



**AR
KUS**

RISK BASED
GOVERNANCE

MARKET VOLATILITY RISK NEWSLETTER – August 2021

Keynesian Struggle

Member of the Profidata Group

Executive Summary

- **Region volatility movements were mixed.** Region volatility spanned a range that goes from 11.5% (North America) to 19.4% (Asia ex-Japan), with North America remaining in the low volatility regime, Japan (Nikkei) in the medium, Asia ex-Japan changing from low up to high and Europe changing from low up to medium.
- **Realized volatility** (of the Euro Stoxx 50 index over 30 days) increased from 11.2% (Low) to 17.7% (medium).
- **Equity price sector results were mixed**, with IT increasing the most (+3.5%) and Energy losing the most (-6.3%). Sector **volatilities** spanned a range that goes from 6.8% (Consumer Staples) to 26.9% (Energy), with Consumer Staples and IT with no change on the low volatility regime, and Energy and Financials changing from low up to medium.
- **Sovereign bond price movements were all upward**, with Germany gaining the most (2.3%). **Volatility** moves were mixed and spanned a range that goes from 1% (Japan) to 4.2% (US).
- **€ results were mixed**, with the EUR losing the most against Swiss Franc (-2%) and gaining slightly only against US Dollar (+0.2%). **FX volatility results were mixed**; ended ranging between 3.6% (€/CHF) and 5.9% (€/Yen).
- **Options' implied volatility results were downward**, with the VIX increasing from 15.8 to 18.2, while the VSTOXX from 18.2 to 20.9, with the VIX remaining in the low volatility regime, and the VSTOXX changing from low up to medium.
- **Commodities price changes were mixed**; with Cooper gaining the most (+4.3%) and only Iron Ore closing on the negative side (-15.4%). **Volatility changes were mixed** and spanned a range between 9.1% (Gold) to 35.3% (Oil-Brent).
- **Real Estate (equity) prices were mixed**, with Europe increasing the most (+6.3%) and only Japan closing on the negative side (-1.1%). **Volatility moves were mixed**, ranging between 10.6% (Japan) to 16.4% (Europe).
- **The average PE Funds** gained +3.5%, while the **average Hedge Fund** lost -0.5%. **Volatility** for the average hedge fund increased from 1.9% to 3.3%, while for the average PE fund it went up from 10.2% to 17.7%.

The Arkus Risk Team



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Summary volatility matrix and outlook

Tensions between the US and China intensify after accusations of misled policies on China were brought up by Chinese officials during a visit of US Deputy Secretary of State in the country. This adds to a series of problems between the two countries stalling hopes for a normalization under new president Biden.

Europe has been hit by several natural disasters all the while still struggling to get keep infection rates with the coronavirus at low levels, so the end of crises mode of governments and central banks is not yet in sight.

The US economy continues its recovery with an inflation above 5%. On top of that, the new \$3tn infrastructure deal in addition to the loose monetary policy will further induce upside pressure for prices of goods and, also...assets. Stock markets continue to push ATHs, similar picture for real estate prices in large (and also increasingly smaller) cities.

ASSET CLASS	AREA	LATEST VOLATILITY	LATEST Z-SCORE	REGIME
EQUITIES	North America	11.5%	-0.6	low
	Asia ex-Japan	19.4%	1.4	high
	Europe	14.0%	0.1	medium
	Japan (Nikkei)	15.2%	-0.4	medium
	Energy	26.9%	-0.2	medium
	Consumer Staples	6.8%	-1.3	low
	Financials	18.7%	0.4	medium
	IT	12.6%	-1.2	low
VOLATILITY OF VOLATILITY	Volatility of VIX	139%	0.4	medium
	Volatility of VSTOXX	163%	1.9	high
GOVERNMENT BONDS	Germany	3.1%	-0.6	low
	US	4.2%	1.1	high
	Japan	1.0%	-0.2	medium
	Italy	2.8%	-1.8	low
FX VS \$	€/\$	4.2%	-1.8	low
	€/Yen	5.9%	0.3	medium
	€/CHF	3.6%	0.0	medium
	€/£	5.6%	-0.3	medium
COMMODITIES	Oil (Brent)	35.3%	0.5	high
	Gold	9.1%	-1.7	low
	Copper	24.3%	0.3	medium
	Iron Ore	27.7%	0.2	medium
PROPERTY	US	16.3%	-0.6	low
	Europe	16.4%	0.2	medium
	Japan	10.6%	-1.2	low
ALTERNATIVES	HFRX Global HF	3.3%	0.7	high
	Avg PE Fund	17.7%	1.0	high
KURTOSIS	ZCF 1% left (vs -2.33 for normal curve)	-2.95	-0.7	high
CORRELATION	Average market correlation with euro equities	37%	1.0	high

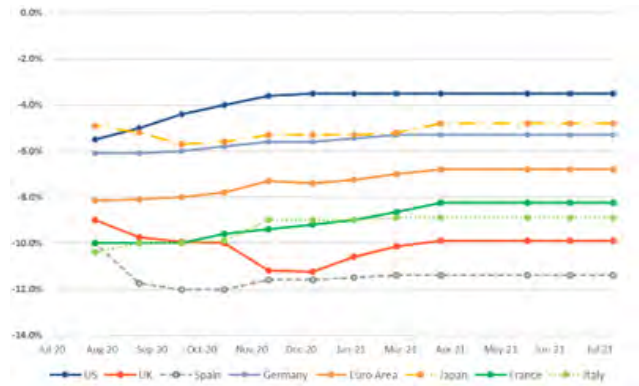
Note: Throughout the text we refer to volatilities as being "low", "medium" or "High". We define this by defining three equal "sized" regimes over the last 12 months. i.e. "High" volatility implies that volatility is in the upper third of its statistical range over the last 12 months. The table shows the "z-score" of the volatility of each market, i.e. how many standard deviations above (or below) the mean over the last 12 months each market's volatility is.

Key News

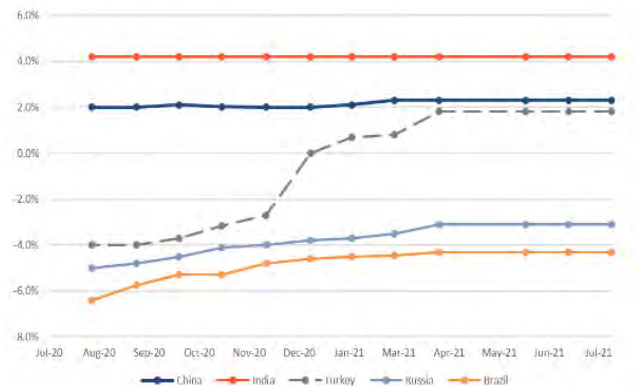
Major Volatility-Driving Events

- Flooding disaster in central Europe destroys parts of Germany and Belgium causing several hundred deaths and still leaves some people missing.
- US unemployment rate declined unexpectedly to 5.4% in July, US yields up to 1.30%. Yields on German Government bonds turn negative again during July.
- Wildfires ravage in parts of Turkey and Greece causing evacuations of thousands of people and destroying huge woodlands. Consequently, tourism as major economic factor for those regions also affected.
- Indonesia's biggest ever IPO Bukalapak (IPO value \$6bn) saw a 25% price jump at trading start. Next in line of IPOs in the country is food-delivery and e-commerce company GoTo.
- Viacom CBS signs \$900mln deal with the creators of the comedy series "Southpark" for further episodes to gain traction in the battle of media companies in the global streaming market.
- A private equity consortium lead by Fortress Investment Group agrees the takeover of supermarket chain Morrisons for £6.7bn.

GDP ESTIMATES FOR 2021, DEVELOPED COUNTRIES



GDP ESTIMATES FOR 2021, DEVELOPING COUNTRIES



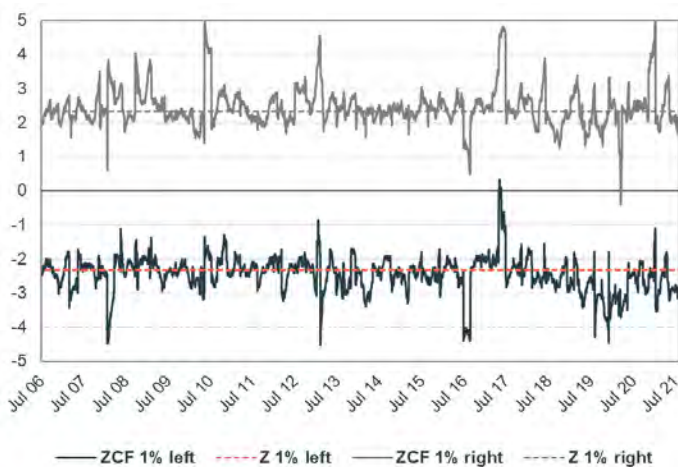
Kurtosis

Correlation in the equity markets

Kurtosis (against normal +/- 2.33)

The distribution of risks in European equity market displays denormalization on the left side with the ZCF 1% left at -2.95 and the right ZCF 1% at +1.9 (both as of 30th of July).

Cornish-Fischer expansion of Eurostoxx50 (60 days)



Methodology

To capture a measure of both Skewness and Kurtosis we look at the Cornish-Fischer expansion, which gives a good measure of the tails of the equity market. (We use a 60-calendar day rolling basis). The underlying market we plot is the Euro Stoxx 50, but other equity markets normally show very similar results.

We plot on the chart the expected Z-scores for 1% left tail (i.e., a 99% VaR) and a 1% right tail assuming a normal distribution: +/-2.33.

We also show the Cornish-Fischer expansion result for the same market. This indicates how far from a normal distribution each tail was.

On a long-term basis, on average, the tails are slightly fatter than the normal distribution would suggest, which should not come as a surprise. What is perhaps more surprising is how much variation in fat-tailedness there has been: a daily 99% VaR has varied between -1 and -4.5 standard deviations over time.

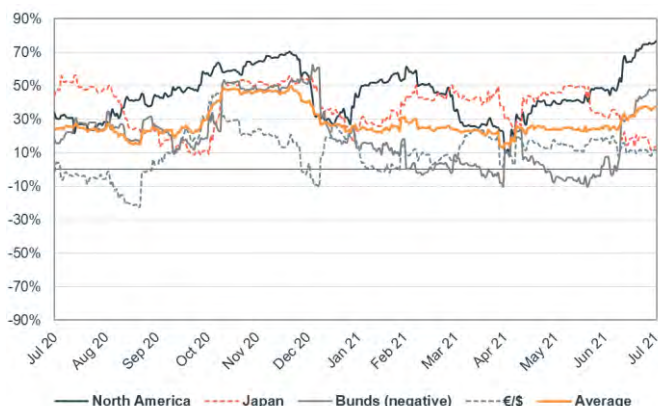
Inter-market correlations with EU equities



37.2%

AVERAGE
CORRELATION

Inter-market correlations (with EU equities)



Correlation with euro equities increased during last month, leading our average correlation indicator to increase from 26% to 37.2% (medium up to high).



11.95%

AVERAGE
VOLATILITIES

Multi-asset portfolio volatility



We also look at a hypothetical multi-asset portfolio consisting of equities, bonds, gold, oil, and hedge funds.

The average asset volatility increased, moving from 9.64% to 11.95%, while the benefit of multi-asset diversification decreased, moving from 4.8% to 4.4%.

In combination, multi-asset portfolio volatility increased from 4.8% to 7.6%.



7.6%

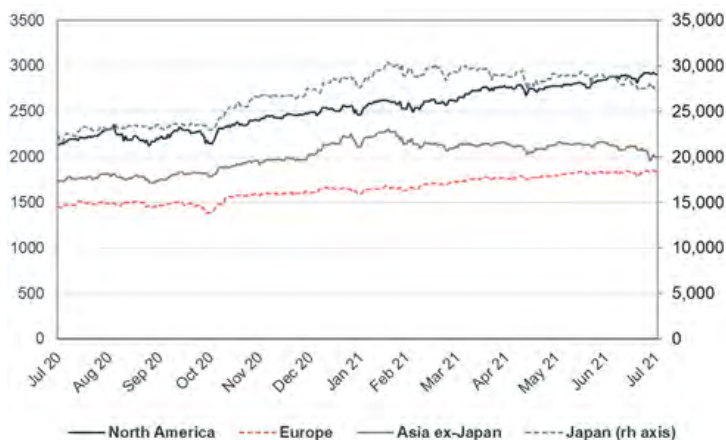
PORTFOLIO
VOLATILITY

Note: The chart shows 30-day correlation over time between different markets and the pan-Euro equity market. Higher levels of correlation will in general lead to less ability to diversify risks, and higher portfolio volatility for given position holding volatility.

Equities

Stock price

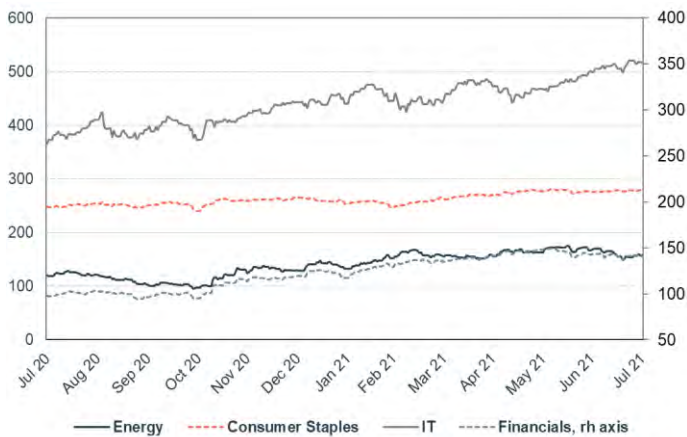
STOCK PRICE PERFORMANCE: REGIONS (LOG SCALES)



Equity region price movements were mixed. North America gained +2.1%, Asia ex-Japan lost -7.3%, Europe gained +1.4%, Japan (Nikkei) lost -5.2%.

+1.4%
Europe

STOCK PRICE PERFORMANCE: SECTORS (LOG SCALES)



Equity sector results were mixed. Energy lost -6.3%, Consumer Staples gained +1.1%, Financials lost -0.3%, IT gained +3.5%.

-0.3%
FINANCIALS

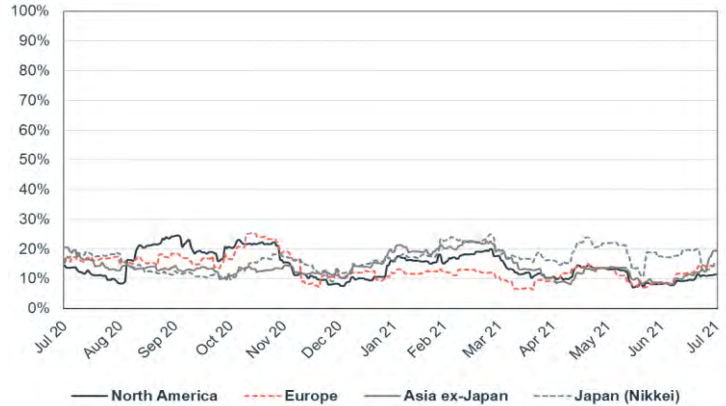
+3.5%
IT

-6.3%
ENERGY

+1.1%
CONSUMER STAPLES

Equities Volatility

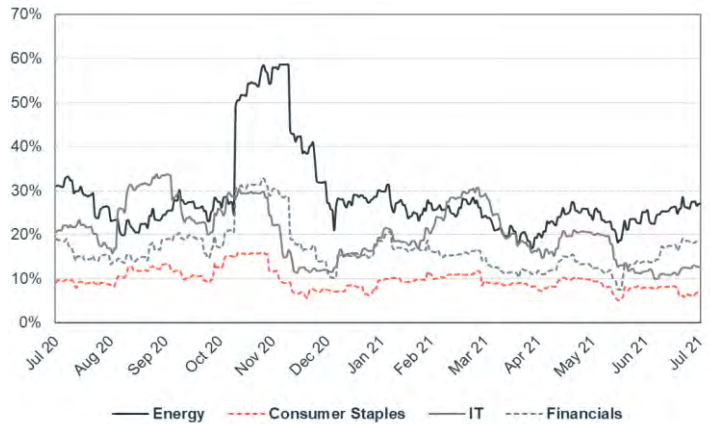
EQUITY VOLATILITY: REGIONS



14.0% EUROPE

Volatility results were also mixed. North America rose from 8.3% to 11.5% (low), Asia ex-Japan rose from 8.8% to 19.4% (low up to high), Europe rose from 9.0% to 14.0% (low up to medium), Japan (Nikkei) fell from 17.6% to 15.2% (medium).

EQUITY VOLATILITY: SECTORS



Volatility results were also mixed. Energy rose from 25.1% to 26.9% (low up to medium), Consumer Staples fell from 8.1% to 6.8% (low), Financials rose from 13.8% to 18.7% (low up to medium), IT rose from 11.7% to 12.6% (low).

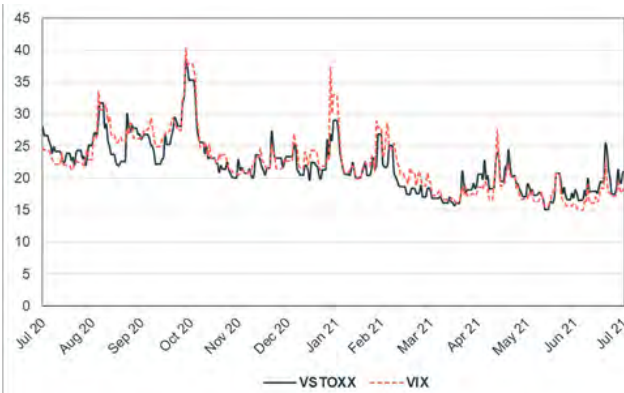
Equity Implied Volatility

Market-Implied Near Term Outlook

Implied Volatility

Implied volatility results were upwards. VIX increased from 15.8 to 18.2 (low), while the VSTOXX from 18.2 to 20.9 (low up to medium).

IMPLIED VOLATILITY



18.2% VIX

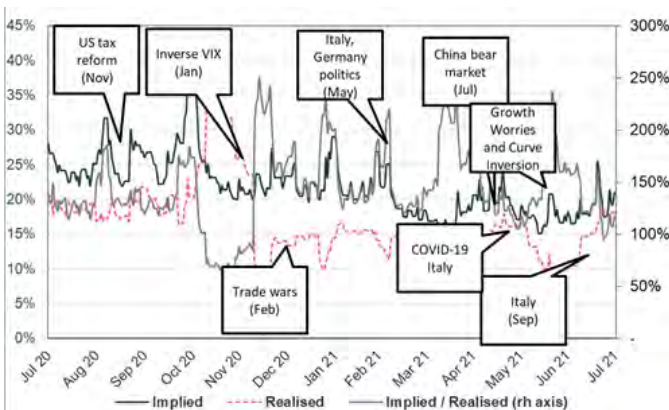
20.9% VSTOXX

Implied vs Realised Volatility

(European equity) implied volatility increased from 18.2 to 20.9. The realised volatility (of the Euro Stoxx 50 index over 30 days) also increased from 11.2% to 17.7% bringing the ratio of implied/realised volatility to move down from 162% to 118%.

This ratio is still suggesting that the market is currently anticipating future volatility to be higher than current.

IMPLIED VS. REALISED VOLATILITY



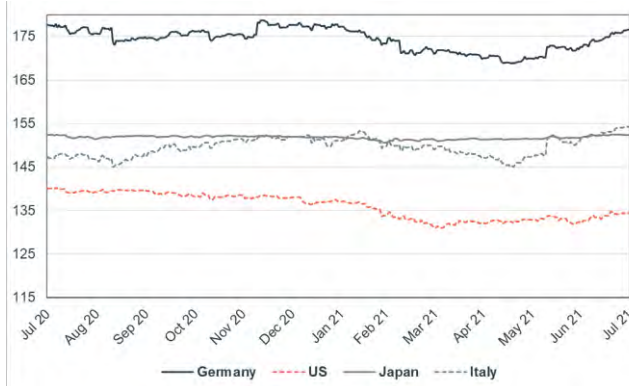
118% IMPLIED/REALISED VOLATILITY

Note: Note: the implied/realised volatility ratio gives an indication as to whether the market sees an event in the next 30 days (the implied volatility period) which will increase realised volatility (implied/realised >100%, e.g. within 30 days prior to the Greek elections during the Greek crisis) or a period of relative calm after high realised volatility (implied/realised <100%, e.g. immediately after Draghi's calming "whatever it takes" comments).

Fixed Income

10-Year Government Bond Futures

PRICES OF 10Y BOND FUTURES



Prices

Government bond prices movements were all upwards. Germany gained +2.3%, US gained +1.5%, Japan gained +0.4%, Italy gained +1.9%.

10 YEAR BOND SPREADS OVER GERMANY, %



Italian spreads over Germany increased from 1.03% to 1.08%, while the Spanish spreads against Germany increased from 0.62% to 0.73%.

VOLATILITY OF 10Y BOND FUTURES



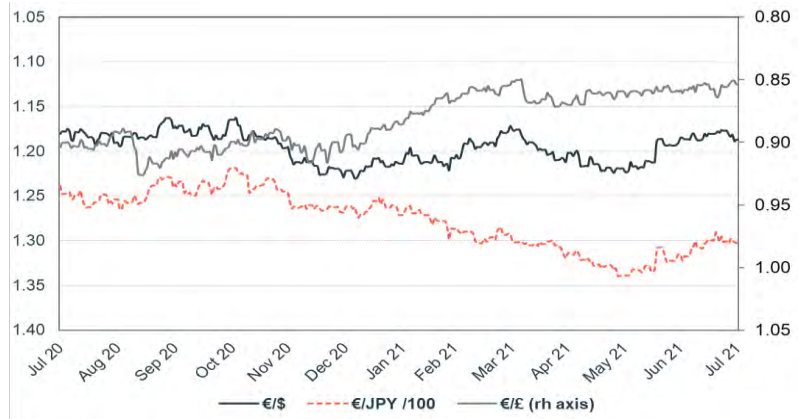
Volatility results were mixed. Germany rose from 2.8% to 3.1% (low), US rose from 3.9% to 4.2% (high), Japan fell from 1.1% to 1.0% (medium), Italy fell from 4.2% to 2.8% (medium down to low).

Foreign Exchange

Prices

Euro results were mixed. Euro gained 0.2% against the US Dollar, Euro lost 1.1% against the Japanese Yen, Euro lost 2.0% against the Swiss Franc, Euro lost 0.6% against the British Pound.

FX RATES VS. €



Volatility

FX volatility moves were also mixed. €/£ fell from 7.6% to 4.2% (high down to low), €/Yen fell from 6.5% to 5.9% (high down to low), €/CHF rose from 2.6% to 3.6% (low up to medium), €/£ rose from 3.9% to 5.6% (low up to medium).

VOLATILITY OF FX RATES VS. €



4.2% € vs. \$

5.6% € vs. £

5.9% € vs. ¥

Note: The charts show currencies vs. the €. Axes on the first chart are inverted to show conventional currency quotations, but with higher on the chart representing a stronger currency vs. the euro.

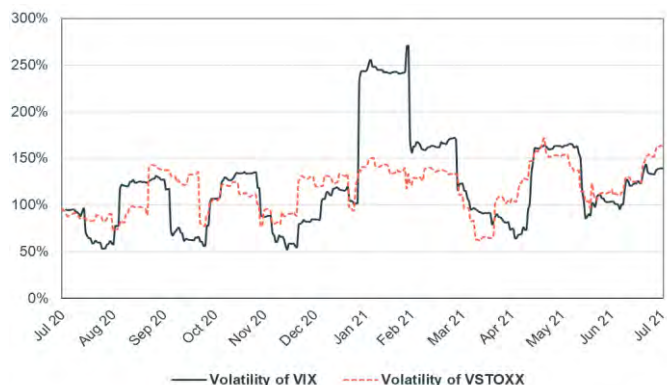
(Equity) Options

Option volatility is mainly driven by the volatility of volatility and moves in prices of the underlying instruments affecting options' deltas.

Implied volatility

Volatility of implied volatility increased in both US and Europe. Volatility of VSTOXX rose from 116.6% to 162.7% (medium up to high) Volatility of VIX rose from 103.6% to 139.3% (medium).

VOLATILITY OF VOLATILITY



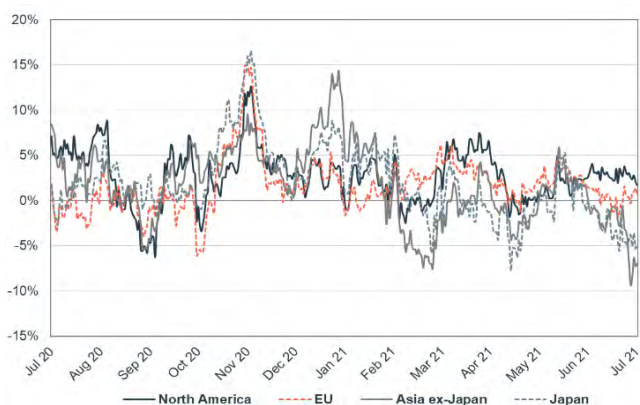
139.3% US

162.7% EUROPE

Major (Regional Equity) price moves

Regions price movements were mixed. North America gained +2.1%, Asia ex-Japan lost -7.3%, Europe gained +1.4%, Japan (Nikkei) lost -5.2%.

CHANGE IN PRICES OF EQUITY INDICES, 30 DAYS



Note on Treatment: Options show more complex behaviour than the other instruments we look at in this report, so we make some simplifying assumptions. As Calls and Puts are in effect polar opposites and in and out of the money options behave very differently, it is hard to generalise all options' behaviour. However, we look at the two key drivers: volatility of implied volatility and major price movements of the underlying security.

Implied volatility (via an option's Vega) drives option prices, so a big indicator of option price volatility is the "volatility of implied volatility".

But usually the biggest driver of individual option prices is the movement of the underlying (via the option Delta): a move in either direction will cause the option to go more in or out of the money (and a corresponding change in the option's Delta and price volatility). As a proxy for this, we look at the 30-day price swing of equity market indices; options on bonds or FX could of course behave differently. The 30-day period is relatively close to the time to maturity of many options. Calls and Puts will respond in opposite fashions: calls becoming more volatile (relative to the size of the underlying notional) as prices rise.

Note on Convertibles: Convertibles are in effect a combination of a bond and a call option, with the bond portion usually making little contribution to the instrument volatility unless the option is significantly out of the money. As such, convertible portfolios' volatilities will tend to behave similarly to call option portfolios, and this commentary can be applied to convertibles as well as options.

Commodities

+1.6% OIL

+ 2.3% GOLD

+ 4.3% COPPER

Prices

Commodities price movements were mixed during July. Oil (Brent) gained +1.6%, Gold gained +2.3%, Copper gained +4.3%, Iron Ore lost -15.4%.

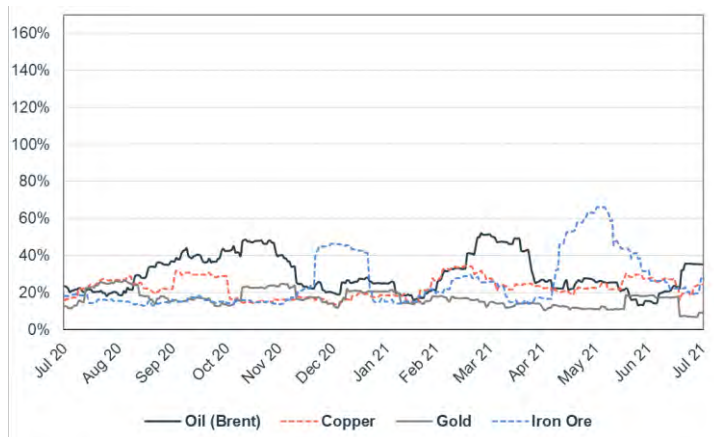
COMMODITIES PRICES, \$



Volatility

Volatility movements for Commodities were also mixed. On this regard, we have that Oil (Brent) rose from 15.4% to 35.3% (low up to high), Gold fell from 18.3% to 9.1% (medium down to low), Copper fell from 27.5% to 24.3% (high down to medium), Iron Ore fell from 32.3% to 27.7% (high down to medium).

COMMODITIES VOLATILITY



Note: all prices refer to near futures rather than spot with the exception of iron ore which is a spot price.

Real Estate and Alternatives

(Real Estate Share Prices)

REAL ESTATE (REIT) PRICES



Real Estate prices movements were mixed. US gained +4.8%, Europe gained +6.3%, Japan lost -1.1%.

+ 6.3% EUROPE

+ 4.8% US

- 1.1% JAPAN

REAL ESTATE (REIT) VOLATILITY



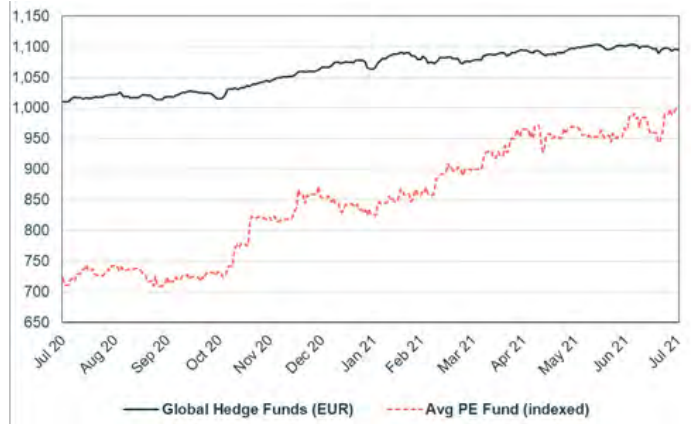
Volatility moves were also mixed. We have that US fell from 16.5% to 16.3% (low), Europe rose from 10.5% to 16.4% (low up to medium), Japan fell from 15.5% to 10.6% (medium down to low).

Note: Note that for property we look at indices of the share prices of REITs, and not the underlying property directly, for which little real-time data is available. This is usually consistent with funds which tend to invest in property indirectly, e.g. via REITs or property companies.

As REITs are usually focused on commercial property, residential property may also follow a slightly different pattern to that discussed in this article.

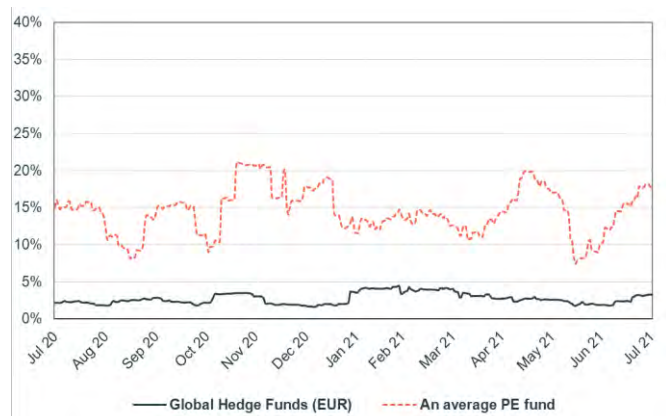
Alternatives

ALTERNATIVES PRICES



The average hedge fund lost -0.5%, an average PE fund gained +3.5%.

AI VOLATILITY



Volatility results for Alternative Investments increased during July. We have that the average hedge fund rose from 1.9% to 3.3% (low up to high), An average PE fund rose from 10.2% to 17.7% (low up to high).



3.3%

HFRX
Volatility



17.7%

AVERAGE
PE FUND

Definitions

To avoid repetitions, the term volatility refers to annualised, 30-day average realised volatility in local currency unless otherwise specified. As such, it may be lower than, and lag, shorter-term market volatility in times of high market volatility.

Charts show data up to 30th July 2021, and news and events are included up to that date. The commentary was written on or before August 10th, 2021.

Disclaimer

The commentary does not constitute, and is not intended to constitute, investment advice.

Any views expressed in this report are based on historical market data and as such cannot be interpreted as being forward-looking, or to constitute forecasts. Past movements are not necessarily indicative of future movements.

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