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KUS**  
RISK BASED  
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MARKET VOLATILITY RISK NEWSLETTER – September 2021

# *September in the rain*

Member of the Profidata Group

# Executive Summary

- **Region volatility decreased in all observed markets.** Region volatility spanned a range that goes from 7.2% (Europe) to 16.2% (Asia ex-Japan), with North America remaining in the low volatility regime, Asia ex-Japan remaining in the high regime, and Japan (Nikkei) and Europe changing from medium down to low.
- **Realized volatility** (of the Euro Stoxx 50 index over 30 days) decreased from 17.2% (Medium) to 8% (Low).
- **Equity price sector results were mixed**, with IT increasing the most (+3.8%) and Energy losing the most (-1.8). Sector **volatilities** spanned a range that goes from 6.8% (Consumer Staples) to 23.6% (Energy), with Consumer Staples and IT remaining in the low volatility regime, with Energy and Financials changing from medium down to low.
- **Sovereign bond price movements were all downwards**, with Italy losing the most(-6.42%). **Volatility** moves were mixed and spanned a range that goes from 0.9% (Japan) to 4.9% (Italy).
- **€ results were mixed**, with the EUR losing the most against US Dollar (-0.5%) and gaining the most against GBP(+0.62%). **FX volatility results were mixed**; ended ranging between 3.7%(€/£) and 4.6% (€/CHF).
- **Options' implied volatility decreased in both observed markets**, with the VIX decreasing from 18.2 to 16.48, while the VSTOXX from 20.9 to 18.8, with both indicators on the low volatility regime.
- **Commodities price changes were mixed**; with Gold gaining slightly (+0.2%) and Iron Ore losing the most (-14.3%). **Volatility changes were mixed** and spanned a ranged between 15.4% (Gold) to 36.4% (Oil-Brent).
- **Real Estate (equity) prices movements were mixed**, with Europe increasing the most again (+2.5%) and only Japan closing on the negative side again (-0.5%). **Volatility moves were mixed**, ranging between 10% (US) to 13% (Japan).
- **The average PE Funds** gained +4.3%, while the **average Hedge Fund** +0.6%. **Volatility** for the average hedge fund decreased from 3.3% to 1.9%, while for the average PE fund it went down from 17.7% to 10.6%, with both changing from high down to low volatility regime.

The Arkus Risk Team



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# Summary volatility matrix and outlook

Markets are still flying high on central bank and government support pushing valuation higher and higher. However, as inflationary pressure keeps rising and geopolitical tensions between China and the US continue to linger unresolved, there may soon be an end to the party.

First attempts of central banks to prepare an end to the tapering, resulted in an increase in yields for weaker economies. Also, equity markets started skidding as uncertainty about sustainability of current bull markets rose.

Biden's retreat from Afghanistan sent the country back into the hands of the Taliban creating unrest in the region. Global supply chains are still impacted by COVID restrictions, notably new cases in China, while global IPOs continues increasing. Overheated markets may be due for a cooling off in the autumn rain soon.

ASSET CLASS	AREA	LATEST VOLATILITY	LATEST Z-SCORE	REGIME
EQUITIES	North America	8.1%	-1.3	low
	Asia ex-Japan	16.2%	0.4	high
	Europe	7.2%	-1.4	low
	Japan (Nikkei)	13.4%	-0.8	low
	Energy	23.6%	-0.5	low
	Consumer Staples	6.8%	-1.1	low
	Financials	11.7%	-1.0	low
	IT	10.9%	-1.3	low
VOLATILITY OF VOLATILITY	Volatility of VIX	127%	0.0	medium
	Volatility of VSTOXX	114%	-0.3	medium
GOVERNMENT BONDS	Germany	3.0%	-0.5	low
	US	3.3%	-0.1	medium
	Japan	0.9%	-0.4	medium
	Italy	4.9%	0.4	medium
FX VS \$	€/\$	4.3%	-1.5	low
	€/Yen	3.9%	-1.4	low
	€/CHF	4.6%	1.3	high
	€/£	3.7%	-1.3	low
COMMODITIES	Oil (Brent)	36.4%	0.5	high
	Gold	15.4%	-0.2	medium
	Copper	22.4%	-0.1	medium
	Iron Ore	32.1%	0.4	medium
PROPERTY	US	10.0%	-1.5	low
	Europe	12.3%	-0.7	low
	Japan	13.0%	-0.4	medium
ALTERNATIVES	HFRX Global HF	1.9%	-1.2	low
	Avg PE Fund	10.6%	-1.2	low
KURTOSIS	ZCF 1% left (vs -2.33 for normal curve)	-3.17	-1.1	high
CORRELATION	Average market correlation with euro equities	36%	0.8	high

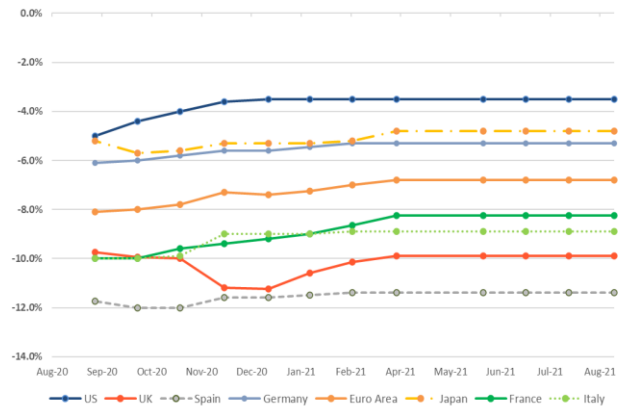
**Note:** Throughout the text we refer to volatilities as being "low", "medium" or "High". We define this by defining three equal "sized" regimes over the last 12 months. i.e. "High" volatility implies that volatility is in the upper third of its statistical range over the last 12 months. The table shows 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

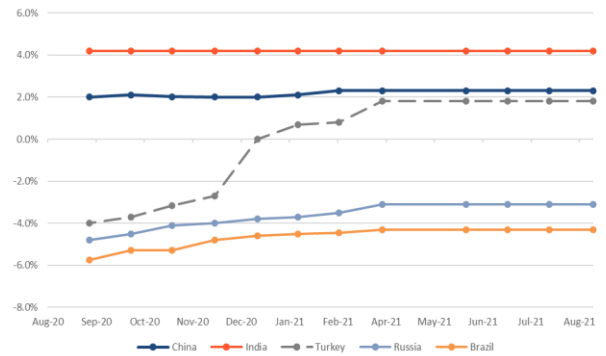
## Major Volatility-Driving Events

- ECB adjusts pace of PEPP program. Only “recalibrating” PEPP not tapering claims ECBs Lagarde. Earlier fears of an end of tapering led to jumps in yields of Southern European countries. ECB’s balance sheet continue to push ATHs.
- Chinese Real Estate giant Evergrande so far unsuccessfully looking for a capital injection through new investors raising fears of a second Lehman type of situation.
- FED also pushing ATHs for its balance sheet now roughly at 37% of GDP vs. 80% for ECB. Bank of Japan levelling at 134%.
- Polls in Germany see tight race between conservatives and socialist parties in the race to succeed Angela Merkel. Also, no clear potential constellation regarding government coalition emerging yet.
- As US president Biden commands US troops back home, Afghanistan plunges into chaos with the Taliban taking control over the country. This wiped out 20 years long international efforts in the country to establish a western type of democracy.
- As search for investment opportunities becomes more and more difficult, global IPOs keep creeping up into what some people may call “IPO Mania”, Some analysts see this as the next phase in overheating markets.

**GDP ESTIMATES FOR 2021, DEVELOPED COUNTRIES**



**GDP ESTIMATES FOR 2021, DEVELOPING COUNTRIES**



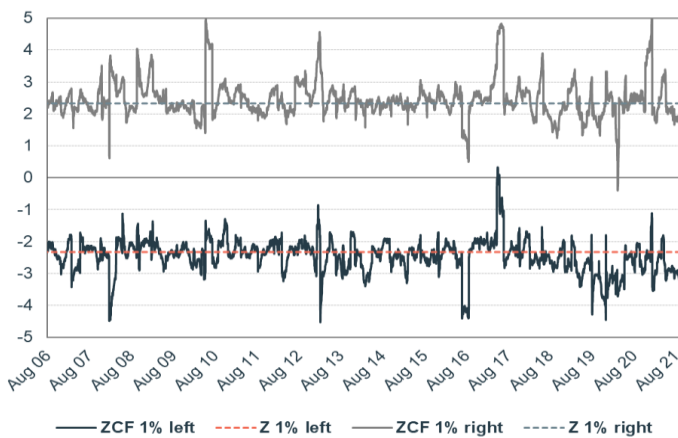
# Kurtosis

## 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 -3.17 and the right ZCF 1% at +1.87 (both as of 31st of August).

### *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.

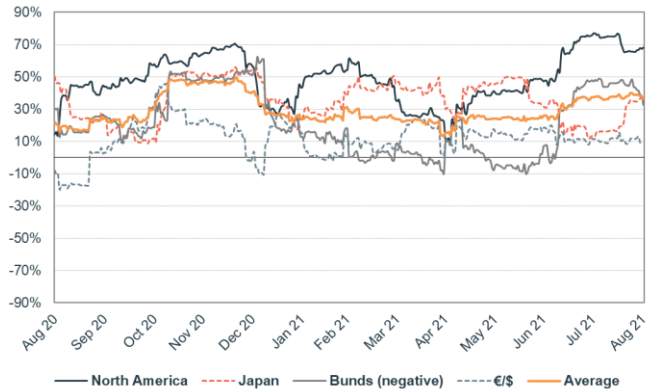
# Inter-market correlations with EU equities



36%

AVERAGE  
CORRELATION

Inter-market correlations (with EU equities)



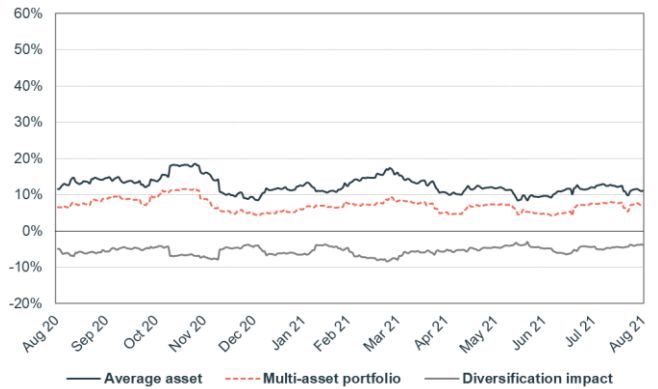
Correlation with euro equities decreased during last month, leading our average correlation indicator to increase from 37.2% to 36% (high).



11.08%

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 decreased, moving from 11.95% to 11.08%, while the benefit of multi-asset diversification decreased, moving from 4.4% to 3.9%.

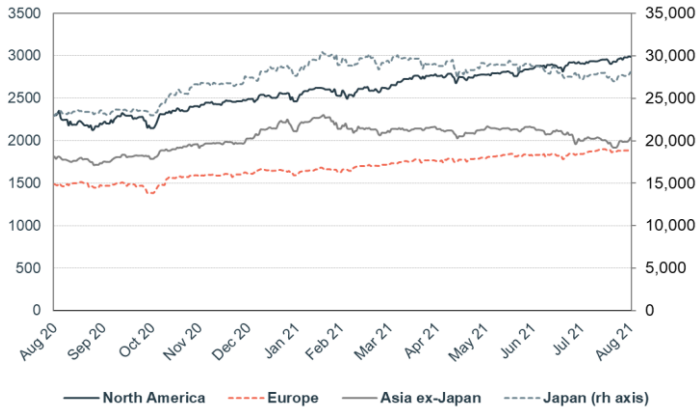
In combination, multi-asset portfolio volatility decreased from 7.6% to 7.2%.

**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

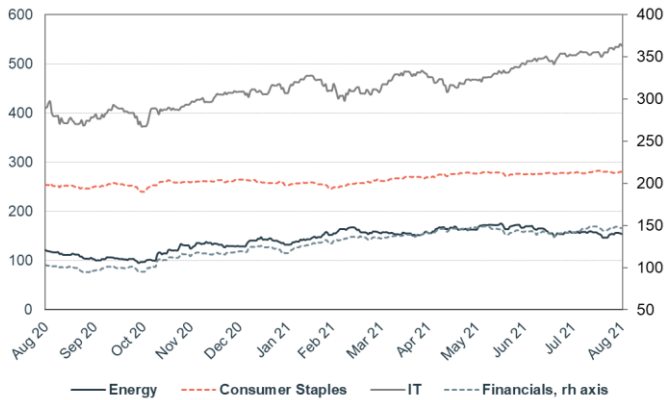
### STOCK PRICE PERFORMANCE: REGIONS (LOG SCALES)



**+1.9%**  
Europe

Equity region price movements were upward trending. North America gained +2.7%, Asia ex-Japan gained +1.7%, Europe gained +1.9%, Japan (Nikkei) gained +3.0%.

### STOCK PRICE PERFORMANCE: SECTORS (LOG SCALES)



**+3.4%**  
FINANCIALS

**+3.8%** IT

**-1.8%**  
ENERGY

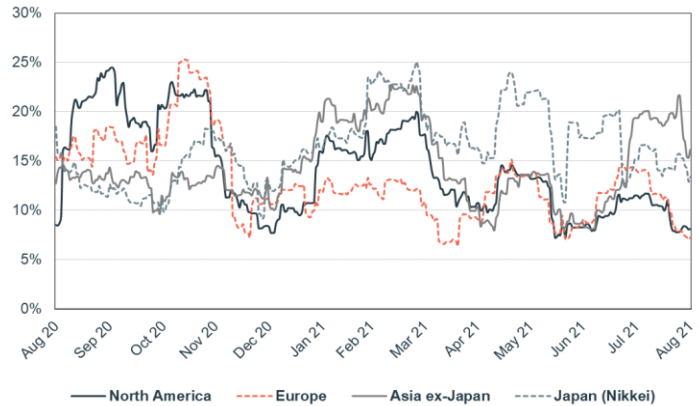
**+0.7%**  
CONSUMER STAPLES

Equity sector results were mixed. Energy lost -1.8%, Consumer Staples gained +0.7%, Financials gained +3.4%, IT gained +3.8%.



# Equities Volatility

## EQUITY VOLATILITY: REGIONS

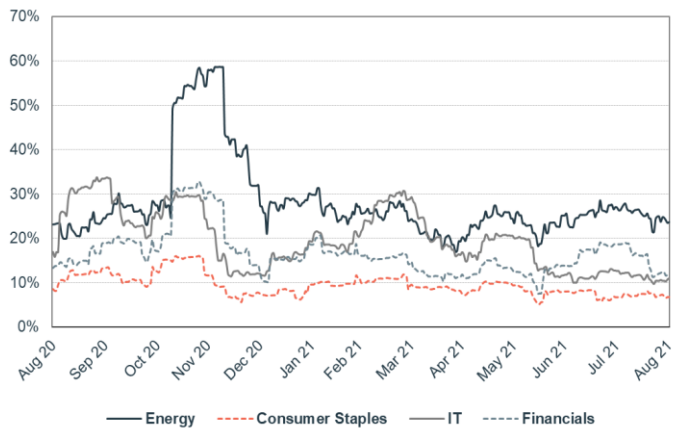


# 7.2%

EUROPE

Volatility decreased in all observed regions. North America fell from 11.5% to 8.1% (low), Asia ex-Japan fell from 19.4% to 16.2% (high), Europe fell from 14.0% to 7.2% (medium down to low), Japan (Nikkei) fell from 15.2% to 13.4% (medium down to low).

## EQUITY VOLATILITY: SECTORS



Volatility results were also mixed. Energy fell from 26.9% to 23.6% (medium down to low), Consumer Staples rose from 6.8% to 6.8% (low), Financials fell from 18.7% to 11.7% (medium down to low), IT fell from 12.6% to 10.9% (low).

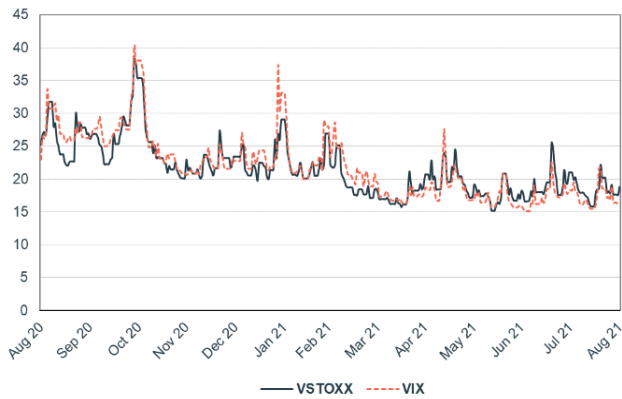
# Equity Implied Volatility

## Market-Implied Near Term Outlook

### Implied Volatility

Implied volatility decreased during August. VIX changed from 18.2 to 16.48 (low), while the VSTOXX from 20.9 to 18.8 (medium down to low).

#### IMPLIED VOLATILITY



16.48% VIX

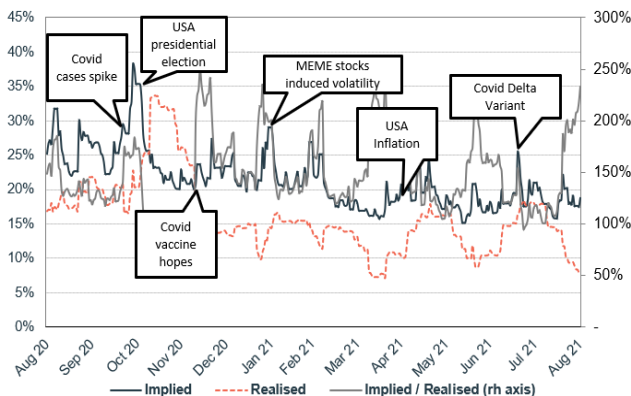
18.8% VSTOXX

### Implied vs Realised Volatility

The realised volatility (of the Euro Stoxx 50 index over 30 days) also decreased from 17.7% to 8% bringing the ratio of implied/realised volatility to move up from 118% to 234%.

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

#### IMPLIED VS. REALISED VOLATILITY



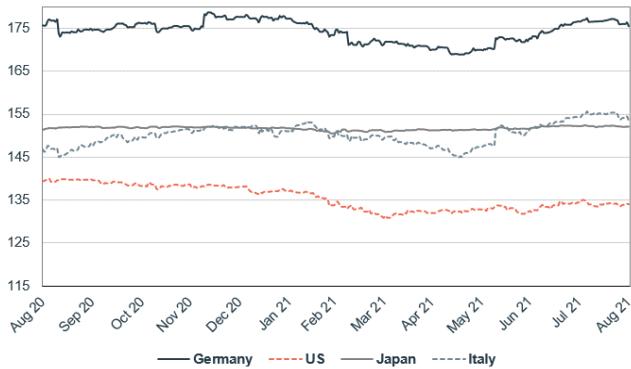
234% IMPLIED/REALISED VOLATILITY

**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

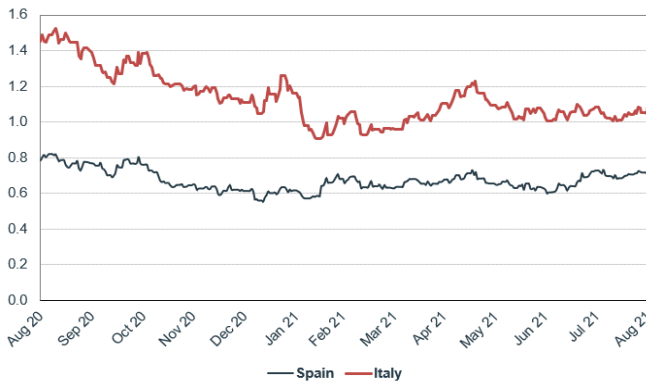
**PRICES OF 10Y BOND FUTURES**



### Prices

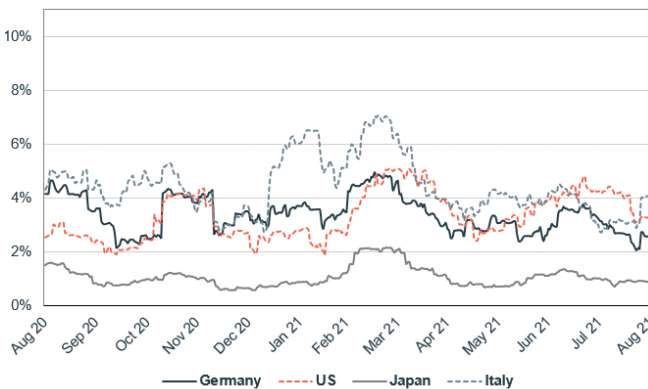
Government bond prices movements were all downwards. Germany lost -0.6%, US lost -0.3%, Japan lost -0.1%, Italy lost -0.6%.

**10 YEAR BOND SPREADS OVER GERMANY, %**



Italian spreads over Germany increased slightly from 1.08% to 1.09%, while the Spanish spreads against Germany decreased from 0.73% to 0.72%.

**VOLATILITY OF 10Y BOND FUTURES**



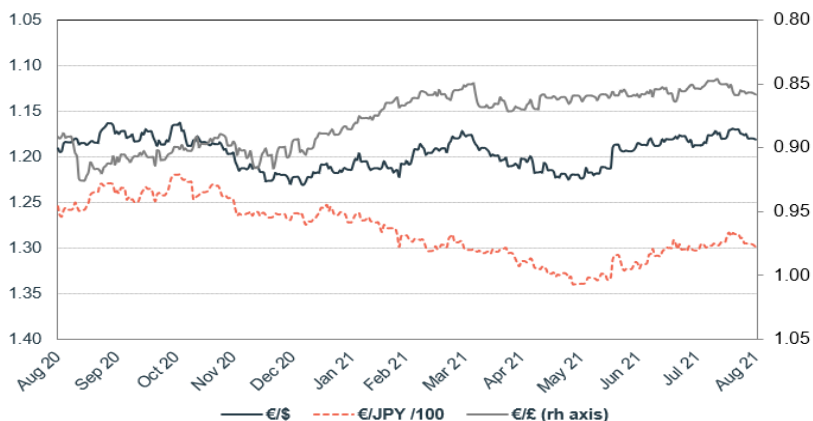
Volatility results were mixed. Germany fell from 3.1% to 3.0% (low), US fell from 4.2% to 3.3% (high down to medium), Japan fell from 1.0% to 0.9% (medium), Italy rose from 2.8% to 4.9% (low up to medium).

# Foreign Exchange

## Prices

Euro results were mixed. Euro lost 0.5% against the US Dollar, Euro lost 0.3% against the Japanese Yen, Euro gained 0.6% against the Swiss Franc, Euro gained 0.6% against the British Pound.

FX RATES VS. €



## Volatility

FX volatility moves were also mixed. €/£ rose from 4.2% to 4.3% (low), €/Yen fell from 5.9% to 3.9% (medium down to low), €/CHF rose from 3.6% to 4.6% (medium up to high), €/£ fell from 5.6% to 3.7% (medium down to low).

VOLATILITY OF FX RATES VS. €



↑ 4.3% € vs. \$

↓ 3.7% € vs. £

↓ 3.9% € 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.

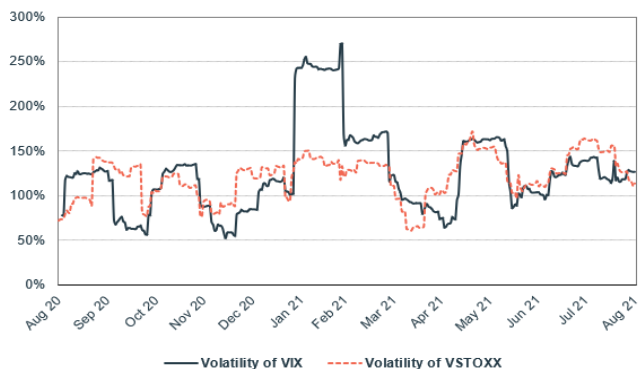
# (Equity) Options

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 decreased in both US and Europe. Volatility of VSTOXX fell from 162.7% to 113.9% (high down to medium), while Volatility of VIX fell from 139.3% to 126.7% (medium),

### VOLATILITY OF VOLATILITY



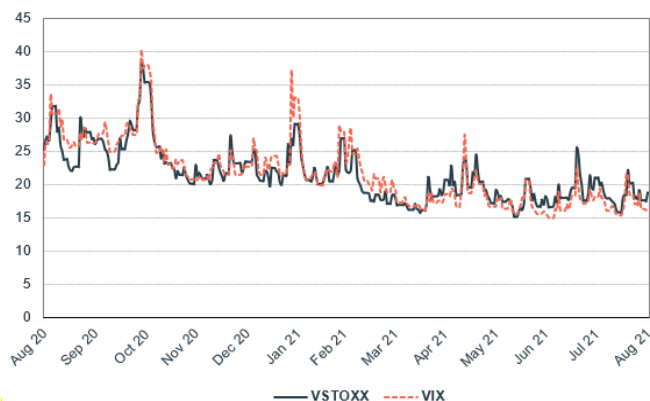
126.7% US

113.9% EUROPE

## Major (Regional Equity) price moves

Regions price movements were all upward. North America gained +2.7%, Asia ex-Japan gained +1.7%, Europe gained +1.9%, and Japan (Nikkei) gained +3.0%.

### 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

## Prices

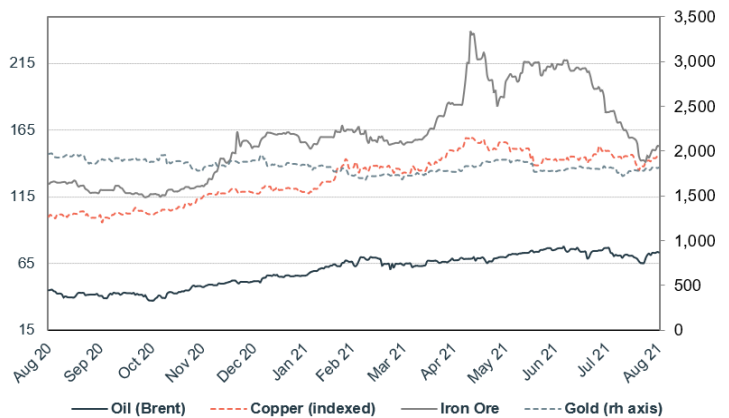
Commodities price movements were mixed during August. Oil (Brent) lost -4.4%, Gold gained +0.2%, Copper lost -2.7%, Iron Ore lost -14.3%.

- 4.4% OIL

+ 0.2% GOLD

- 2.7% COPPER

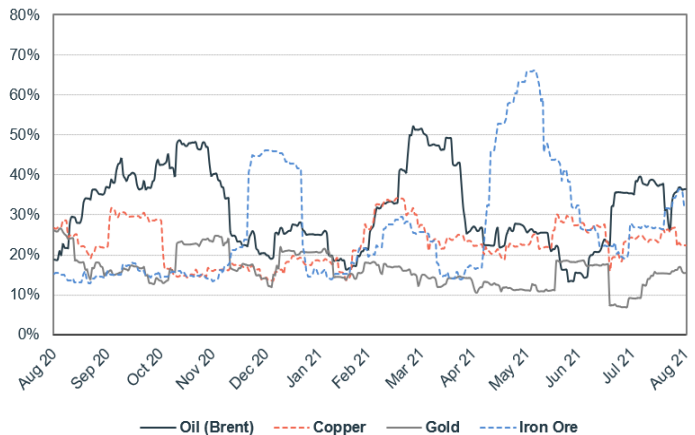
COMMODITIES PRICES, \$



## Volatility

Volatility movements for Commodities were also mixed. On this regard, we have that Oil (Brent) rose from 35.3% to 36.4% (high), Gold rose from 9.1% to 15.4% (low up to medium), Copper fell from 24.3% to 22.4% (medium), Iron Ore rose from 27.7% to 32.1% (medium).

COMMODITIES VOLATILITY

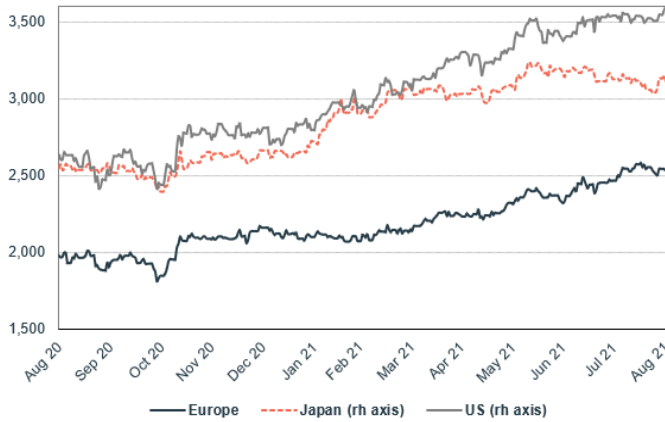


*Note: all prices refer to near futures rather than spot with the exception of iron ore which is a spot price.*

# Real Estate and Alternatives

## (Real Estate Share Prices)

REAL ESTATE (REIT) PRICES



Real Estate prices movements were mixed. US gained +1.6%, Europe gained +2.5%, Japan lost -0.5%.

+ 2.5% EUROPE

+ 1.6% US

- 0.5% JAPAN

REAL ESTATE (REIT) VOLATILITY



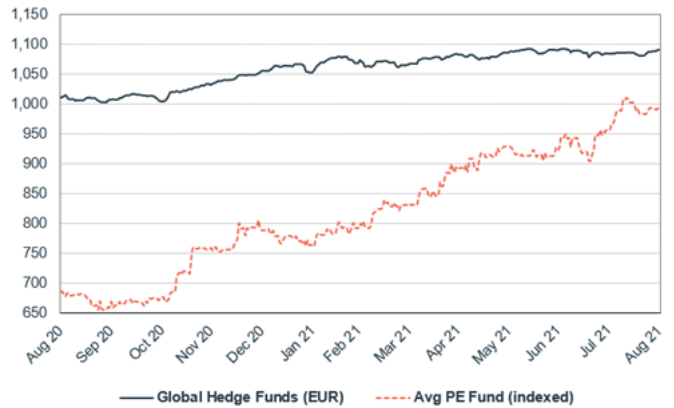
Volatility moves were also mixed. We have that US fell from 16.3% to 10.0% (low), Europe fell from 16.4% to 12.3% (medium down to low), Japan rose from 10.6% to 13.0% (low up to medium).

*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.*

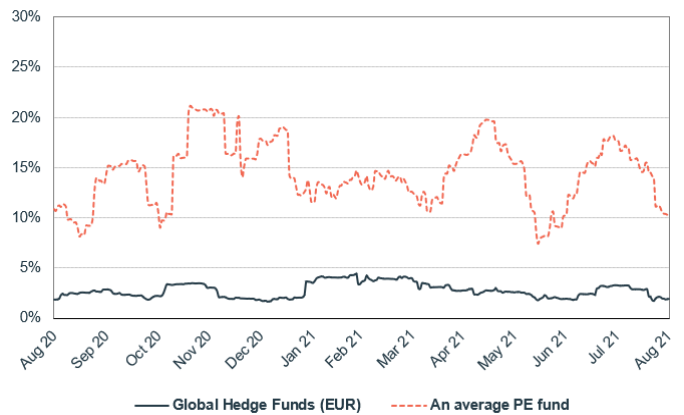
# Alternatives

## ALTERNATIVES PRICES



The average hedge fund gained +0.6%, and the average PE fund +4.3%.

## AI VOLATILITY



Volatility results for Alternative Investments were downwards during August. We have that the average hedge fund fell from 3.3% to 1.9% (high down to low), An average PE fund fell from 17.7% to 10.6% (high down to low).



1.9%

HFRX  
Volatility



10.6%

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 31st August 2021, and news and events are included up to that date. The commentary was written on or before September 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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