Astoria's Investment Committee Quarterly Report:

Forget the past decade. Invest with a forward-looking, strategic vision.

Q1 2020

Key Themes that Drive Astoria's Portfolio Construction Process: Global Diversified Portfolios, Low Cost ETFs, Factors, Tax Loss Harvesting, Strategic Long-term Allocation, & Modest Amount of Alternatives

Astoria's OverWeights have Strategically Shifted

- Astoria was **skeptical on risk assets in 2018**, turned **quite** constructive in early Jan 2019, and remain moderately constructive for 2020 although our **overweights have shifted**.
- Our **preference for 2020 is international markets** namely **China**, **emerging markets value stocks,** and **high-quality dividend growth stocks in Europe and Japan**. We prefer to be **underweight U.S. stocks** in our dynamic global ETF portfolios.
- In our U.S. Thematic Equity Model, we favor high quality dividend growth stocks, U.S. value stocks, and high quality dividend paying Mid-Cap stocks. Why Mid-Caps? They are cheaper than Large-Caps and not as reliant on the credit cycle or funding pressures that persist with Small-Caps.
- Astoria believes there's not much value across the fixed income spectrum and **we remain underweight** the asset class relative to our benchmarks. We think **inflation is mispriced** and remains the **biggest risk** for bondholders in the years to come. We remain **overweight short duration, high quality bonds** namely **munis** and **securitized credit.** We don't see much value in investment-grade corporates or high-yield credit at these spread and yield levels.

Don’t just rely on bonds to hedge your equity risk. Moreover, there are other ways to generate income besides fixed income.

Bonds produced a 2-3 Sharpe Ratio in 2019. It’s hard to see that repeating again.

- Astoria is focused on **risk-adjusted, after-tax**, and **after-inflation** returns which is why our dynamic ETF portfolios include alternatives, commodities, and specific portions of the bond complex (i.e. those which have lower correlations to stocks). We find many investors are overweight high yield credit which is positively correlated to stocks.

- We believe the biggest risk for most multi-asset portfolios is a breakdown in the stock & bond correlation. We never understood why the alternatives ETF universe didn’t garner more assets. Across our dynamic ETF portfolios, we will be including alternatives to soften our portfolio volatility. That is, after all, **Astoria’s ‘True North**.’ We begin 2020 with the same alternatives we included for most of 2019: merger arbitrage, gold, gold miners, and long/short market neutral strategies.

- Tax-loss harvesting remains a key focus area. Some managers will only harvest losses at the end of the calendar year. We find that to be quite strange. Astoria will always be systematic with harvesting losses all year long.

Nobody is positioned for inflation. Astoria has been allocating to commodities for several years now. A modest amount of inflation hedges won't hurt your overall portfolio risk/return.

A Word on Commodities

- We've consistently included gold in our ETF portfolios for several years due to their low correlation to stocks, low opportunity cost, and elevated recession risks in 2018/2019. As noted above, we think inflation risks remain underpriced. On this year's list, we include a broad-based commodity ETF as well as a gold miner ETF. Does that mean we are less bullish on physical gold? No. Again, this report is meant to provide unique thought leadership with actionable investment ideas.

Exhibit 1. *Astoria's 10 ETFs for 2020*

Astoria's 10 ETFs for 2020

Ticker	Name	Segment
QVAL	Alpha Architect U.S. Quantitative Value ETF	U.S. - Total Market Value
DON	WisdomTree U.S. MidCap Dividend Fund	U.S. - Mid Cap
KBWB	Invesco KBW Bank ETF	U.S. Banks
IHDG	WisdomTree International Hedged Quality Dividend Growth Fund	Developed Markets Ex-U.S. - Total Market
EDIV	SPDR S&P Emerging Markets Dividend ETF	Emerging Markets - High Dividend Yield
MCHI	iShares MSCI China ETF	China - Total Market
GDX	VanEck Vectors Gold Miners ETF	Global Gold Miners
VTEB	Vanguard Tax-Exempt Bond ETF	Municipal Investment Grade
VMBS	Vanguard Mortgage-Backed Securities ETF	Mortgage-backed Investment Grade
COMB	GraniteShares Bloomberg Commodity Broad Strategy No K-1 ETF	Broad Market

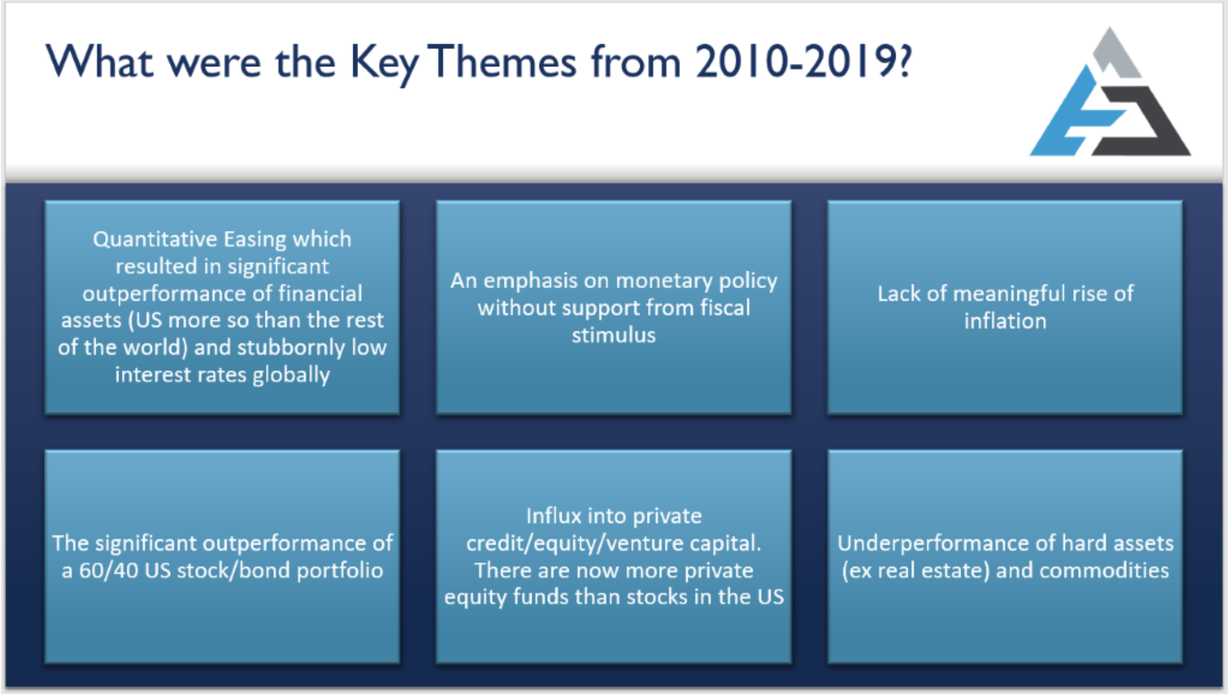
Source for 10 ETFs for 2020 is Astoria Portfolio Advisors. Category data retrieved from ETFAction.com on December 30, 2019.

Most people structure portfolios using a backwards looking approach. Unfortunately, markets trade, on the margin, based on forward looking views.

Forget the previous winners from 2010-2019. Past winners rarely repeat themselves.

- Investors' love affair with past winners is **insatiable**. The '*conventional wisdom*' on Wall Street is that **U.S. stocks, private equity, private credit, venture capital, and bonds** will continue to be the '*big winners*' in the years to come. Unfortunately, yesterday's darlings almost never outperform in the future with the same risk-adjusted returns per unit of liquidity risk (this is important). Paradigm shifts typically happen *slowly* and *quietly* with most investors realizing after the fact.

Exhibit 2. *Key Themes from 2010 to 2019*



Source: Astoria Portfolio Advisors.

Most people structure portfolios using a backwards looking approach. Unfortunately, markets trade, on the margin, based on forward looking views.

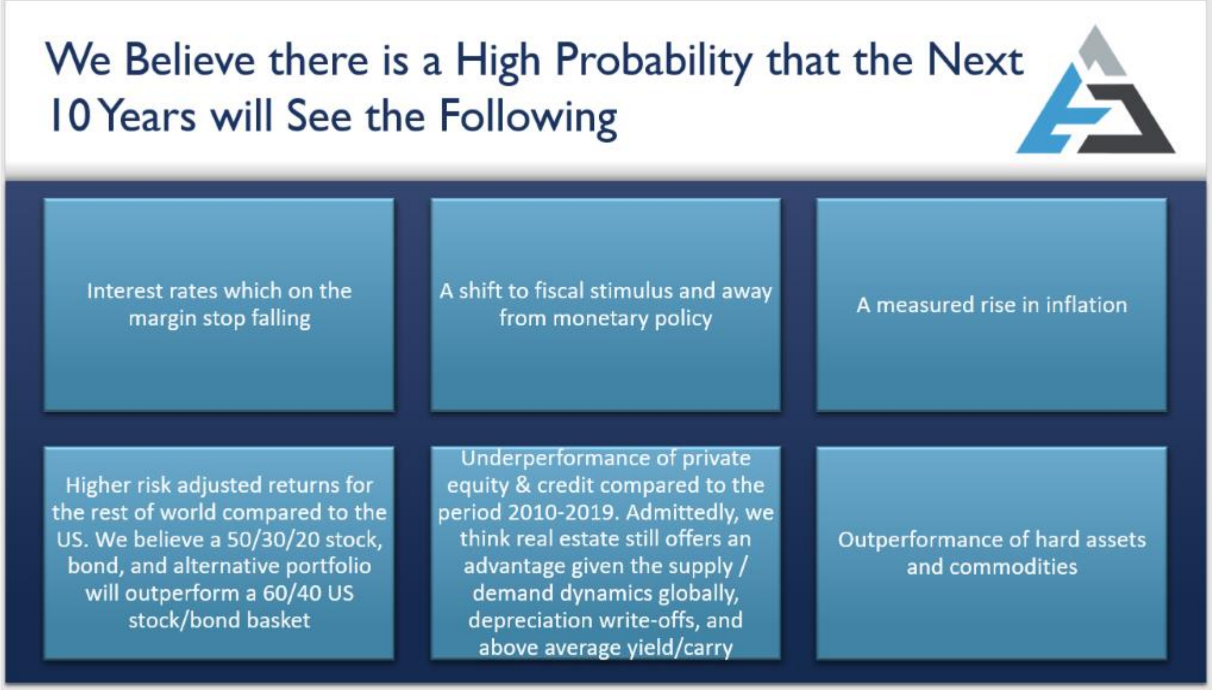
Astoria's Forward Looking Views

- We recently wrote a report arguing why we believe the next 10 years won't see the dramatic outperformance of U.S. stocks, U.S. bonds, private equity, private credit, and venture capital (click here).

- Many investors **shunned** international markets in 2019 over concerns of U.S. vs. China trade negotiations, Brexit, inverted yield curves, or the negative interest rate environment across Europe and Japan. Unfortunately, the reality is that they missed a strong year for global stocks as most broad market international indices were up 20-30% in 2019.

- As capital ultimately gets allocated to seek the highest return per unit of risk (liquidity adjusted), Astoria believes there is a **reasonably high probability that the next 10 years will see the following:**

Exhibit 3. *Key Themes for the Next 10 Years*



Source: Astoria Portfolio Advisors.

2019 saw more inflows into bond ETFs compared to equity ETFs. This is despite a 30% increase in S&P 500 index last year!

We believe most bond segments will be challenged in the years ahead. We recommend sticking with equities to generate attractive risk adjusted portfolio returns.

- Perhaps the biggest story of most people's careers was when interest rates turned negative in Europe and Japan. Investors would have to be very bearish on the global economy if they believe yields **will stay this low by the end of this decade.**

- Astoria's view is that we will see **a measured rise in rates**, as well as inflation in the years to come. For this reason, we think there is a reasonably high probability that most bond segments will produce negative (inflation-adjusted and after-tax) total returns in the next decade. We would advise investors to look at other ways to produce income and to hedge equity risk in the years to come. There are strategies such as call overwriting, put selling, commercial real estate, and municipal bonds which we think offer more attractive ways to generate income or to reduce equity risk.

- In our view, with a relatively benign interest rate environment, stocks are still the most attractive asset class to own compared to private equity, venture capital, U.S. bonds, etc. There are now more private equity funds than U.S. stocks. There are stories of private equity funds buying dental practices, plumbing businesses, and taxi medallions. **Give me a break!**

Astoria's portfolios include international stocks, higher quality equities, higher quality bonds, a modest amount of alternatives, and multiple factors.

The standard U.S. equity indices are large *'bet'* on growth stocks (momentum, concentration risk, and expensive). Don't be afraid to tilt away from the benchmark.

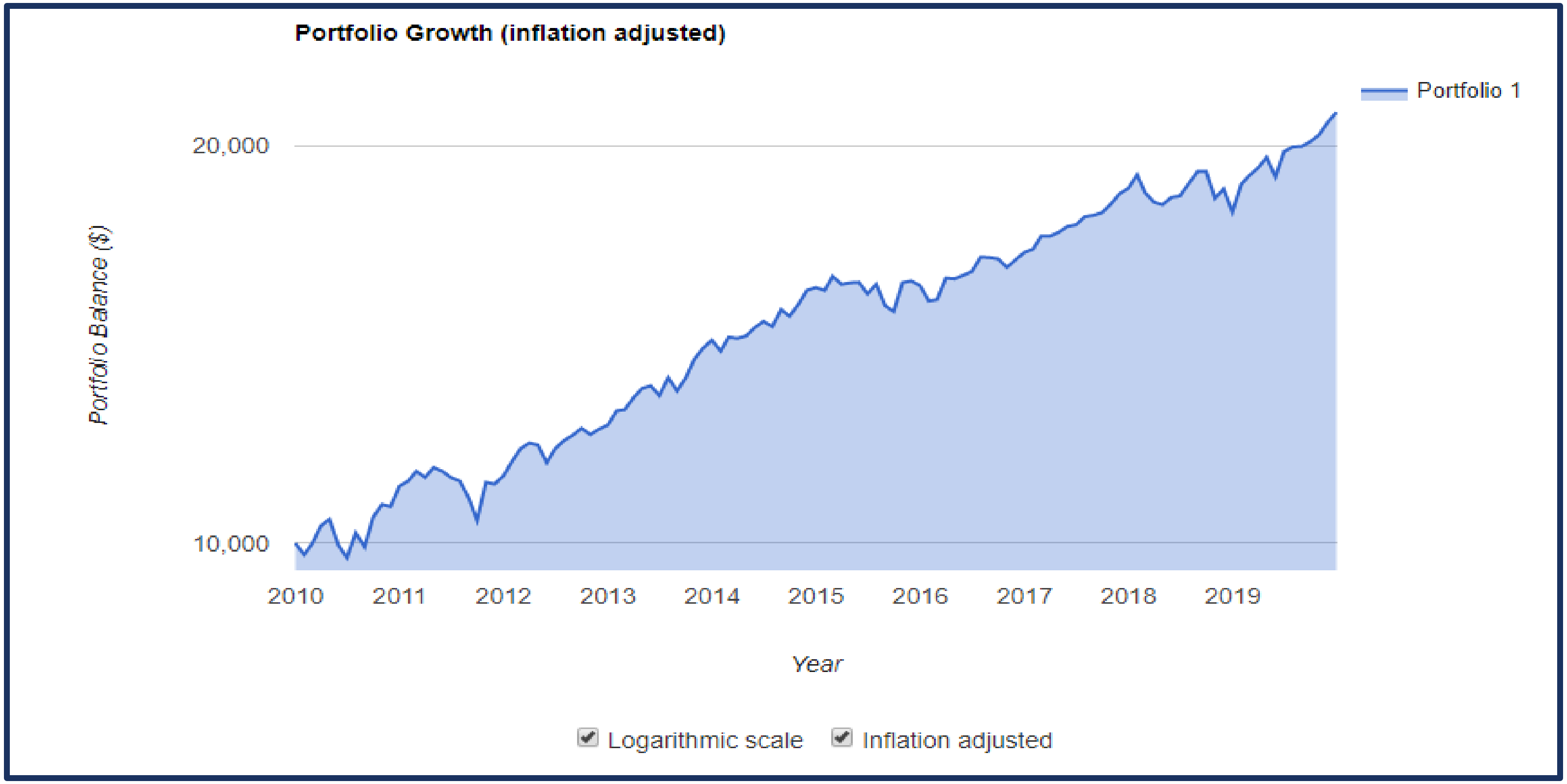
- While stocks are attractive, we don't think the answer is buying broad-based index funds with zero cost management fees. If someone is offering you an ETF for zero management fee, there's likely not much value in owning those stocks. **Nobody gives away anything for free!**

- To generate equity returns, investors will likely need to look for idiosyncratic market segments, special situations, or specific regions of the world. Buying a broad-based index fund is ok if you are delivering benchmark returns but if you are trying to outperform you will need to do something different than the benchmark. This entails potentially tilting your portfolio, using more concentrated ETFs, or utilizing factor focused strategies.

- The U.S. 60/40 stock & bond portfolio produced an astonishing CAGR of 9.7% in the 2010-2019 decade. We believe there is a reasonably high probability that a 60/40 U.S. stock/bond portfolio won't repeat such a dramatic performance in the next decade. Investors who held U.S. stocks and bonds for the entirety of the past decade have enjoyed significant portfolio increases. **Don't be greedy!**

The U.S. 60% stocks & 40% bond portfolio was the biggest beneficiary of QE in the past decade. Past winners rarely repeat themselves in the future. Look at a 50%/30%/20% portfolio in the years to come.

Exhibit 4. *Growth of a 60% SPY and 40% AGG ETF Portfolio from Jan 2010 to Dec 2019*



Source for the historical timeseries is PortfolioVisualizer.com. The portfolio is rebalanced quarterly.

2020 Portfolio Construction Strategic Tilts: International Stocks, Inflation Hedges, Multi Factors, Munis, Mortgage Backed Securities, and Modest Amount of Alternatives

Exhibit 5. *Valuation Data for Astoria's Equity ETF Picks*

Astoria's Equity ETF Picks for 2020

Ticker	Yield	2020E EPS	PE Ratio	ROE	ROA
QVAL	2.63%	0.64%	10.50	24.17%	7.78%
EDIV	5.75%	9.75%	11.83	11.79%	2.09%
KBWB	2.61%	2.30%	11.85	8.39%	0.95%
MCHI	2.66%	19.41%	13.15	10.91%	1.51%
DON	3.23%	5.82%	15.61	12.27%	3.20%
IHDG	3.15%	6.44%	17.82	22.00%	9.47%
GDX	1.33%	53.47%	28.26	1.54%	0.87%

Source for 10 ETFs for 2020 is Astoria Portfolio Advisors. Valuation data retrieved from ETFAction.com on December 30, 2019.

Exhibit 6. *Valuation Data for Astoria's Fixed Income ETF Picks for 2020*

Astoria's Fixed Income ETF Picks for 2020

Ticker	Yield to Maturity	Yield to Worst	Coupon Rate	OAS	Effective Duration	Average Life
VTEB	2.79	1.76	4.73%	47.69bps	5.24	5.99
VMBS	2.55	2.55	3.47%	41.07bps	2.81	4.82

Source for 10 ETFs for 2020 is Astoria Portfolio Advisors. Fixed Income data retrieved from ETFAction.com on December 30, 2019.

Its Simple: Don't Fight the Fed!

The U.S. Federal Reserve's Balance Sheet has been highly correlated with the increase in the S&P 500 Index level since 2010.

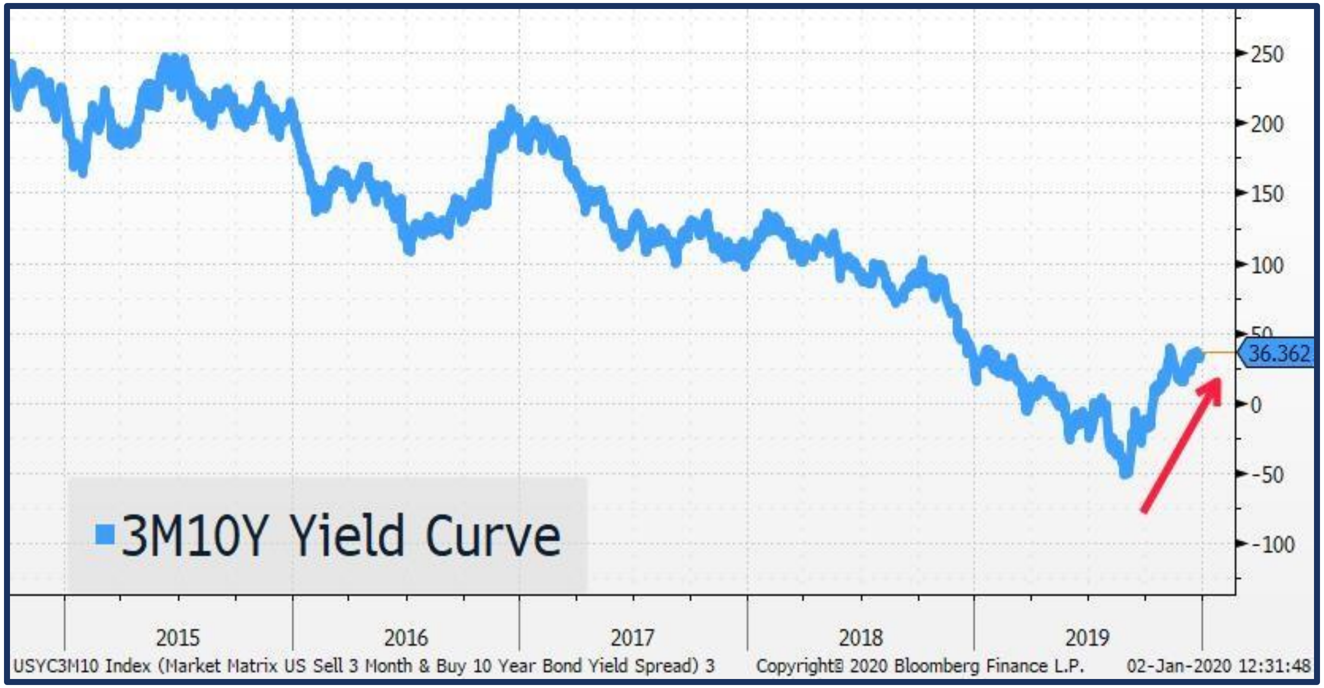
Exhibit 7. *The U.S. Federal Reserve's Balance Sheet & the S&P 500 Index*

Source: Bloomberg, Astoria Portfolio Advisors.

The inversion did not lead to a recession in 2019, but that does not eliminate the probability of one occurring in the nearby future.

The 3M10Y interest rate spread now currently stands at 36.36bps as of December 31, 2019. This is a healthy sign but as mentioned above, it does not remove the probability of a recession occurring in the future.

Exhibit 8. *The 3M10Y Yield Curve*

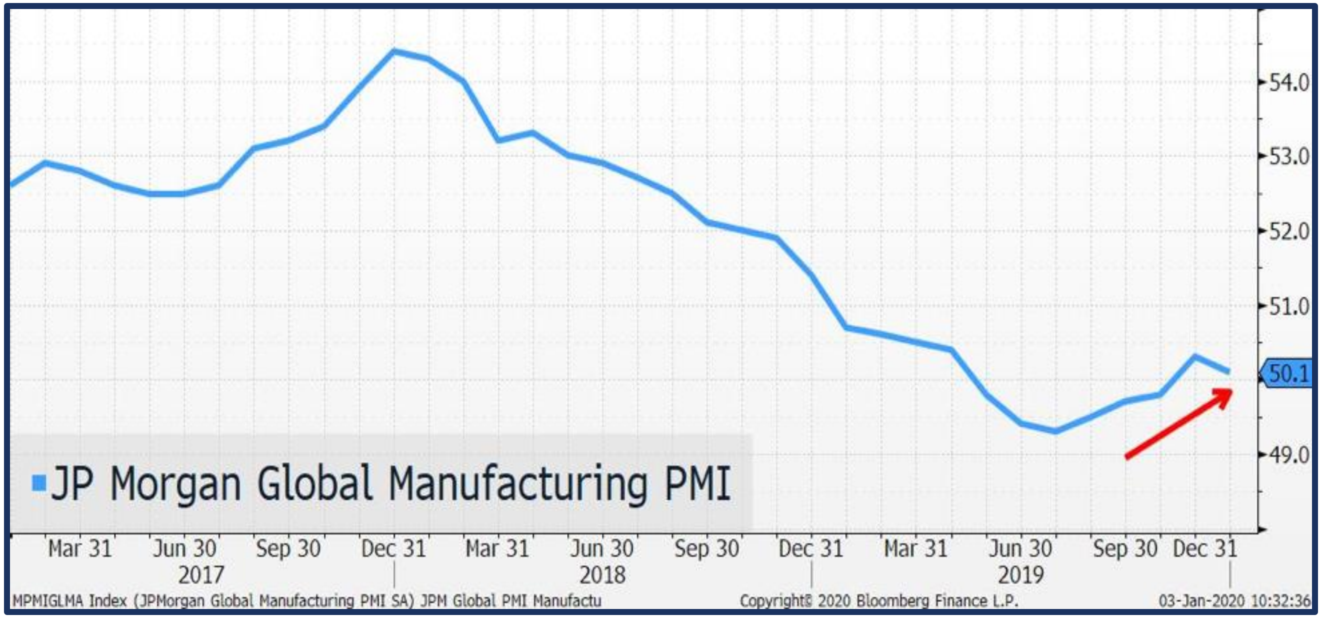


Source: Bloomberg, Astoria Portfolio Advisors.

Stabilizing Global Trade + PMIs Bottoming = Rally in Risk Assets

The J.P. Morgan Global Manufacturing Purchase Managers Index, which is a measure of economic health for the manufacturing and service sector, saw an increase in the fourth quarter. This is noteworthy as the index has been steadily declining since January 2018.

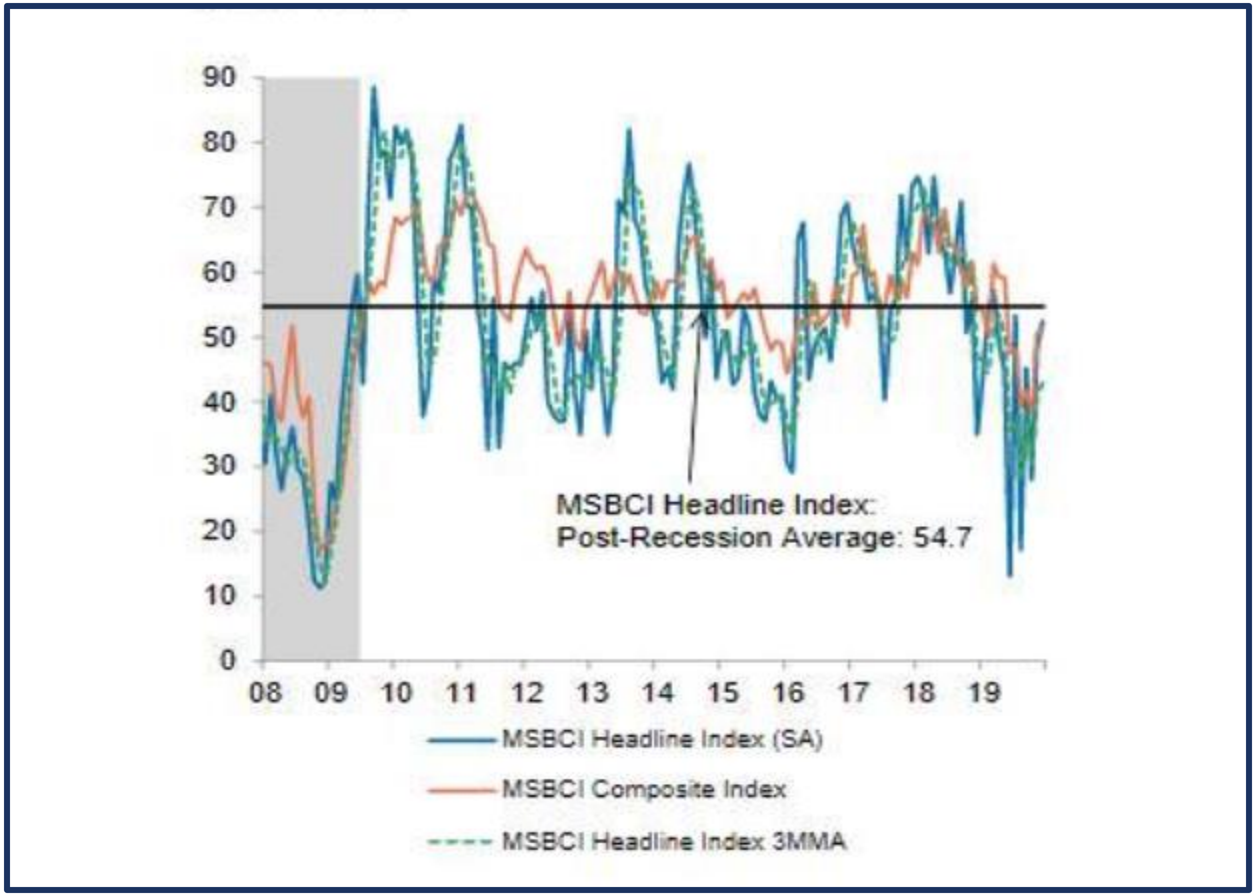
Exhibit 9. *J.P. Morgan Global Manufacturing PMI*



Source: Bloomberg, J.P. Morgan, Astoria Portfolio Advisors.

The Morgan Stanley Business Conditions Index rose four points in December to an index level of 52 and remains solidly above the mid teen / low 20 index level from mid-summer.

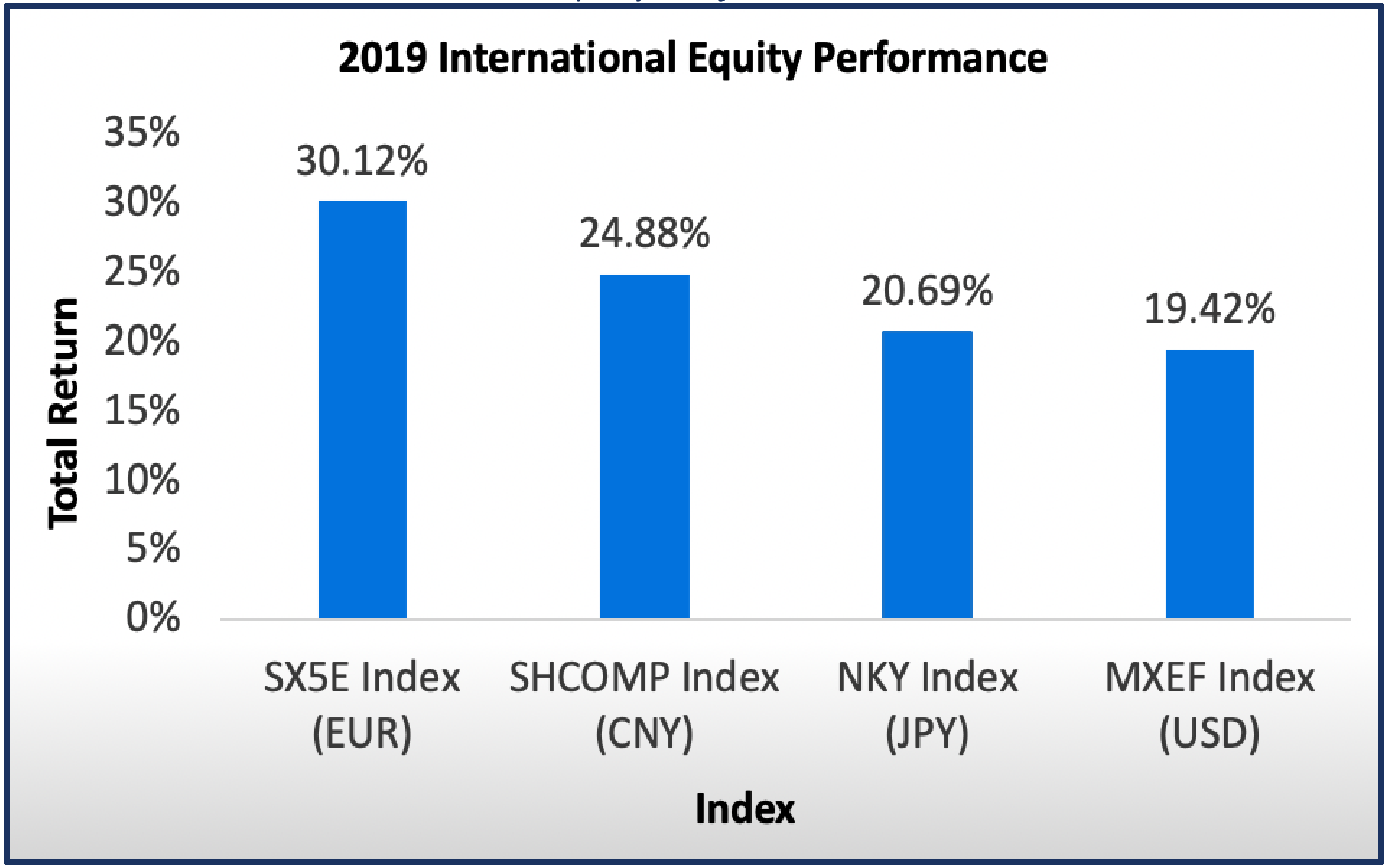
Exhibit 10. *MSBCI and the MSBCI Composite: Recent Performance*



Source: Morgan Stanley Research.

Astoria has been allocating to International Equities. Despite all the trade noise and concerns over Brexit, HK protests, inverted yield curves, and trade wars, global equities rallied significantly last year.

Exhibit 11. *2019 International Equity Performance*



Source: Bloomberg, Astoria Portfolio Advisors.

Diversify Your Factor Exposure!

Over the past 1 Year, the best performing long-only factor ETFs are QUAL (+35%), IVE (32%), and SIZE (30%).

- In the below table, we show the 1-year returns, 2020 EPS estimates, ROE, ROA, and PE ratios for the following ETFs: iShares Edge MSCI USA Quality Factor ETF (**QUAL**), iShares S&P 500 Value ETF (**IVE**), iShares Edge MSCI USA Size Factor ETF (**SIZE**), iShares Edge MSCI Min Vol USA ETF (**USMV**), iShares Edge MSCI USA Momentum Factor ETF (**MTUM**), and iShares Select Dividend ETF (**DVY**).

Exhibit 12. *Factor Table*

Ticker	1-Year Return	2020E EPS	ROE	ROA	PE Ratio
QUAL	35.13%	9.13%	22.19%	6.39%	20.83
IVE	31.60%	7.17%	12.77%	2.56%	17.02
SIZE	29.70%	10.20%	12.11%	2.69%	19.00
USMV	28.86%	14.86%	14.59%	3.81%	21.55
MTUM	28.54%	10.60%	14.58%	4.71%	28.03
DVY	22.66%	5.13%	14.84%	2.87%	15.42

Source: ETFAction.com, Astoria Portfolio Advisors. Data accessed on January 3, 2020.

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