures



Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.

# BLOOMBERG PROJECTS A 1.67% TRACKING ERROR. THE BIGGEST DIVERSIFIABLE RISK IS DRIVEN BY EQUITY & CURRENCY RISK

Dynamic Growth Model vs. 70/30 ACWI/AGG: Total Risk

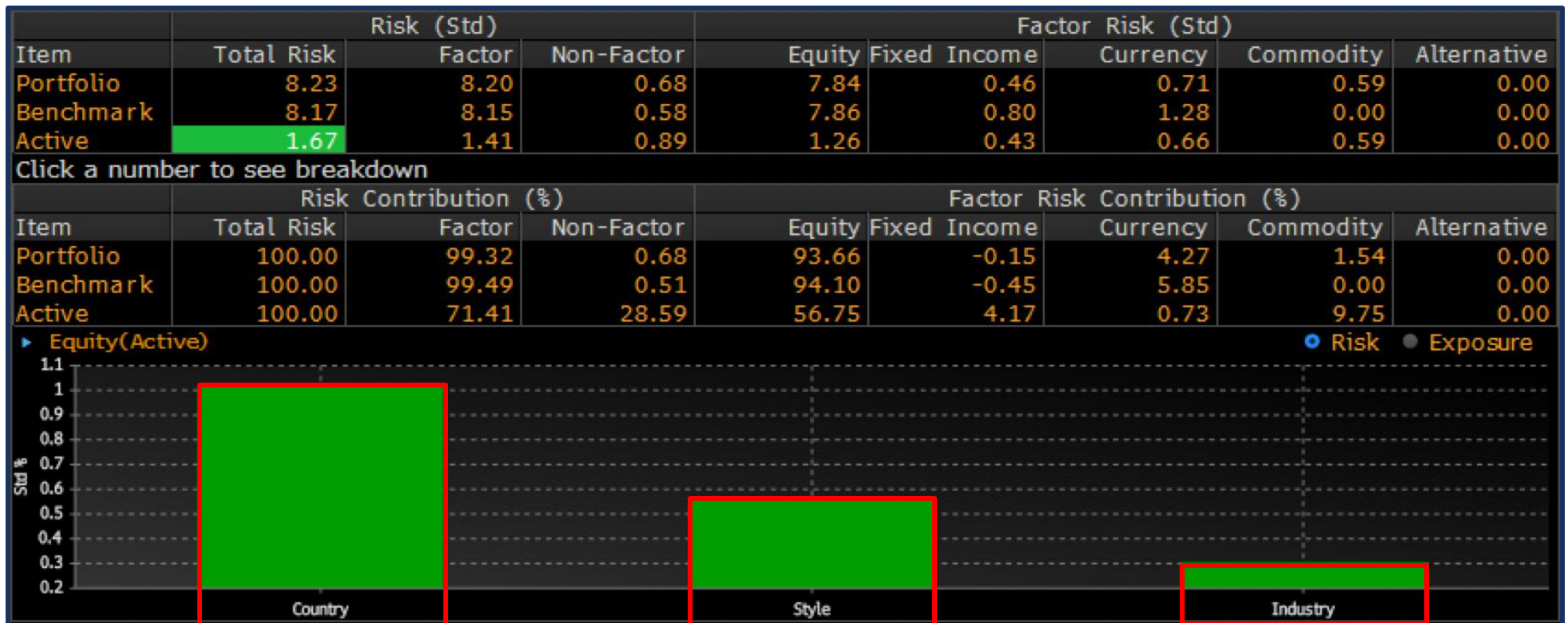


Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.



# COUNTRY, STYLE, & INDUSTRY ARE THE BIGGEST DRIVERS OF EQUITY RISK

Dynamic Growth Model vs. 70/30 ACWI/AGG: Equity Risk

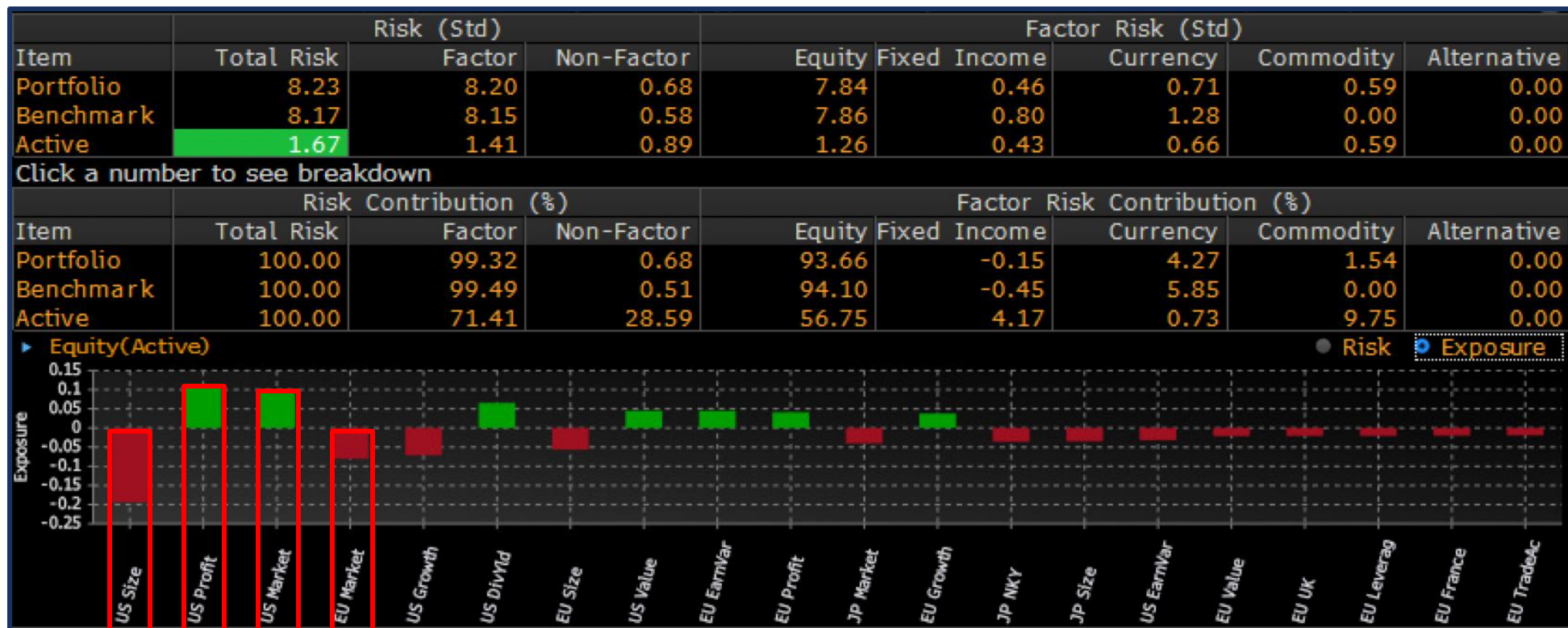


Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.



# THE MODEL IS UNDER EXPOSED TO US SIZE & EU MARKET AND OVER EXPOSED TO US PROFIT & US MARKET

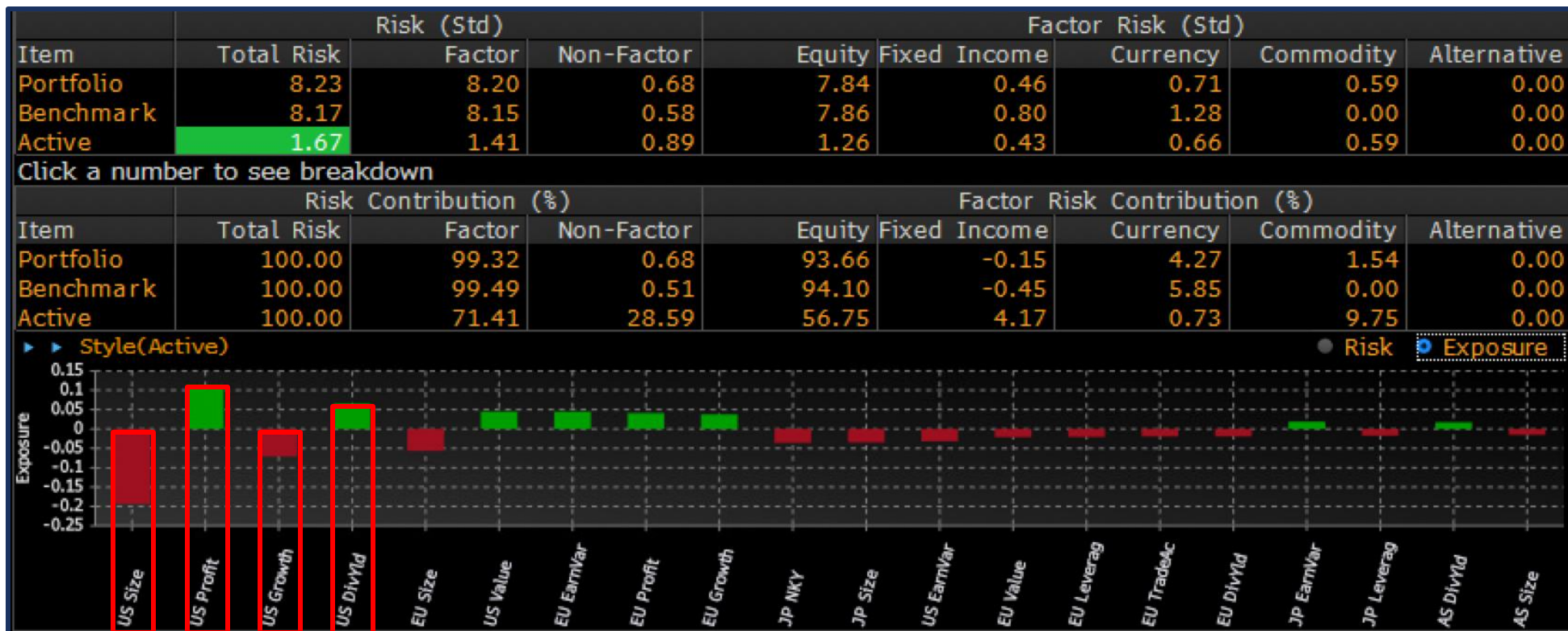
Dynamic Growth Model vs. 70/30 ACWI/AGG: Equity Factor Exposures



Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.

# THE MODEL IS UNDER EXPOSED TO US SIZE & US GROWTH AND OVER EXPOSED TO US PROFIT AND US DIVIDENDS

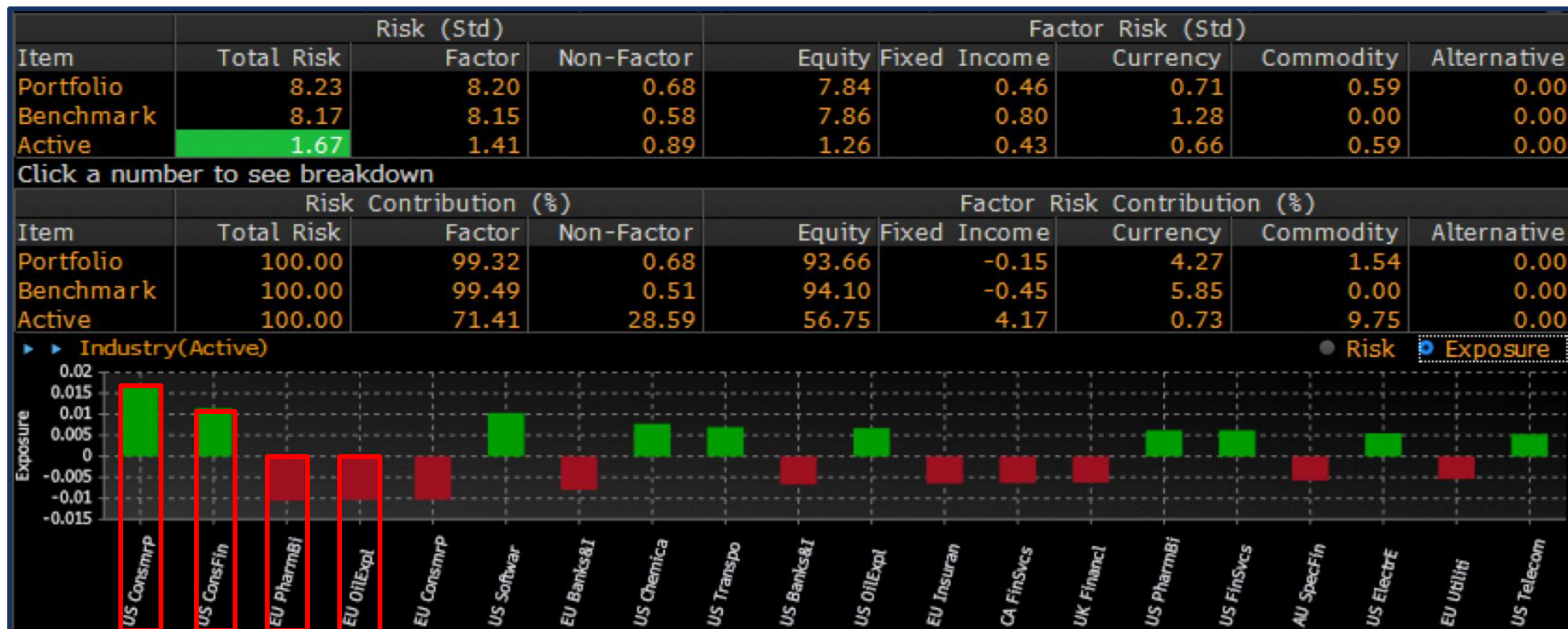
Dynamic Growth Model vs. 70/30 ACWI/AGG: Style Factor Exposures



Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.

# THE MODEL IS UNDER EXPOSED TO EU PHARMA & EU OIL EXPL AND OVER EXPOSED TO US CONSUMER & US CONS FIN

Dynamic Growth Model vs. 70/30 ACWI/AGG: Industry Factor Exposures

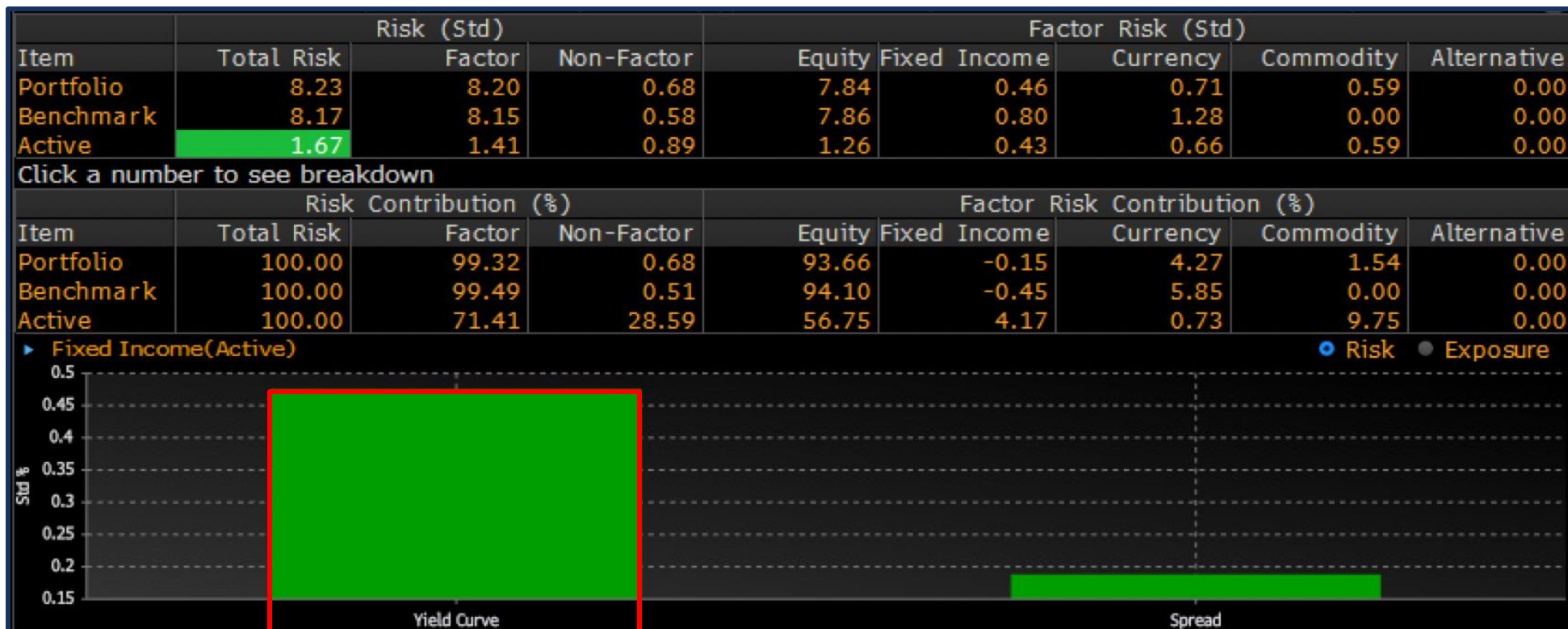


Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.



# YIELD CURVE IS THE BIGGEST DRIVER OF FIXED INCOME RISK

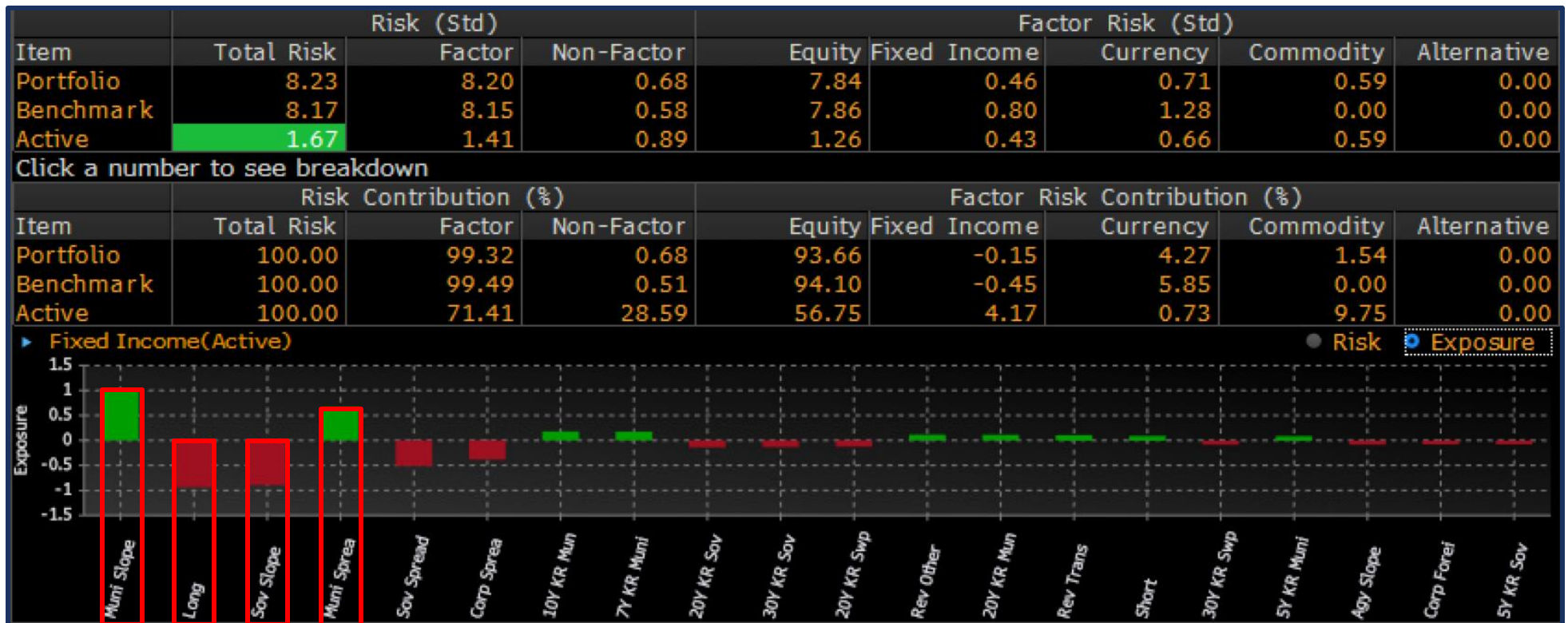
Dynamic Growth Model vs. 70/30 ACWI/AGG: Fixed Income Risk



Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.

# THE MODEL IS UNDER EXPOSED TO LONG DURATION & SOVEREIGN SLOPES AND OVER EXPOSED TO MUNI SLOPES & MUNI SPREADS

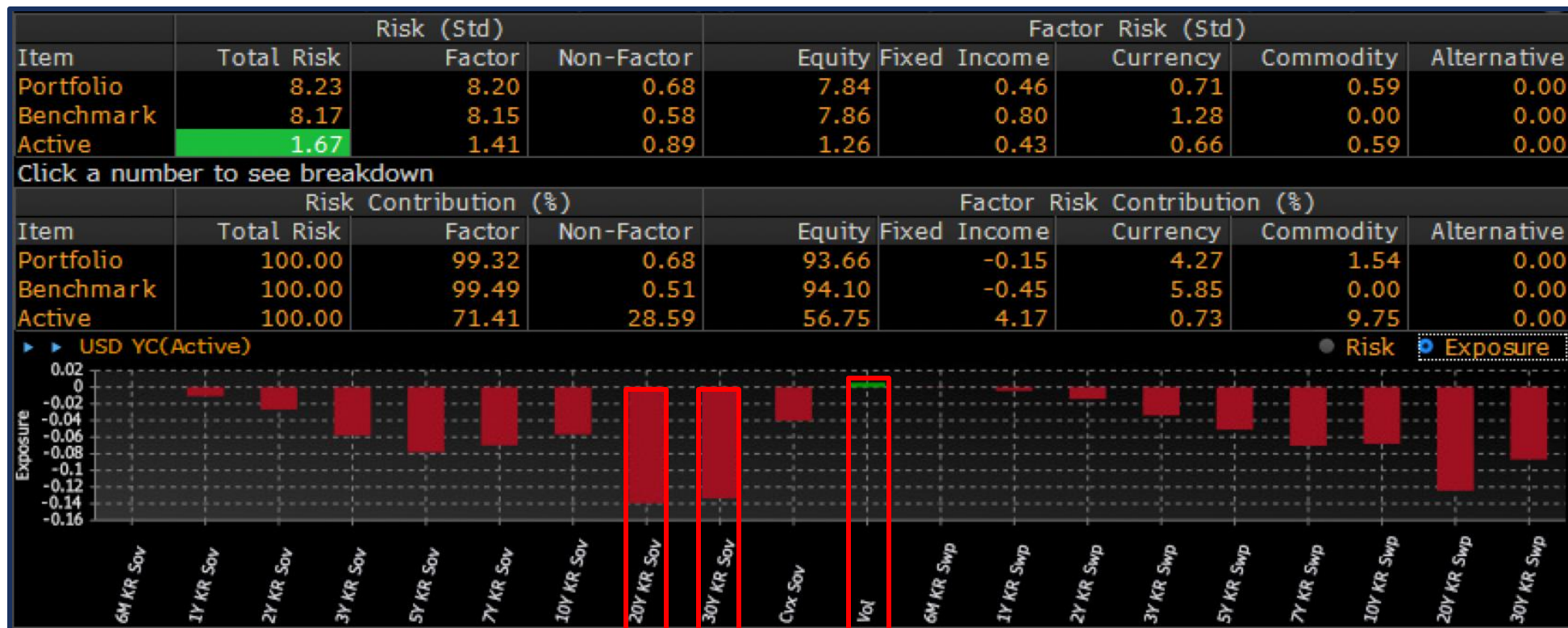
Dynamic Growth Model vs. 70/30 ACWI/AGG: Fixed Income Factor Exposures



Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.

# THE MODEL IS UNDER EXPOSED TO 20Y KR SOVEREIGNS & 30Y KR SOVEREIGNS AND OVER EXPOSED TO VOL

Dynamic Growth Model vs. 70/30 ACWI/AGG: Yield Curve Factor Exposures

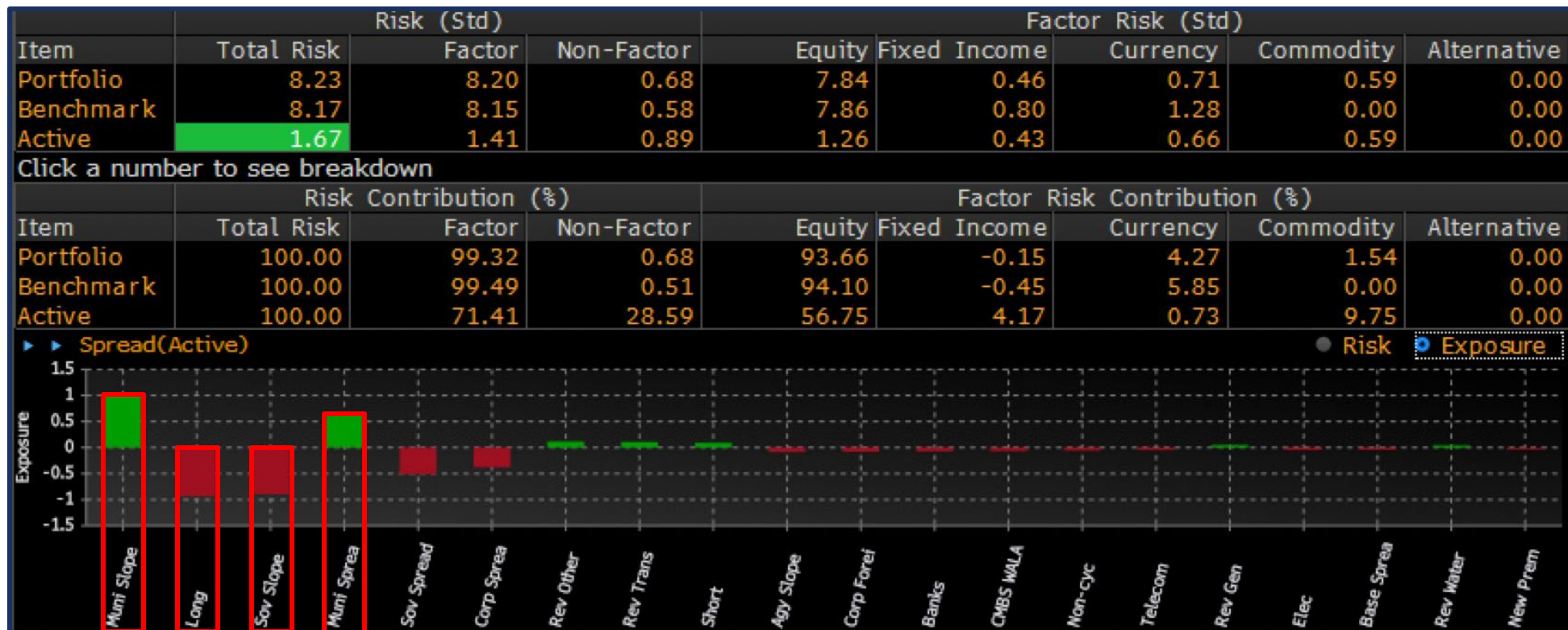


Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.



# THE MODEL IS UNDER EXPOSED TO LONG DURATION & SOVEREIGN SLOPES AND OVER EXPOSED TO MUNI SLOPES & MUNI SPREADS

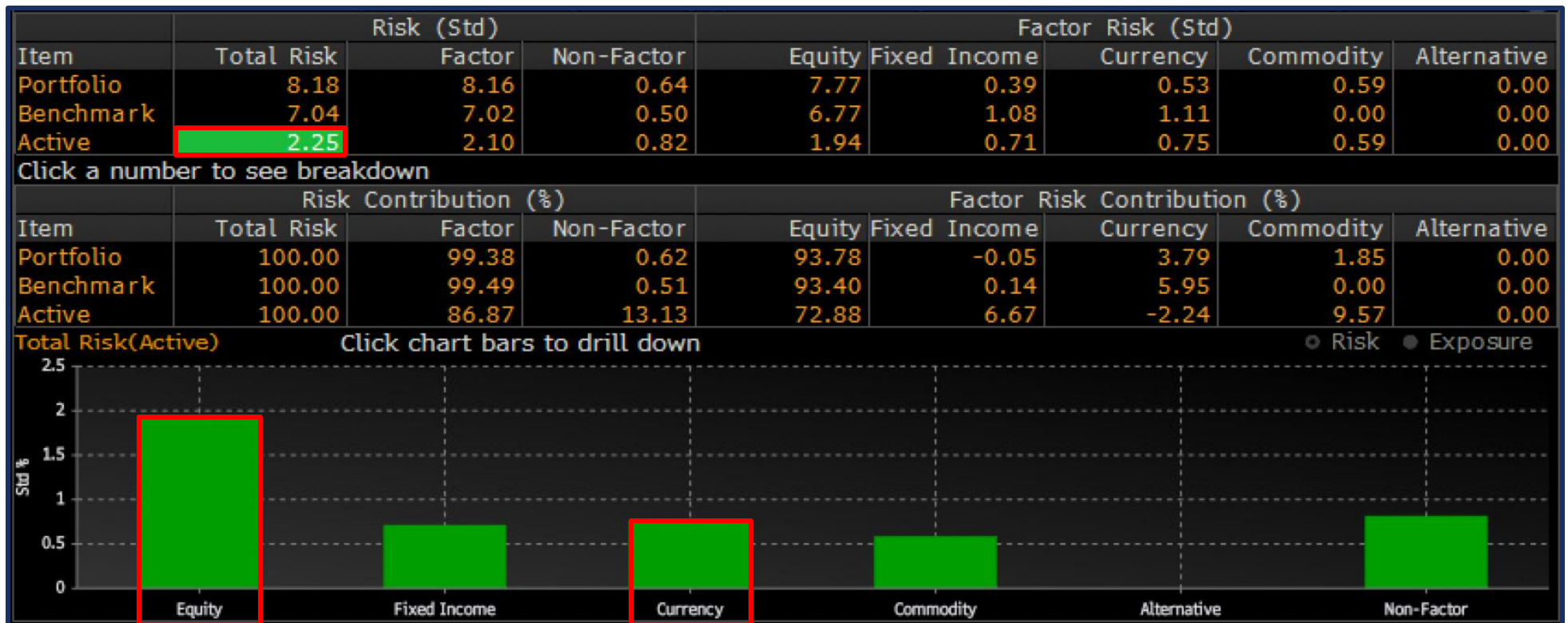
Dynamic Growth Model vs. 70/30 ACWI/AGG: Spread Factor Exposures



Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.

# BLOOMBERG PROJECTS A 2.25% TRACKING ERROR. THE BIGGEST DIVERSIFIABLE RISK IS DRIVEN BY EQUITY & CURRENCY RISK

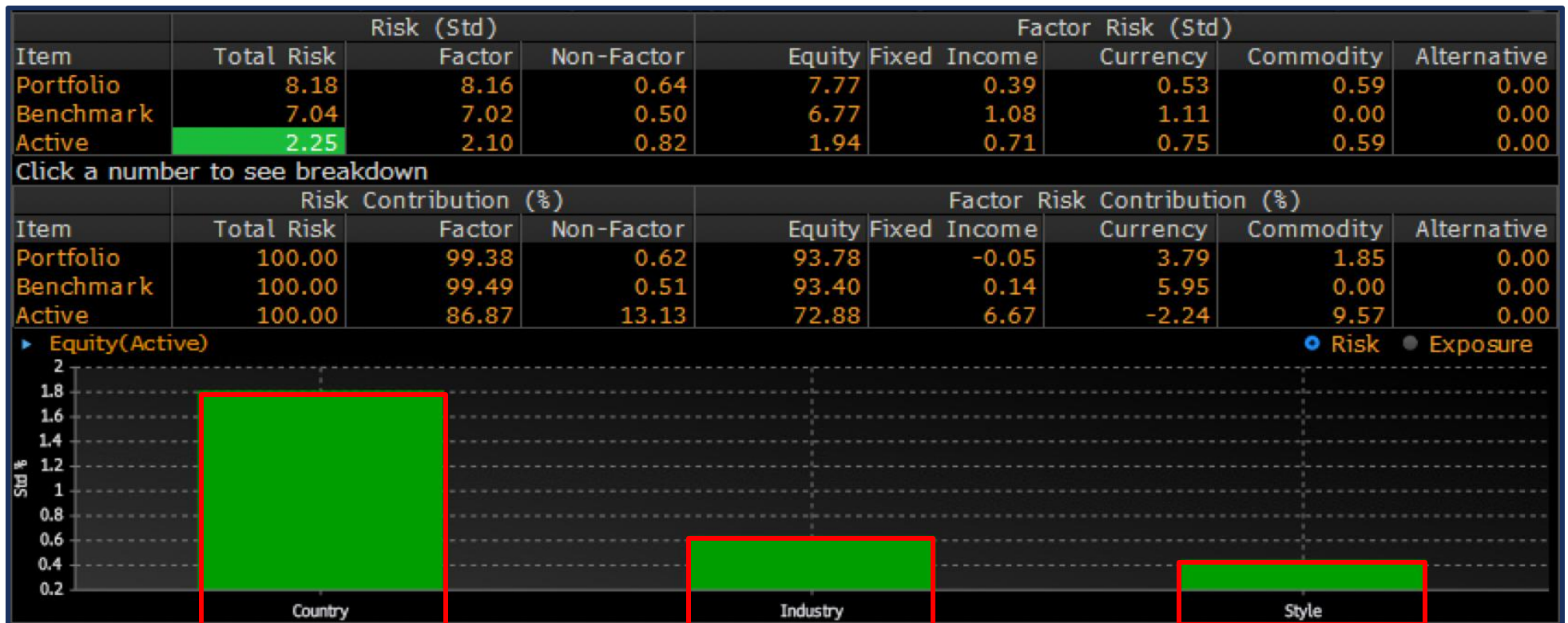
Multi-Asset Risk Strategy (MARS) vs. 60/40 ACWI/AGG: Total Risk



Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.

# COUNTRY, INDUSTRY, & STYLE ARE THE BIGGEST DRIVERS OF EQUITY RISK

Multi-Asset Risk Strategy (MARS) vs. 60/40 ACWI/AGG: Equity Risk

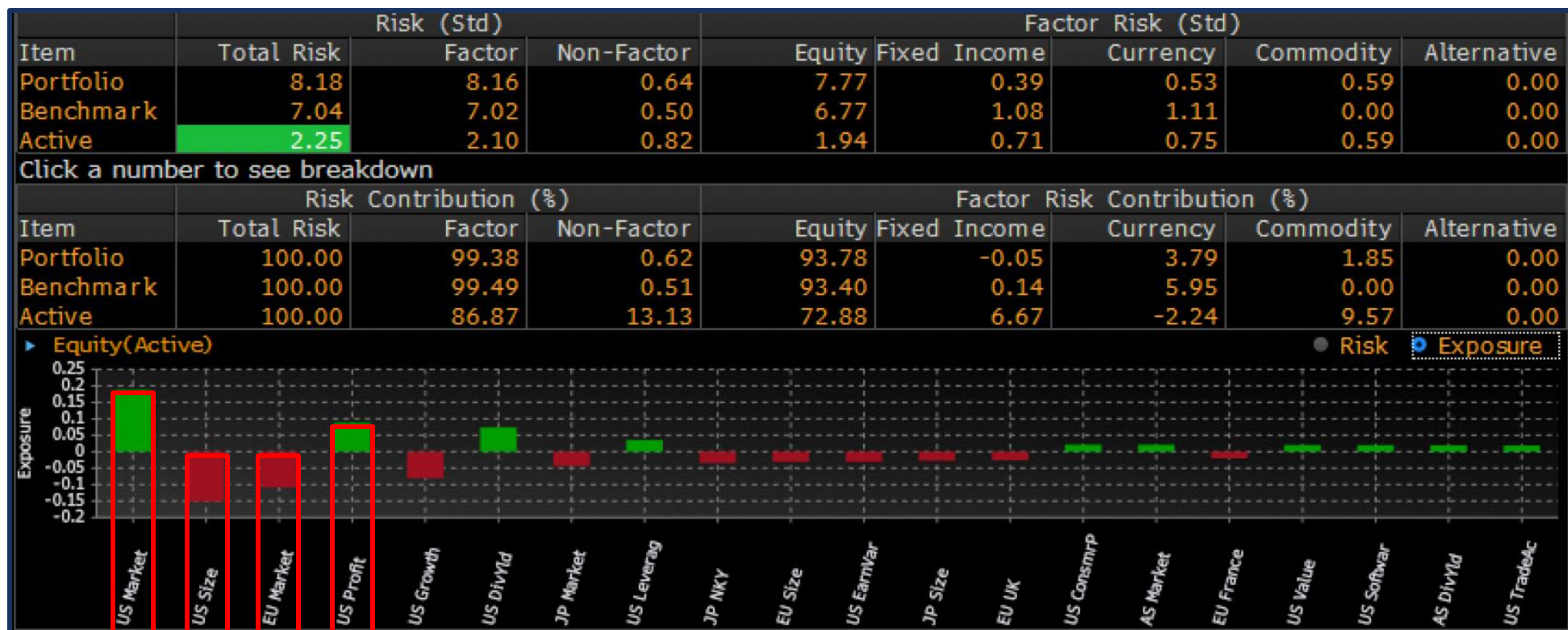


Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.



# THE MODEL IS UNDER EXPOSED TO US SIZE & EU MARKET AND OVER EXPOSED TO US MARKET & US PROFIT

Multi-Asset Risk Strategy (MARS) vs. 60/40 ACWI/AGG: Equity Factor Exposures

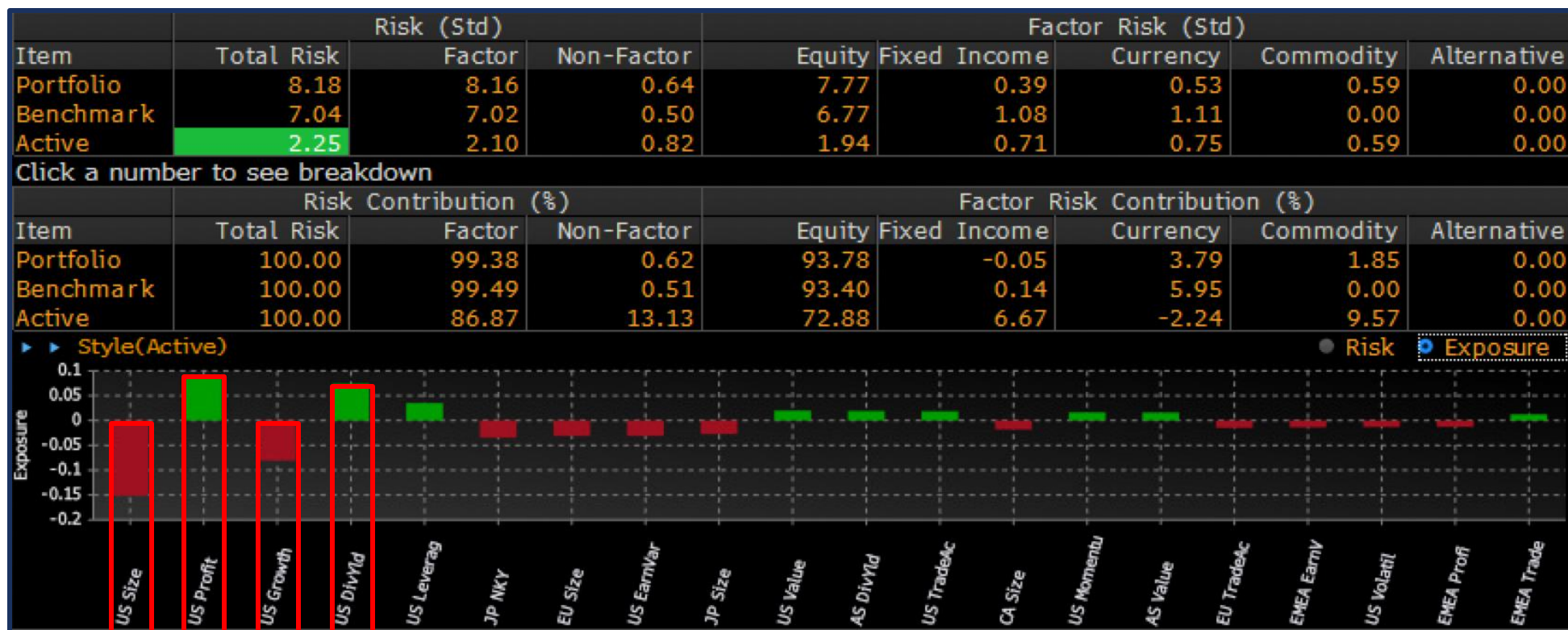


Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.



# THE MODEL IS UNDER EXPOSED TO US SIZE & US GROWTH AND OVER EXPOSED TO US PROFIT & US DIVIDENDS

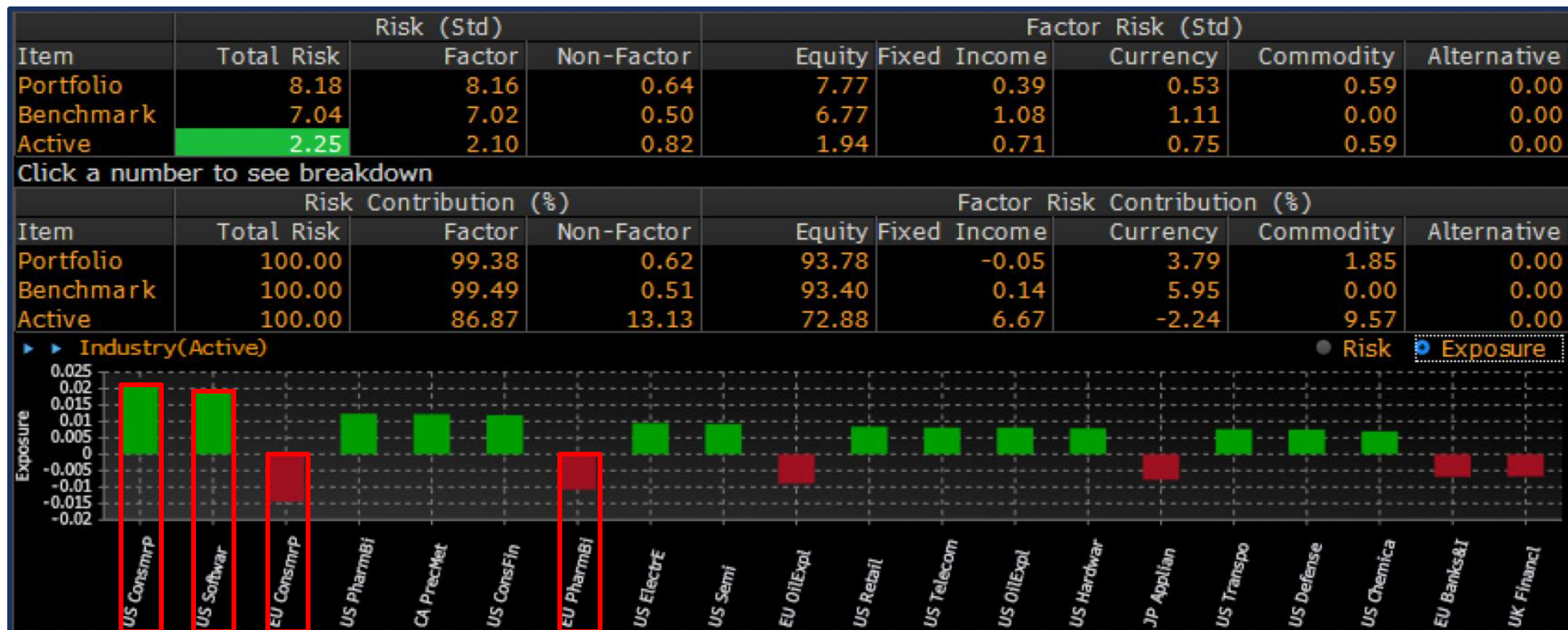
Multi-Asset Risk Strategy (MARS) vs. 60/40 ACWI/AGG: Style Factor Exposures



Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.

# THE MODEL IS UNDER EXPOSED TO EU CONSUMER & EU PHARMA AND OVER EXPOSED TO US CONSUMER AND US SOFTWARE

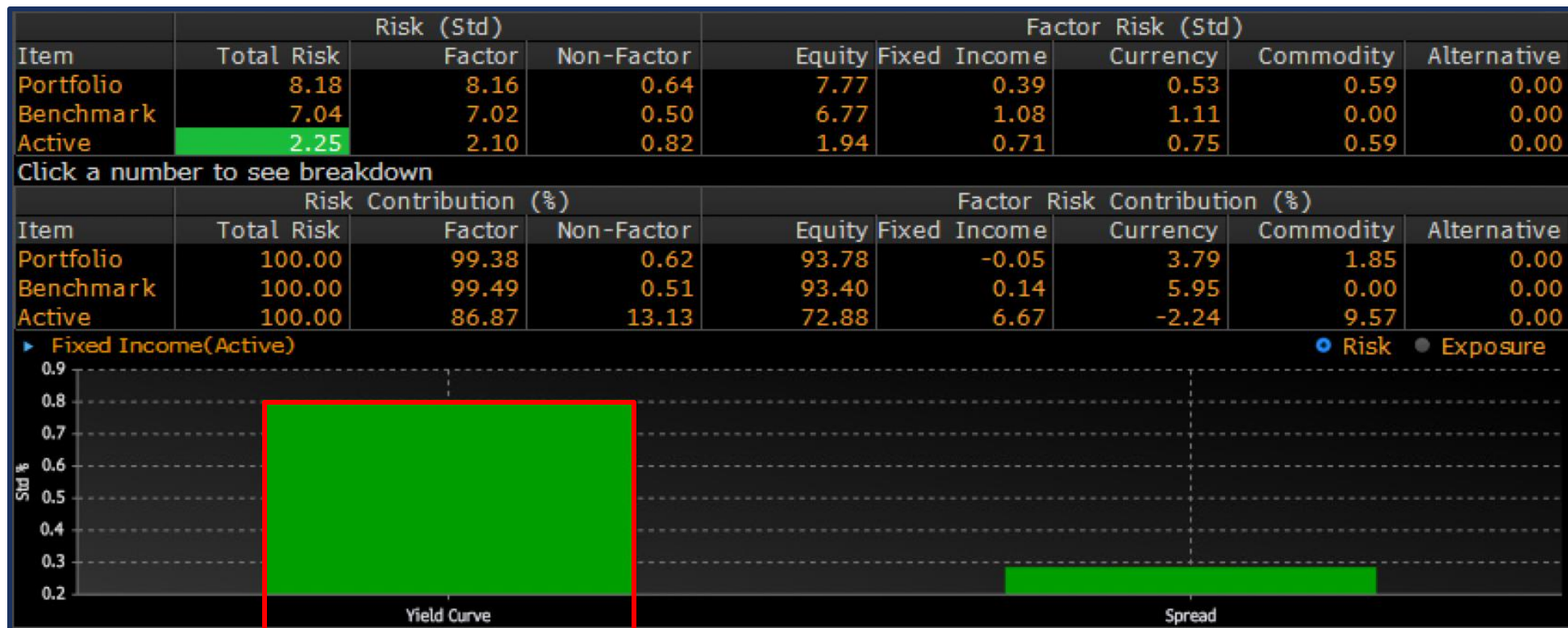
Multi-Asset Risk Strategy (MARS) vs. 60/40 ACWI/AGG: Industry Factor Exposures



Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.

# YIELD CURVE IS THE BIGGEST DRIVER OF FIXED INCOME RISK

Multi-Asset Risk Strategy (MARS) vs. 60/40 ACWI/AGG: Fixed Income Risk

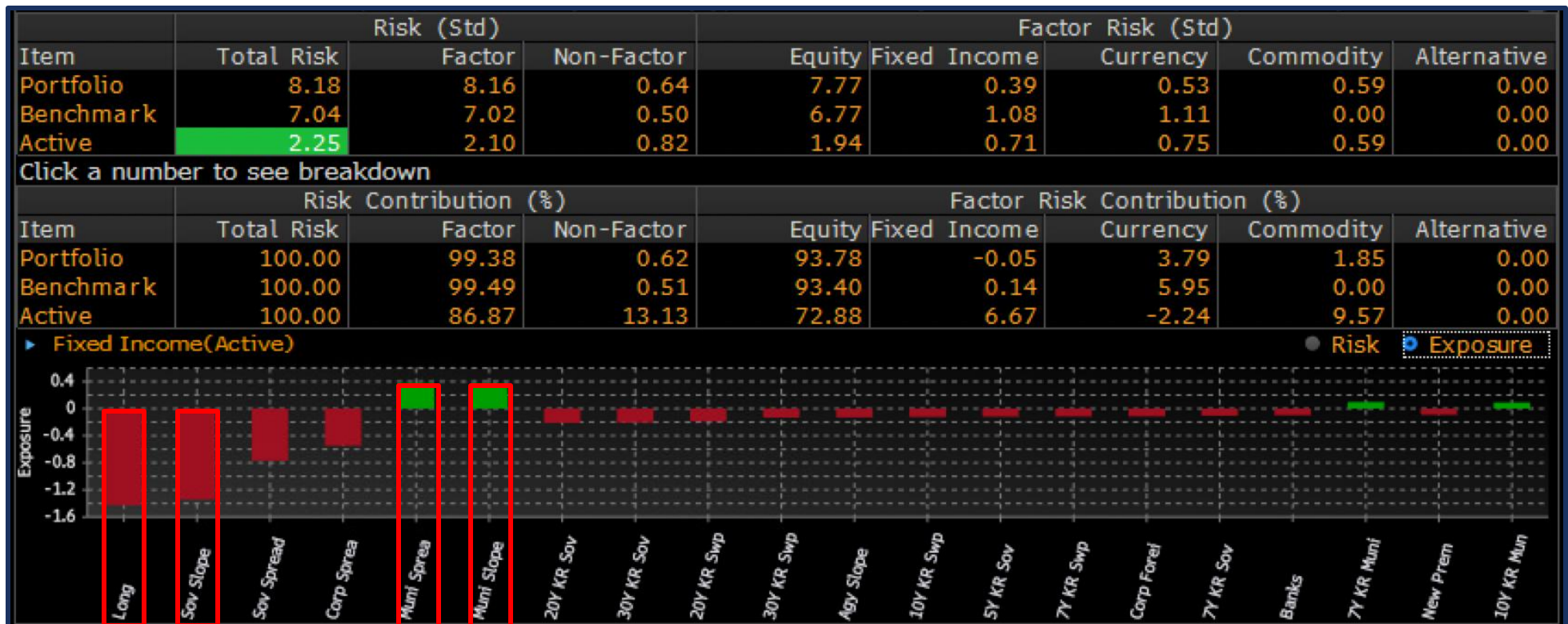


Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.



# THE MODEL IS UNDER EXPOSED TO LONG DURATION & SOVEREIGN SLOPES AND OVER EXPOSED TO MUNI SPREADS & MUNI SLOPES

Multi-Asset Risk Strategy (MARS) vs. 60/40 ACWI/AGG: Fixed Income Factor Exposures

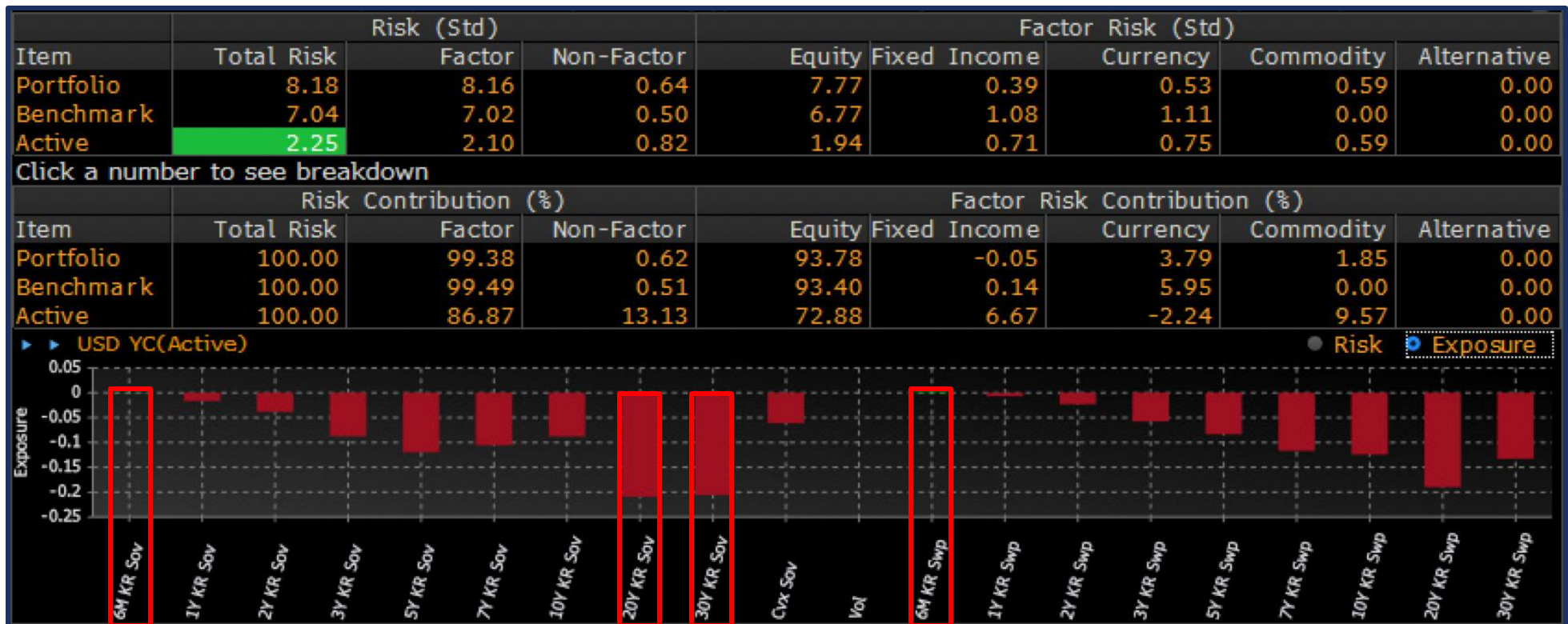


Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.



# THE MODEL IS UNDER EXPOSED TO 20Y KR SOVEREIGNS & 30Y KR SOVEREIGNS AND OVER EXPOSED TO 6M KR SWAPS & 6M KR SOVEREIGNS

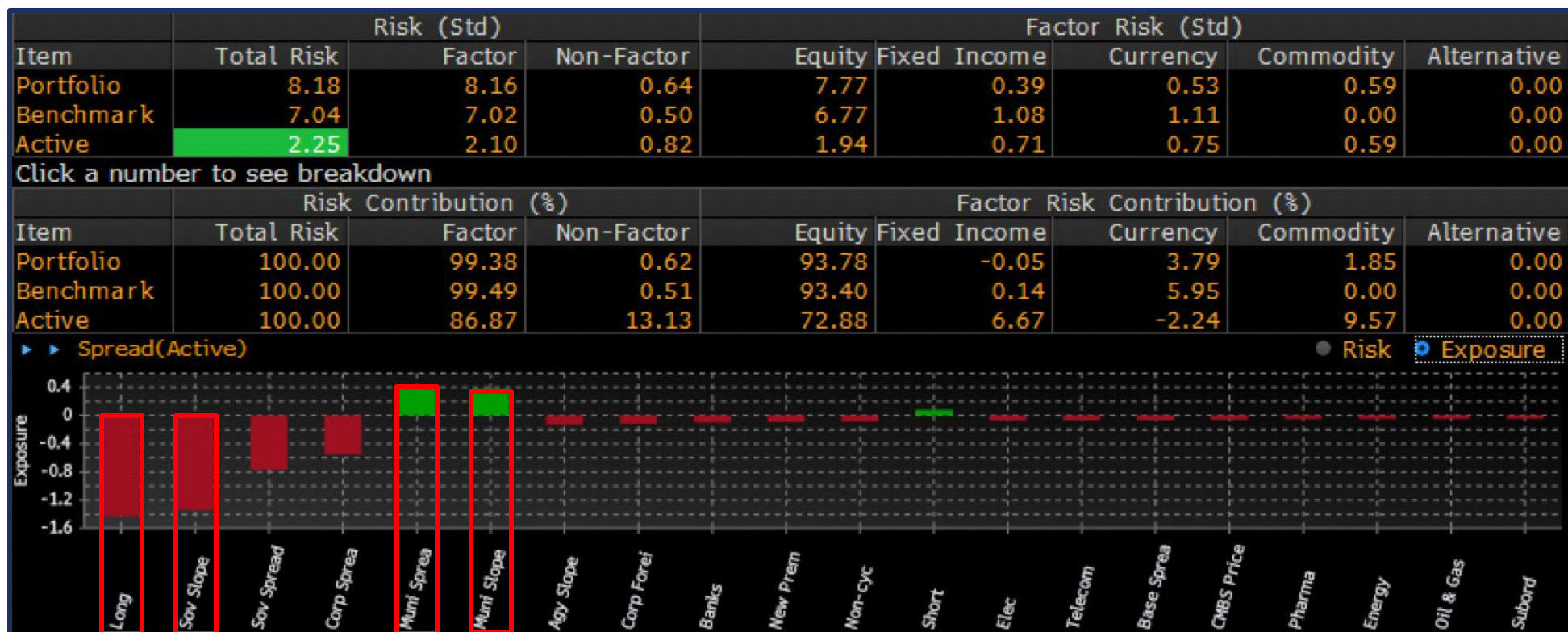
Multi-Asset Risk Strategy (MARS) vs. 60/40 ACWI/AGG: Yield Curve Factor Exposures



Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.

# THE MODEL IS UNDER EXPOSED TO LONG DURATION & SOVEREIGN SLOPES AND OVER EXPOSED TO MUNI SPREADS & MUNI SLOPES

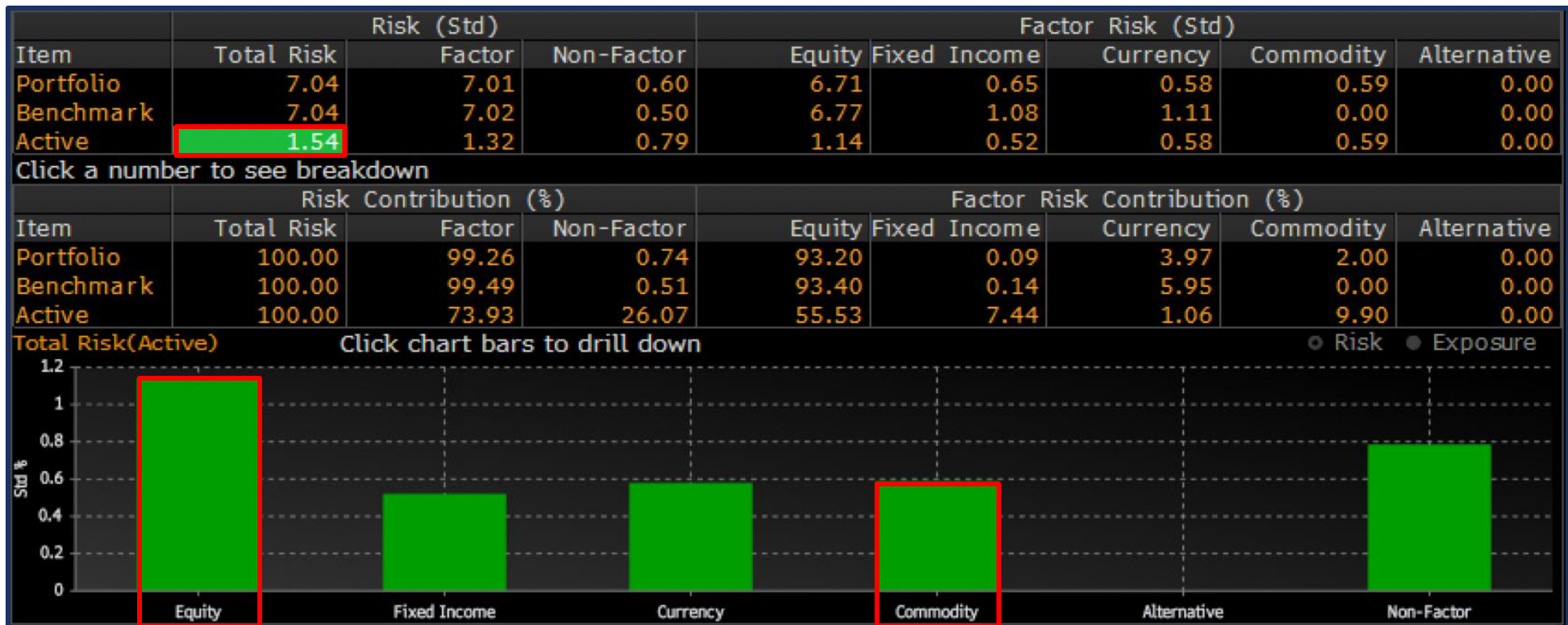
Multi-Asset Risk Strategy (MARS) vs. 60/40 ACWI/AGG: Spread Factor Exposures



Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.

# BLOOMBERG PROJECTS A 1.54% TRACKING ERROR. THE BIGGEST DIVERSIFIABLE RISK IS DRIVEN BY EQUITY & COMMODITY RISK

Dynamic Growth & Income Model vs. 60/40 ACWI/AGG: Total Risk

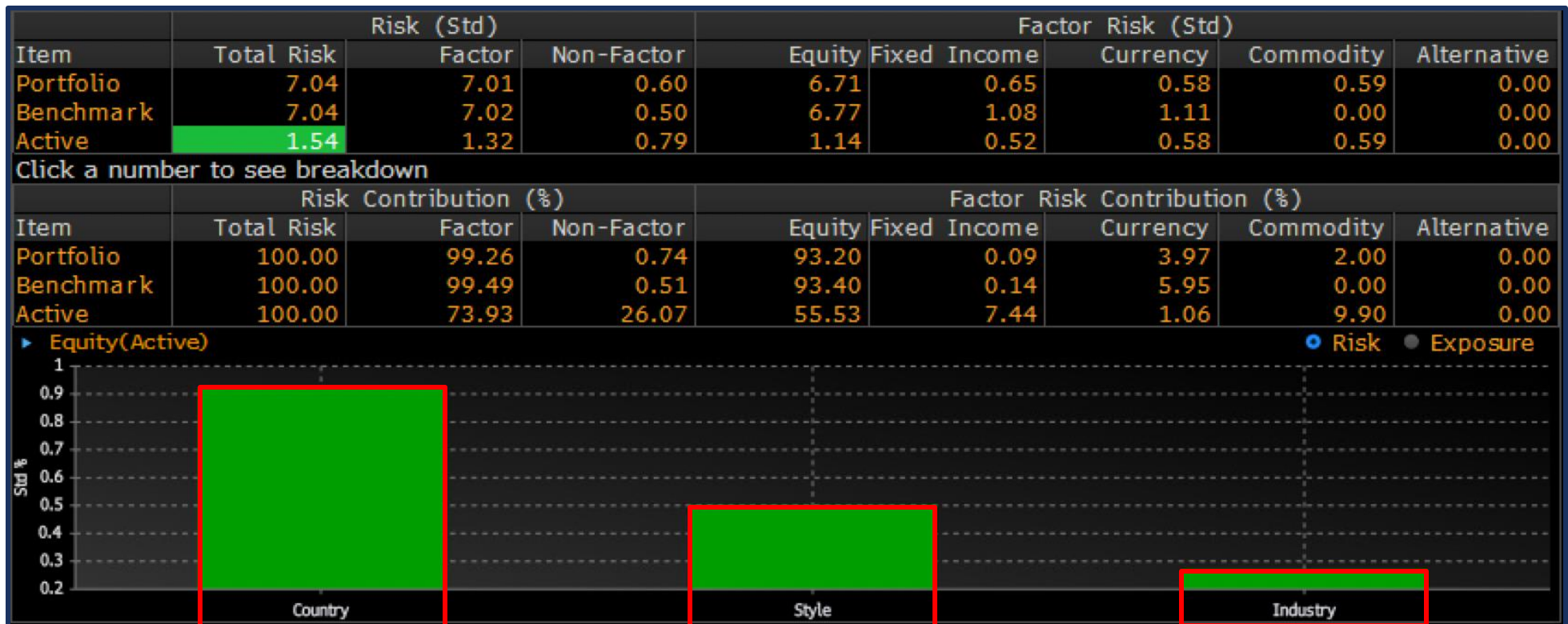


Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.



# COUNTRY, STYLE, & INDUSTRY ARE THE BIGGEST DRIVERS OF EQUITY RISK

Dynamic Growth & Income Model vs. 60/40 ACWI/AGG: Equity Risk

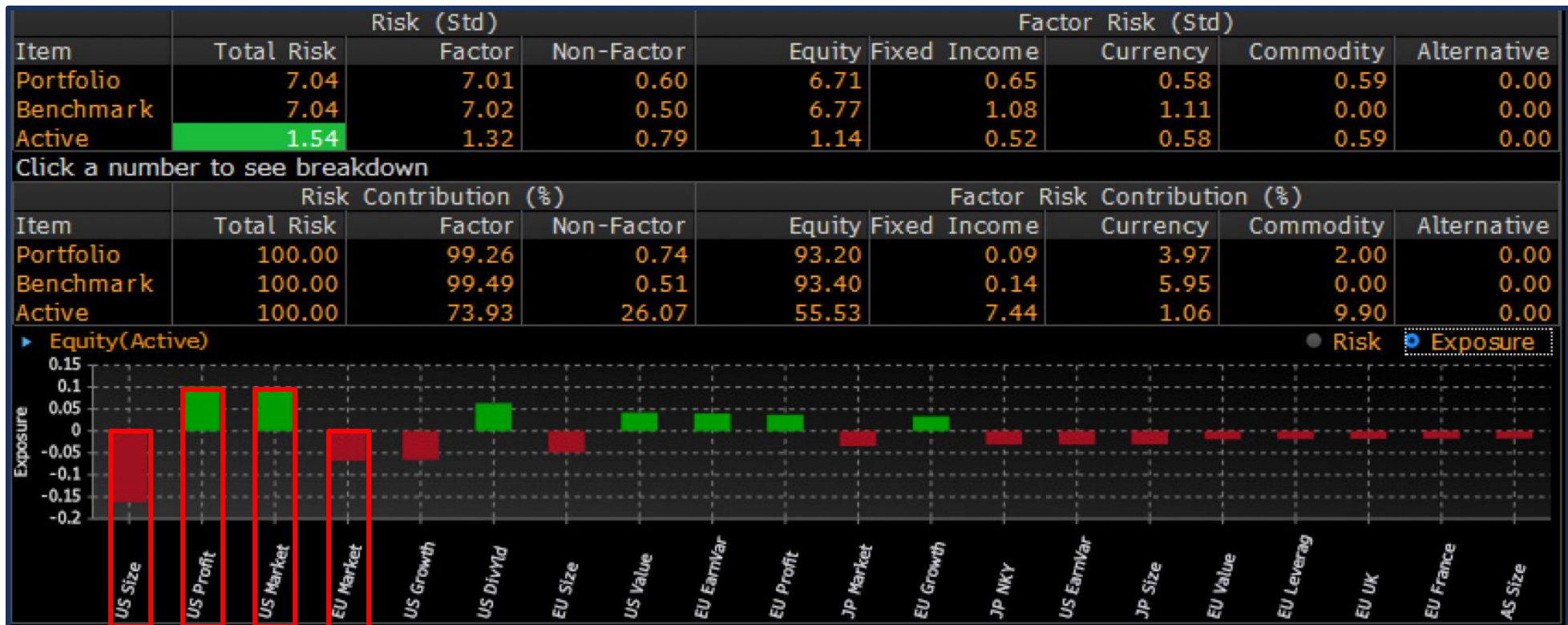


Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.



# THE MODEL IS UNDER EXPOSED TO US SIZE & EU MARKET AND OVER EXPOSED TO US PROFIT & US MARKET

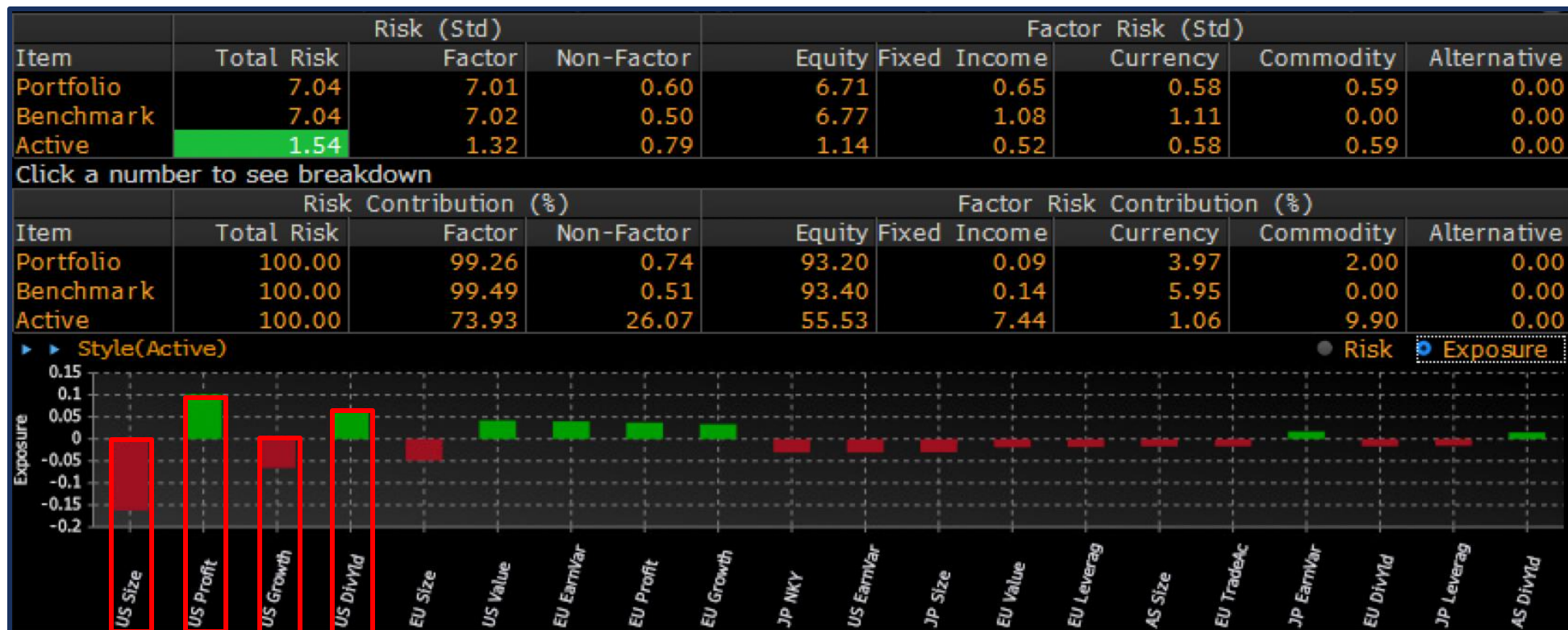
Dynamic Growth & Income Model vs. 60/40 ACWI/AGG: Equity Factor Exposures



Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.

# THE MODEL IS UNDER EXPOSED TO US SIZE & US GROWTH AND OVER EXPOSED TO US PROFIT AND US DIVIDENDS

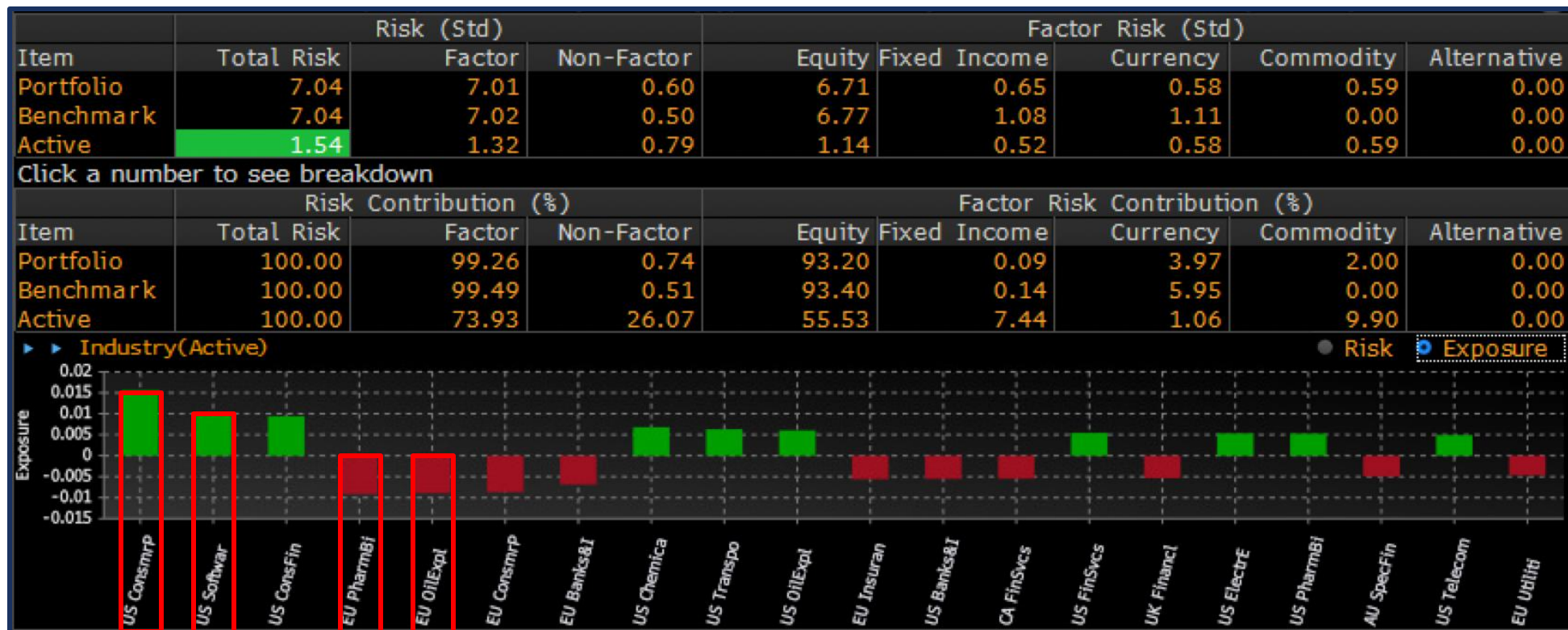
Dynamic Growth & Income Model vs. 60/40 ACWI/AGG: Style Factor Exposures



Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.

# THE MODEL IS UNDER EXPOSED TO EU PHARMA & EU OIL EXPL AND OVER EXPOSED TO US CONSUMER & US SOFTWARE

Dynamic Growth & Income Model vs. 60/40 ACWI/AGG: Industry Factor Exposures

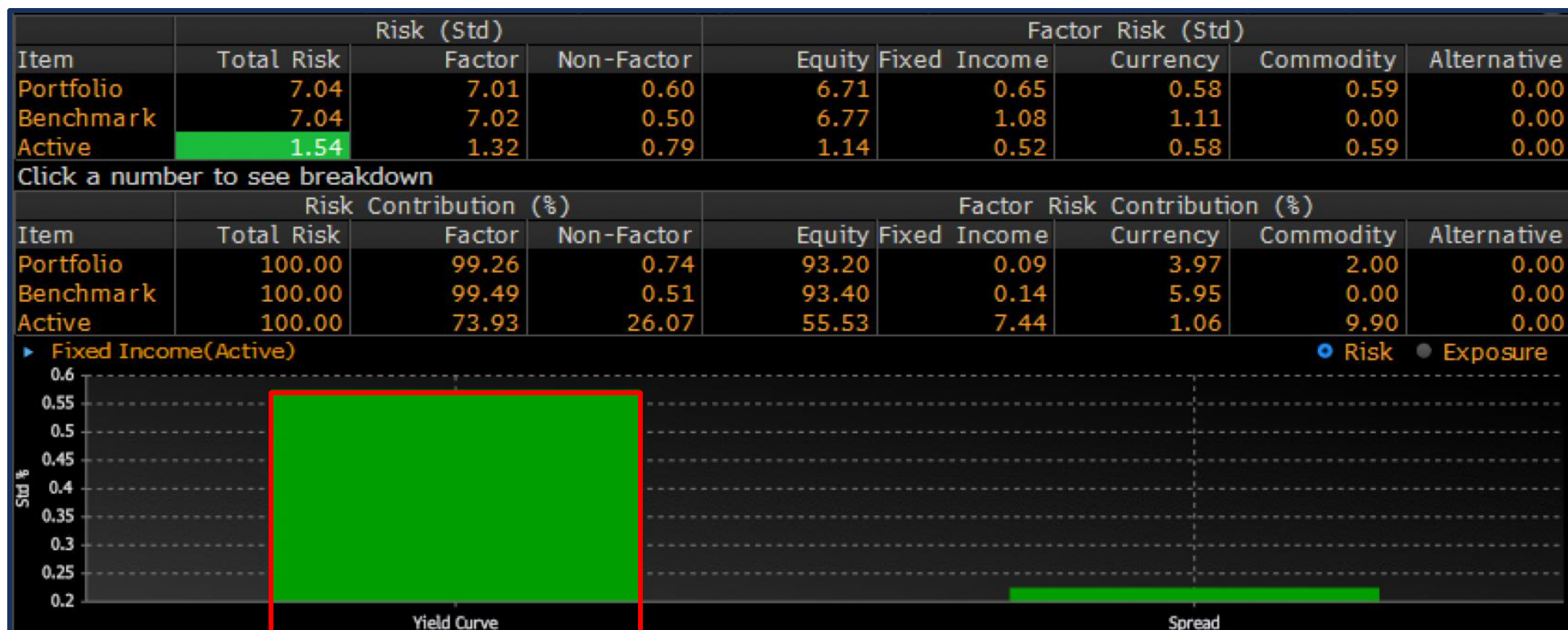


Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.



# YIELD CURVE IS THE BIGGEST DRIVER OF FIXED INCOME RISK

Dynamic Growth & Income Model vs. 60/40 ACWI/AGG: Fixed Income Risk

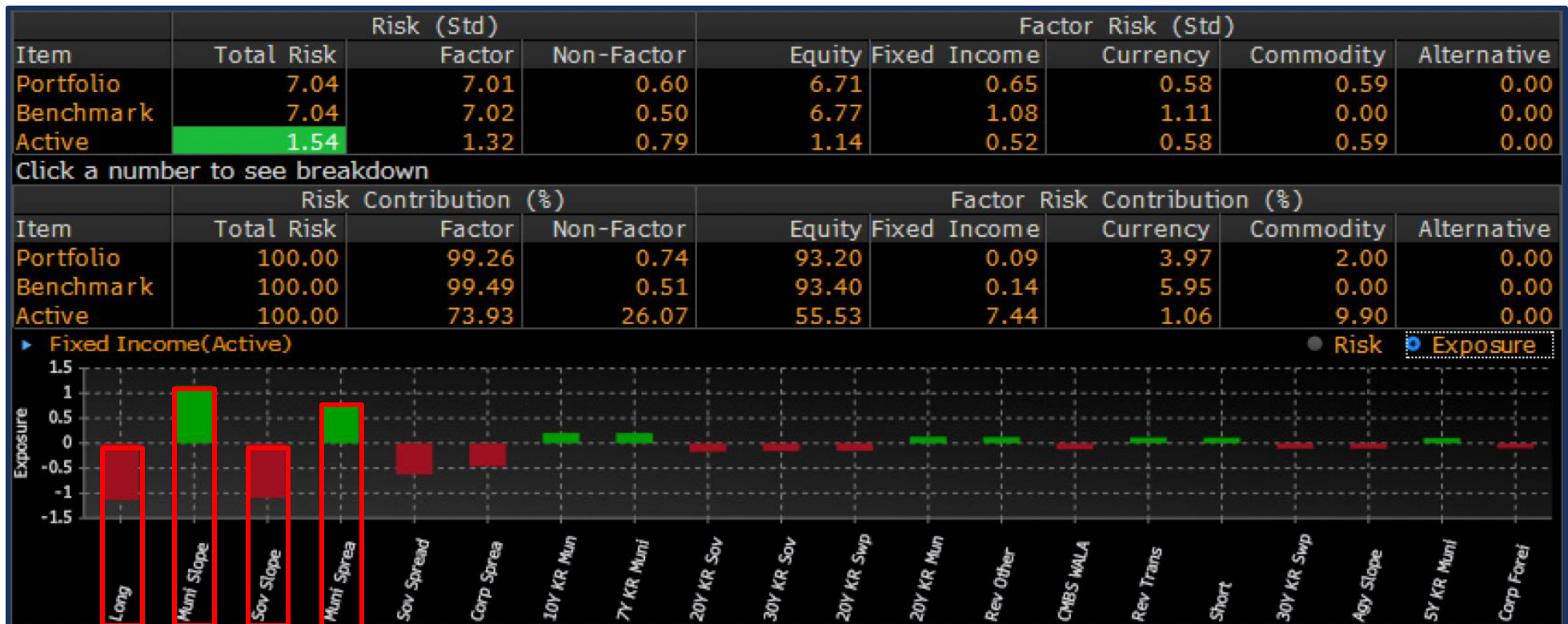


Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.



# THE MODEL IS UNDER EXPOSED TO LONG DURATION & SOVEREIGN SLOPES AND OVER EXPOSED TO MUNI SLOPES & MUNI SPREADS

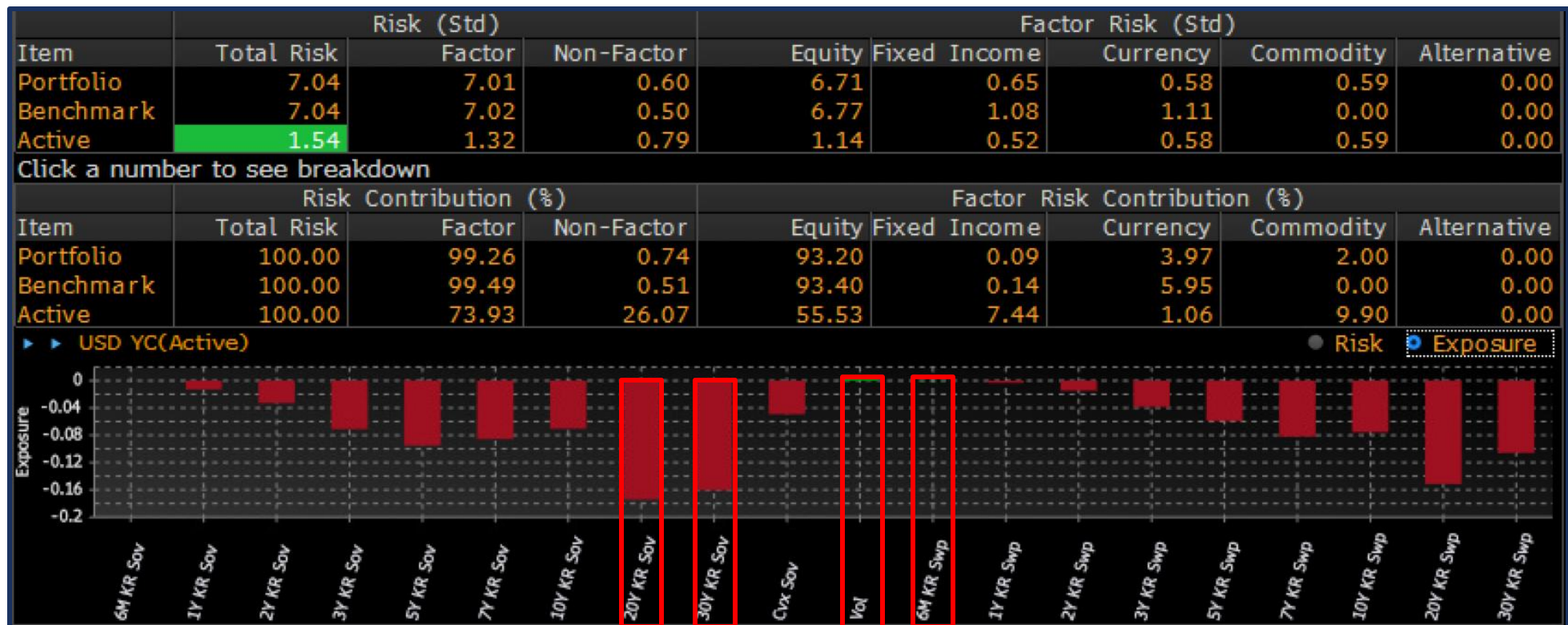
Dynamic Growth & Income Model vs. 60/40 ACWI/AGG: Fixed Income Factor Exposures



Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.

# THE MODEL IS UNDER EXPOSED TO 20Y KR SOVEREIGNS & 30Y KR SOVEREIGNS AND OVER EXPOSED TO VOL & 6M KR SWAPS

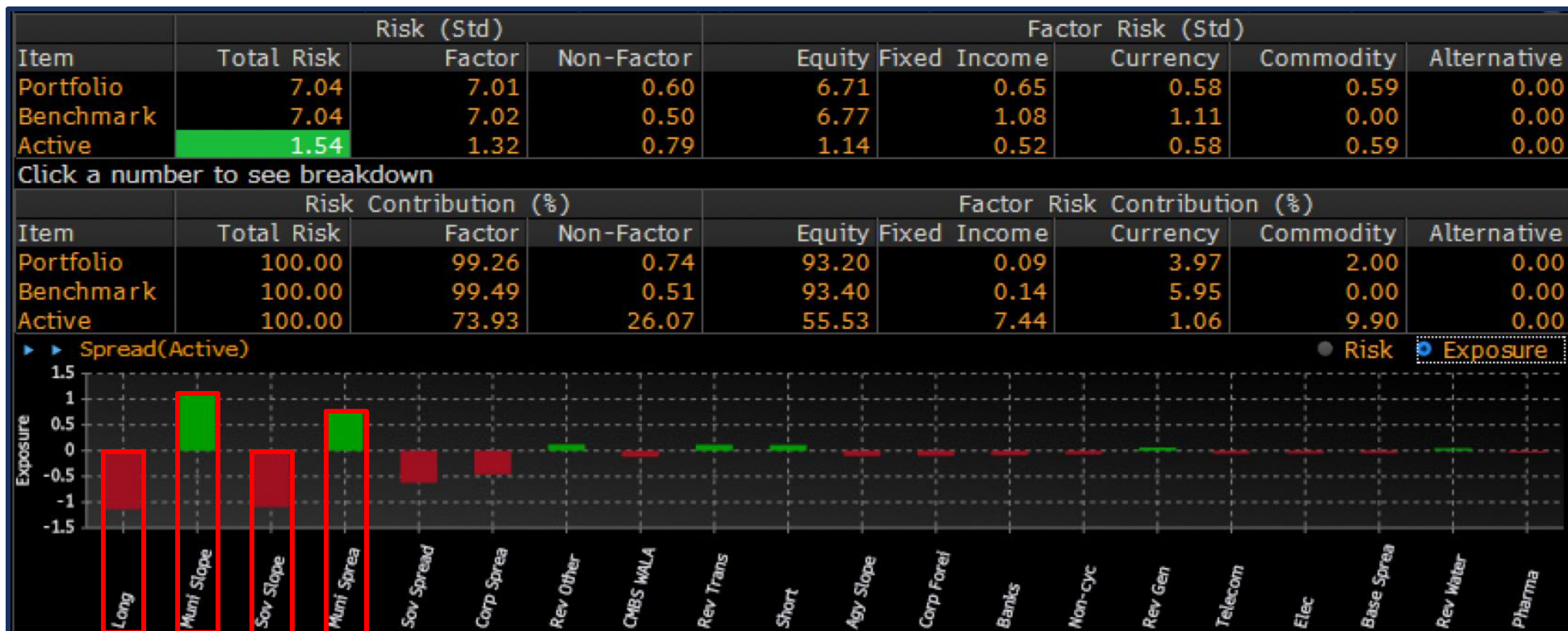
Dynamic Growth & Income Model vs. 60/40 ACWI/AGG: Yield Curve Factor Exposures



Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.

# THE MODEL IS UNDER EXPOSED TO LONG DURATION & SOVEREIGN SLOPES AND OVER EXPOSED TO MUNI SLOPES & MUNI SPREADS

Dynamic Growth & Income Model vs. 60/40 ACWI/AGG: Spread Factor Exposures

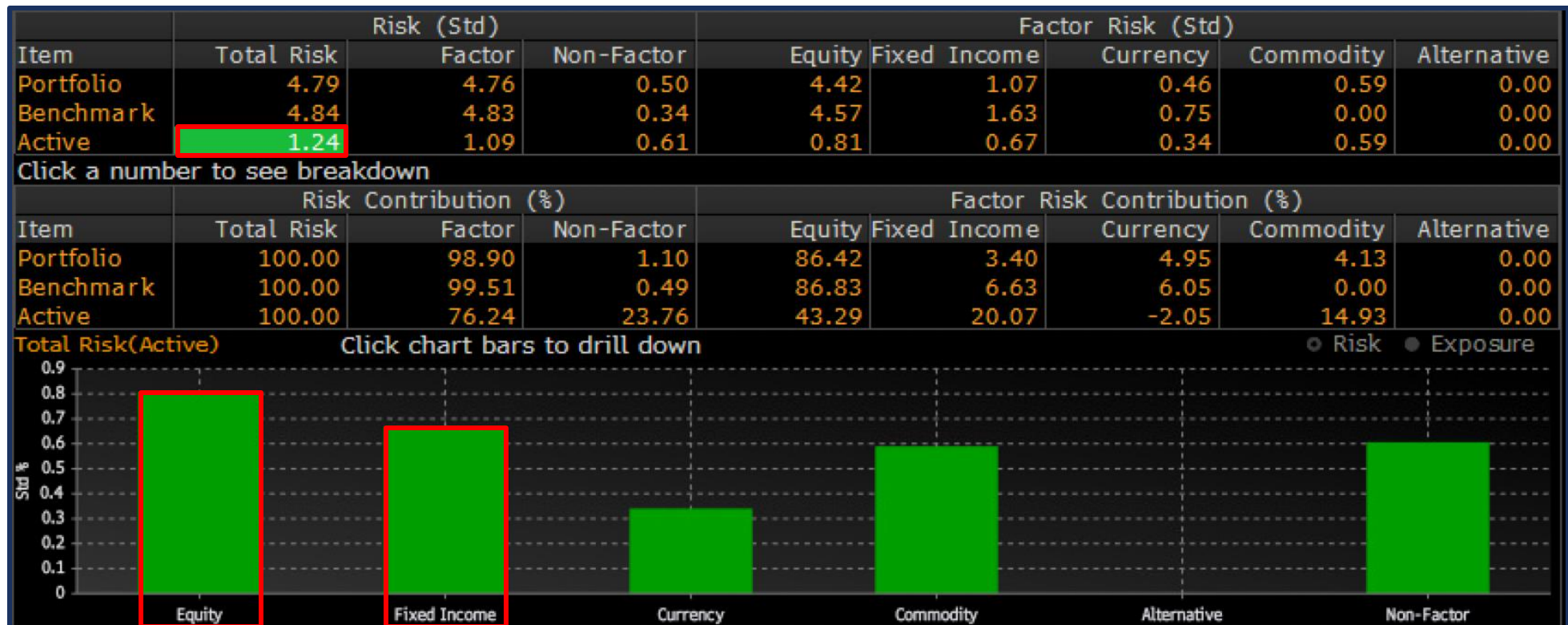


Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.



# BLOOMBERG PROJECTS A 1.24% TRACKING ERROR. THE BIGGEST DIVERSIFIABLE RISK IS DRIVEN BY EQUITY & FIXED INCOME RISK

Dynamic Conservative Model vs. 40/60 ACWI/AGG: Total Risk

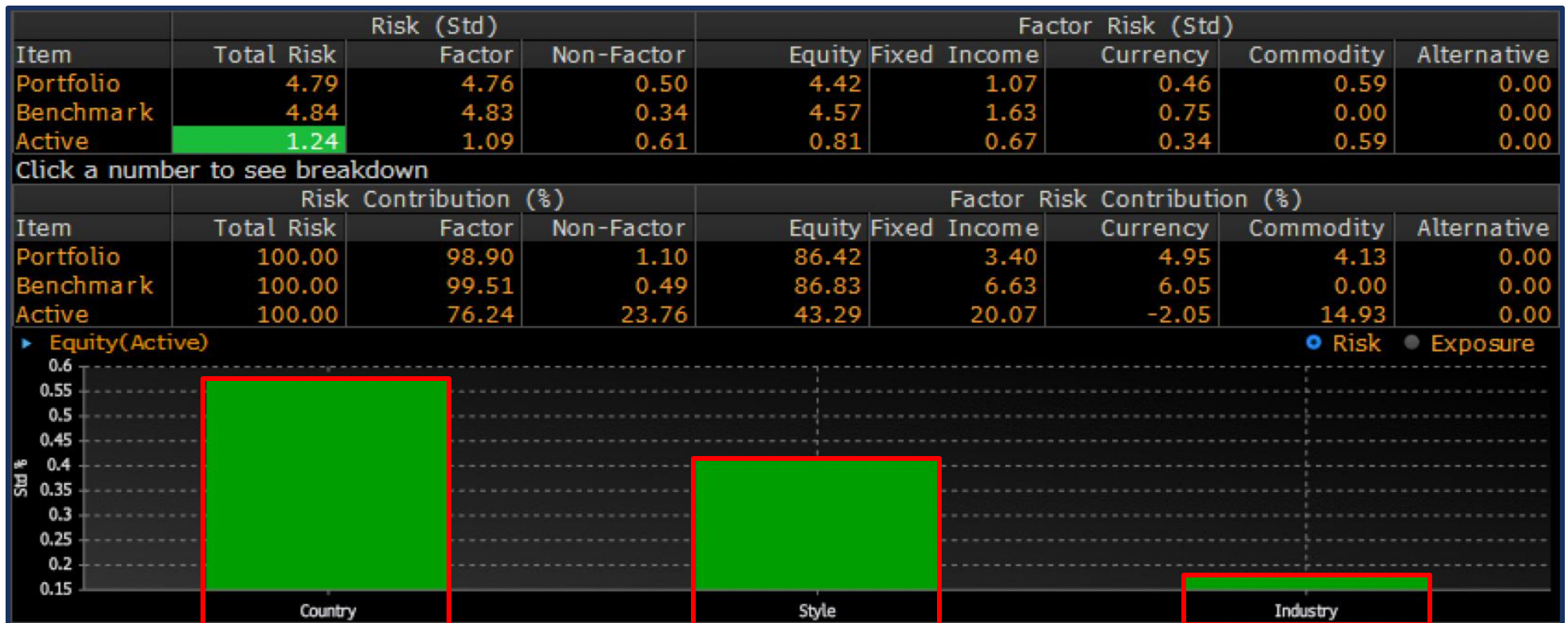


Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.



# COUNTRY, STYLE, & INDUSTRY ARE THE BIGGEST DRIVERS OF EQUITY RISK

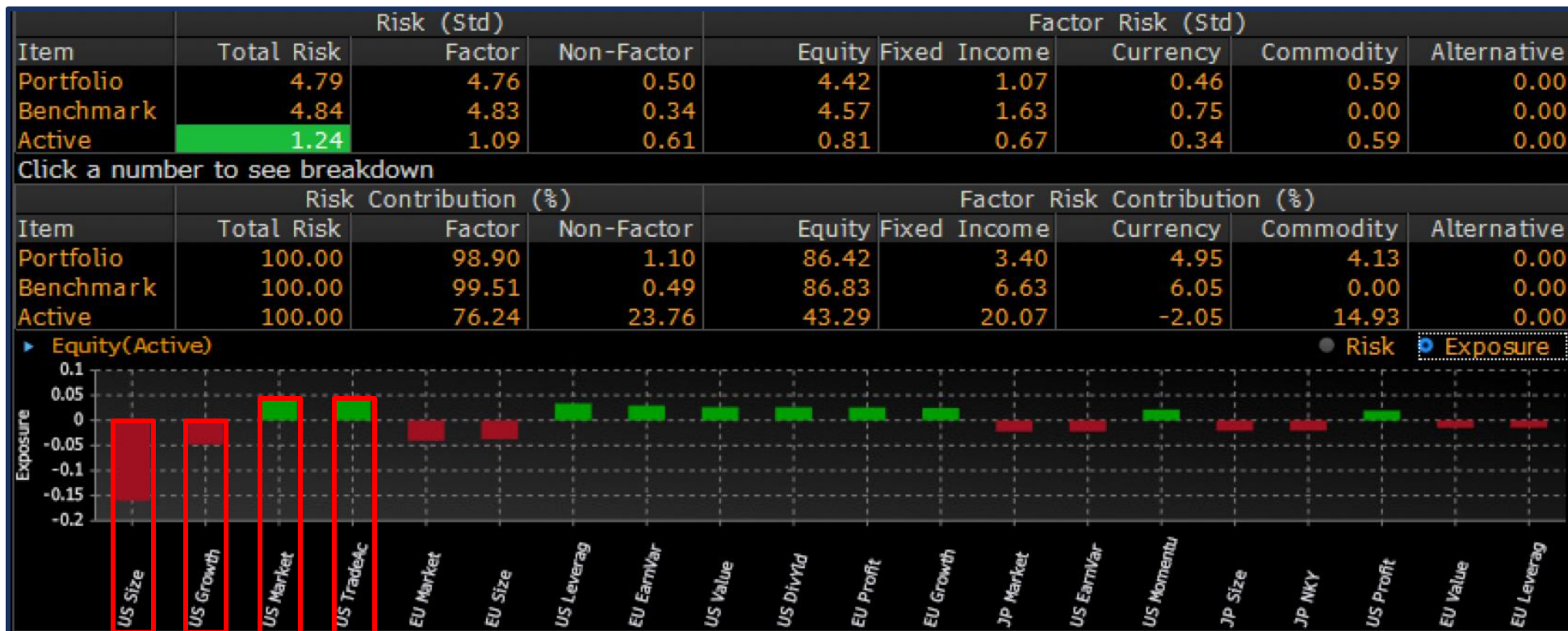
Dynamic Conservative Model vs. 40/60 ACWI/AGG: Equity Risk



Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.

# THE MODEL IS UNDER EXPOSED TO US SIZE & US GROWTH AND OVER EXPOSED TO US MARKET & US TRADE ACTIVITY

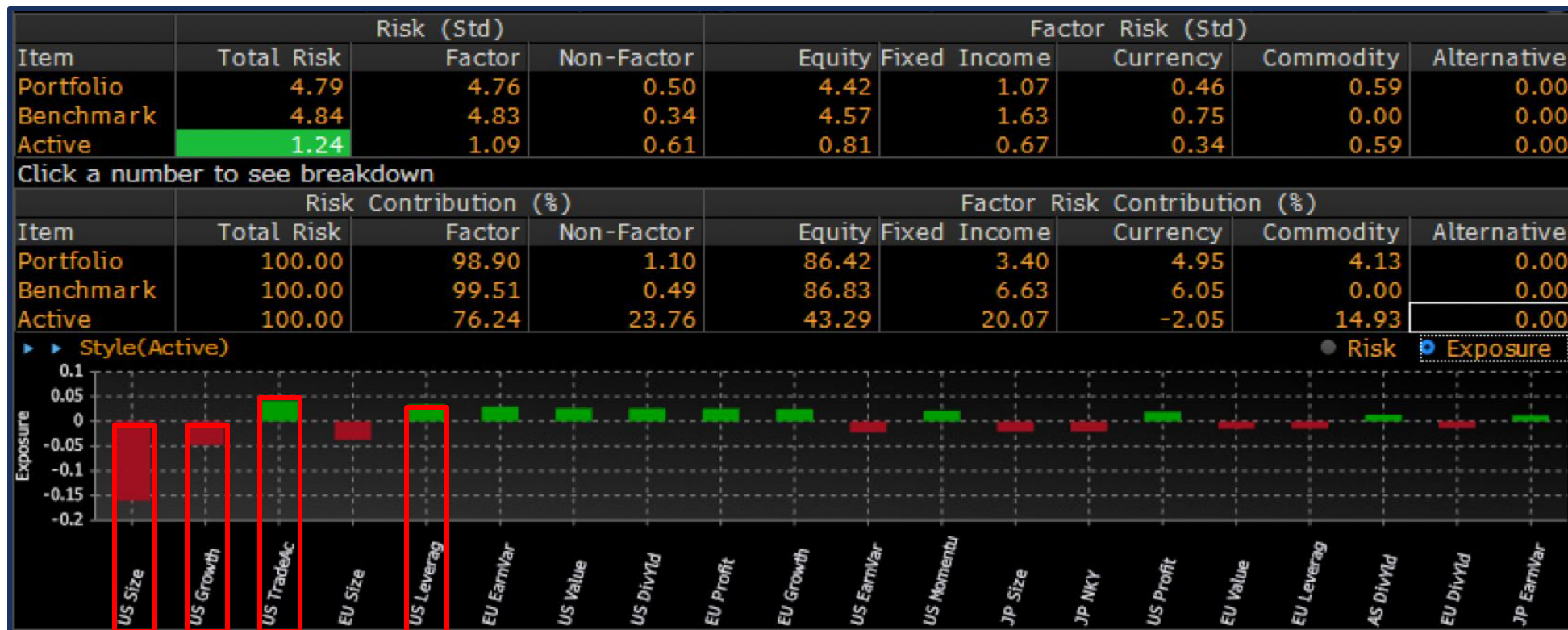
Dynamic Conservative Model vs. 40/60 ACWI/AGG: Equity Factor Exposures



Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.

# THE MODEL IS UNDER EXPOSED TO US SIZE & US GROWTH AND OVER EXPOSED TO US TRADE ACTIVITY & US LEVERAGE

Dynamic Conservative Model vs. 40/60 ACWI/AGG: Style Factor Exposures

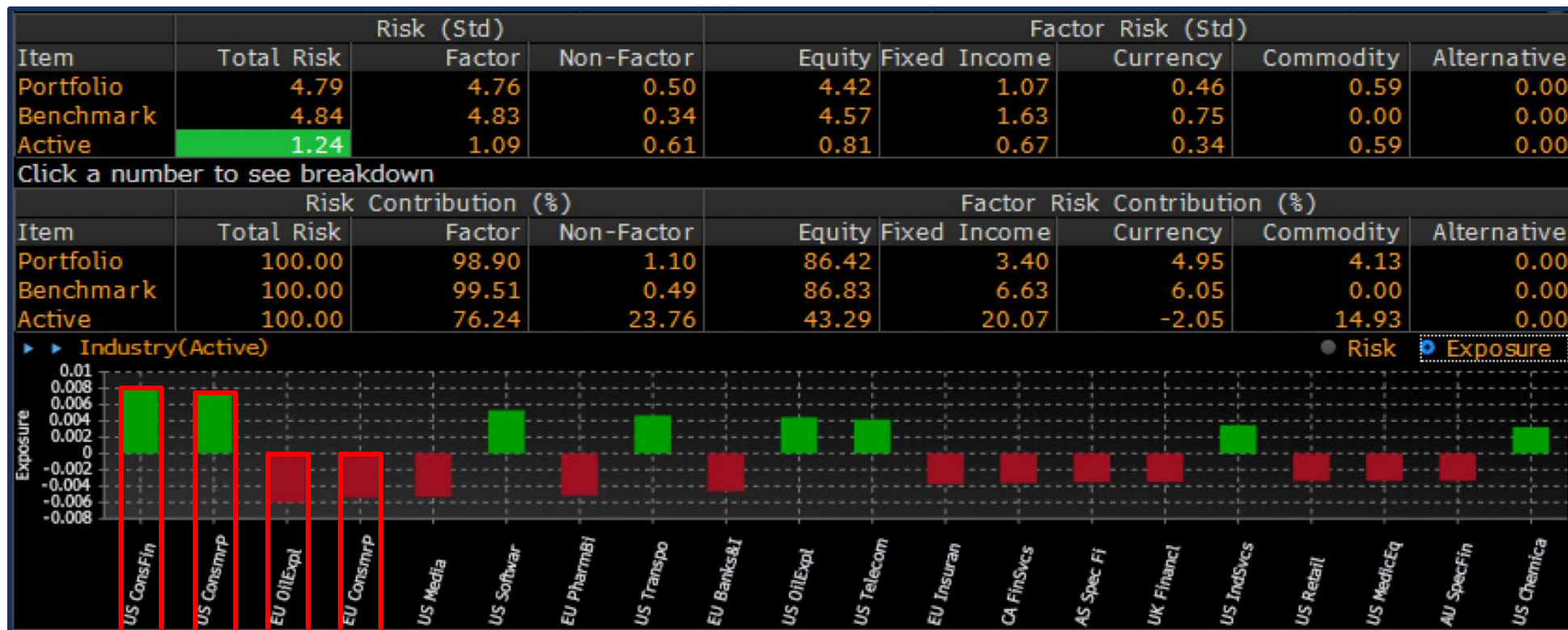


Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.



# THE MODEL IS UNDER EXPOSED TO EU OIL EXPL & EU CONSUMER AND OVER EXPOSED TO US CONS FIN & US CONSUMER

Dynamic Conservative Model vs. 40/60 ACWI/AGG: Industry Factor Exposures

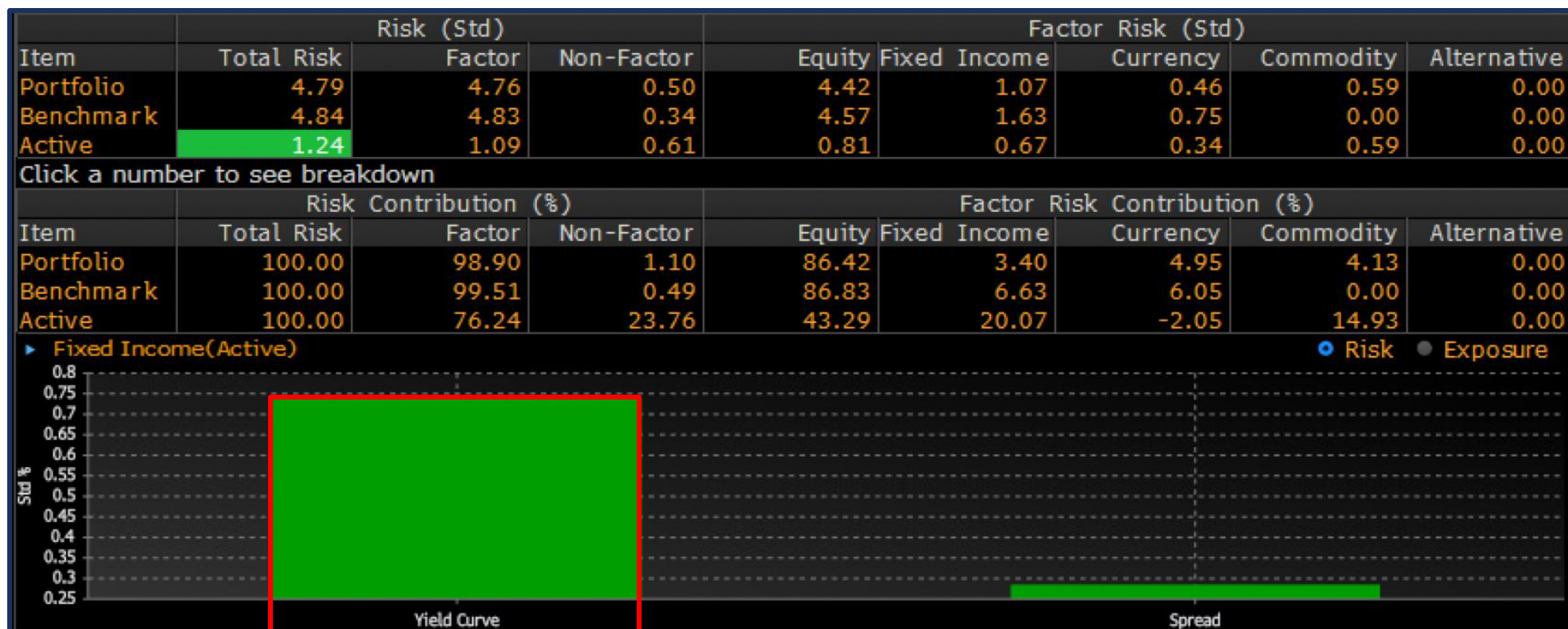


Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.



# YIELD CURVE IS THE BIGGEST DRIVER OF FIXED INCOME RISK

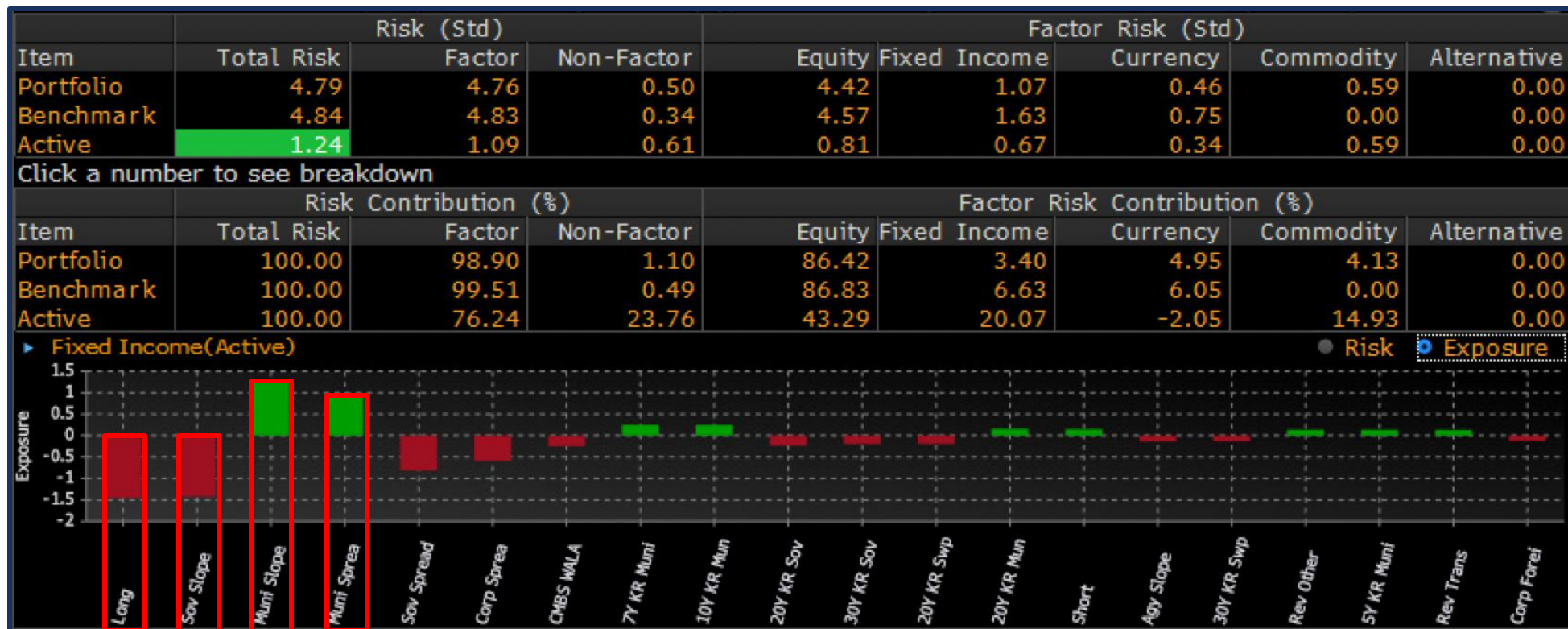
Dynamic Conservative Model vs. 40/60 ACWI/AGG: Fixed Income Risk



Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.

# THE MODEL IS UNDER EXPOSED TO LONG DURATION & SOVEREIGN SLOPES AND OVER EXPOSED TO MUNI SLOPES & MUNI SPREADS

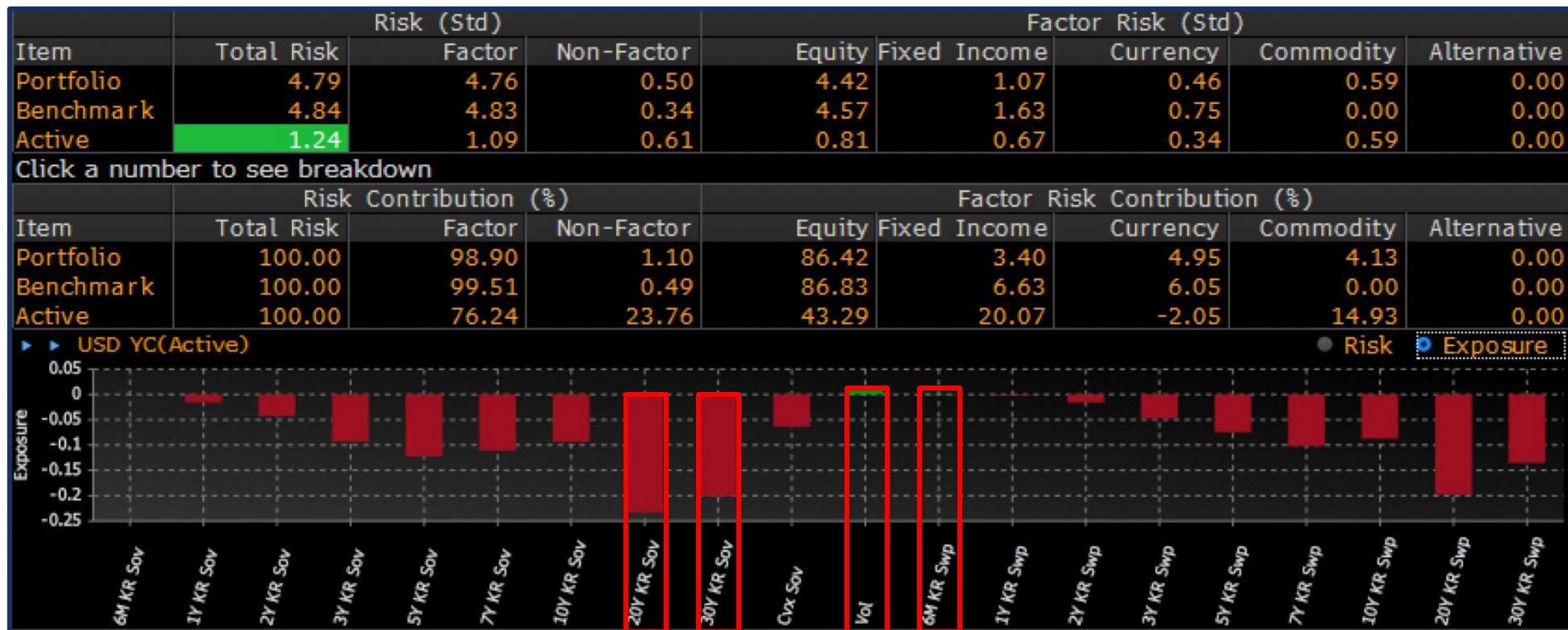
Dynamic Conservative Model vs. 40/60 ACWI/AGG: Fixed Income Factor Exposures



Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.

# THE MODEL IS UNDER EXPOSED TO 20Y KR SOVEREIGNS & 30Y KR SOVEREIGNS AND OVER EXPOSED TO VOL & 6M KR SWAPS

Dynamic Conservative Model vs. 40/60 ACWI/AGG: Yield Curve Factor Exposures

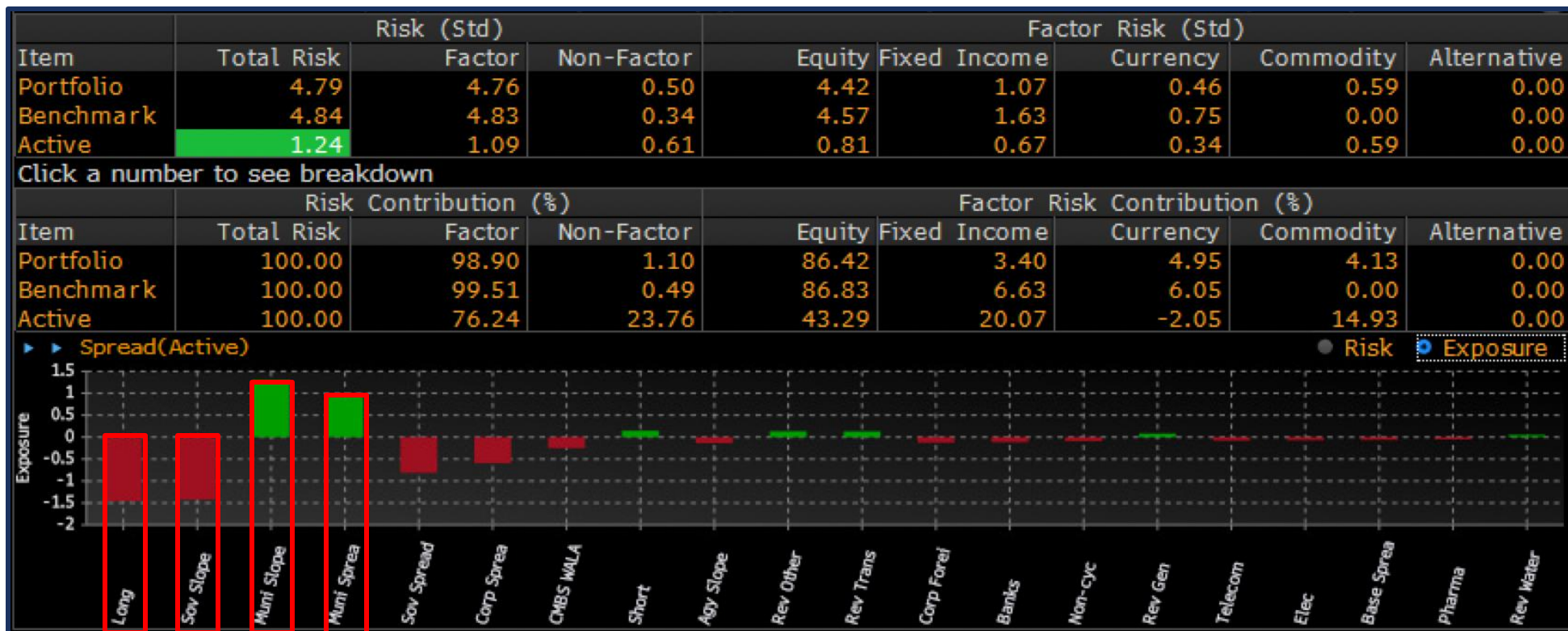


Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.



# THE MODEL IS UNDER EXPOSED TO LONG DURATION & SOVEREIGN SLOPES AND OVER EXPOSED TO MUNI SLOPES & MUNI SPREADS

Dynamic Conservative Model vs. 40/60 ACWI/AGG: Spread Factor Exposures

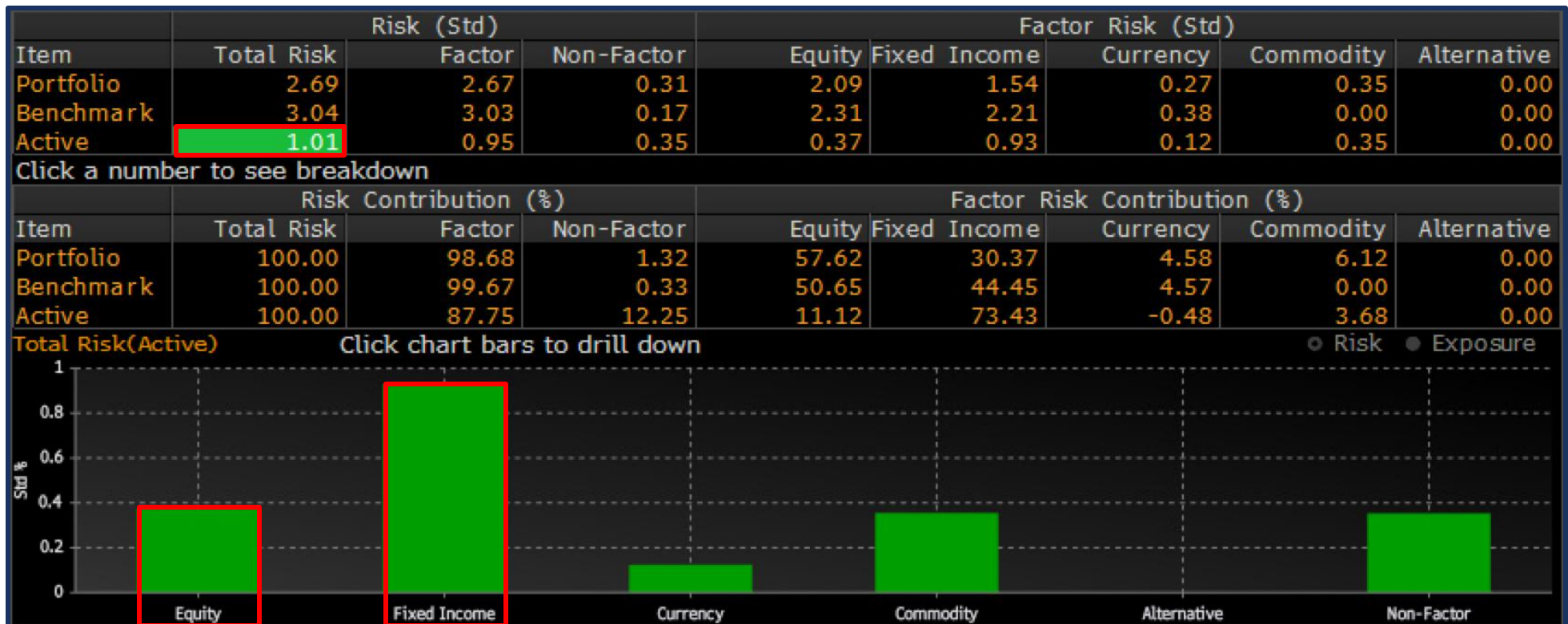


Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.



# BLOOMBERG PROJECTS A 1.01% TRACKING ERROR. THE BIGGEST DIVERSIFIABLE RISK IS DRIVEN BY FIXED INCOME & EQUITY RISK

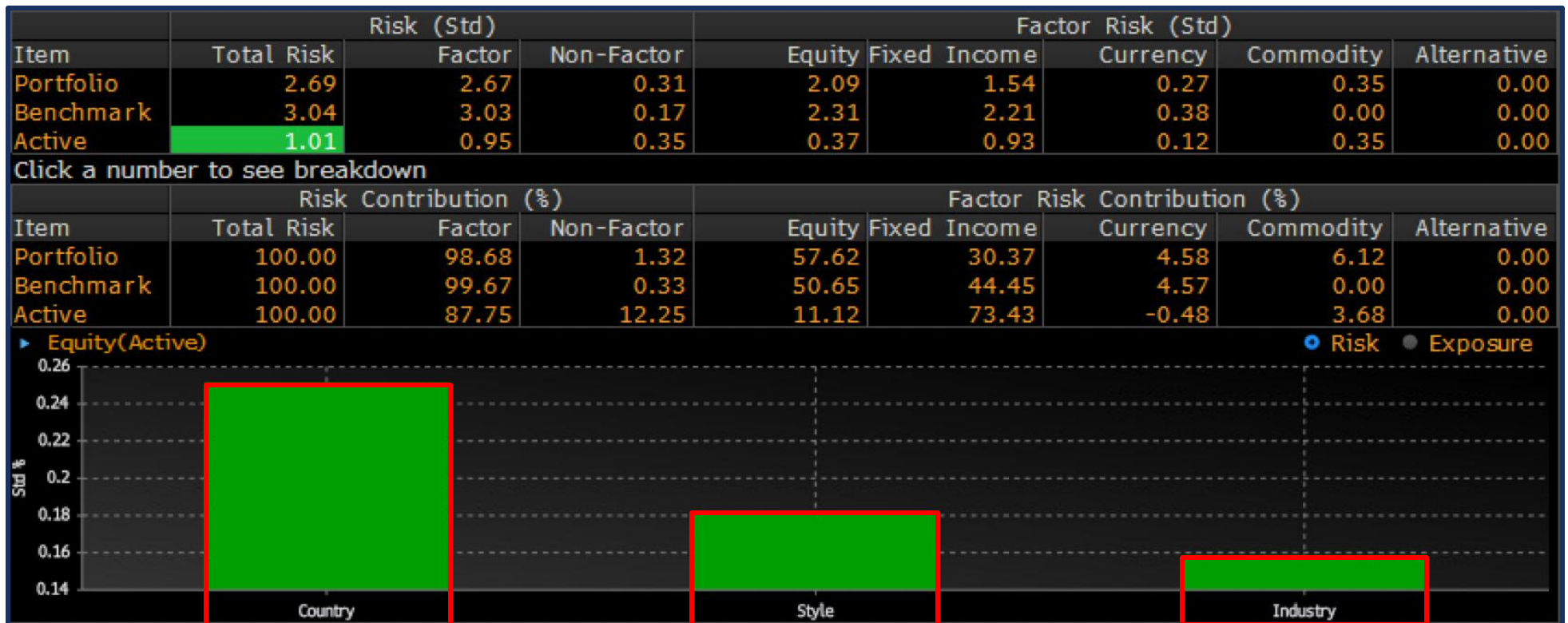
Risk Managed Dynamic Income (RMDI) Model vs. 20/80 ACWI/AGG: Total Risk



Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.

# COUNTRY, STYLE, & INDUSTRY ARE THE BIGGEST DRIVERS OF EQUITY RISK

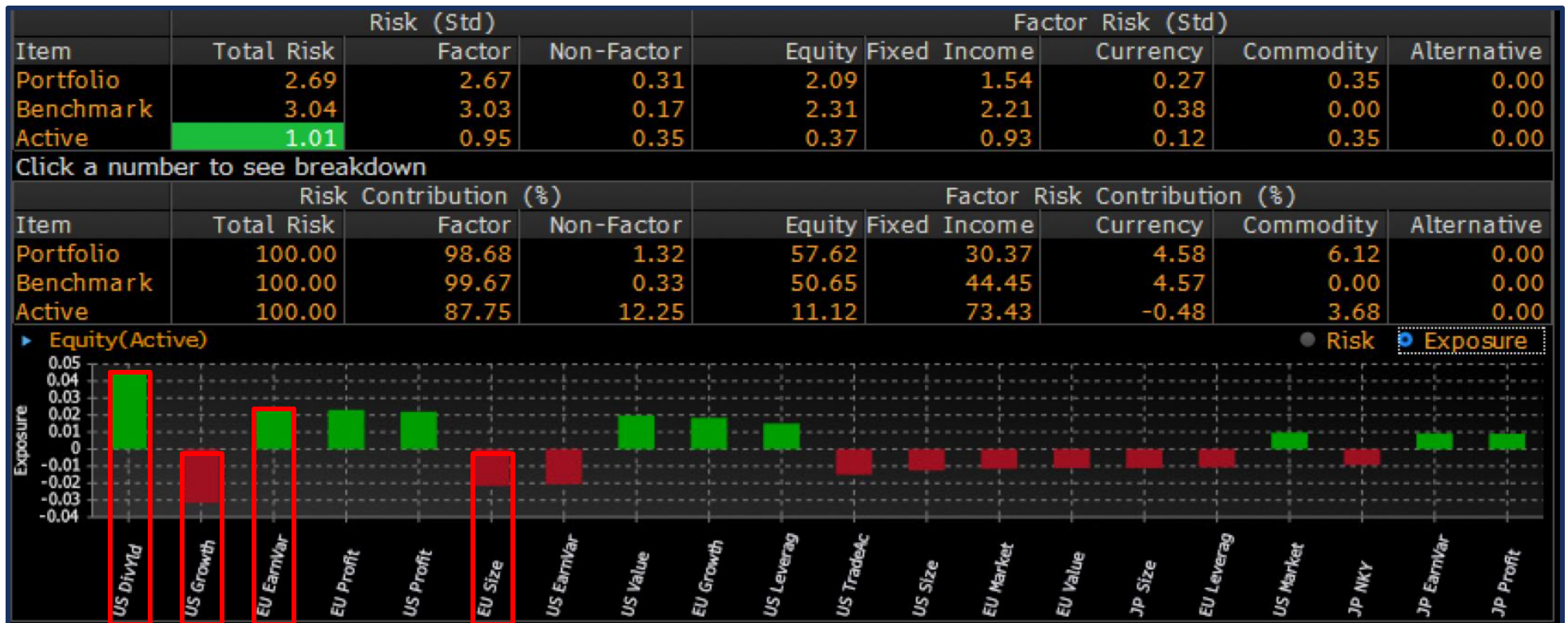
Risk Managed Dynamic Income (RMDI) Model vs. 20/80 ACWI/AGG: Equity Risk



Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.

# THE MODEL IS UNDER EXPOSED TO US GROWTH & EU SIZE AND OVER EXPOSED TO US DIVIDENDS & EU EARNINGS

Risk Managed Dynamic Income (RMDI) Model vs. 20/80 ACWI/AGG: Equity Factor Exposures

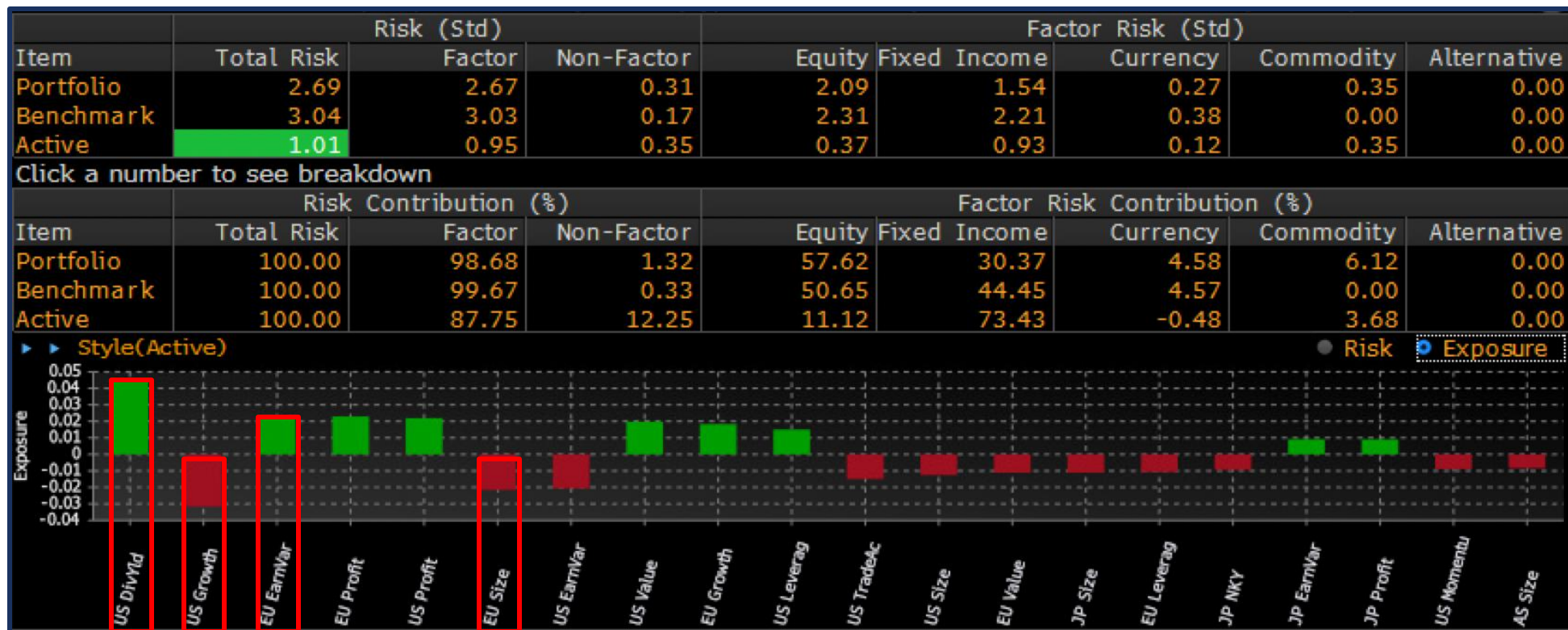


Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.



# THE MODEL IS UNDER EXPOSED TO US GROWTH & EU SIZE AND OVER EXPOSED TO US DIVIDENDS & EU EARNINGS

Risk Managed Dynamic Income (RMDI) Model vs. 20/80 ACWI/AGG: Style Factor Exposures

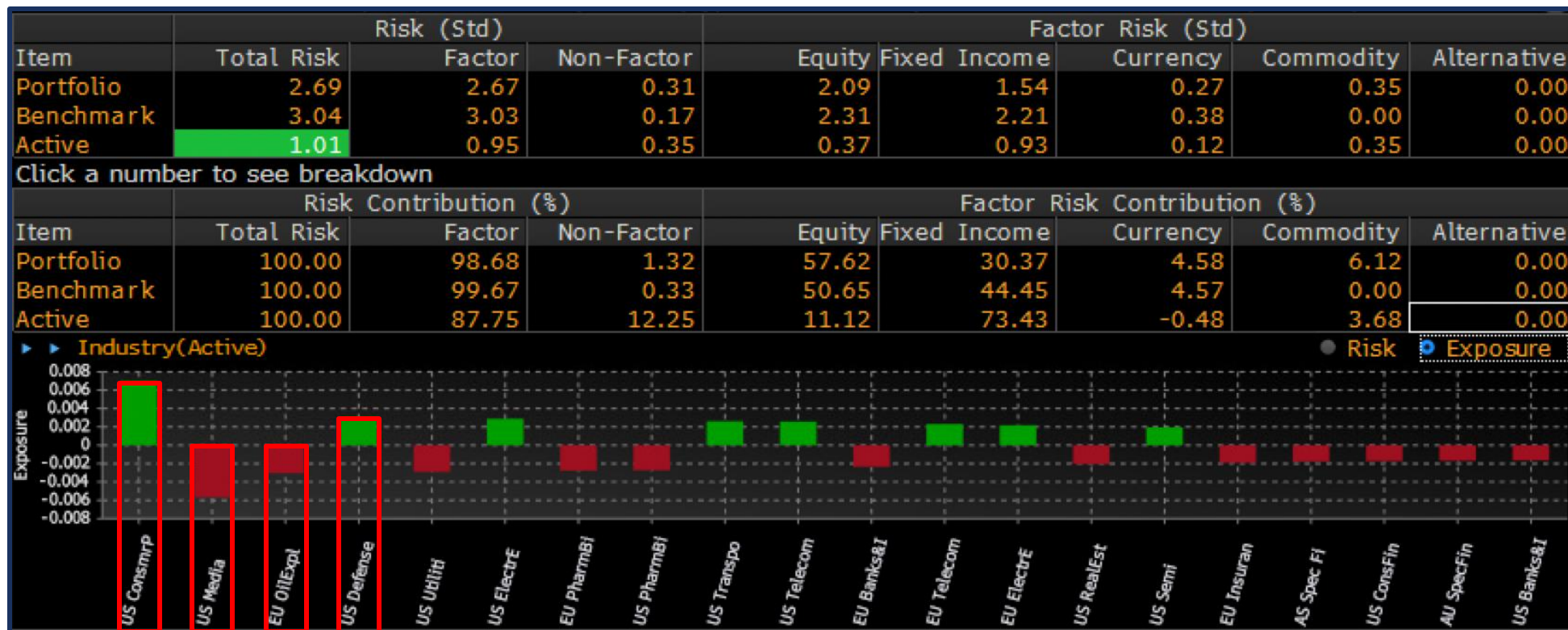


Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.



# THE MODEL IS UNDER EXPOSED TO US MEDIA & EU OIL EXPL AND OVER EXPOSED TO US CONSUMER & US DEFENSIVES

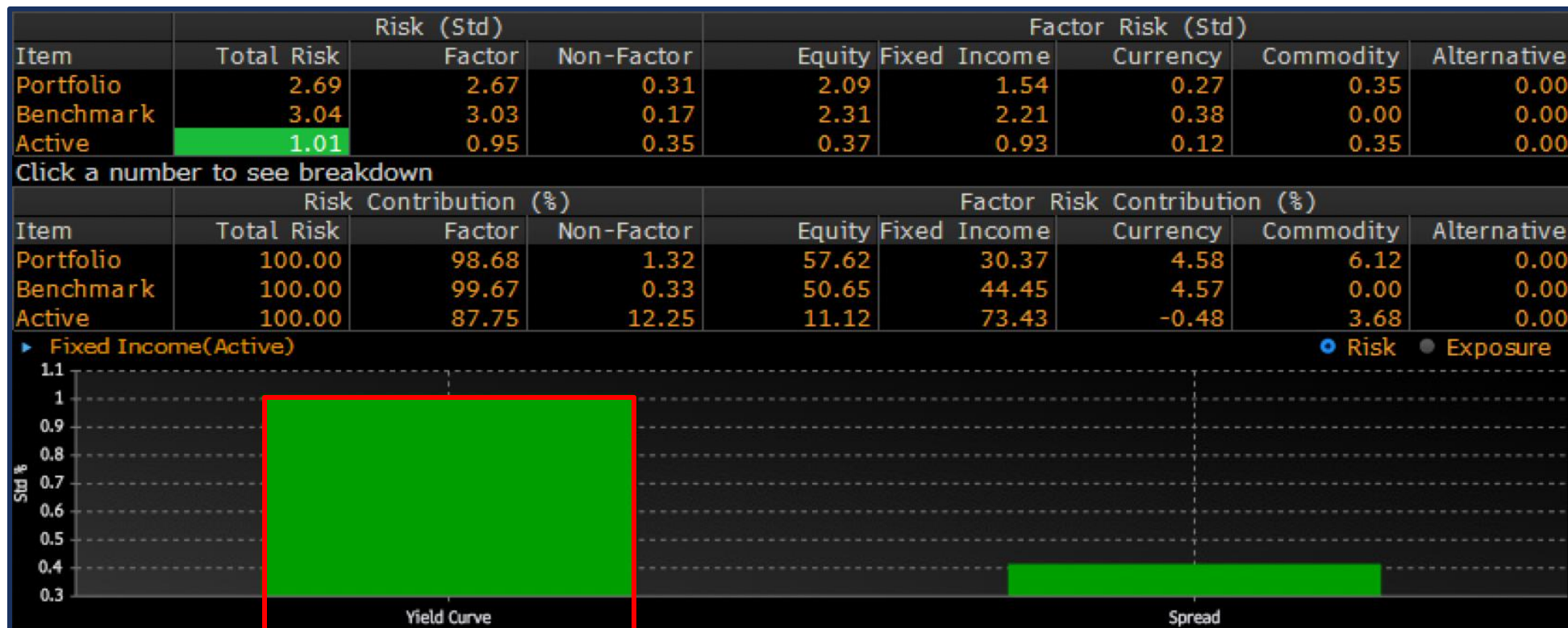
Risk Managed Dynamic Income (RMDI) Model vs. 20/80 ACWI/AGG: Industry Factor Exposures



Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.

# YIELD CURVE IS THE BIGGEST DRIVER OF FIXED INCOME RISK

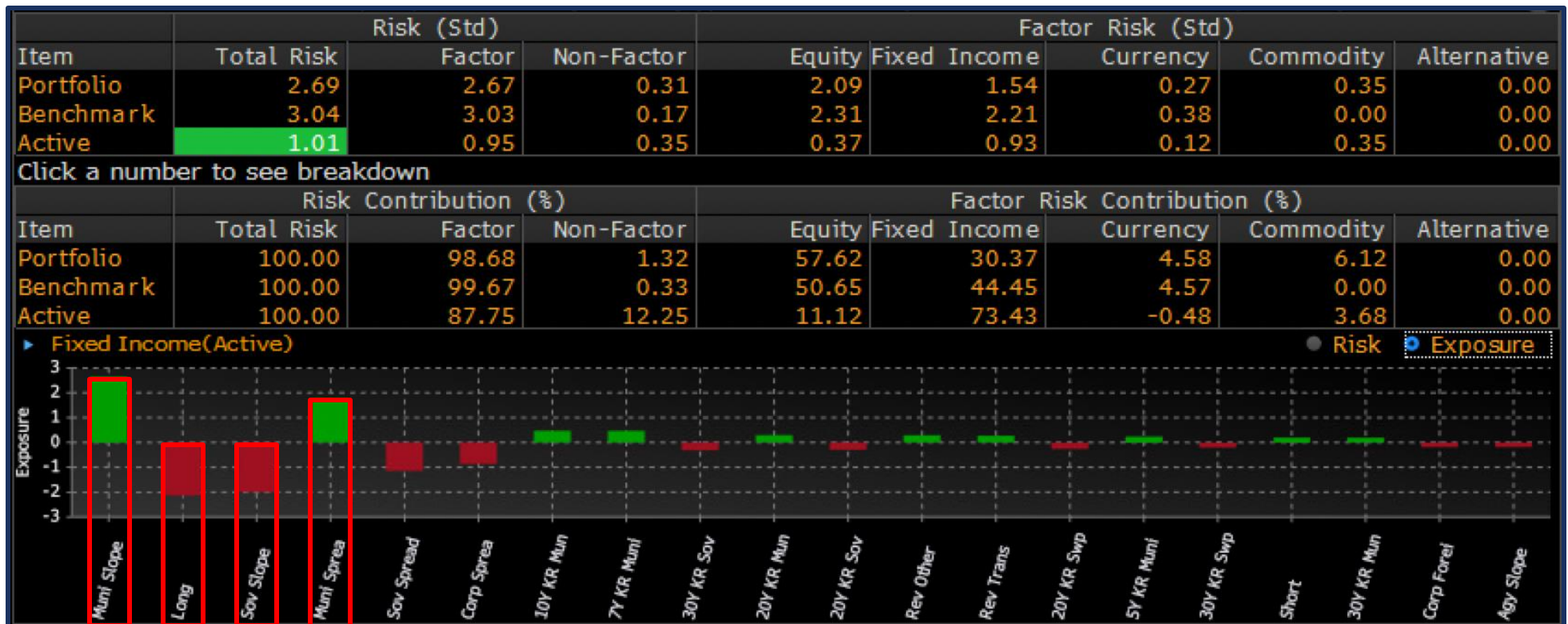
Risk Managed Dynamic Income (RMDI) Model vs. 20/80 ACWI/AGG: Fixed Income Risk



Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.

# THE MODEL IS UNDER EXPOSED TO LONG DURATION & SOVEREIGN SLOPES AND OVER EXPOSED TO MUNI SLOPES & MUNI SPREADS

Risk Managed Dynamic Income (RMDI) Model vs. 20/80 ACWI/AGG: Fixed Income Factor Exposures

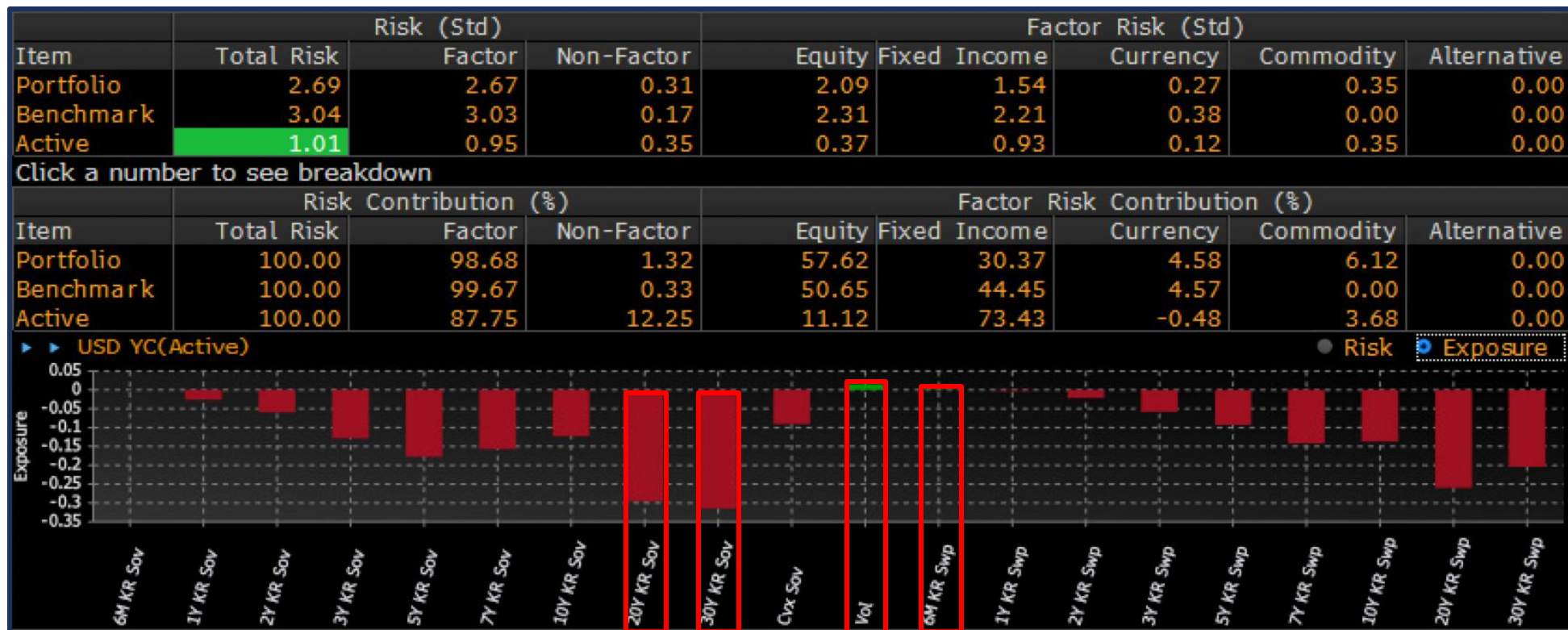


Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.



# THE MODEL IS UNDER EXPOSED TO 30Y KR SOVEREIGNS & 20Y KR SOVEREIGNS AND OVER EXPOSED TO VOL & 6M KR SWAPS

Risk Managed Dynamic Income (RMDI) Model vs. 20/80 ACWI/AGG: Yield Curve Factor Exposures

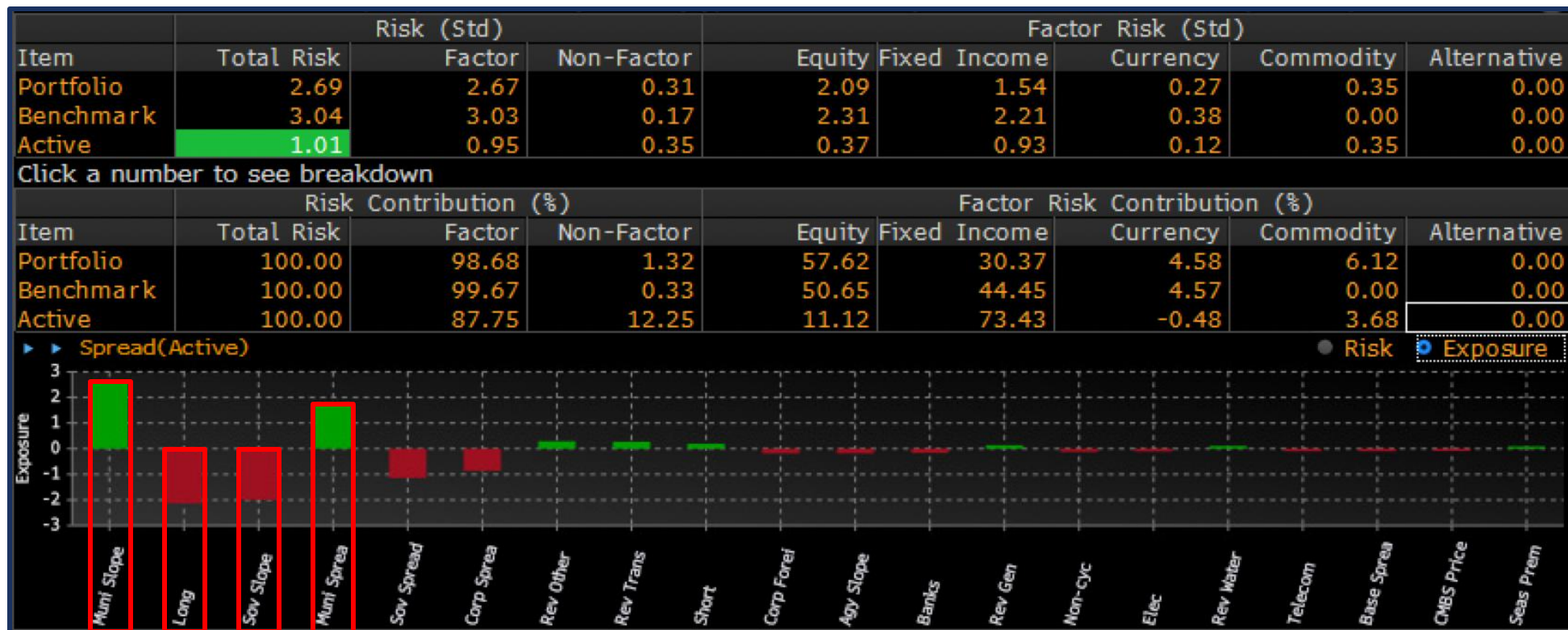


Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.



# THE MODEL IS UNDER EXPOSED TO LONG DURATION & SOVEREIGN SLOPES AND OVER EXPOSED TO MUNI SLOPES & MUNI SPREADS

Risk Managed Dynamic Income (RMDI) Model vs. 20/80 ACWI/AGG: Spread Factor Exposures



Source: Astoria Portfolio Advisors, Bloomberg. Data accessed on July 2, 2019.

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