

Each bucket contains a number of individual factors that speak to the macro scenario being captured. The bucket sensitivities are a result of each individual factor increasing by 1 standard deviation, and are therefore calculated as the sum of all the relevant factor sensitivities.

## Buckets

**Corporate Credit** - US, European & Japanese corporate credit spreads as measured by Credit Default Swaps. Both Investment Grade & High Yield credit are captured (depending on the country). Wider spreads (in basis points) indicate stress in credit markets. A positive relationship implies your asset wants increased credit stress.

**Energy** - Crude oil prices measured by WTI in USD/bbl. A positive relationship suggests your asset will rally in an inflationary environment / is not adversely impacted with high oil acting as a "tax" on the asset.

**CB QT Expectations** - Rate vol is used as a proxy for Central Bank (Fed/BoJ/ECB/BoE) Quantitative Tightening expectations. Higher rate vol speaks to increased QT expectations (like the 2013 Taper Tantrum for example). A positive relationship implies your asset is comfortable with a tighter monetary policy stance, presumably as it reflects a self-sustaining upswing in the economic cycle.

**Metals** - Higher Copper & Iron Ore prices are typically positively associated with risky assets and bond yields as they speak to the idea the global economy is growing.

**Risk Aversion** - VIX & other "fear gauges" across DM & EM equity markets, plus the gold/silver ratio.

**Economic Growth** - Tracking GDP growth as measured by Now-Casting for US, China, Japan & EuroZone.

**China / EM Stress** - Measured by Sovereign Credit Default Swaps which effectively capture the cost to insure against a country potentially defaulting. Wider CDS implies higher default risk. A negative relationship therefore suggests your asset wants lower sovereign risk; in this instance in China specifically & EM generically.

**Canadian Sov. Confidence** - Measured by Sovereign Credit Default Swaps which effectively capture the cost to insure against Canada potentially defaulting. Wider CDS implies higher default risk. A negative relationship therefore suggests your asset wants lower sovereign risk.

**Eurozone Confidence** - Captures sovereign risk again but this time via Asset Swaps measured by swap yields less government bond yield in the EuroZone periphery (Italy, Spain & Greece). A positive relationship means your asset performs when government yields remain relatively low, i.e. less sovereign stress.

**Inflation** - The inflation swap market for the relevant country. Up implies higher inflation expectations so, typically, positive for risky assets & negative for Fixed Income instruments.

**USD Liquidity** - EURUSD & USDJPY cross-currency basis swaps; effectively captures the cost of USD liquidity for non-American banks. A measure of liquidity stress: negative basis means a USD shortage & hence tighter financial conditions. A negative relationship therefore implies your asset performs during a period of tighter USD liquidity.

**Forward Growth Expectations** - The shape of the relevant country's yield curve. For DM markets typically the shape of the yield curve between 5yrs & 30yrs. In some EM markets where liquidity diminishes for longer maturities, it may be the 2s10s yield curve that is captured. QE has distorted the classic interpretation but the rule-of-thumb still stands: the curve flattens in a recessionary environment, steepens during periods of reflation.

**Country Growth** - Tracking GDP growth for that country.

**DM FX** - Captures the relevant DM currency for that model & its geography. All models / assets include the USD as a factor given its role as global reserve currency. Then, a European asset would also include the Euro, a UK market GBP fx, Japan the Yen etc.

**EM FX** - Same principle – all models include the US Dollar but, for EM models, we focus on USDCNH.

**Real Rates** - Real yields in USD, EUR & JPY. Measured by nominal yield less inflation expectation at the 10y maturity in each currency.

**CB Rate Expectations** - Measured by the slope of the money market curve where we use 1y1y swap yields less spot 1y swap yields. This effectively captures what the USD, EUR, GBP & JPY money markets are discounting in terms of policy rate cuts or hikes over the next 12-24 months from the Fed, ECB, BoE, BoJ.

## Model Metrics

**Model Confidence** - (Also known as R Squared or RSq) is a gauge of how sensitive the asset is to macroeconomic forces. Typically values above 65% are considered to show strong explanatory power or 'confidence'.

**Model Value** - Represents the macro warranted fair value of the asset based on the Qi methodology.

**Fair Valuation Gap** - The difference between the actual price of an asset and the Qi Model Value. This is quoted both as an absolute (can be percentage, USD or basis points depending on the instrument in question) and in standard deviation terms.

**Sensitivity** - The impact on the price of the asset in % (basis points for rates) for a 1 standard deviation move up in the macro driver. This tells us the influence a driver has on the price of an asset, allowing us to rank drivers and also to identify the directional impact.

	Macro Factors	Description	Definition	Interpretation
Corporate credit	US High Yield 'US HY'	US High Yield Credit Spreads	An index based on a basket of 100 US single- name high yield Credit Default Swaps (CDS).	The CDS spread identifies concerns over default risk; it is the price the market is willing to pay for insurance against corporates defaulting. It can be thought of as a fear indicator. Spreads rise due to credit stress as the market pays more for credit protection. Up = higher credit risk in US High Yield corporates. Typically equities have a negative sensitivity to High Yield; i.e. a 1 SD move higher in CDS spreads would be negative for equity markets as they fear rising corporate defaults.
	Itraxx Japan	Japanese Credit Spreads	An index based on a basket of 40 equally- weighted CDS on investment grade Japanese corporate credit.	Up = higher credit risk in Japan. Negative relationship with equities. Domestic equities suffer on the fear of rising corporate defaults. Note international equities benefited from tight spreads during the BoJ QE as it prompted capital flight from Japanese investors seeking higher yield.
	Itraxx Crossover 'Itraxx Xover'	EUR High Yield Credit Spreads	An index of 75 equally weighted CDS on the most liquid sub investment grade European corporate entities.	Up = higher credit risk in Europe. Again, the typical relationship is wider CDS are negative for European equities. Greater demand for insurance against defaults is bad news for EU stocks.
	FinSub Credit	EUR Financial Credit	An index of 30 equally weighted CDS on investment grade European financial entities.	Up = higher credit risk in EU banks. As above, greater demand for insurance against banks potentially defaulting would typically be negative for European financials and the broader equity market.
Energy	WTI	Crude Oil (WTI)	Energy commodity	Assets can have either a positive or negative relationship. Yields and energy stocks would expect to be positive: higher crude fuels higher inflation fears and helps the bottom line of energy stocks. Conversely, for other equities or even countries which are net importers, higher crude prices may be seen as a tax on consumers, businesses, sovereigns.
CB QLT Expectations	EUR Swaption Rates Nvol 1y5y 'EUR 1y5y Rate Nvol'	ECB Quantitative Tightening Expectations	A swaption (swap option) is the option to enter into an interest rate swap. In exchange for option premium, the buyer gains the right but not the obligation to enter into a specified swap agreement on a specified future date. Here we talk about options on 5yr interest rate swaps 1yr forward in USD, EUR, JPY & GBP.	During Quantitative Easing, Central Bank buying of government, mortgage, corporate bonds suppressed vol across all asset classes but especially in the intermediate part of the government yield curve where the bulk of purchases took place. By keeping yields and vol low, CBs encouraged portfolios to allocate towards more risky financial products. Hence, low rate vol (ongoing QE) is typically seen as positive for risky assets. An aggressive QT approach (eg. taper tantrum) has the potential to upset markets, with risky assets particularly vulnerable.
	USD Swaption Rates Nvol 1y5y 'USD 1y5y Rate Nvol'	Fed Quantitative Tightening Expectations	A swaption (swap option) is the option to enter into an interest rate swap. In exchange for option premium, the buyer gains the right but not the obligation to enter into a specified swap agreement on a specified future date. Here we talk about options on 5yr interest rate swaps 1yr forward in USD, EUR, JPY & GBP.	During Quantitative Easing, Central Bank buying of government, mortgage, corporate bonds suppressed vol across all asset classes but especially in the intermediate part of the government yield curve where the bulk of purchases took place. By keeping yields and vol low, CBs encouraged portfolios to allocate towards more risky financial products. Hence, low rate vol (ongoing QE) is typically seen as positive for risky assets. An aggressive QT approach (eg. taper tantrum) has the potential to upset markets, with risky assets particularly vulnerable.
	JPY Swaption Rates Nvol 1y5y 'JPY 1y5y Rate Nvol'	BoJ Quantitative Tightening Expectations	A swaption (swap option) is the option to enter into an interest rate swap. In exchange for option premium, the buyer gains the right but not the obligation to enter into a specified swap agreement on a specified future date. Here we talk about options on 5yr interest rate swaps 1yr forward in USD, EUR, JPY & GBP.	During Quantitative Easing, Central Bank buying of government, mortgage, corporate bonds suppressed vol across all asset classes but especially in the intermediate part of the government yield curve where the bulk of purchases took place. By keeping yields and vol low, CBs encouraged portfolios to allocate towards more risky financial products. Hence, low rate vol (ongoing QE) is typically seen as positive for risky assets. An aggressive QT approach (eg. taper tantrum) has the potential to upset markets, with risky assets particularly vulnerable.
	GBP Swaption Rates Nvol 1y5y 'GBP 1y5y Rate Nvol'	BoE Quantitative Tightening Expectations	A swaption (swap option) is the option to enter into an interest rate swap. In exchange for option premium, the buyer gains the right but not the obligation to enter into a specified swap agreement on a specified future date. Here we talk about options on 5yr interest rate swaps 1yr forward in USD, EUR, JPY & GBP.	During Quantitative Easing, Central Bank buying of government, mortgage, corporate bonds suppressed vol across all asset classes but especially in the intermediate part of the government yield curve where the bulk of purchases took place. By keeping yields and vol low, CBs encouraged portfolios to allocate towards more risky financial products. Hence, low rate vol (ongoing QE) is typically seen as positive for risky assets. An aggressive QT approach (eg. taper tantrum) has the potential to upset markets, with risky assets particularly vulnerable.

Metals	Copper	Copper	Industrial metal - futures contract	Can be 'spurious' but the typical pattern is higher industrial metal prices are positively associated with risky assets and bond yields, as they speak to a growing global economy.
	Iron Ore	Iron Ore	Industrial metal - futures contract	Can be 'spurious' but the typical pattern is higher industrial metal prices are positively associated with risky assets and bond yields, as they speak to a growing global economy.
Risk Aversion	Gold Silver Ratio	Gold Silver Ratio	Gold to Silver Ratio - futures contracts	Gold is widely perceived as a safe haven proxy. Higher gold prices relative to silver prices suggest uncertainty / fear is higher and there's a "flight-to-quality" dynamic at work.
	VIX	VIX	A measure of the implied volatility of S&P 500 index options. Often referred to as the fear index or the fear gauge, it represents one measure of the market's expectation of stock market volatility over the next 30-day period.	Up = higher equity risk in US, more fear
	VXEEM	VIX EEM	CBOE Emerging Markets ETF Volatility Index	Up = higher equity risk in EM, more fear
	VDAX	VDAX	Deutsche Boerse volatility index	Up = higher equity risk in EU, more fear
Economic Growth	China GDP	Chinese GDP	China Current Quarter tracking GDP forecast (QoQ %) from Nowcast	Up = higher growth
	Euro GDP	European GDP	Europe Current Quarter tracking GDP forecast (QoQ %) from Nowcast	Up = higher growth
	US GDP	US GDP	US Current Quarter tracking GDP forecast (QoQ %) from Nowcast	Up = higher growth
	Japan GDP	Japan GDP	Japan Current Quarter tracking GDP forecast (QoQ %) from Nowcast	Up = higher growth
China / EM Stress	EM CDS	EM sovereign risk	Generic 5y CDS of the sovereign(s) . The cost to insure against a country defaulting.	Up=higher default risk. US federal shutdowns, hard Brexit, fears about Chinese Wealth Management products would all be examples of negative credit events bottom of the same page EU Breakup risk is missing as the name of the macro factor.
	China 5y CDS	China sovereign risk	Generic 5y CDS of the country. The cost to insure against a country defaulting.	Up = higher default risk. US federal shutdowns, hard Brexit, fears about Chinese Wealth Management products would all be examples of negative credit events that might cause the demand for protection to rise. Risky assets typically have a negative relationship, i.e. want sovereign risk to remain low.
Country Sov Risk	Canada 5Y CDS <i>'Canadian Sov. Confidence'</i>	Canadian Sovereign Risk	5y CDS of the sovereign. The cost to insure against a country defaulting.	Up = higher default risk. Any negative credit events that might cause the demand for protection to rise. Risky assets typically have a negative relationship, i.e., want sovereign risk to remain low.
Eurozone Confidence	Greece 10y ASW <i>'Greek Sov. Confidence'</i>	Greek Sovereign Risk	EUR 10y Swap rate minus Greece 10y Generic Bond Yield	Positive relationship means the financial asset performs when GGB yields stay comparatively low, i.e. there is less sovereign stress.
	Italy 5y ASW <i>'Italian Sov. Confidence'</i>	Italian Sovereign Risk	EUR 5y Swap rate minus Italy 5y Generic Bond Yield	In periods of increased political stress (like in the aftermath of the M5S / Lega Nord coalition winning the May 2018 election & in their spat with Brussels over the Italian budget) BTP yields rise relative to swaps. Any model that has a positive relationship at that time implies Italian politics needs to be benign for that asset to perform.
	Spain 5y ASW <i>'Spain Sov. Confidence'</i>	Spanish Sovereign Risk	EUR 5y Swap rate minus Spain 5y Generic Bond Yield	Negative relationship means the financial asset performs when SPGB yields spike versus swaps, i.e. there is increased sovereign stress.
EU Breakup Risk	EU Breakup Risk	EURUSD 1Y 10D RR	Buying low delta, 1y expiry risk reversals on EURUSD was a popular 'lottery ticket' trade used by many during the Eurozone sovereign debt crisis to capture a potential break-up of the single currency. Lower RRs mean increased fragmentation risks in Europe.	

Inflation	<b>Inflation expectations 2y US</b> <i>'2y Infl. Expec.'</i>	2y Inflation Expectations	2y inflation expectation for the country as measured by Zero Coupon inflation swaps	Up = higher inflation. Typically positive for risky assets (although not always) and negative for Fixed Income instruments.
	<b>Inflation expectations 5y US</b> <i>'5y Infl. Expec.'</i>	5y Inflation Expectations	5y inflation expectation for the country as measured by Zero Coupon inflation swaps	Up = higher inflation. Typically positive for risky assets (although not always) and negative for Fixed Income instruments.
	<b>Inflation expectations 10y US</b> <i>'10y Infl. Expec.'</i>	10y Inflation Expectations	10y inflation expectation for the country as measured by Zero Coupon inflation swaps	Up = higher inflation. Typically positive for risky assets (although not always) and negative for Fixed Income instruments.
USD liquidity	<b>EUR 1y CCY Basis Swap</b> <i>'EUR 1y Basis Swap'</i>	USD liquidity (EUR)	The cost for a European bank to fund themselves in USD	In general, cross currency basis is a measure of any Dollar shortage in financial markets. The more negative the basis becomes, the more severe the shortage. It is the additional hedging cost added to the interest differential of the two currencies. The most important drivers of the cross currency basis spreads appear to be short and medium term EU financial sector credit risk and, to a slightly lesser extent, the equivalent US indicators. Calendar distortions like the year-end turn can impact but, in general, periods of more negative basis reflect worries about the EuroZone: peripheral stress, the sovereign-bank feedback loop etc.
	<b>JPY 1y CCY Basis Swap</b> <i>'jpy 1y Basis Swap'</i>	USD liquidity (JPY)	The cost for a Japanese bank to fund themselves in USD	Given negative interest rates, Japanese investors typically will look to pick up yield overseas. Japan has huge savings pot that is looking for yield. USDJPY is a 'risk on' / 'risk off' metric. During periods of 'risk on' they will fund themselves using cheap currency which is Yen; so buy USD/sell JPY, and in 'risk off' it is usually sell USD/buy JPY.
Forward Growth Expectations	<b>5s30s Swap curve</b> <i>'5s30s Swap Cy1' '5s30s Swap Cy2' 'Country 5s30s Swap'</i>	Forward growth expectations	The spread between the 5y yield and the 30y yield of the relevant currency	Interest Rate curve proxy for medium term growth expectations. A bullish growth scenario implies higher 30yr yields versus 5yrs. Conversely, a recession would typically see the curve flatten / invert.
DM FX	<b>Country TWI</b>	Currency - Trade Weighted index	An index showing the value of a country's currency in relation to the currencies of a group of countries with which it trades. In the index, each country's currency is given an importance in relation to the amount of trade it does.	Up = Stronger Currency
E.M. FX	<b>USDCNH</b>	US Dollar / Offshore Chinese Renminbi	How many CNH per 1 US Dollar	Dollar Higher USDCNH means a stronger USD / weaker CNH. A positive relationship means your asset wants a stronger USD / weaker CNH.

Real Rates

<b>EUR 10y Real Rate</b>	EUR 10y Real Rate	EUR 10y Generic Nominal Yield minus 10y Expected Inflation	Reflect the real cost of capital so are often seen as the best single indicator for overall financial conditions in an economy. Can have a positive or negative relationship with equities. It was negative during large parts of the Great Financial Crisis - risky assets needed the ECB to keep monetary policy easy. A positive relationship suggests equities are sufficiently confident in a self-sustaining cyclical upswing that higher rates / tighter financial conditions reflect a strong economy which is good for earnings.
<b>USD 10y Real Rate</b>	USD 10y Real Rate	US 10y Generic Nominal Yield minus 10y Expected Inflation	Reflect the real cost of capital so are often seen as the best single indicator for overall financial conditions in an economy. Can have a positive or negative relationship with equities. It was negative during large parts of the Great Financial Crisis - risky assets needed the Fed to keep monetary policy easy. A positive relationship suggests equities are sufficiently confident in a self-sustaining cyclical upswing that higher rates / tighter financial conditions reflect a strong economy which is good for earnings/margins.
<b>JPY 10y Real Rate</b>	JPY 10y Real Rate	JPY 10y Generic Nominal Yield minus 10y Expected Inflation	Reflect the real cost of capital so are often seen as the best single indicator for overall financial conditions in an economy. Can have a positive or negative relationship with equities. It was negative during large parts of the Great Financial Crisis - risky assets needed the BoJ to keep monetary policy easy. A positive relationship suggests equities are sufficiently confident in a self-sustaining cyclical upswing that higher rates / tighter financial conditions reflect a strong economy which is good for earnings.

C.B. Rate Expectations

<b>Fed Rate Expectations</b>	Fed Rate Expectations	Slope of the relevant money market strip. This is done by capturing the spread between 1y1y forward swap yields less spot 1y swap yields.	Measured by the slope of the money market curve where we use 1y1y swap yields less spot 1y swap yields. This effectively captures what the USD, EUR, GBP & JPY money markets are discounting in terms of policy rate cuts or hikes over the next 12-24 months from the Fed, ECB, BoE, BoJ.
<b>ECB Rate Expectations</b>	ECB Rate Expectations	Slope of the relevant money market strip. This is done by capturing the spread between 1y1y forward swap yields less spot 1y swap yields	Measured by the slope of the money market curve where we use 1y1y swap yields less spot 1y swap yields. This effectively captures what the USD, EUR, GBP & JPY money markets are discounting in terms of policy rate cuts or hikes over the next 12-24 months from the Fed, ECB, BoE, BoJ.
<b>BoE Rate Expectations</b>	BoE Rate Expectations	Slope of the relevant money market strip. This is done by capturing the spread between 1y1y forward swap yields less spot 1y swap yields	Measured by the slope of the money market curve where we use 1y1y swap yields less spot 1y swap yields. This effectively captures what the USD, EUR, GBP & JPY money markets are discounting in terms of policy rate cuts or hikes over the next 12-24 months from the Fed, ECB, BoE, BoJ.
<b>BoJ Rate Expectations</b>	BoJ Rate	Slope of the relevant money market strip. This is done by capturing the spread between 1y1y forward swap yields less spot 1y swap yields	Measured by the slope of the money market curve where we use 1y1y swap yields less spot 1y swap yields. This effectively captures what the USD, EUR, GBP & JPY money markets are discounting in terms of policy rate cuts or hikes over the next 12-24 months from the Fed, ECB, BoE, BoJ.

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