

PROFIDATA

MARKET VOLATILITY RISK NEWSLETTER

Wings of Wax?

SEPTEMBER 2020

Executive Summary

- Volatility of all observed markets decreased, with all settling in the medium-low volatility regime. Region volatility spanned a range that goes from 8.4% (US) to 15.8% (Japan), with the US settling in the low volatility segment and all other market in the medium regime.
- Realized volatility (of the Euro Stoxx 50 index over 30 days) decreased from 20.5% to 17.1%.
- The equity markets closed with all sectors increasing in price, with IT gaining the most (+10.5%). Sector volatilities spanned a range that goes from 8.2% to 23.2%, with all sectors closing in low volatility regimes.
- Sovereign bond price moves were all negative. Germany closed the month with the highest loss (-1.1%), with Japan, US, and Italy going down -0.5%. Volatility moves were mixed. Volatility regimes spanned a range between 1.5% and 4.4%, with all markets settling in the low regime.
- The EUR closed the month appreciating against almost all observed currencies. We have Euro gained +1.4% against the US Dollar, gained +1.3% against the Japanese Yen, increased +0.2% against the Swiss Franc and lost 0.8% against the British Pound. FX volatility results were mixed in the observed currency pairs against the Euro. FX Volatility ended ranging between 4.5% and 6.4%, with only the pair EUR/CHF settling in high, and all the other observed pairs in medium and low regimes.
- Options' implied volatility increased in both observed markets, VIX rose from 24.5 to 26.4, and the VSTOXX increased slightly from 26.66 to 26.7.
- Commodities' prices all moved upward; Oil (Brent) gained +4.6%, Gold gained +0.4%, Copper gained +6.0%, Iron Ore gained +13.6%. Volatility changes were mixed. It ranged between 15.3% to 26.5%, with the Gold experiencing the biggest increase moving from 12.6% to 25.8%.
- Real Estate (equity) price moves were all upward trending, with the US increasing +0.4%, Europe +0.5%, and Japan +7.6%. Volatility moves were mixed, ranging from 15.7% to 18.8%.
- PE Funds gained +4.7%, while the Hedge Funds appreciated +1.1%. Volatility for the average hedge fund decreased from 2.2% to 1.8%, while the average PE fund fell from 14.3% to 11%.

The Arkus Risk Team



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Summary volatility matrix and outlook

Infection rates are rising again in most countries, some call it the second wave, yet markets did not seem to care too much and continued their rally. Most equities are now back at pre-crisis levels or even higher.

High flying markets are having tailwinds provided by dovish central banks (whose balance sheets are at ATHs) and unprecedented fiscal packages. Realized equity volatilities are all in their low to medium regimes adding to the seemingly sunny picture.

However, It is still unclear how persistent the recovery is and if the financial system will be stressed with rising default rates or not. On the geopolitical side besides the EU still squabbling with the UK on how to separate rising tensions between Russia and the Western world give rise to concern. Also there are, of course, the US elections coming up in November. We shall see if current valuations are indeed flying too close to the sun on their wings of wax.

ASSET CLASS	AREA	LATEST VOLATILITY	LATEST Z-SCORE	REGIME
EQUITIES	North America	8.4%	-0.7	low
	Asia ex-Japan	13.9%	-0.4	medium
	Europe	15.1%	-0.4	medium
	Japan (Nikkei)	15.8%	-0.4	medium
	Energy	23.2%	-0.4	low
	Consumer Staples	8.2%	-0.5	low
	Financials	13.7%	-0.6	low
	IT	15.8%	-0.5	low
VOLATILITY OF VOLATILITY	Volatility of VIX	78%	-0.9	low
	Volatility of VSTOXX	74%	-1.0	low
GOVERNMENT BONDS	Germany	4.1%	-0.7	low
	US	2.6%	-1.4	low
	Japan	1.5%	-0.7	low
	Italy	4.4%	-1.1	low
FX VS \$	€/\$	6.4%	0.1	medium
	€/Yen	6.3%	-0.4	medium
	€/CHF	4.6%	0.7	high
	€/£	4.5%	-1.3	low
COMMODITIES	Oil (Brent)	18.6%	-0.9	low
	Gold	25.8%	0.9	high
	Copper	26.5%	1.0	high
	Iron Ore	15.3%	-0.6	low
PROPERTY	US	18.3%	-0.4	low
	Europe	18.8%	-0.2	medium
	Japan	15.7%	-0.4	medium
ALTERNATIVES	HFRX Global HF	1.8%	-0.5	low
	Avg PE Fund	11.0%	-0.5	low
KURTOSIS	ZCF 1% left (vs -2.33 for normal curve)	-2.10	2.0	low
CORRELATION	Average market correlation with euro equities	27%	-0.5	low

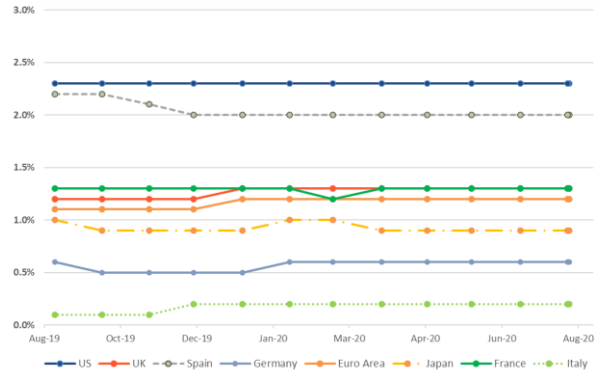
Note: Throughout the text we refer to volatilities as being "low", "medium" or "High". We define this by defining three equal "sized" regimes over the last 12 months. i.e. "High" volatility implies that volatility is in the upper third of its statistical range over the last 12 months. The table shows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

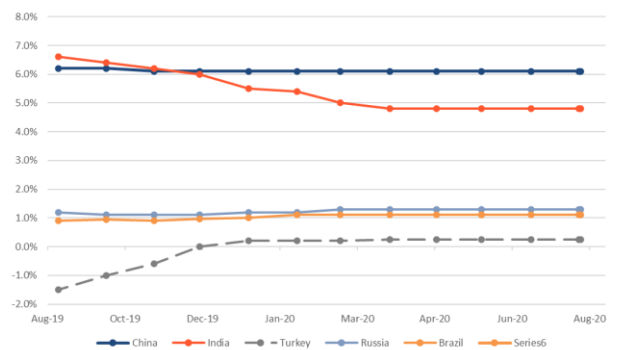
Major Volatility-Driving Events

- ▶ US election moves closer as Joe Biden and Donald Trump intensify their campaigns. Polls initially saw Biden in front after Trump’s disastrous handling of the pandemic, but are now predicting a tighter race.
- ▶ After the involvement from US officials, Israel’s prime minister Benjamin Nethanyahu and Emirati Crown Prince Mohammed Bin Zayed agreed to fully normalize the relations between the two countries.
- ▶ Russian opposition leader Alexei Navalny was poisoned at an airport in Russia. The longtime Kremlin critic had lost consciousness while travelling in Russia and is now being treated in Berlin.
- ▶ Further clashes between protestors and the police happened in the US after the shooting of a black man in the city of Kenosha, Wisconsin.
- ▶ The Federal Reserve announced a change in its policy introducing an average inflation target of 2%. This effectively means that the Fed will aim to lift inflation above 2% for a certain period as it was running well below this target in the past.
- ▶ Tesla shares rallied out of bounds reaching levels >\$ 2.000 as the company is being expected to continue to dominate the market for electric cars.
- ▶ Exxon drops out of the Dow Jones Industrial Index. After 92 years of membership, the oil company is being replaced by software company Salesforces. The move is symptomatic for a prevailing paradigm shift: old energies out – cloud technologies in.
- ▶ With Europe slightly lagging most equity indices are back to their pre-crisis levels, despite concerns about the sustainability of the recovery.

GDP ESTIMATES FOR 2020, DEVELOPED COUNTRIES



GDP ESTIMATES FOR 2020, DEVELOPING COUNTRIES



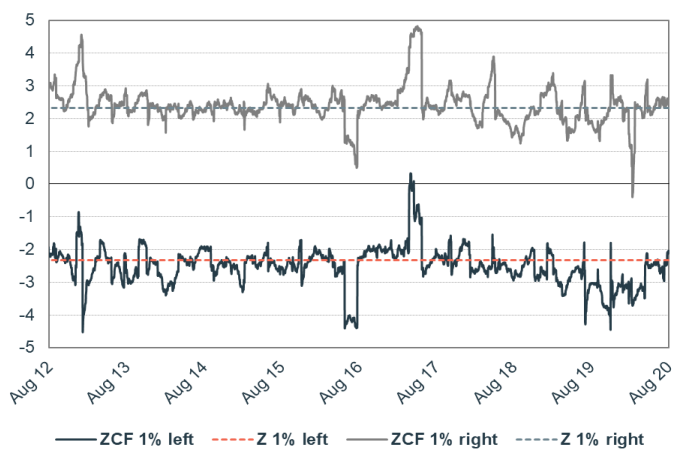
Kurtosis

Correlation in the equity markets

Kurtosis (against normal +/- 2.33)

The distribution of risks in European equity market displays denormalization with the ZCF 1% left at -2.10 and the right ZCF 1% at +2.52 (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.

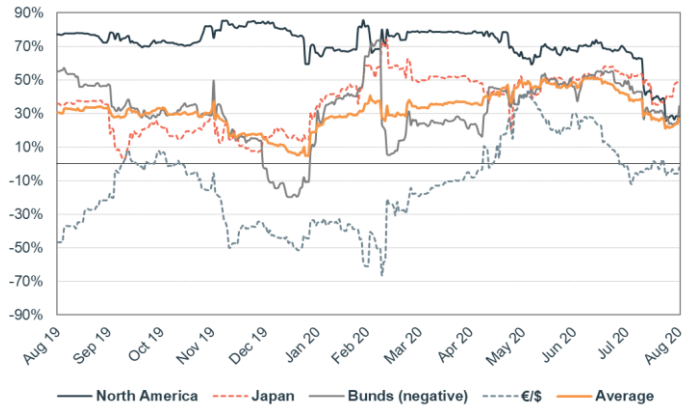
On a long-term basis, on average, the tails are slightly fatter than the normal distribution would suggest, which should not come as a surprise. What is perhaps more surprising is how much variation in fat-tailedness there has been: a daily 99% VaR has varied between -1 and -4.5 standard deviations over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

Inter-market correlations with EU equities



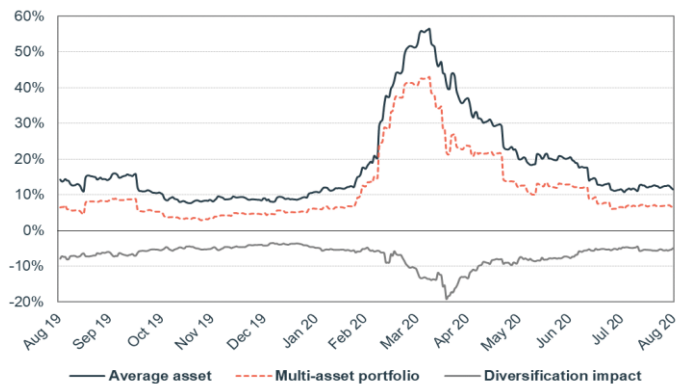
27.1% AVERAGE CORRELATION

Inter-market correlations (with EU equities)



Correlation decreased during August, leading our average correlation indicator to change from 41.4% to 27.1%.

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 slightly considerably, moving from 11.7% to 11.5% while the benefit of multi-asset diversification decreased from 5.1% to 5%.

In combination, multi-asset portfolio volatility increased from 6.5% to 6.6%.



11.5% AVERAGE VOLATILITIES



6.6% 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

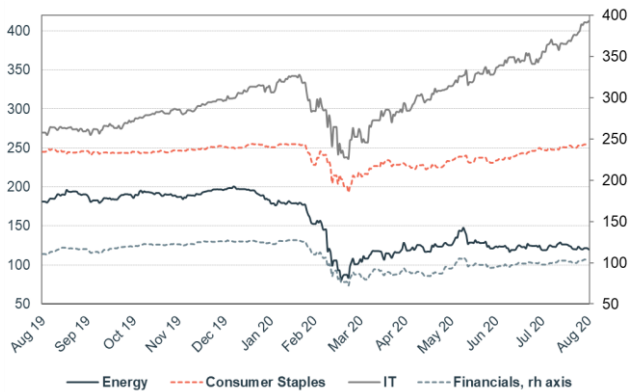
STOCK PRICE PERFORMANCE: REGIONS (LOG SCALES)



+2.5%
Europe

All equity regions increased in price during August. North America gained +7.2%, Asia ex-Japan gained +3.0%, Europe gained +2.5%, Japan (Nikkei) gained +6.6%.

STOCK PRICE PERFORMANCE: SECTORS (LOG SCALES)



+5.2%
FINANCIALS

+10.8% IT

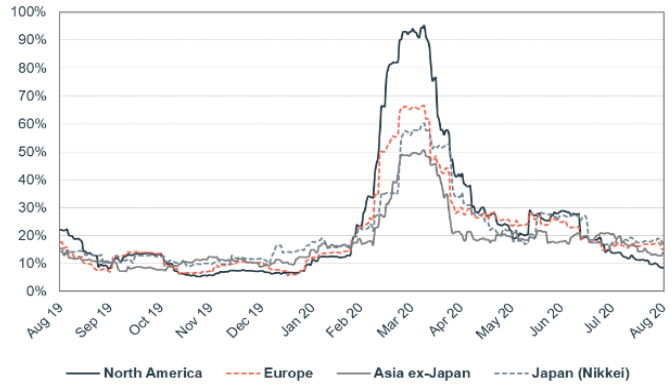
+0.8%
ENERGY

+2.8%
CONSUMER
STAPLES

All equity sectors continued rallying. Energy gained +0.8%, Consumer Staples gained +2.8%, Financials gained +5.2%, IT gained +10.5%.

Equities Volatility

EQUITY VOLATILITY: REGIONS

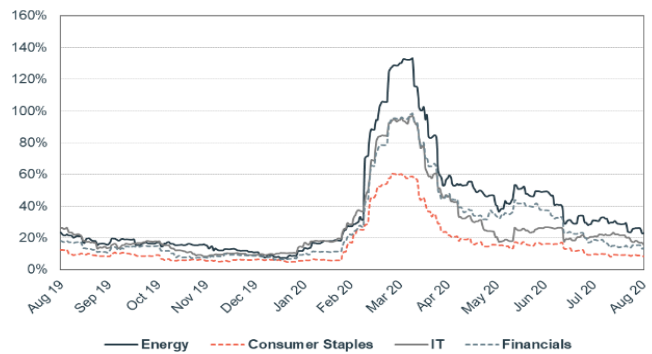


15.1% EUROPE

All regional volatilities decreased during last month, with no changes of regime observed. North America fell from 13.8% to 8.4% (low), Asia ex-Japan fell from 20.5% to 13.9% (medium), Europe fell from 17.1% to 15.1% (medium), Japan (Nikkei) fell from 17.4% to 15.8% (medium).

Equity volatility: regions

EQUITY VOLATILITY: SECTORS



All sectors volatility decreased during the last month, with some sectors changing regimes from medium to low regime.

Energy fell from 31.1% to 23.2% (medium down to low), Consumer Staples fell from 9.7% to 8.2% (medium down to low), Financials fell from 18.8% to 13.7% (medium down to low), IT fell from 21.0% to 15.8% (medium down to low).

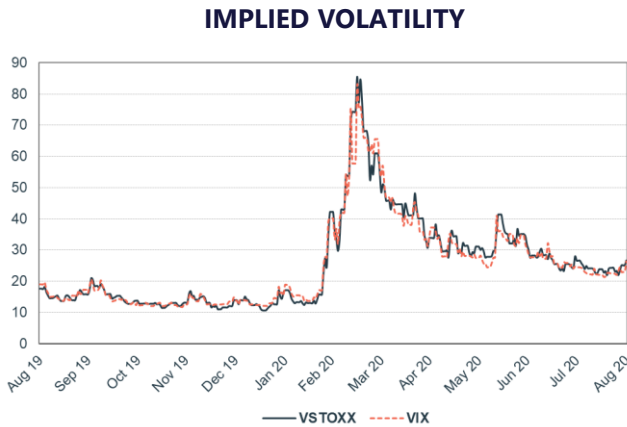
Equity volatility: sectors

Equity Implied Volatility

Market-Implied Near Term Outlook

Implied Volatility

Implied volatility for both US and EU Markets increased. VIX rose from 24.5 to 26.4 (medium), and the VSTOXX rose slightly from 26.66 to 26.7 (medium)



26.4% VIX

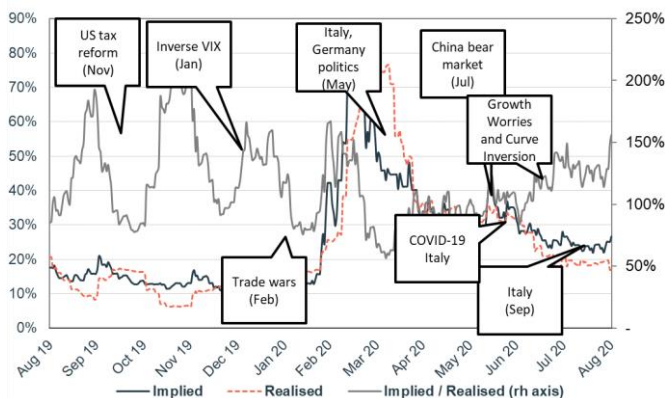
26.70% VSTOXX

Implied vs Realised Volatility

(European equity) implied volatility decreased. The realised volatility (of the Euro Stoxx 50 index over 30 days) was 17.5% (medium) bringing the ratio of implied/realised volatility to move up from 130% to 156%.

This ratio is suggesting that the market is currently pricing further volatility inducing news compared to the previous month.

IMPLIED VS. REALISED VOLATILITY



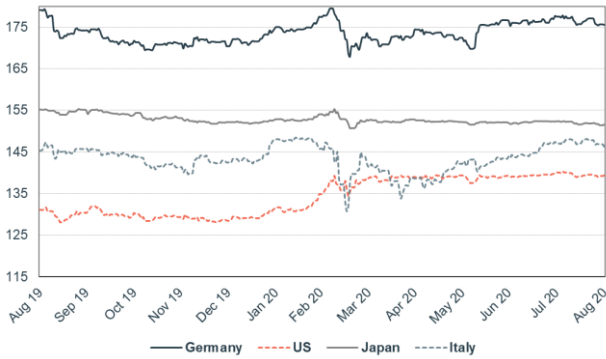
156% IMPLIED/REALISED VOLATILITY

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

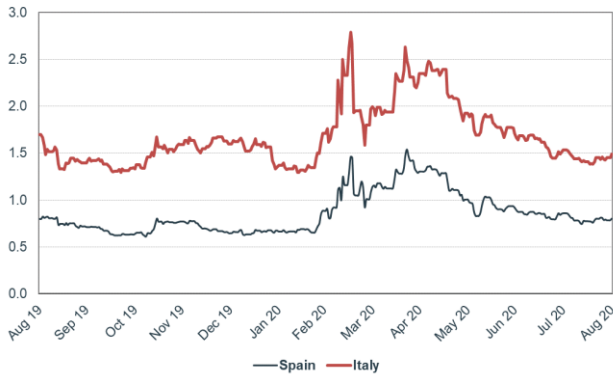
PRICES OF 10Y BOND FUTURES



Prices

Government bond prices movements were all down. Germany lost -1.1%, US lost -0.5%, Japan lost -0.5%, and Italy lost -0.5%

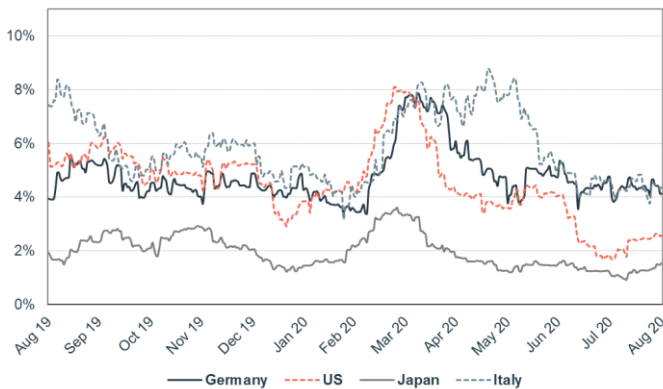
10 YEAR BOND SPREADS OVER GERMANY, %



Italian spreads over Germany decreased to 1.49%, and the

Spanish spreads decreased to 0.80% against Germany.

VOLATILITY OF 10Y BOND FUTURES

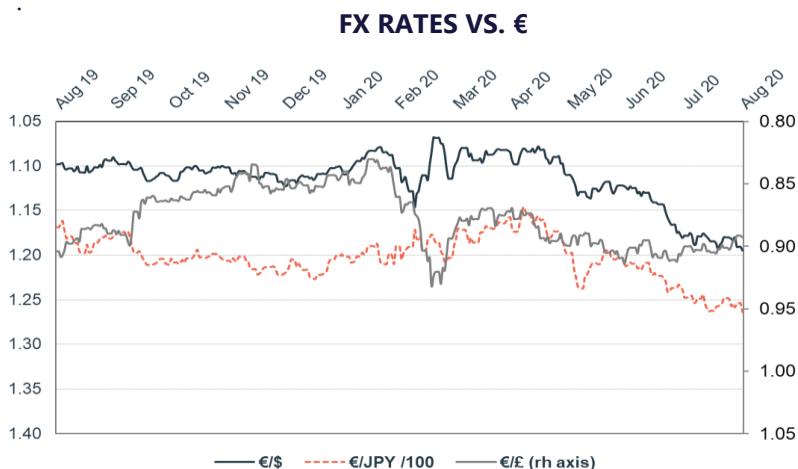


Volatility moves were mostly downwards, and all observed market closed on the low volatility regime. Germany decreased from 4.8% to 4.1% (medium down to low), US increased from 1.8% to 2.6% (low), Japan went up from 1.2% to 1.5% (low), and finally Italy went down from 4.7% to 4.4% (low).

Foreign Exchange

Prices

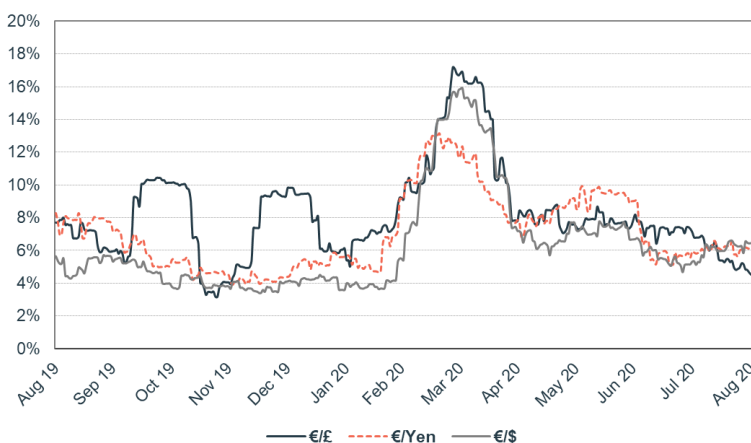
Euro gained value against all major currencies except against the British Pound. Euro gained 1.4% against the US Dollar, Euro gained 1.3% against the Japanese Yen, Euro gained 0.2% against the Swiss Franc, Euro lost 0.8% against the British Pound.



Volatility

FX volatility moves were mixed. €/USD rose from 5.3% to 6.4% (medium), €/Yen rose from 6.0% to 6.3% (low up to medium), €/CHF fell from 4.8% to 4.6% (high), €/GBP fell from 7.1% to 4.5% (low)

VOLATILITY OF FX RATES VS. €



↗ 6.4% € vs. \$

↘ 4.5% € vs. £

↗ 6.3% € 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.

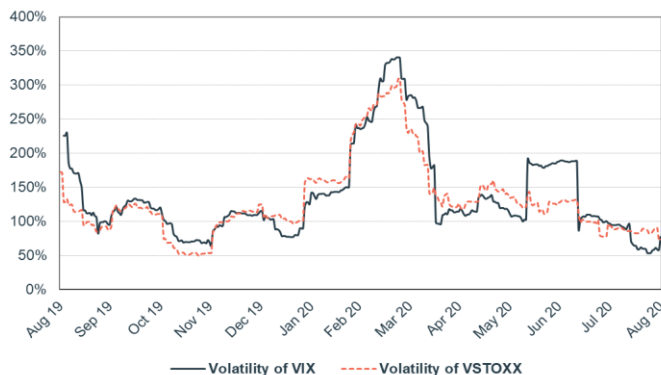
(Equity) Options

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 markets. Volatility of VSTOXX fell from 94.0% to 73.7% (low), and Volatility of VIX fell from 97.0% to 77.6% (low), with both markets closing in low regime.

VOLATILITY OF VOLATILITY



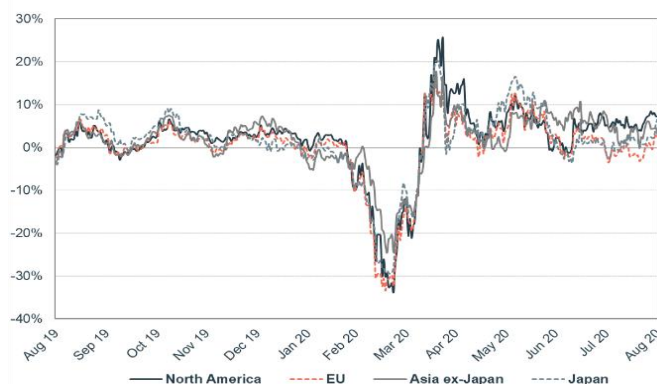
77.6% US

73.7% EUROPE

Major (Regional Equity) price moves

(Equity) price moves experienced less volatility compared to July in almost all observed markets. North America fell from 13.8% to 8.4% (low), Asia ex-Japan fell from 20.5% to 13.9% (medium), Europe fell from 17.1% to 15.1% (medium), Japan (Nikkei) fell from 17.4% to 15.8% (medium).

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

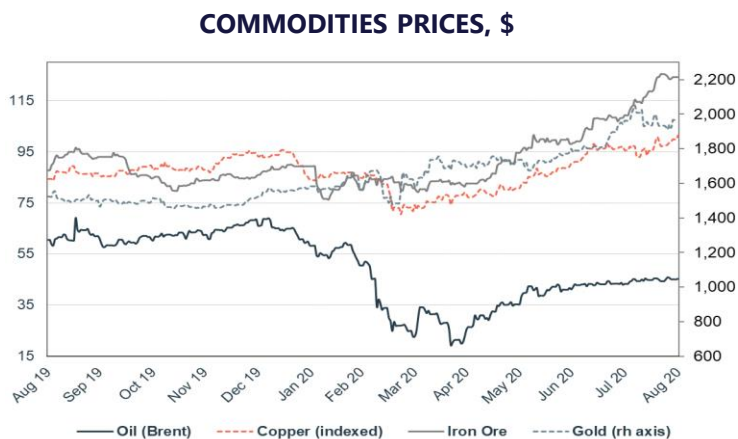
+4.6% OIL

+0.4% GOLD

+6.0% COPPER

Prices

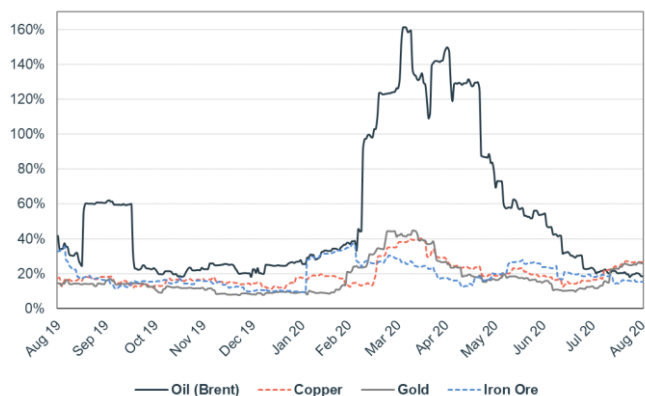
Commodity prices continued its recovery during the last month. Oil (Brent) gained +4.6%, Gold gained +0.4%, Copper gained +6.0%, Iron Ore gained +13.6%.



Volatility

Volatility movements were mixed during August. Oil (Brent) fell from 23.1% to 18.6% (low), Gold rose from 12.6% to 25.8% (medium up to high), Copper rose from 16.5% to 26.5% (medium up to high), Iron Ore fell from 18.0% to 15.3% (medium down to low).

COMMODITIES VOLATILITY

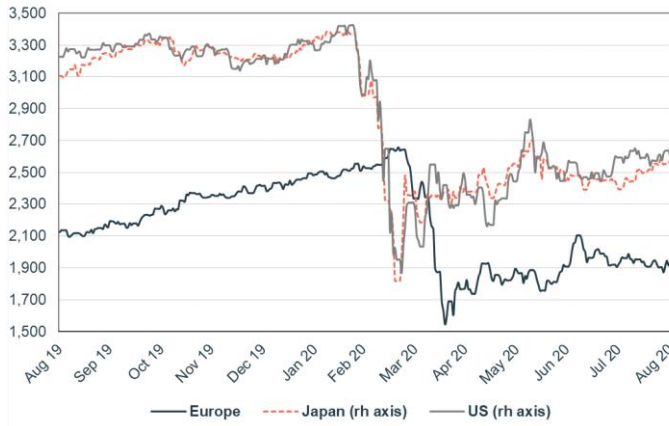


Note: all prices refer to near futures rather than spot with the exception of iron ore which is a spot price.

Real Estate and Alternatives

(Real Estate Share Prices)

REAL ESTATE (REIT) PRICES



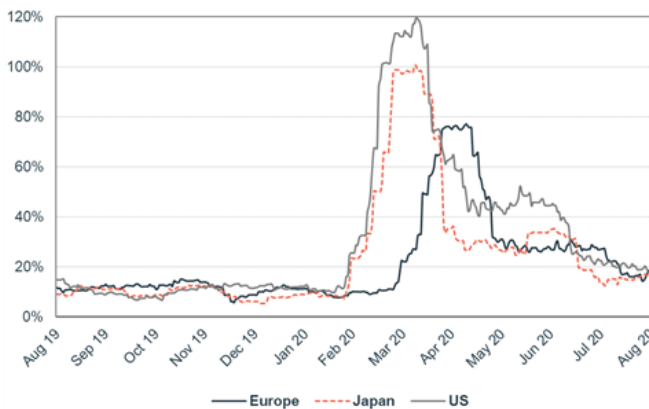
+ 0.5% EUROPE

+ 0.4% US

+ 7.6% JAPAN

Real estate regional prices movements were all upward. US gained +0.4%, Europe gained +0.5%, and Japan gained +7.6%

REAL ESTATE (REIT) VOLATILITY



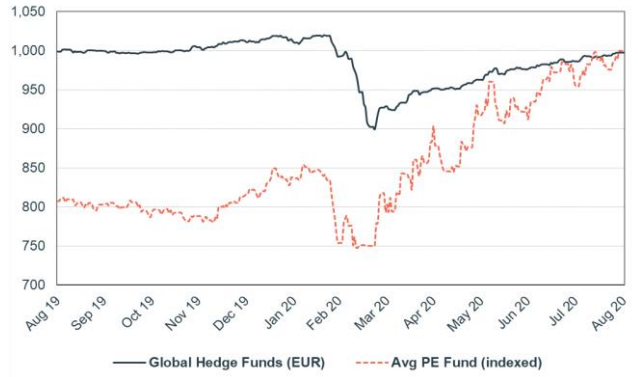
Volatility moves were all downwards, and now all regimes are medium-low. US fell from 22.4% to 18.3% (medium down to low), Europe remained unchanged at 18.8% (medium), and Japan rose from 13.5% to 15.7% (medium).

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.

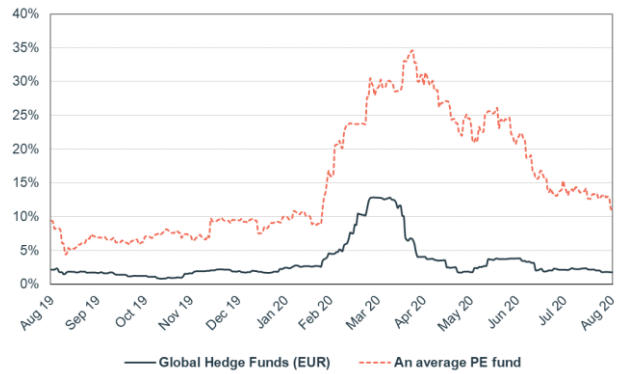
Alternatives

ALTERNATIVES PRICES



The average hedge fund gained +1.1%, an average PE fund gained +4.7%

AI VOLATILITY



Volatility movements were downwards, so we have that the average hedge fund fell from 2.2% to 1.8% (medium down to low), An average PE fund fell from 14.3% to 11.0% (medium down to low).



1.8% HFRX
Volatility



11.0% 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 2020, and news and events are included up to that date. The commentary was written on or before August 5th, 2020.

Disclaimer

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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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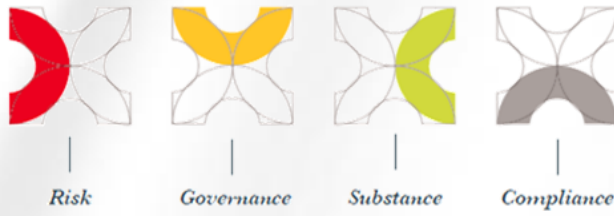
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