

PORTFOLIO COMPASS

December 7, 2021

QES ONLINE PORTFOLIO ANALYTICS 5G

Intraday Analysis, Custom Estimation Universe, Sector Risk Models, and More

- **QES Factor Awareness Dashboard 5G.** Since the launch of our [QES Factor Awareness Dashboard](#) in September 2020, we have received tremendous interest from clients around the world. In this research, we are excited to announce the fifth generation of our online portfolio analytics tool. Our dashboard allows portfolio managers to securely upload their portfolios (or watch lists), monitor exposures to a multitude of alpha and risk factors, conduct performance attribution, and manage risk at both the security and portfolio levels. Clients can select from 11,000+ equity securities, 60+ benchmark indices, and 1,200 ETFs globally to include into their portfolios. In this release, we added a host of new features.
- **Intraday Factor Performance.** Managers can view the *intraday* performance of 100+ risk and alpha factors on a minute-by-minute basis. Analyzing intraday factor shifts is particularly useful on days with rapid market movement, often triggered by major economic, political, and/or pandemic news releases.
- **Sector Specific Risk Models.** In addition to Broad Market risk models, users can choose from our six sector specific risk models (Energy, Consumer, TMT, Health Care, Industrials & Materials, and Financials) to analyze their portfolios. Our sector specific models incorporate risk factors that are material and meaningful for industry focused managers. The risk factors included in each model are grouped into five risk categories: Fundamental, Technical, Alternative, Macro, and Positioning. Our newly launched V2 Broad Market risk model includes a new ETF-based factor, measuring a portfolio's risk and exposure to passive strategies.
- **Other New Features.** In addition to US Broad and sector-specific risk models, clients can also choose a custom estimation universe that is more consistent with their investment philosophy, e.g., global developed markets or EM. Moreover, in recent years, we have launched multiple investable strategies and baskets, which can now be accessed using our enhanced dashboard. Our dashboard enables clients to conduct stock screens based on the 100+ risk and alpha signals. Users can view factor scores for not only securities within their entered interest lists, but also stocks with similar characteristics.
- **Upload a Sample Portfolio.** Lastly, we have constructed a [sample portfolio](#) for clients to upload into the [dashboard](#) to familiarize themselves with the rich set of available analytics and features.



Source: Pixabay.com

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FACTOR AWARENESS DASHBOARD 5G

We are excited to launch the fifth generation (i.e., 5G) of our best-selling [Factor Awareness Dashboard](#) – an online analytical tool designed for both fundamental and systematic investors.

In September 2020, we launched the [QES Factor Awareness Dashboard V1.0](#), which integrated factor performance, factor distortion, and other basic analytics into one platform. Then, in December 2020, we introduced the second version [QES Factor Awareness Dashboard V2.0](#), which enabled investors to upload their portfolios, monitor associated factor exposures, and assess risk of potential factor reversals. Furthermore, [QES Factor Awareness Dashboard V3.0](#) was released in February 2021, providing further support of 11,000+ securities, 1,200+ ETFs, and 60+ benchmark indices globally. Recently, we developed [QES Factor Awareness V4.0](#) in May 2021, integrating our Wolfe medium-term equity risk model and selective QES hedge baskets.

The newly launched 5G dashboard includes the following new features:

- **Intraday Factor Performance.** Managers can view the performance of 100+ risk and alpha factors intraday, at a minute-by-minute frequency. Analyzing intraday factor shifts is particularly useful on days with rapid market movement, often triggered by major economic, political, and/or pandemic news releases. Our intraday factor performance is automatically updated every 60 seconds **LIVE**.
- **Custom Estimation Universe.** Portfolio factor exposures and other analytics can now be calculated based on three distinct estimation universes: US Broad, Developed Markets, and Emerging Markets. As detailed in [GEM Portfolio Construction](#), using the estimation universe that is consistent with a manager's investment mandate provides more precise risk analytics and often leads to superior performance and decision making. The US Broad Risk Model is also recently upgraded to version 2.0, with multiple enhancements, e.g., an ETF factor measuring a portfolio's risk and exposure to passive strategies.
- **Sector Risk Models.** One of the unique features of our risk analytics is that we provide sector-specific risk models, in addition to broad market models. Consistent with our industry-specific alpha research series (e.g., [Banking on the Banks – Welcome to BALI](#)), risk models that are calibrated specifically for a given sector provide more intuitive analysis and precise prediction. We introduce six sector specific risk models in this release – Energy, Consumer, TMT, Health Care, Industrials & Materials, and Financials. Our sector specific models incorporate risk factors that are material and meaningful for industry focused managers. The risk factors included in each model are grouped into five categories: fundamental, technical, alternative, macro, and positioning/crowding.
- **Advanced Analytics.** We have added a series of advanced analytics to the dashboard. Performance attribution is now conducted over a three-month window (extended from one month in the previous version). Furthermore, managers can conduct deep time series analysis on style and risk exposures. Our revamped portfolio uploader enables seamless uploads and can be minimized to make room for multidimensional factor analysis.
- **Investable Baskets.** In recent years, we have launched multiple investable strategies and baskets (e.g., the cybersecurity, pricing power, and socially conscious baskets detailed in [Autonomous Thematic Investing](#)). These tradeable strategies can now be accessed using our

enhanced dashboard. Clients can view the performance, factor exposures, expected risk, and stock constituents of these baskets.

- **Factor Screening.** Our dashboard allows clients to screen stocks based on 100+ risk and alpha factors. Users can view factor scores not only for securities within their entered interest list, but also for stocks with similar factor exposures to their own portfolio.
- **Comprehensive Portfolio Reporting.** We have upgraded our portfolio reporting tool, including intuitive charts, detailed metrics on both factor and company exposures, and a multitude of risk metrics. Portfolio reports can also be downloaded in either an Excel spreadsheet or PDF files, which can then be shared between team members, senior management, and other parties.
- **Enhanced Documentation.** We have included a rich document library for each QES product, risk, and alpha models. Our document library outlines the methodology, data, and mechanics of each product.

This note serves as a user guide for the latest version of [Factor Awareness Dashboard](#). Before we discuss the new enhancements, let's briefly review the exiting features.

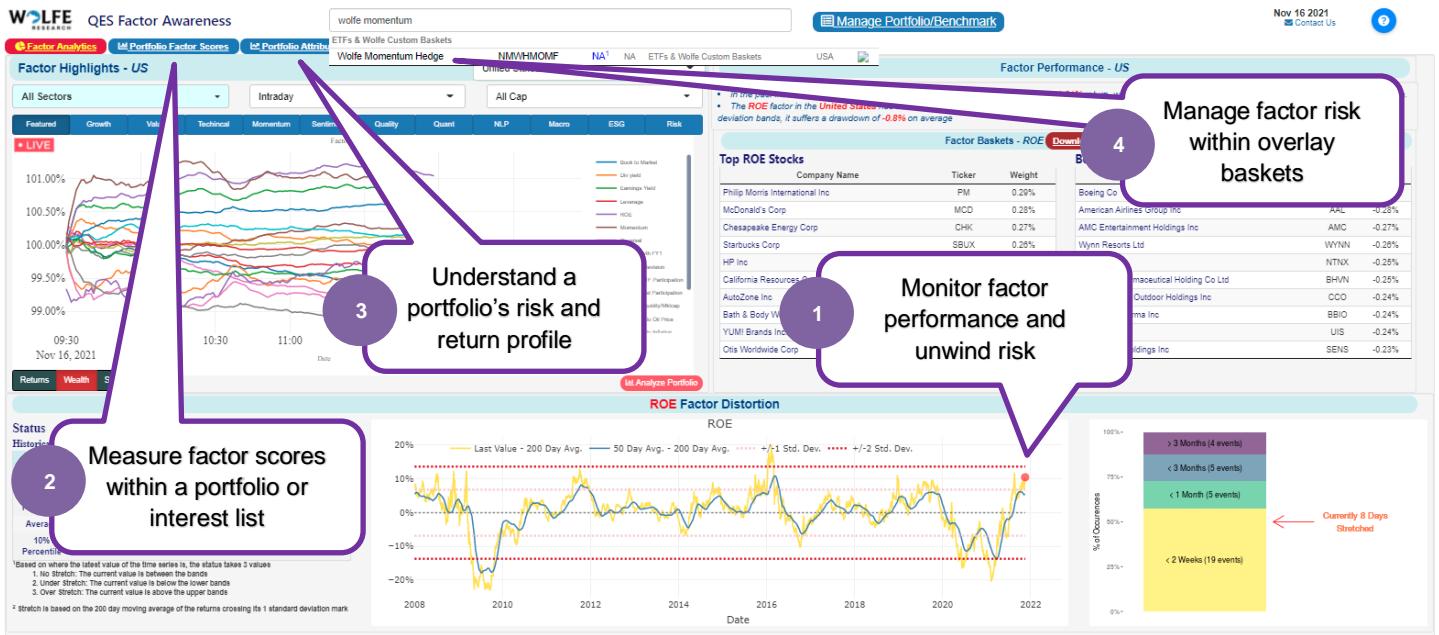
A QUICK RECAP OF THE EXISTING FACTOR AWARENESS DASHBOARD

Recall that our Factor Awareness Dashboard allows investment managers to analyze their portfolios across four key dimensions (see Figure 1):

1. **Monitoring Factor Performance and Unwind Risk:** Users can track the performance of 100+ different alpha and risk factors across multiple styles such as value, growth, sentiment, NLP (Natural Language Processing), crowding, investor participation, technical, macro, etc. Users can view the stock constituents of each factor basket. Our dashboard also highlights key factor dislocations as well as pinpoints factors facing significant unwind risk. We also estimate the duration, severity, and timing of a potential factor reversal.
2. **Measuring a Portfolio's Factor Exposure:** Clients can seamlessly upload their portfolios or interest lists using 128-bit encryption. Users can select from 11,000+ securities and 1,200 ETFs globally to include in their portfolios for detailed factor diagnostics. Moreover, investment managers can choose between 60+ benchmark indices when analyzing relative performance. The tool allows managers to track factor exposures from multiple investment styles – both traditional features (e.g., value, growth, sentiment) and alternative signals (such as retail participation, hedge fund crowding, passive investing, quant, inflation sensitivity, and ESG). We also highlight the stocks within your portfolio that are the largest contributors to a particular factor risk. A comprehensive portfolio and stock level factor report can be downloaded into a nicely formatted Excel file.
3. **Understanding How Factor Exposures Impact Risk and Return:** Managers can view the return and risk contribution emanating from styles and industries within a clean and comprehensive portfolio summary page. Our attribution analysis includes the integration of our medium-term equity risk model, which incorporates fundamental, technical, macro positioning, and alternative data factors. Managers can utilize our state-of-the-art analytics to decompose their portfolio performance across various attributes – style factors and industries. Investors can pinpoint those risk dimensions with positive and negative return contribution and adjust their risk profile accordingly.

4. Managing a Portfolio's Factor Risk: Users can change the weights of individual stocks within their portfolios to control for factor risk. A more optimal method to manage style risk is to incorporate a well-designed Wolfe QES hedge basket into a portfolio. Using our dashboard, QES hedge baskets can be included within a portfolio to remove undesirable factor risk without significantly impacting other style or sector exposures. In the coming weeks and months, our dashboard will support several factor overlay baskets.

Figure 1 Factor Awareness Dashboard 4.0



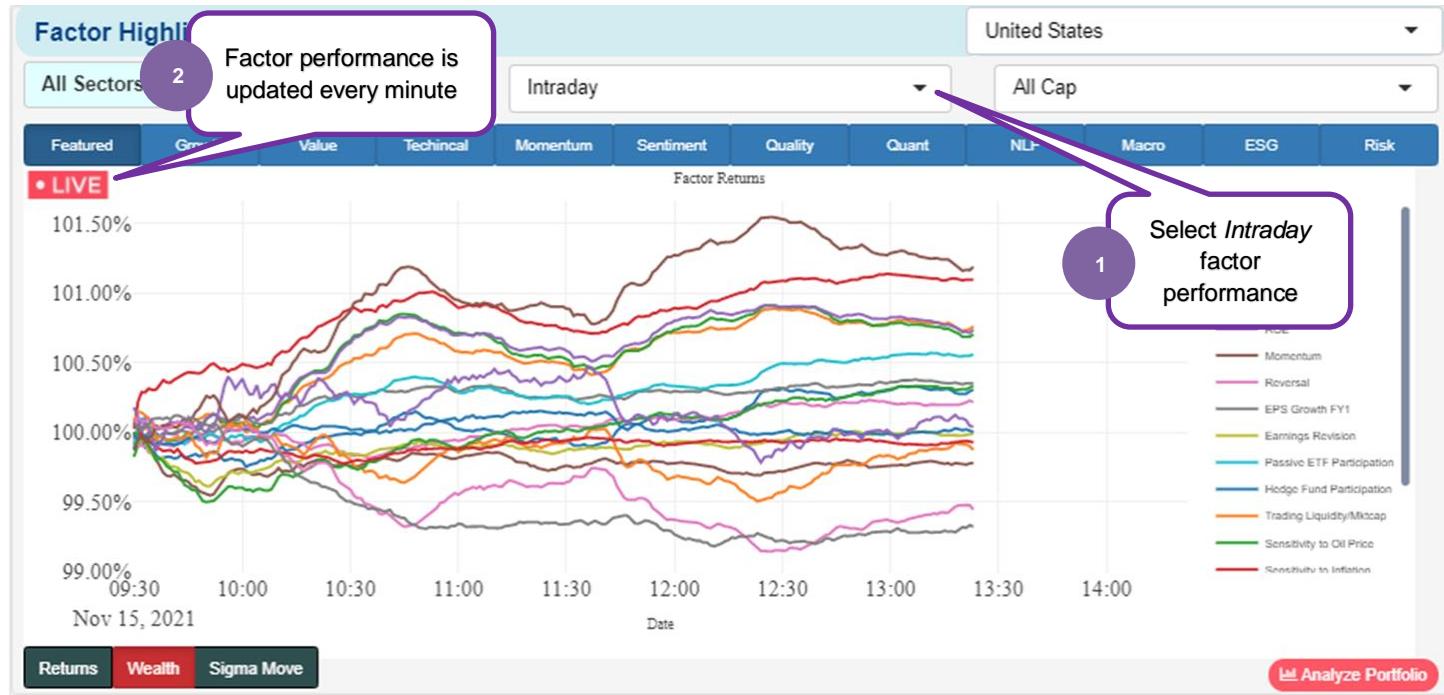
Sources: Bloomberg Finance LLP, FTSE Russell, Haver, S&P Capital IQ, Thomson Reuters, Wolfe Research Luo's QES

INTRADAY FACTOR PERFORMANCE

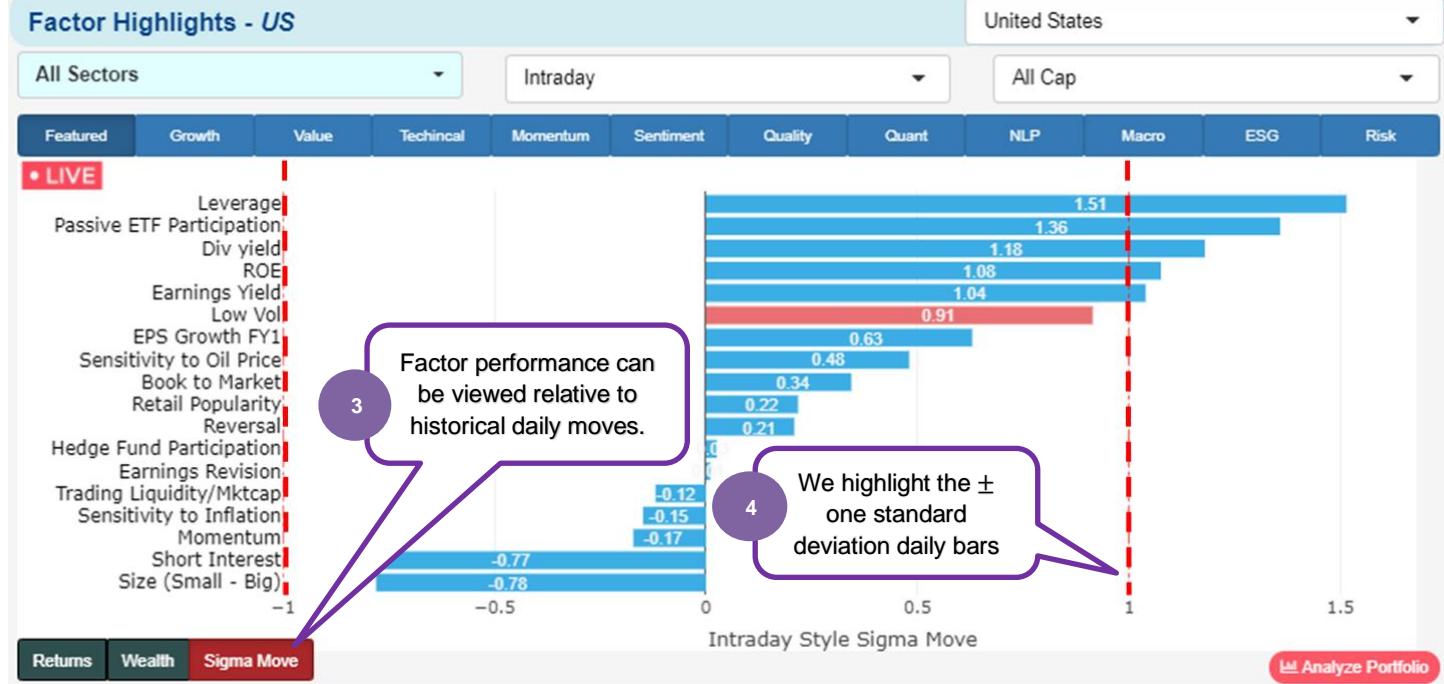
Real time intraday factor performance is now available on our [Factor Awareness Dashboard](#). Managers can view intraday performance of 100+ risk and alpha factors. Performance is available at one-minute bars. We have added a new dropdown menu which displays *intraday* factor performance (see #1 Figure 2). Our intraday factor performance is automatically updated every 60 seconds **LIVE** (see #2 Figure 2). We further show the extent of intraday factor shifts by highlighting the daily standard deviation of the move (see #3 and #4 Figure 2).

Figure 2 Intraday Factor Performance

A) Intraday Cumulative Factor Performance



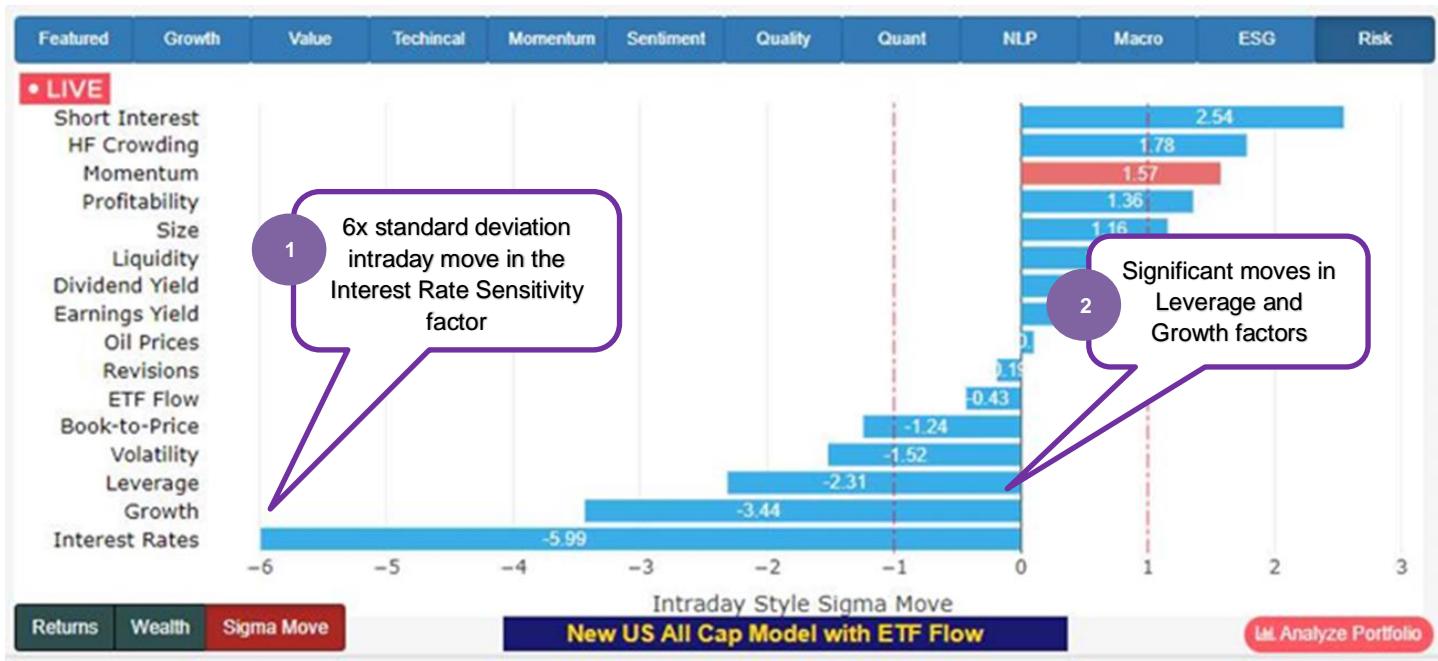
B) Intraday Sigma Move



Sources: Bloomberg Finance LLP, FTSE Russell, Haver, S&P Capital IQ, Thomson Reuters, Wolfe Research Luo's QES

Analyzing intraday factor performance is imperative, particularly in volatile market environment, most driven by major economic, political, and/or pandemic news events, announced prior to or during market trading hours. For example, on Friday, November 26th, 2021, while many Americans were celebrating Thanksgiving, news of the Omicron COVID variant made headlines. Our factor awareness dashboard captured a six standard deviation *intraday* move in our interest rate sensitivity factor¹ (see #1 in Figure 3), which resided to a 4.5 sigma shift by the end of the day. The Growth and Leverage factors also plunged on the B.1.1.529 news (see #2 in Figure 3).

Figure 3 Intraday Factor Performance on Friday, November 26th



Sources: Bloomberg Finance LLP, FTSE Russell, Haver, S&P Capital IQ, Thomson Reuters, Wolfe Research Luo's QES

NEW RISK TAB

In the latest version, we add a new *Risk* tab (see #1 in Figure 4), which shows the performance of the factors in our Wolfe US Broad Risk Model². Portfolio performance is based on FMP's (Factor Mimicking Portfolios). By design, these FMPs are orthogonalized against each other. Each FMP has a unit exposure to its tracking factor and no exposure to other factors (see #2 in Figure 4).

Selecting the new *Risk* tab and choosing a sector (see #3 in Figure 4) will highlight the performance of factors within each Wolfe Sector-Specific Risk Model. More details on our US Broad and Sector-Specific risk models will be covered in a later section. Lastly, after viewing intraday factor performance,

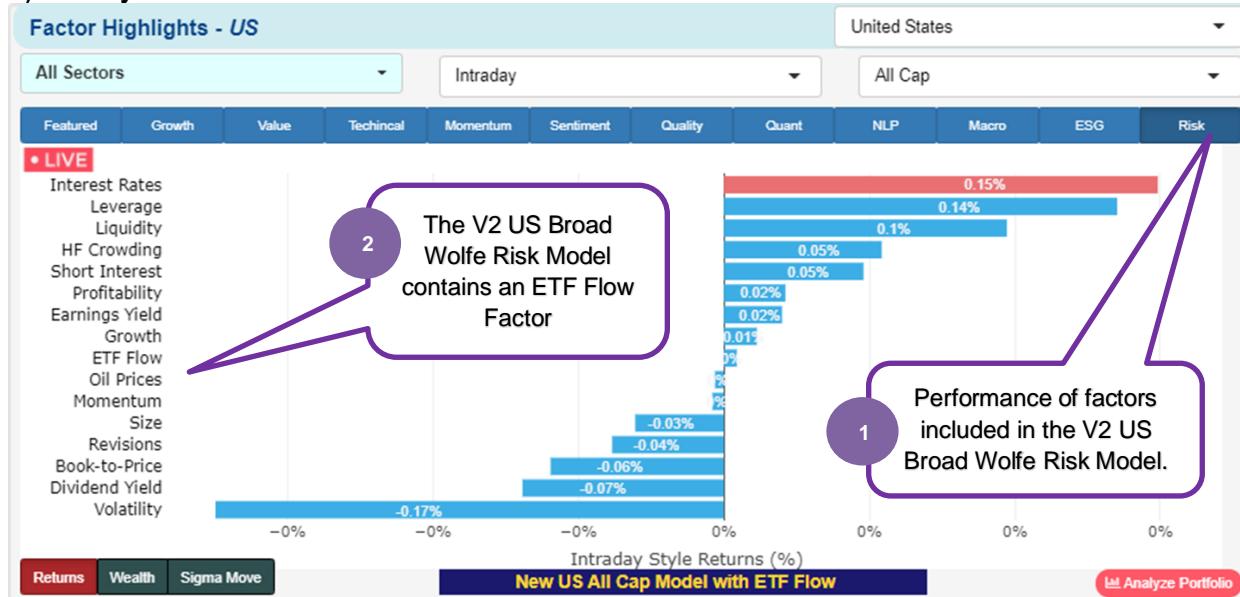
¹ See [Stocks Most Exposed to Rising Interest Rate](#) for more details on our interest rate sensitivity factor.

² Wolfe QES has recently launched the second generation of our US Broad and Sector-Specific risk models (V2). Please contact us or your Wolfe Research sales representatives for details.

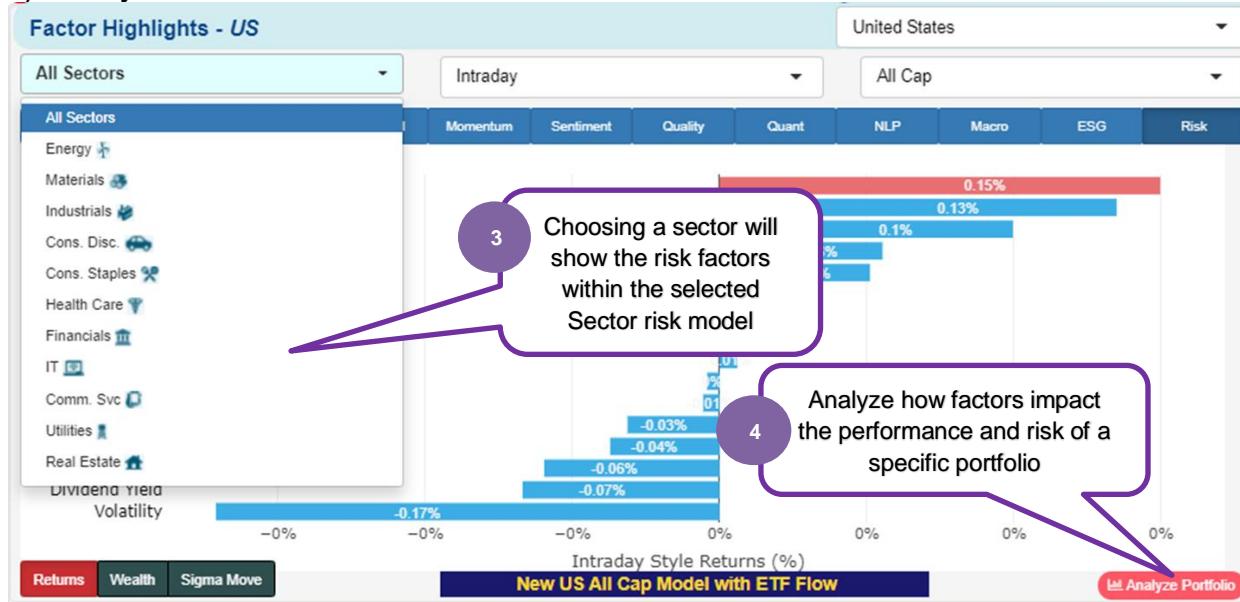
users can quickly switch to their own portfolios, by selecting the “Analyze Portfolio” button (see #4 Figure 4) to upload a portfolio or interest list³.

Figure 4 New Risk Tab

A) Intraday Performance of Factors in the Broad US Wolfe Risk Model



B) Intraday Performance of Factors in the US Wolfe Sector Risk Models



Sources: Bloomberg Finance LLP, FTSE Russell, Haver, S&P Capital IQ, Thomson Reuters, Wolfe Research Luo's QES

³ Please note that that intraday factor performance and data is *not* currently used in user portfolio analytics. Rather, previous day's data (t-1) is used. In the next release, we plan to add functionalities to analyze portfolios with real-time intraday factor data, stock prices, and returns.

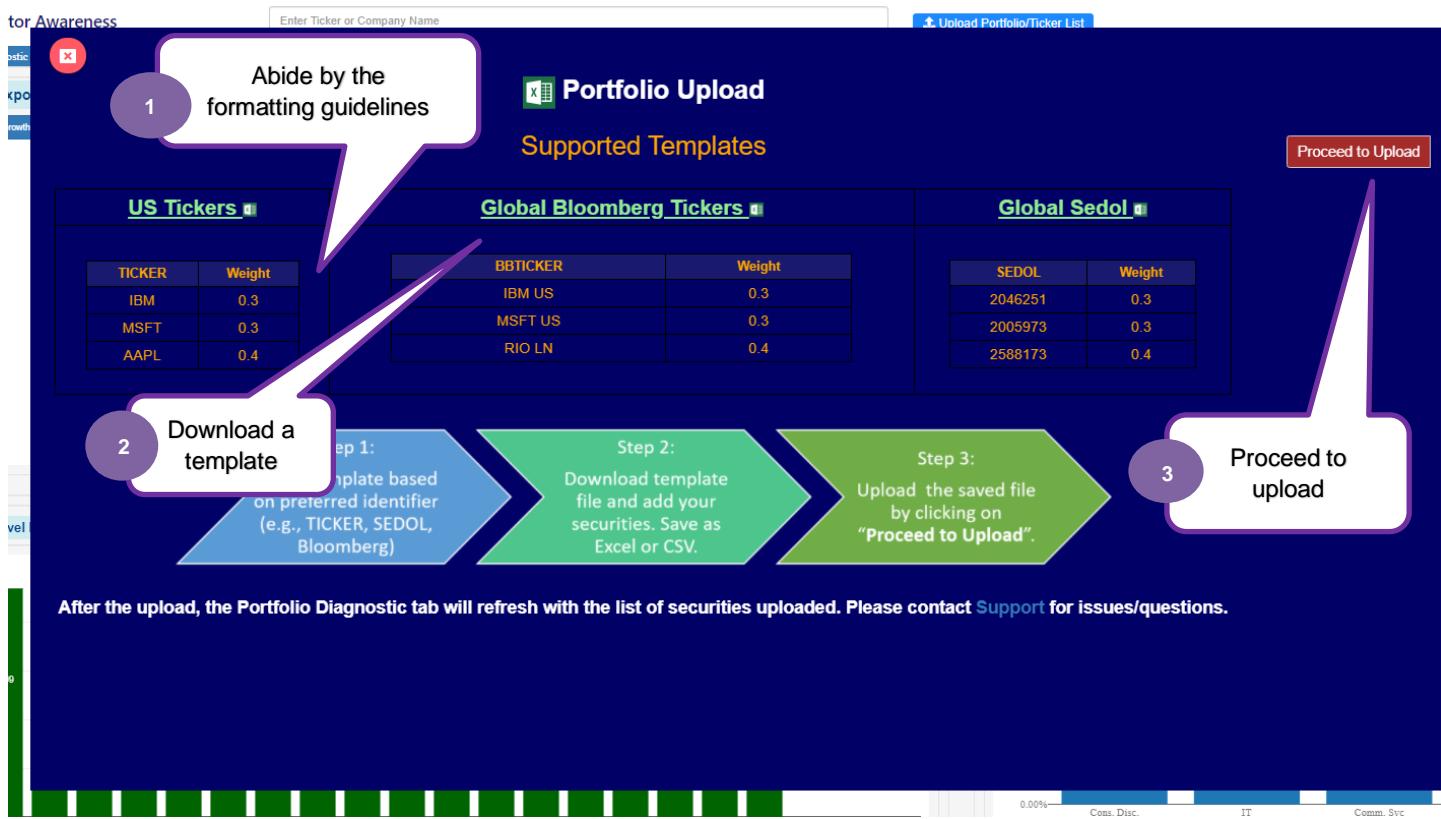
UPLOADING PORTFOLIOS OR INTEREST LISTS

Upon selecting the *Analyze Portfolio* button, our portfolio uploading tool will launch. Users can proceed to enter their portfolio using either an Excel spreadsheet or CSV (Comma Separated Value) file. Please ensure column titles, company identifiers, and format of the Excel/CSV file are consistent with the guidelines presented (see #1 in Figure 5). We support US exchange tickers, global Bloomberg tickers, and SEDOLs as company identifiers. Users can also download any of the three provided templates to input their interest list and subsequently upload the file (see #2 in Figure 5).

Once the Excel or CSV file is formatted as per the guidelines, users can proceed to upload their portfolios (see #3 in Figure 5). Any unidentified securities will be flagged, and then users can make further adjustments.

After the initial upload, users can make further edits on position sizes or add securities to the portfolio. We support securities (and ETFs) globally. Investment managers can also select from over 60+ benchmark indices for their analysis. The ability to seamlessly upload a portfolio or watch list revolutionizes how clients can consume our models/research and perform risk analysis.

Figure 5 Uploading a Portfolio



Sources: Bloomberg Finance LLP, FTSE Russell, Haver, S&P Capital IQ, Thomson Reuters, Wolfe Research Luo's QES

PRELOADED QES INVESTABLE STRATEGIES AND FACTOR BASKETS

In addition to user portfolios, managers can also view factor and attribution analysis of QES investable strategies and factor baskets. Simply select *Mange Portfolio* (see #1 in Figure 6) and choose a QES strategy (see #2 in Figure 6). Please note that new investable strategies are constantly being added to the dashboard.

Clients can also search for baskets by typing *NMW* (Nomura Wolfe) into the search bar. Several factor and thematic baskets will be displayed. Please [contact us](#) for more information on our tradeable strategies.

Figure 6 Upload and Manage a Portfolio or Interest List

Manage Portfolio/Benchmark

Portfolio

Benchmark

Clear Portfolio

X

User Portfolios

Default	None
---------	------

Factor Basket

Hedge Fund (Most Crowded - Least Crowded)
Dividend (Top Payers - Non-payers)
1 Month Reversal (Longs - Shorts)
Long Term Momentum (Longs - Shorts)
Growth (Longs - Shorts)
Size (Big - Small)
Low Volatility (Risk) (Low Vol - Hi Vol)
Leverage (Longs - Shorts)
Cyclical Value (Longs - Shorts)
Defensive Value (Longs - Shorts)
Quality (Longs - Shorts)
10-year Yield (Most Sensitive - Least Sensitive)
Oil Sensitivity (Most Sensitive - Least Sensitive)
Credit Sensitivity (Most Sensitive - Least Sensitive)
Growth Nowcasting (Longs - Shorts)
Manufacturing PMI (Most Sensitive - Least Sensitive)
Short Interest (Highest - Least)

NextCap (\$ B)	Sector	Days to Cover	1Y Return	Weight	Benchmark Weight
1.3	Health Care	6.01	-2.9%	5.6%	0.000%
9.9	IT	2.57	51.2%	3.3%	0.000%
0.6	Comm. Svc	1.36	-0.6%	5.1%	0.000%
8.8	IT	1.48	87.6%	6.1%	0.000%
2.2	Comm. Svc	0.89	-23.6%	4.2%	0.000%
75.2	IT	1.73	53.5%	6.0%	0.000%
2.4	IT	2.91	59.2%	5.8%	0.000%
1.1	IT	1.68	-3.4%	2.6%	0.000%
3.9	IT	4.04	34.5%	2.1%	0.000%
0.5	IT	3.19	-2.4%	2.0%	0.000%
7.7	Comm. Svc	8.81	-51.7%	2.0%	0.000%
3.3			39.9%	3.0%	0.000%
5.5			21.6%	2.8%	0.000%
1.1			2.5%	0.000%	0.000%
5.3	IT	4.57	3.0%	0.000%	0.000%
5.5	Comm. Svc	4.69	-1.2%	2.2%	0.000%

Avg. Days to Cover **Gross Weight** **Net Weight**
 4.3 100.0% 100.0%

1

2

Prebuilt portfolios or factor baskets

Manage a portfolio or interest list

Sources: Bloomberg Finance LLP, FTSE Russell, Haver, S&P Capital IQ, Thomson Reuters, Wolfe Research Luo's QES

FACTOR ANALYTICS

One of the most powerful quantitative tools that almost all active managers can leverage is factor analysis. As explained in [*The Future of Active Management – 2021 Edition*](#), style factors can explain a significant portion of the risk and return of most equity portfolios. Therefore, it is critical for managers to understand where they take on factor risk and whether such risk is intentional/desirable.

SELECTING AN ESTIMATION UNIVERSE

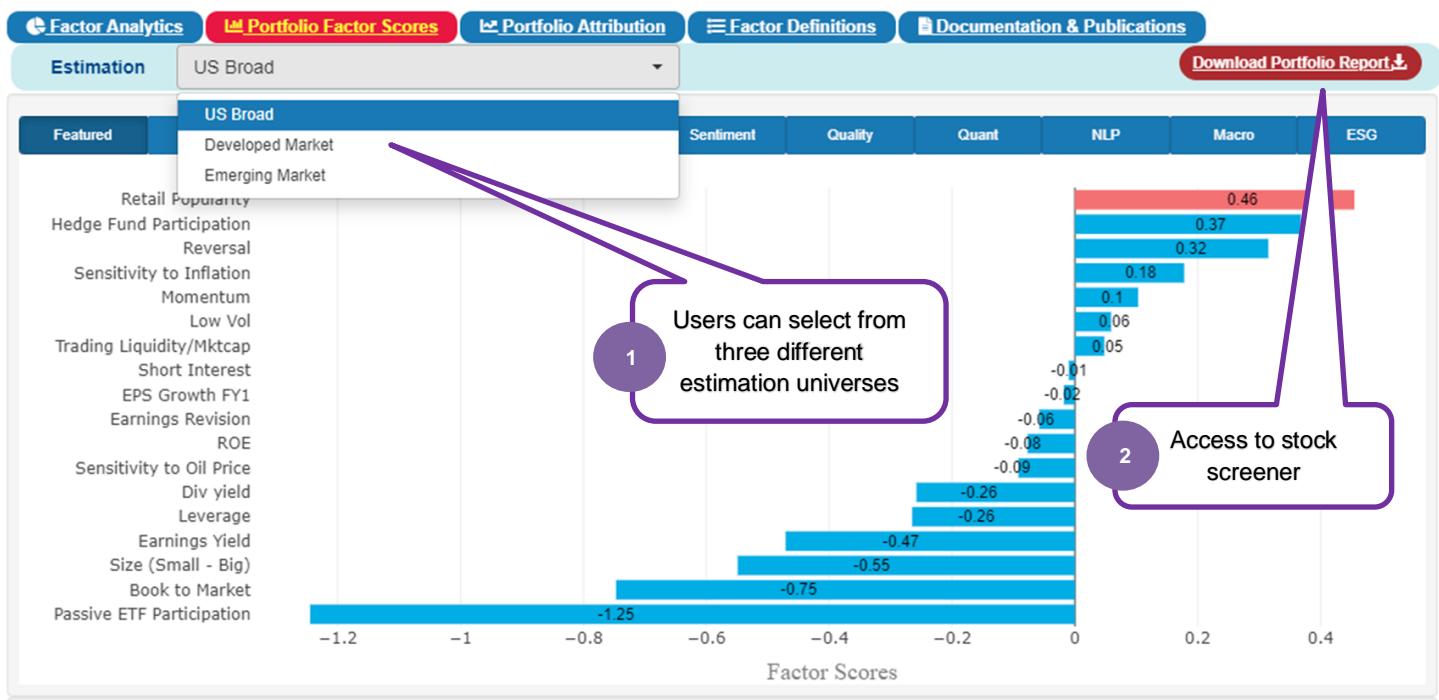
Once a portfolio is uploaded on the dashboard, clients can view the factor exposures. It is important to highlight that factor analysis is conducted and risk models are estimated using an estimation universe. It is also critical to point out that managers may want to choose an estimation universe that is consistent with their investment mandate.

Our newly enhanced dashboard allows users to conduct factor analysis by choosing from three different estimation universes – US Broad, Developed Markets, and Emerging Markets (see #1 in Figure 7). US Broad is a US large-cap equity universe like the Russell 1000 or S&P 1500 index. Our Developed Markets universe is comparable to the MSCI World Index, while our Emerging Markets universe closely resembles the MSCI Emerging Market Index. Lastly, we want to point out that our factor scores are not country or sector neutralized⁴.

Portfolio factor exposures are aggregated as the sum-product of each stock's weight and factor z-score. For companies outside the estimation universe, z-scores are extrapolated based on their factor values as well as the mean and standard deviation of the factor distribution within the estimation universe.

⁴ There are pros and cons for neutralizing country/sector exposures. For stock-selection models, we typically control for country/sector risks, while for risk analytics, the convention is not to adjust country/sector exposure at the factor level – instead, country/sector risks are reported along with style factor exposures.

Figure 7 Selecting an Estimation Universe



Sources: Bloomberg Finance LLP, FTSE Russell, Haver, S&P Capital IQ, Thomson Reuters, Wolfe Research Luo's QES

Stock Screening Capabilities

In the new release, users can also view factor scores for individual stocks within their portfolios, which essentially enables clients to use our factor awareness dashboard as a stock screening tool. By selecting *Download Portfolio Report* (see #2 in Figure 7), users can view factor scores of each stock in their portfolio (see Figure 8). The downloaded Excel report highlights the latest factor scores across 100+ signals. Recall that factor scores are updated daily. The Excel report is designed for investors to conduct stock screens based on systematic factors. The Excel screen shows the latest cross-sectional factor scores. To analyze factor exposures over time, we have also added the *Factor Spotlight* tool.

Figure 8 Excel Stock Screener

	A	B	C	D	H	I	J	K	L	M	N	O	P	Q	R	
1	Ticker	Name	MktCap (\$B)	Sector	Weight	Benchmark Weight	ROE	Div yield	Earnings Yield	Book to Market	EPS Growth FY1	Reversal	Momentum	Earnings Revision	Low Vol	Size
2	CERN US	Cerner Corp	21.90	Health Care	5.2%	0.0%	-0.01	0.24	-0.31	-0.53	-0.26	0.10	-1.15	-0.04	2.00	
3	MANH US	Manhattan Associates Inc	10.70	IT	3.0%	0.0%	1.31	-0.84	-0.69	-1.55	-0.11	0.40	1.03	-0.90	-0.11	
4	EA US	Electronic Arts Inc	39.10	Comm. Svc	5.2%	0.0%	-0.24	-0.09	-0.42	-0.43	-0.04	0.29	-0.70	0.48	0.76	
5	INTU US	Intuit Inc.	173.60	IT	6.1%	0.0%	0.80	-0.13	-0.65	-1.53	-0.31	-0.83	1.15	-0.89	0.65	
6	ATVI US	Activision Blizzard Inc	50.00	Comm. Svc	4.2%	0.0%	0.31	0.02	0.0	0.09	-0.51	1.76	-1.10	-0.69	0.04	
7	MSFT US	Microsoft Corp	2546.10	IT	6.0%	0.0%	1.27	0.07	-0.21	-1.21	-0.31	-0.76	0.64	0.25	1.45	
8	ORCL US	Oracle Corp	260.60	IT	5.8%	0.0%	1.81	0.40	-1.81	-0.82	0.63	1.11	-0.01	0.94	-0.21	
9	DLB US	Dolby Laboratories Inc	5.70	IT	0.0%	0.0%	-0.25	0.01	-0.06	-0.68	0.95	-0.81	-0.03	1.26	-0.33	
10	CVLT US	CommVault Systems Inc	1.40	IT	0.0%	0.0%	-0.84	-0.69	-1.55	-0.11	0.40	1.03	-0.90	1.16	-0.37	
11	PTC US	PTC Inc	0.70	IT	0.0%	0.0%	0.80	-0.84	-0.02	-0.64	-0.42	1.09	-0.29	1.16	-0.79	
12	BAND US	Bandwidth Inc	1.20	IT	0.0%	0.0%	-1.34	-0.84	-1.27	-0.30	0.19	1.72	-2.22	-1.36	0.11	
13	ALTR US	Altair Engineering Inc	0.70	IT	0.0%	0.0%	-1.02	-0.84	-0.95	-1.13	0.80	-0.22	0.38	0.5162	-0.14	
14	CHNG US	Change Healthcare Inc	0.70	IT	0.0%	0.0%	-1.02	-0.84	-1.09	0.55	-0.35	0.48	-0.19	0.14	-0.48	
15	EVCM US	EverCommerce Inc	0.70	IT	0.0%	0.0%	-1.42	-0.84	-1.37	-0.07	1.33	0.20	1.16	1.16	-0.33	
16	IS US	IronSource Ltd	6.50	IT	0.0%	0.0%	1.31	-0.84	-0.69	-1.55	-0.11	0.40	1.03	-0.90	-0.90	
17	MGNI US	Magritek Inc	2.90	Comm. Svc	2.2%	0.0%	-0.90	-0.84	-0.78	0.00	1.35	2.47	0.47	0.72	-2.38	
18	MAX US	MediaAlpha Inc	0.70	Comm. Svc	2.2%	0.0%	-2.53	-0.84	-1.26	-1.91	1.20	0.74	-2.76	-1.67	-1.81	
19	CERT US	Certara Inc	5.80	Health Care	3.4%	0.0%	-1.25	-0.84	-1.15	-0.55	0.24	0.92	1.28	1.28	-1.48	
20	NABL US	N-able Inc	2.30	IT	2.9%	0.0%	-0.84	-0.84	-1.08	-0.12	2.27	0.78	0.20	0.20	-0.33	
21	DOCS US	Doximity Inc	4.30	Health Care	2.3%	0.0%	-1.34	-0.84	-1.27	-0.30	0.19	1.72	-2.22	-1.36	-0.36	
22	MCFE US	McAfee Corp	4.70	IT	2.8%	0.0%	-2.71	2.41	-1.43	-3.26	-1.02	-1.30	1.18	0.85	-1.02	
23	OLO US	Olo Inc	1.60	IT	2.1%	0.0%	-0.55	-0.84	-0.75	-0.86	-0.42	1.68	0.67	-1.13	-0.33	
24	KNBE US	KnowBe4 Inc	0.80	IT	3.2%	0.0%	0.80	-0.84	-0.02	-0.64	-0.42	1.09	-0.29	1.16	-0.37	
25	RBLX US	Roblox Corp	65.80	Comm. Svc	7.5%	0.0%	-1.34	-0.84	-1.27	-0.30	0.19	1.72	-2.22	-1.36	-0.79	
26	BMBL US	Bumble Inc	4.90	Comm. Svc	2.1%	0.0%	-1.02	-0.84	-0.95	-1.13	0.80	-0.22	0.38	0.52	-0.11	

Sources: Bloomberg Finance LLP, FTSE Russell, Haver, S&P Capital IQ, Thomson Reuters, Wolfe Research Luo's QES

Factor Spotlight

In addition to the ability of analyzing stocks at a given point in time, the *Factor Spotlight* tab allows managers to view factor performance over time. Once you are on the *Portfolios Factor Scores* tab, users can select any factor (see #1 in Figure 9) and view the factor's time series performance (see #2 in Figure 9). Factor portfolios are signal weighted and rebalanced daily. Performance is reported over a three-month period.

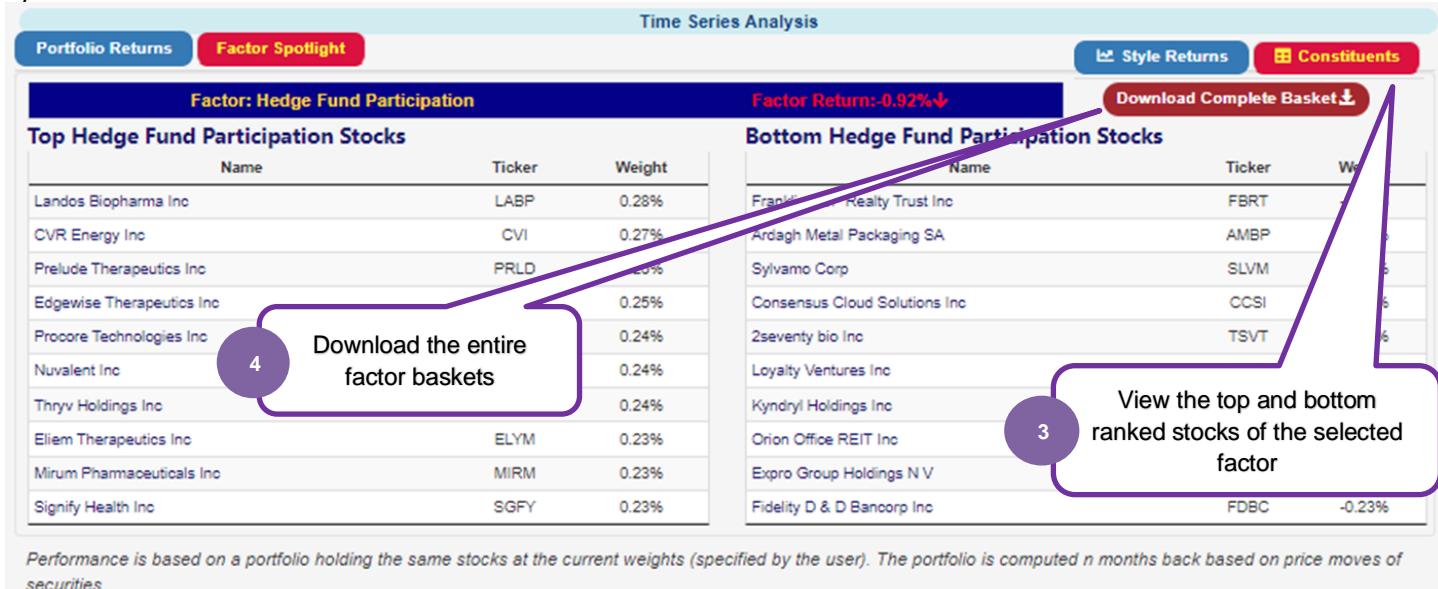
In addition to viewing factor performance, clients can also examine the underlying stock constituents of each factor portfolio, by selecting the *Constituents* tab (see #3 in Figure 9). While the panel only shows the highest and the lowest weighted stocks in the factor portfolio, clicking the *Download Complete Baskets* button allows users to retrieve the entire list of stocks in the factor portfolio (see #4 in Figure 9). Users can then manage their portfolio's style exposures by adding/removing stocks or adjusting weights.

Figure 9 Factor Spotlight

A) Time Series Performance of a Selected Factor



B) Factor Basket Constituents

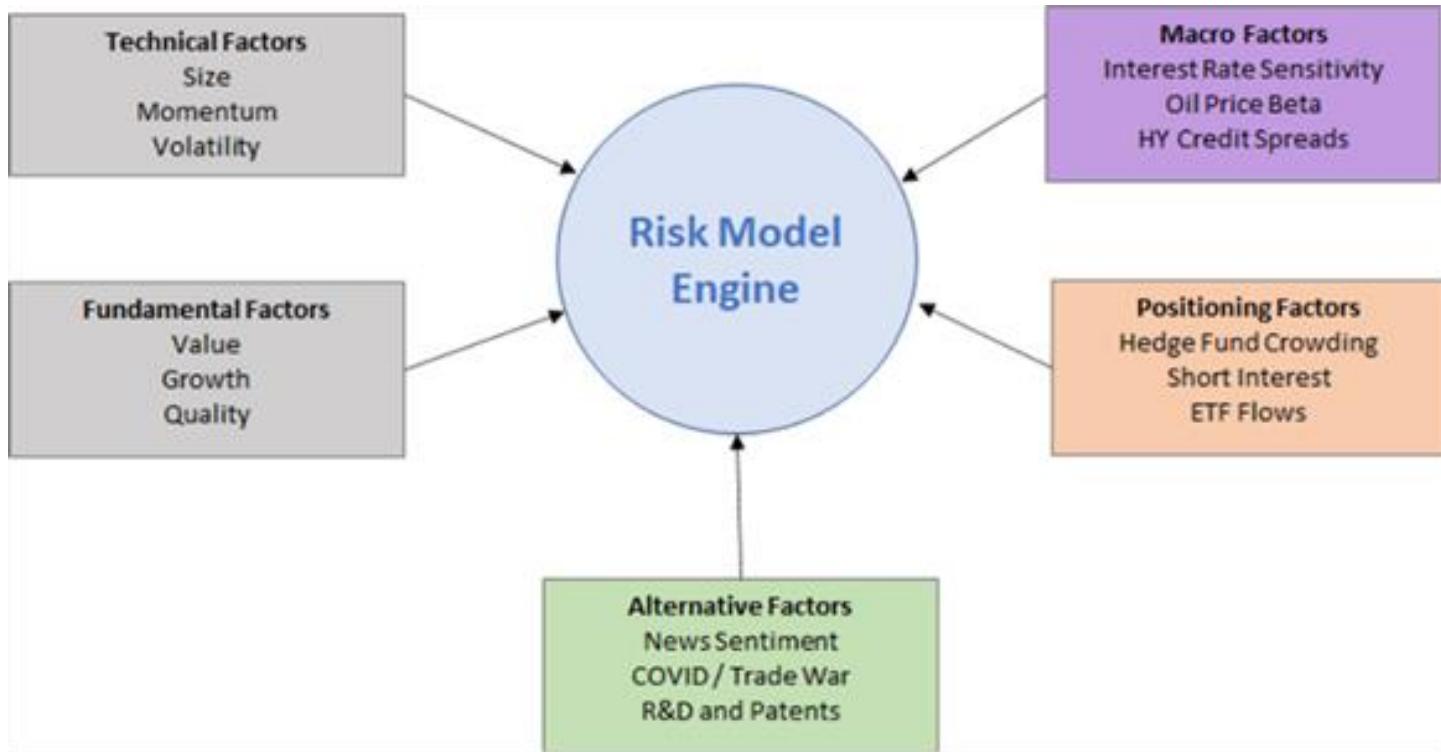


Sources: Bloomberg Finance LLP, FTSE Russell, Haver, S&P Capital IQ, Thomson Reuters, Wolfe Research Luo's QES

INCORPORATING THE NEXT GENERATION OF BROAD MARKET RISK MODEL (V2)

After the successful launch of our Wolfe QES Broad Market Risk model suite two years ago, we recently release the second version (V2). The new V2 risk model suite is now added to our enhanced factor awareness dashboard. Our equity risk model leverages our strength in quantitative research, alternative data, and model development (see Figure 10).

Figure 10 Risk Model Construction Methodology



Sources: Wolfe Research Luo's QES

Our US Broad Risk Model covers over 40,000+ global public equities and approximately 1,000 ETFs. Daily history is available from January 2007. The risk model estimation universe comprises of both large- and small-cap stocks. Figure 11 summarizes the current factors included in our V2 risk model. In particularly, an ETF flow factor that measures the impact of passive investing is added to the model.

Figure 11 US Broad Medium Horizon Risk Model (V2)

QES Factor	Signal Description
Earnings Yield	Next 12-month median consensus EPS divided by current share price.
Book-to-Price	Ratio of book value of equity to market value of equity.
Growth	Combination of median consensus EPS growth and sales growth over the next 12-months.
Revisions	Combination of 3-month changes in mean consensus EPS and Sales over the next 12-months.
Profitability	Combination of trailing ROE and net margin.
Leverage	Combination of debt-to-equity and debt-to-total capital at current market value.
Dividend Yield	Trailing 12-month dividend per share divided by current share price.
Momentum	Total return of the past 12-months excluding the most recent 1-month.
Volatility	Realized volatility, based on daily returns over the past 12-months.
Size	Market capitalization, common shares outstanding multiplied by the current share price.
HF Crowding	Combination of hedge fund intensity (% of float) and level (market value) based on 13F filings.
Liquidity	Past 3-month average dollar volume divided by average market capitalization.
Interest Rates	Beta to interest rate changes for US Treasuries approximately equivalent to the 10Y.
Oil Prices	Beta to weekly returns of crude oil WTI Futures TR after controlling for market beta.
Short Interest	Ratio of shares borrowed for shorting to inventory available for lending.
ETF Flow	Measures the sensitivity to passive investing using 3M change in ETF flow.
QES Industries	Binary one or zero values identifying each stock's QES Industry classification.

Sources: Bloomberg Finance LLP, FTSE Russell, S&P Capital IQ, Refinitiv, Wolfe Research Luo's QES

FIVE KEY ADVANTAGES OF WOLFE QES RISK MODELS

Compared to conventional risk models, there are several unique and important advantages offered by the Wolfe QES Risk Model suite:

1. **Next Generation Style Factors.** In addition to conventional technical and fundamental features, we also include a series of unique factors that not only improve explanatory power, but also offer additional investment insights to investors:
 - **Short Interest.** Our research suggests that short interest is a unique risk factor that cannot be captured by traditional fundamental-based style factors (see [New Insights in Short Interest – A Global Perspective](#), Rohal, et al [2017] and [A Battle between Retail and Institutional Investors](#), Jussa, et al [2021]).
 - **Oil Price Sensitivity.** Our oil price sensitivity factor is computed using a machine learning algorithm that dynamically estimates a stock's beta to crude oil return. Although stocks in the energy and utilities sector, along with airlines and renewable energy industries, are expected to be correlated to oil price, companies in other economic sectors may still be exposed to the commodity (see [The Supply Chain Effect of Crude Oil](#), Luo, et al [2018]).
 - **Interest Rate Sensitivity.** As detailed in [Stocks Most Exposed to Rising Interest Rate](#) (see Wang, et al [2018]), we apply a sophisticated machine learning technique to estimate each stock's sensitivity to the level and slope changes of the US treasury yield curve.

Changes in long-term bond yield can have a profound impact on value versus growth stocks via the adjustment to their discount rates.

- **Hedge Fund Crowding.** We utilize the 13F ownership data to measure the percentage of total shares outstanding held by hedge funds. Although hedge fund crowding and short interest both measure the behavior of hedge funds, they are distinctively different (see [A Battle between Retail and Institutional Investors](#), Jussa, et al [2021] for a recent example).
 - **ETF Flow:** Fundamental PMs frequently express concern about the possible impact of ETF flows on their stock-selection. We included an ETF Flow factor in our version two risk models to measure this effect. See [Capturing Innovation from ARK Discretionary ETFs](#), Jussa, et al [2021] to understand how discretionary ETFs can be analyzed using the suite of Wolfe QES Risk Models.
2. **Enhanced Stock Exposures to Factors.** Instead of relying solely on cross sectional rankings of stocks based on a particular signal, we incorporate the stock's statistical sensitivity to each factor (see [Deja Vu, Risk-On and Risk-Off \(RORO\) Again](#)) for details. This reduces *ex post* correlations between alpha and factors resulting in more effective risk management (see [GEM Portfolio Construction](#) for details).
 3. **Expanded Model Coverage.** We provide risk estimates for stocks far beyond each models' estimation universe. For example, our US Broad Risk Model covers 40,000+ stocks globally, so equity positions outside of the model's estimation universe can be incorporated in the risk analytics seamlessly.
 4. **Holdings Based Factor Covariance Matrix.** Conventional vendors use the time series of returns for factors, rebalanced daily to compute variances and covariances (see [Current Affairs: Momentum – Shifting Gears](#)). Our approach uses the time series of returns for today's factor portfolios which are more relevant to future risk prediction. As explained in [GEM Portfolio Construction](#), this unique approach boosts risk model's out-of-sample accuracy considerably.
 5. **Intelligent Residual Risk Computation.** Conventional vendors use the inverse of the square root of market cap as a proxy for idiosyncratic risk. Our approach uses a separate multifactor model to estimate the idiosyncratic risk more accurately for each stock.

PERFORMANCE ATTRIBUTION

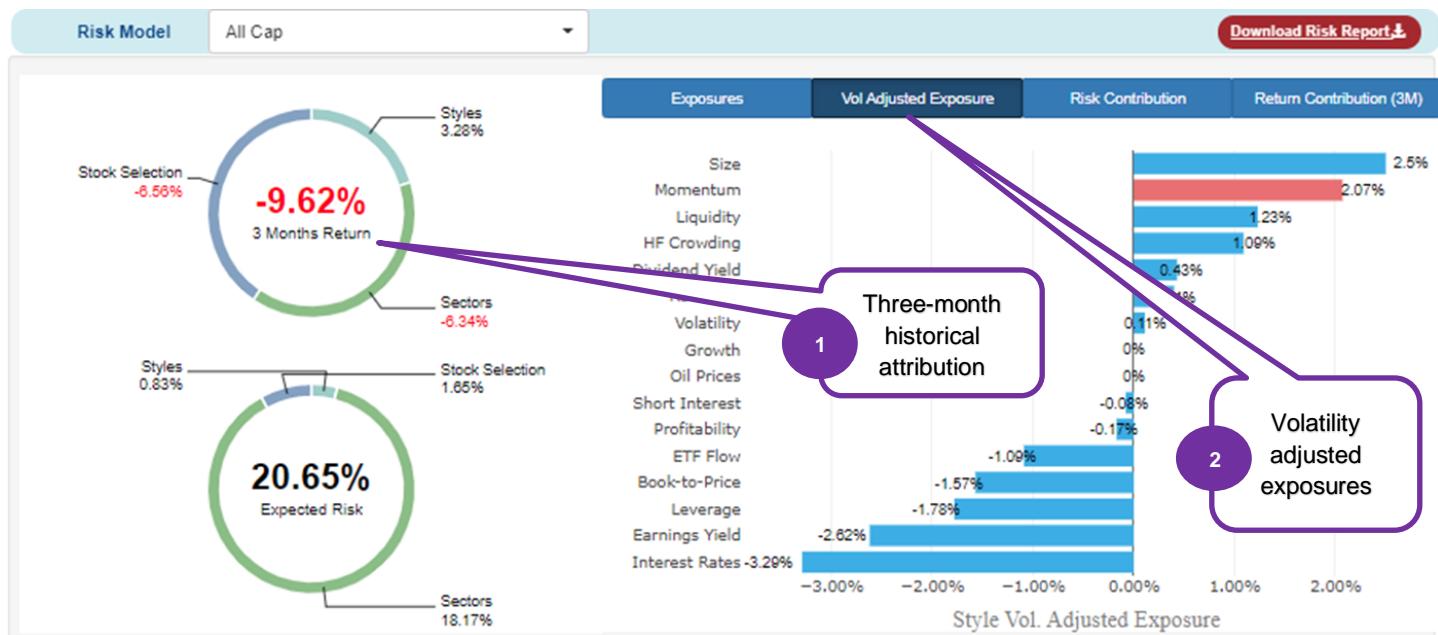
Managers can utilize our dashboard to decompose the past three-month⁵ performance of their portfolios across various attributes – style factors, sectors, and industries (see #1 in Figure 12). Investors can examine their portfolio style exposures and consequently view the return associated with each factor. Our dashboard now includes volatility-adjusted style exposures (see #2 in Figure 12), which makes a fair comparison across different factors.

Clients can also view their portfolios' *ex ante* risk (including volatility and tracking error). The expected risk can be decomposed across various styles, sectors, and industries. Portfolio managers can also view each individual stock's contribution to each risk dimension. Furthermore, users have the option to choose the most appropriate risk model (between broad market and sector specific) for their analysis (see #3 in Figure 12).

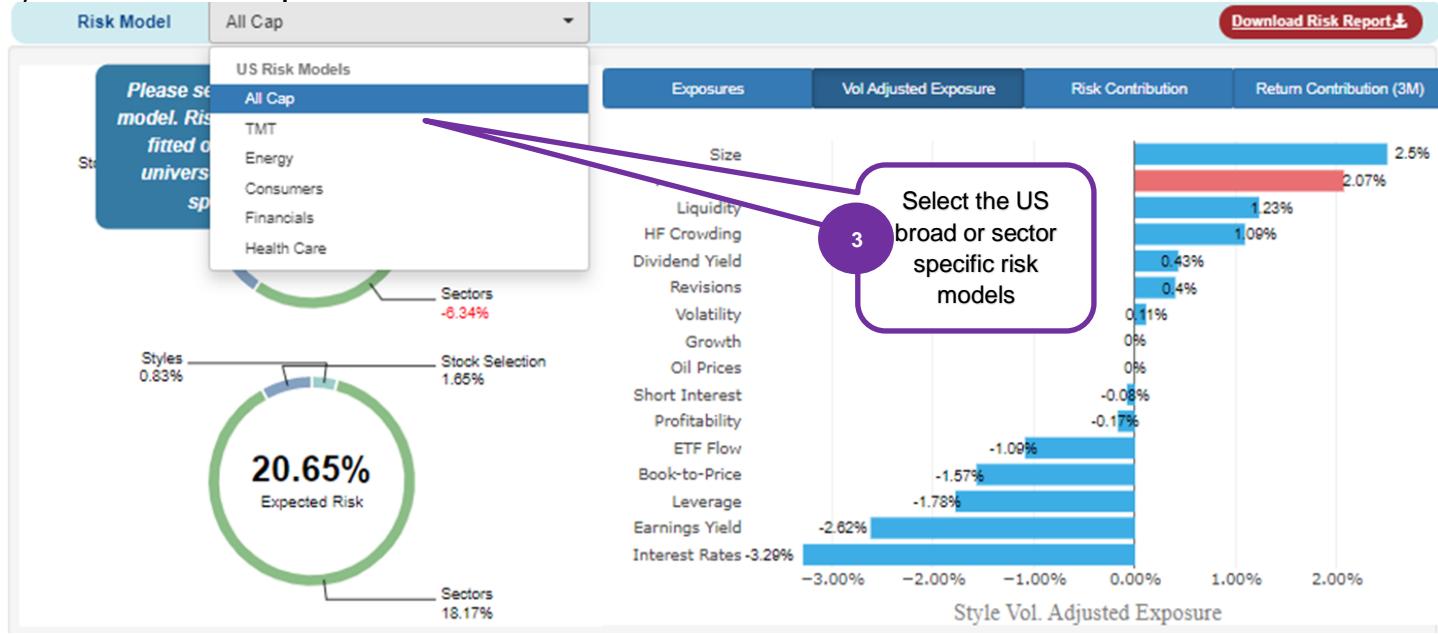
⁵ The previous version of the dashboard only allowed for a *one-month* performance attribution.

Figure 12 Enhanced Features

A) Enhanced Factor Analytics



B) US Broad or Sector Specific Risk Models



Sources: Bloomberg Finance LLP, FTSE Russell, Haver, S&P Capital IQ, Thomson Reuters, Wolfe Research Luo's QES

Our online dashboard gives a reasonable *approximation* of the return and risk profile of an uploaded portfolio. It is important to note that the portfolio returns and FMPs are calculated daily. However, the style and industry beta exposures are static throughout the three-month period and are estimated at the beginning of the period because we assume users have been holding the same portfolio in the past

three months⁶. Key corporate actions are adjusted properly. For most managers with reasonable turnover, this assumption offers fairly accurate assessment of their portfolios. Please note that we offer more accurate performance analytics with point-in-time holdings as a service. Please contact the [QES risk team](#) or your Wolfe Research sales representative for details.

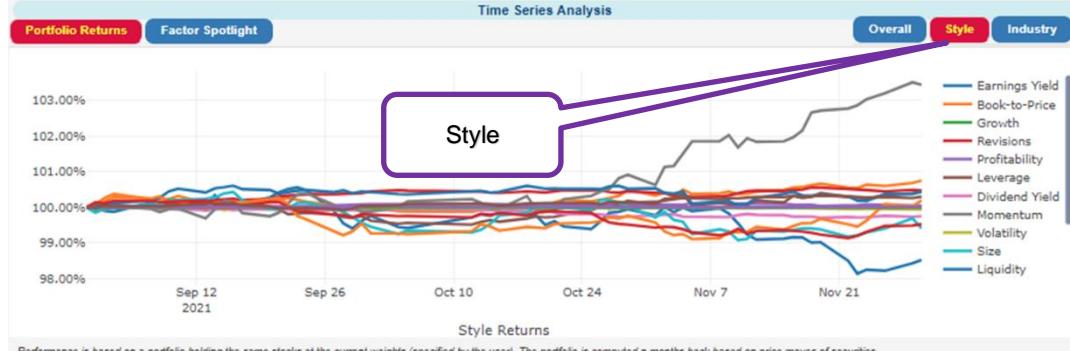
Lastly, in addition to the performance attribution summary (see Figure 12), users can also view the contribution of the aggregated key components (see Figure 13A), and each styles (see Figure 13B) and industries (see Figure 13C) over time.

Figure 13 Portfolio Returns

A) Overall



B) Style



C) Industry



Sources: Bloomberg Finance LLP, FTSE Russell, Haver, S&P Capital IQ, Thomson Reuters, Wolfe Research Luo's QES

⁶ Users requiring a more accurate analysis could enter their portfolio from three months ago into the dashboard.

COMPREHENSIVE RISK REPORT

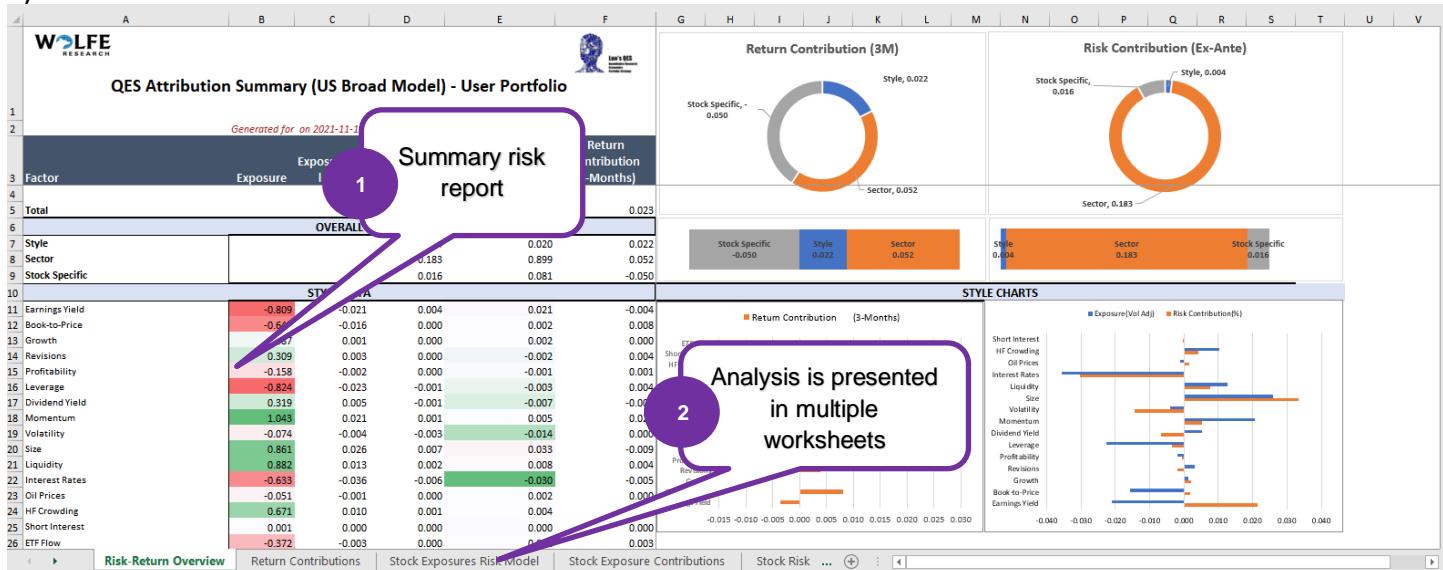
Lastly, we have revamped our risk reporting capabilities to include a comprehensive set of risk metrics, using either an Excel spreadsheet or PDF document:

- The overall portfolio risk/return profile across factors and industries (see #1 in Figure 14A);
- Portfolio exposures, vol-adjusted exposure, and risk and return contribution;
- Informative graphs;
- Daily style and industry return contribution time series data over the past three months; and
- Stock-level style and industry contributions (see #2 in Figure 14A).

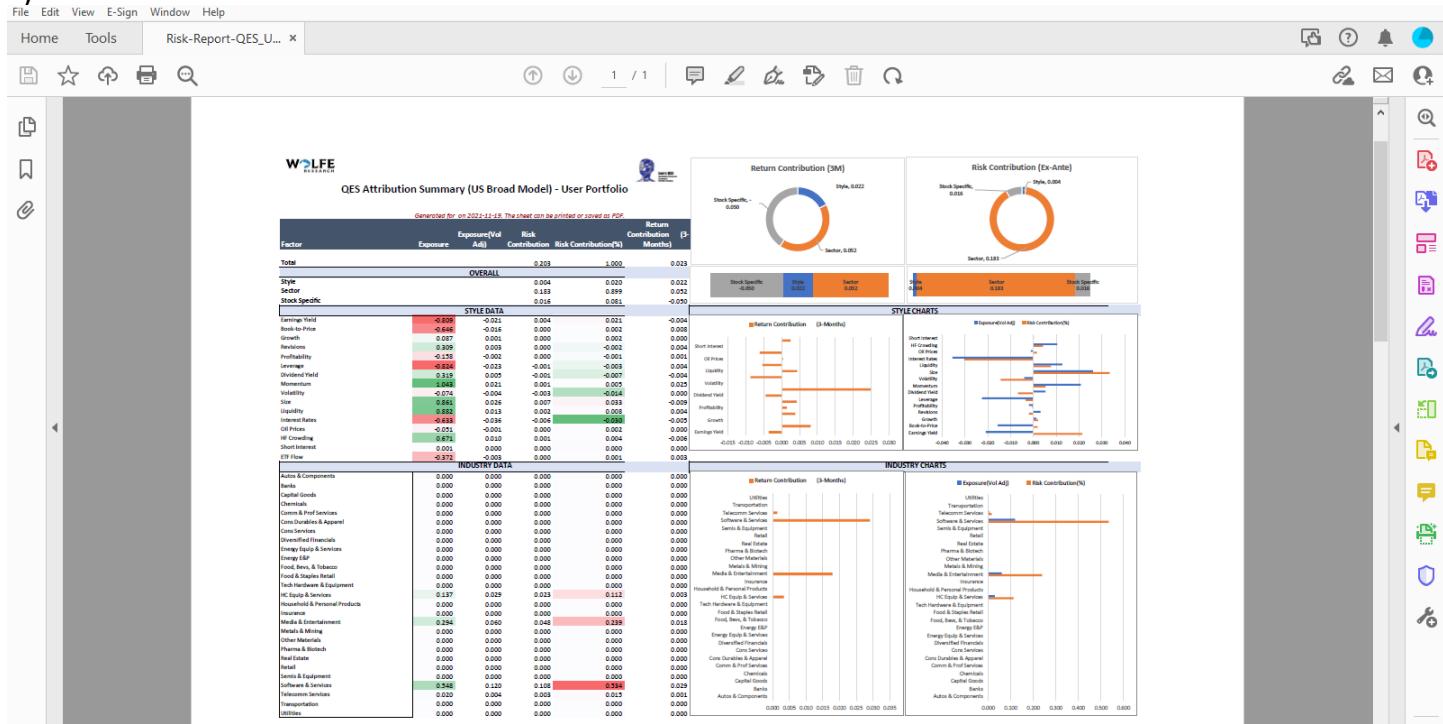
Finally, the Excel spreadsheet can be printed or saved as a PDF report, which can then be shared among colleagues and management (see Figure 14B). All the capabilities and enhancements described thus far also apply to Wolfe's suite of sector risk models.

Figure 14 Risk Report

A) Excel



B) PDF



Sources: Bloomberg Finance LLP, FTSE Russell, Haver, S&P Capital IQ, Thomson Reuters, Wolfe Research Luo's QES

WOLFE QES SECTOR RISK MODELS

Each portfolio manager has their own proprietary investment process; therefore, a one-size-fits-all risk model may be insufficient in many cases. In particular, many managers and research analysts are sector specialists, focusing on stocks from a subset of industries. Our sector risk models are specifically constructed and tailored for managers focusing on a particular sector, theme, or industry. Each risk model is constructed on a specific sector estimation universe (see Figure 15). Sector-specific risk models not only offer more precise risk estimates, but also provide more intuitive interpretation of risk metrics than general purpose models.

Figure 15 Wolfe QES Sector Risk Models

Sector Risk Model	Approximate Risk Estimation Universe	Investment Horizon	Securities Coverage	Model History
Consumer	US All-Cap Consumer Equities	Medium-term	Global equities (~40,000) plus US-listed equity ETFs (~1,000)	January 2007 to present
Energy	US All-Cap Energy Equities	Medium-term	Global equities (~40,000) plus US-listed equity ETFs (~1,000)	January 2007 to present
Health Care	US All-Cap Health Care Equities	Medium-term	Global equities (~40,000) plus US-listed equity ETFs (~1,000)	January 2007 to present
Industrial	US All-Cap Industrial Equities	Medium-term	Global equities (~40,000) plus US-listed equity ETFs (~1,000)	January 2007 to present
Technology, Media, & Telecom	US All-Cap TMT Equities	Medium-term	Global equities (~40,000) plus US-listed equity ETFs (~1,000)	January 2007 to present
Financials	US All-Cap Financials Equities	Medium-term	Global equities (~40,000) plus US-listed equity ETFs (~1,000)	January 2007 to present

Sources: Wolfe Research Luo's QES

Each sector risk model incorporates a custom set of factors, encompassing a variety of different styles – fundamental, technical, alternative, macro, and positioning (see Figure 16). Risk factors are selected based on their relevance, explanatory power, and materiality within a given sector.

For example, our TMT risk model includes a *sales revision* factor. Most technology companies are valued using sales multiples (instead of earnings), because a significant number of these firms report negative earnings especially during their start-up years. Therefore, we would expect *sales* are more applicable than *earnings* metrics for risk prediction and attribution of TMT companies (see [Global TMT Stock Selection Models – Introducing TALIA](#)). Similarly, our Energy risk model incorporates factors such as oil and natural gas price sensitivity, which is highly relevant to energy names especially upstream oil companies (see [Active Global Energy Stock Investing Guide](#)). The Financials risk model contains our interest rate sensitivity and term spread factors, which are material to banking and insurance companies.

Figure 16 Wolfe QES Sector Risk Models

	Broad DM	Broad US	Energy	Consumer	TMT	Healthcare	Industr&Mat	Financials	
Fundamental	Earnings Yield Book-to-Market EPS & Sales Growth ROE & Net Margins	Earnings Yield Book-to-Market EPS & Sales Growth ROE & Net Margins	FCF Yield EBITDA-to-EV CFPS Growth ROIC	Earnings Yield Sales-to-EV EPS & Sales Growth ROIC Gross Margins Inventory Turnover	Earnings Yield Sales-to-EV EPS & Sales Growth ROE & Net Margins Leverage Total Yield	Earnings Yield Sales-to-EV Sales Growth ROIC Leverage Total Yield	Earnings Yield EBITDA-to-EV EPS & Sales Growth ROIC & ROA Leverage Dividend Yield	Earnings Yield Book-to-Market EPS & Sales Growth ROA Re-Investment Rate Receivables Turnover	Fundamental
Technical	Momentum Volatility Size Liquidity	Momentum Volatility Size Liquidity	Momentum Volatility Size Liquidity	Momentum Volatility Size Liquidity	Momentum Volatility Size Liquidity	Momentum Volatility Size Liquidity	Momentum Volatility Size Liquidity	Momentum Volatility Size Liquidity	Technical
Alternative	EPS & Sales Revisions	EPS & Sales Revisions	EBITDA Revisions	EPS & Sales Revisions	Sales Revisions	Sales Revisions		EPS Growth	Alternative
Macro	Interest Rates Oil Prices	Interest Rates Oil Prices	Interest Rates Oil Prices NatGas Prices	HY Credit Spreads			Interest Rates Oil Prices Industrial Metals	Interest Rates Term Spread HY Credit Spreads	Macro
Positioning	HF Crowding Short Interest	HF Crowding Short Interest	HF Crowding Short Interest ETF Crowding	HF Crowding Short Interest ETF Crowding	HF Crowding Short Interest ETF Crowding	HF Crowding Short Interest ETF Crowding	HF Crowding Short Interest ETF Crowding	HF Crowding Short Interest ETF Crowding	Positioning

Sources: Wolfe Research Luo's QES

To appreciate the additional insights from sector-specific risk model, we use a representative TMT model to demonstrate. Using 13F holdings (see [Portable Ownership](#) for more details), we construct a sample TMT portfolio that aggregate all active positions from TMT focused discretionary managers. Once a portfolio is uploaded to the dashboard, users can select the portfolio attribution tab, which provides an overall return and risk decomposition summary (see Figure 17). We examined our sample portfolio using both the Broad Market and TMT risk models.

- In the most recent month, the sample portfolio was down **-8.22%** on an absolute basis⁷ (see Figure 17A and Figure 17B).
- In terms of style factor return contribution, the Broad Marketing risk model suggests **+4.17%** (see #1 in Figure 17), while the TMT sector risk model points to a number materially higher at **+5.96%**.
- More importantly, the TMT sector risk model shows a significant higher proportion of portfolio risk due to style factors (at 38%) than the Broad Market model (at 26%), as shown in #2 in Figure 17.

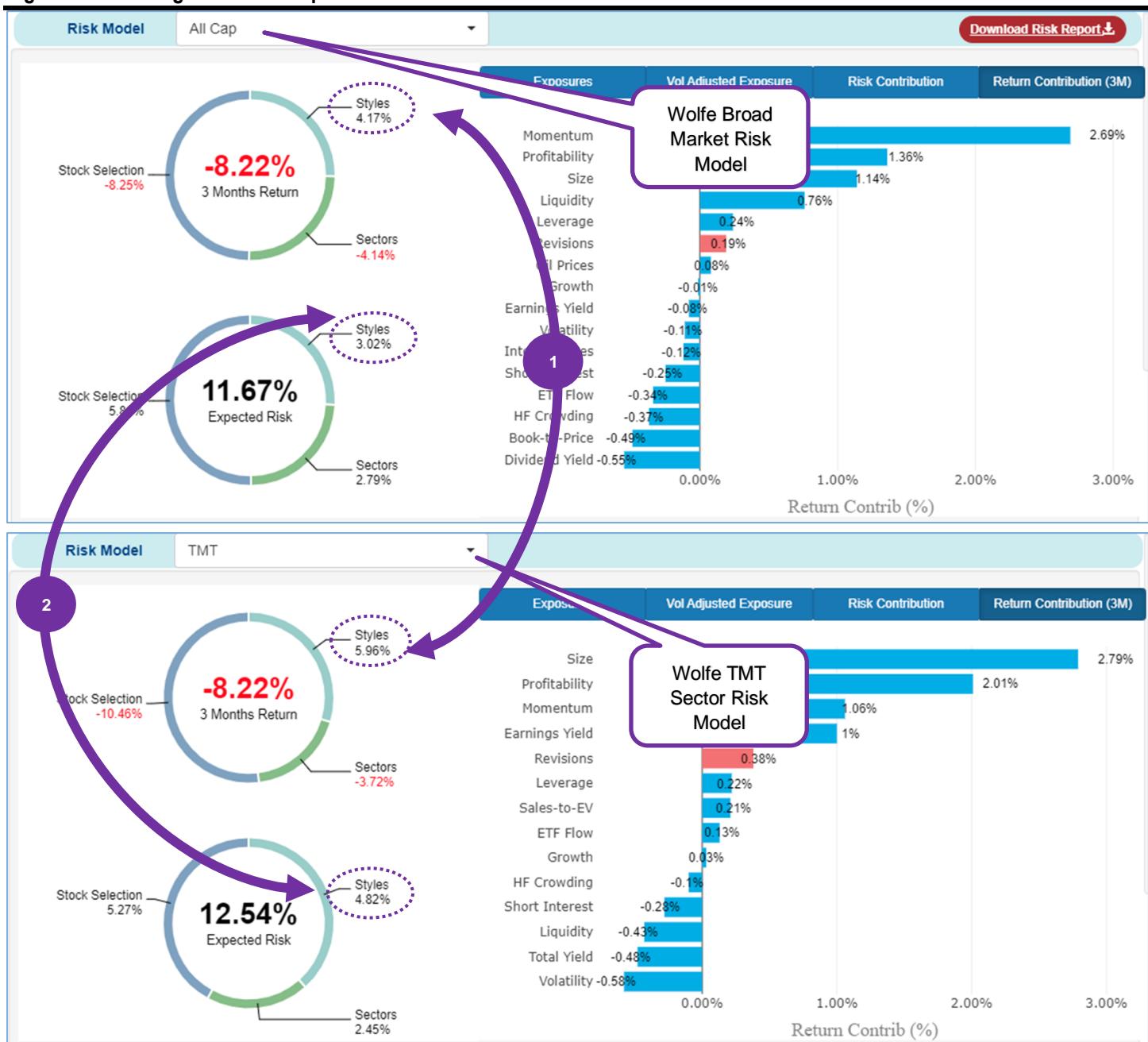
⁷ Because our TMT portfolio is based on the active holdings of hedge funds, we focus on absolute returns and performance, without referencing any benchmark.

⁸ Computed as $\frac{4.82\%}{12.54\%} = 38\%$

⁹ Computed as $\frac{3.02\%}{1.67\%} = 26\%$

Using style factors that are unique to a given sector allows us to measure and attribute risk and returns more accurately than general purpose risk models. As a result, managers can make better decisions in managing their portfolios.

Figure 17 Advantages of Sector Specific Risk Models



Sources: Bloomberg Finance LLP, FTSE Russell, Haver, S&P Capital IQ, Thomson Reuters, Wolfe Research Luo's QES

Company Risk Summary

The *Summary* tab shows portfolio risk contribution by individual securities within the portfolio (see Figure 18). The company-level risk contribution is decomposed by style, sector, and idiosyncratic risk, presented in a tabular format.

Figure 18 Security-Level Risk Decomposition

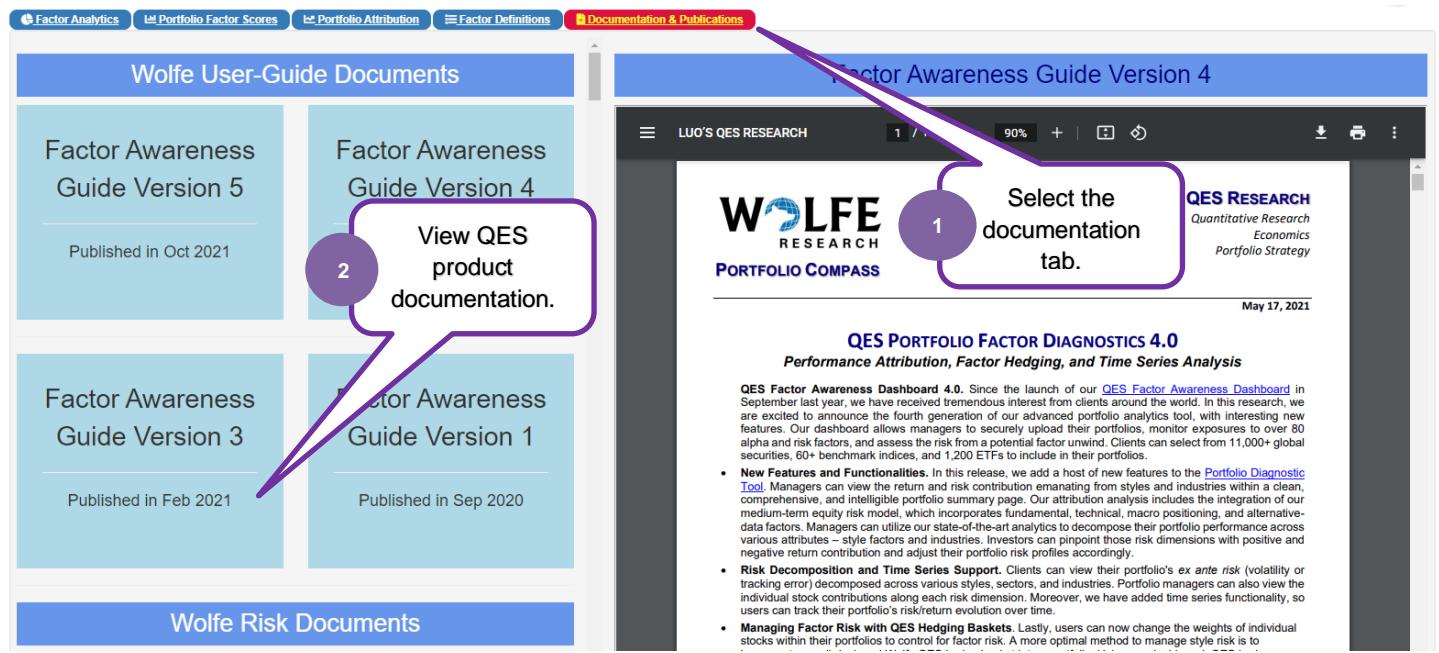
Security Details												
		Portfolio Risk Contribution						Security Risk				
Ticker	Name	MktCap (\$ B)	Weight	Total	Style	Sector	Idio	Total	Style	Sector	Idio	
CERN US	Cerner Corp	5.17%	0.55%	-0.04%	0.53%	0.08%	28.51%	-1.50%	9.51%	18.50%		
MANH US	Manhattan Associates Inc	3.04%	0.70%	0.01%	0.67%	0.03%	34.66%	2.58%	14.42%	17.67%		
EA US	Electronic Arts Inc	5.20%	0.73%	0.09%	0.57%	0.07%	29.09%	2.15%	7.80%	19.14%		
INTU US	Intuit Inc.	6.14%	1.41%	0.15%	1.18%	0.10%	33.67%	4.07%	13.21%	16.39%		
ATVI US	Activision Blizzard Inc	4.21%	0.69%	0.09%	0.54%	0.06%	32.04%	3.98%	8.09%	19.97%		
MSFT US	Microsoft Corp	6.02%	1.10%	0.12%	0.90%	0.09%	29.64%	1.35%	11.88%	16.40%		
ORCL US	Oracle Corp	5.78%	0.83%	-0.04%	0.78%	0.08%	28.47%	-0.59%	10.73%	18.33%		
DLB US	Dolby Laboratories Inc	2.58%	0.42%	-0.02%	0.43%	0.02%	28.94%	-1.70%	12.92%	17.72%		
CVLT US	CommVault Systems Inc	2.42%	0.55%	-0.01%	0.54%	0.02%	36.21%	2.33%	13.95%	19.93%		
PTC US	PTC Inc	2.67%	0.68%	0.01%	0.65%	0.02%	36.37%	4.33%	15.25%	16.80%		
BAND US	Bandwidth Inc	2.05%	0.39%	0.08%	0.29%	0.02%	37.94%	8.58%	8.70%	20.66%		
ALTR US	Altair Engineering Inc	2.99%	0.62%	0.01%	0.58%	0.03%	33.27%	1.85%	13.43%	17.99%		
CHNG US	Change Healthcare Inc	2.80%	0.42%	-0.09%	0.50%	0.02%	30.59%	-0.52%	13.47%	17.65%		
EVCM US	EverCommerce Inc	2.48%	0.36%	0.02%	0.31%	0.02%	32.10%	-0.43%	9.16%	23.37%		

Sources: Bloomberg Finance LLP, FTSE Russell, Haver, S&P Capital IQ, Thomson Reuters, Wolfe Research Luo's QES

DOCUMENTATION

Given the vast number of features constantly being added to the dashboard, we include a separate *Documentation* tab (see #1 in Figure 19). It contains a rich library for each factor product and model. Our document library outlines the methodology, data, and mechanics of each QES product (see #2 in Figure 19).

Figure 19 Online Documentation



The screenshot shows a web browser displaying the 'Factor Awareness Guide Version 4' page. At the top, there is a navigation bar with tabs: 'Factor Analytics', 'Portfolio Factor Scores', 'Portfolio Attribution', 'Factor Definitions', 'Documentation & Publications' (which is highlighted in red), and 'QES Research'. Below the navigation bar, there is a sidebar titled 'Wolfe User-Guide Documents' containing four items:

- Factor Awareness Guide Version 5 (Published in Oct 2021)
- Factor Awareness Guide Version 4 (View QES product documentation. - highlighted by a callout bubble labeled '2')
- Factor Awareness Guide Version 3 (Published in Feb 2021)
- Factor Awareness Guide Version 1 (Published in Sep 2020)

The main content area of the page is titled 'Factor Awareness Guide Version 4' and includes sections like 'LUO'S QES RESEARCH', 'WOLFE RESEARCH PORTFOLIO COMPASS', and 'QES PORTFOLIO FACTOR DIAGNOSTICS 4.0'. A callout bubble labeled '1' points to the 'Documentation & Publications' tab in the browser's address bar.

Sources: Bloomberg Finance LLP, FTSE Russell, Haver, S&P Capital IQ, Thomson Reuters, Wolfe Research Luo's QES

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