# Profiting from Positioning Dynamics in Commodity Futures

## Hedgers vs. Speculators

### A Systematic Commodity Strategy Using Positioning Data

- Using data on futures positioning collected by the Commodity Futures Trading Commission, we can construct a 'Variation in Hedging Pressure' factor that captures positioning dynamics of two distinct groups of market participants: Hedgers and Speculators.
- Variation in Hedging Pressure is a strong predictor of returns, with commodities that see a decrease in hedging pressure outperforming those with increasing hedging pressure.
- Variation in Hedging Pressure not only generates strong risk adjusted returns on a stand-alone basis – it is also an excellent diversifier in combination with other systematic strategies in commodity space
- A comparably constructed Variation in Hedging Pressure measure in FX space confirms our findings in Commodities

**Global Quantitative and Derivatives Strategy**

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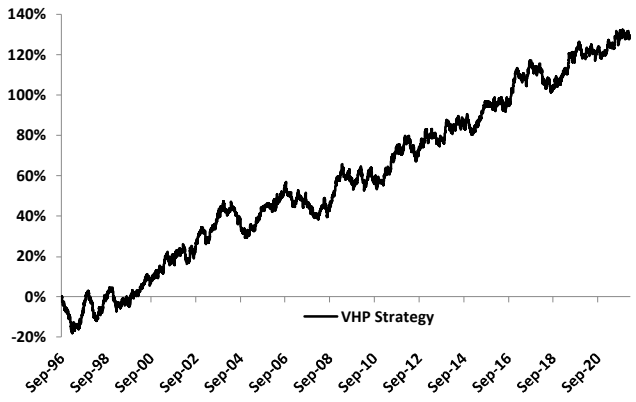
Figure 1: Performance of Variation in Hedging Pressure Strategy




Source: J.P. Morgan Quantitative and Derivatives Strategy

Table 1: Performance Statistics

| | H1 | H2 | Full |
|---|---|---|---|
| start | 1996-09-17 | 2009-06-09 | 1996-09-17 |
| end | 2009-06-05 | 2022-02-25 | 2022-02-25 |
| Ann Return | 4.58% | 5.56% | 5.09% |
| Ann Volatility | 9.45% | 10.00% | 9.73% |
| Sharpe | 0.48 | 0.56 | 0.52 |
| MaxDD | 17.27% | 15.19% | 17.27% |
| Skewness | 0.10 | -0.10 | 0.00 |
| Kurtosis | 0.67 | 0.57 | 0.62 |

Source: J.P. Morgan Quantitative and Derivatives Strategy

**See page 23 for analyst certification and important disclosures, including non-US analyst disclosures.**

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# Introduction

Positioning data in financial markets has been a hot topic for a long time and, with well-documented performance challenges for many factor-based strategies, even more so recently. Asset Managers' 13F filings[1] of US stocks, for example, generate a great deal of interest and are covered extensively by the financial press. Stocks that have been bought or sold by 'Star Managers' seem to be of special interest.

Unfortunately, this kind of attention for managers' positioning often amounts to little more than a derivative of momentum, with in-focus managers typically those that have posted strong investment returns in the recent past. In absence of a well-defined framework for assessing the predictive power of holdings, it is unclear what the added value of the positioning data is.

The situation in commodity markets is quite different: there is a clear distinction between two important groups of market participants: Hedgers and Speculators. Hedgers are those market participants that use financial markets to hedge the production (e.g. oil companies) or consumption (e.g. utility companies) of particular commodities. Speculators on the other hand are looking for a direct financial gain.

The traditional view of the interaction between Hedgers and Speculators is that Hedgers pay a premium to Speculators for insurance to lock in prices. Effectively, this implies that if the net short position by Hedgers – the Hedging Pressure- is high, the premium that can be earned by selling insurance, i.e. taking a long position, is high[2].

This traditional view, however, doesn't recognize the fact that both Hedgers and Speculators may have other motives to trade. Speculators may be pursuing cross-sectional momentum strategies, trend-following strategies or may be simply looking to diversify their investments. Hedgers can facilitate the trades needed for the Speculators' strategies by varying their hedging levels. They would be expecting to earn a liquidity premium for facilitating these trades, as explored by Kang, Rouwenhorst and Tang (2019). An alternative view for variation in hedging levels is that Hedgers have better insights in supply and demand dynamics for their commodities. As a result, they could be adjusting their positions based on superior market insights. Either way, paying attention to Hedgers' short-term deviations from longer term hedging levels could be well worth the effort.

The distinction between hedgers and speculators would just be theory if there was no data available. Fortunately, the distinction between these groups is not just a theoretical one: in its role as regulator of Futures markets, the Commodity Futures Trading Commission collects holdings data on Futures holdings, aggregated by holder type for a broad set of Futures traded on US Exchanges. The Commission has been making this positioning data available free of charge since 1995. We'll elaborate further on the CFTC data in the next section.

At this stage, however, we can already state that it is possible to use the CFTC data to construct a measure that captures long-term hedging pressure as well as the

[1] Investment Managers with discretion over $100mn or more in US Equities are required to file a 13F quarterly report on their US Equity holdings with the SEC
[2] Keynes (1923) and Hicks (1939)

shorter-term variation in those levels. The resulting 'Variation in Hedging Pressure' (VHP) metric exhibits strong and robust return-generating capabilities.

In addition to applying the VHP-strategy in Commodity Markets, we explore the application of the same methodology in FX markets. We'll show results that are consistent with the findings in commodities.

The setup of this research note is as follows: We'll first describe the CFTC Data and touch upon the Market Data used. We then will describe the 'Variation in Hedging Pressure' metric in detail and the portfolio construction methodology we'll be using in our tests. This will be followed by the empirical results, robustness checks and sensitivity analysis. The final section presents the results of VHP in FX Markets.

# Data

## Market Participants Classification

The CFTC and its predecessors have a long history of collecting positioning data for Futures markets. Starting in 1924 positioning data, labelled as Commitment of Traders (COT), was published on an annual basis. From June 1962, the reporting frequency was increased to monthly. The reporting frequency increased further over time, ultimately to weekly. In 1995 all COT reports were made freely available on www.CFTC.gov. Finally, more detailed reports were initiated in 2006. Table 1 provides an overview of the different COT reports available.

**Table 2: Commitment of Traders Reports**

| report | start (weekly frequency) | positions aggregated by | instruments | scope |
|---|---|---|---|---|
| FUT | 1992-09-30 | Commercial<br>Non-Commercial<br>Non-Reportable | Futures | Commodity<br>Financial |
| COM | 1995-03-21 | Commercial<br>Non-Commercial<br>Non-Reportable | Futures<br>Options | Commodity<br>Financial |
| F_TFF | 2006-06-13 | Dealer/Intermediary<br>Asset Manager/Institutional<br>Leveraged Funds<br>Other Reportables | Futures | Financial |
| C_TFF | 2006-06-13 | Dealer/Intermediary<br>Asset Manager/Institutional<br>Leveraged Funds<br>Other Reportables | Futures<br>Options | Financial |
| F_DisAgg | 2006-06-13 | Producer/Merchant/Processor/User<br>Swap Dealers<br>Managed Money<br>Other Reportables | Futures | Commodity |
| C_DisAgg | 2006-06-13 | Producer/Merchant/Processor/User<br>Swap Dealers<br>Managed Money<br>Other Reportables | Futures<br>Options | Commodity |

Source: www.cftc.gov

The first two are the aggregate level COT reports, labelled 'legacy' by the CFTC, the bottom four are the 'disaggregated' reports.

Important is 'positions aggregated by' column. This gives the groups of market participants for which the CFTC reports the holding. In the legacy reports, there are Commercial, Non-Commercial and Non-Reportable. The CFTC classifies a trader as Commercial if they use futures contracts for hedging purposes as defined in CFTC Regulation 1.3(z), 17 CFR 1.3(z). This means that in the legacy reports, Hedgers are Commercial, Speculators are Non-Commercial.

In terms of classification methodology, it is important to note that even if not all positions in a futures contract are held for hedging purposes by a particular trader, in practice all positions held by this trader will all be classified as such. On the other hand, a trader can be classified as Commercial for one commodity and as Non-Commercial for another. The same classification methodology applies to the Disaggregated Commodity reports.

The Disaggregated Financial Futures reports, however, use uniform classifications across market participants: e.g. if a trader is labelled 'Leveraged Funds' for one instrument, it will be classified as such for all instruments.

Finally, each set of reports have are two variants available: one that reports futures positions only and one that adds the delta-adjusted options on futures positions to the futures positions

Of the reportsa available, COM will be our base data set. It offers a good balance of historical availability and scope of instruments. We will use some of the other datasets for sensitivity analysis and robustness checks.

There are two important notes on the data availability and testing setup. First, while the COM dataset is available from March 21st, 1995, the lookback period needed in the construction of our 'Variation in Hedging Pressure' signal, means that the results in the base case will be presented from March 19th, 1996. Secondly, it is important to point out that the dates in the CFTC reports refer to the reporting date, which is the Tuesday of every week[3]. The reports, however, aren't released till the following Friday. Obviously, we can't use the data before it has been released so we will use release dates rather than the reporting dates that are in the COT reports[4].

## Investment Universe

While the CFTC collects data on many futures contracts -currently 237 different series- the majority of these will be illiquid and not relevant to a systematic investment strategy. We therefore limit the investment universe to 19 liquid commodities traded on US Exchanges. The full list of commodities, incl. identifiers can be found in the Appendix. The base futures dataset and associated returns consists of the active contracts, i.e. those contracts closest to expiry. We'll cross-check the results using Single Commodity BCOM Indices[5] and show in the Appendix that results are robust with respect to the choice of instruments.

[3] If the Tuesday is a public holiday, data is generally collected for the next business day
[4] Academic articles using the CFTC data typically use the report date, which is fine for explanatory analysis but clearly not for an investable strategy
[5] For more information on BCOM Single Commodity Indices see the BCOM Index Methodology

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# Setup

Starting point for the positioning-driven strategy in commodities is that Speculators can earn a premium by selling insurance to Hedgers, who want to lock in prices for the commodities they are producing or consuming. On the other hand, both Speculators and Hedgers can have different motivations for short term deviations from long term positions. In the section below we will define the Variation in Hedging Pressure variable that we'll be testing for its return-generating capabilities.

## Variation in Hedging Pressure

First, we will define Hedging Pressure for Commodity i in week t:

$$HP_{i,t} = \frac{CS_{i,t} - CL_{i,t}}{OI_{i,t}}$$

*where*

$$CS_{i,t} = Commercial\ Short\ Position$$

$$CL_{i,t} = Commercial\ Long\ Position$$

$$OI_{i,t} = Open\ Interest$$

The long-term Hedging Pressure is the average of HP as defined above at time t over the previous K weeks:

$$\overline{HP}_{i,t} = \frac{1}{K}\sum_{k=0}^{K-1} HP_{i,t-k}$$

We now can define Variation in Hedging Pressure as:

$$VHP_{i,t} = \frac{\overline{HP}_{i,t} - HP_{i,t}}{\sigma_{HP_{i,t}}}$$

*where*

$$\sigma_{HP_{i,t}} = \sqrt{\frac{\sum_{t=0}^{-K+1}\left(HP_{i,t} - \overline{HP}_i\right)^2}{K-1}},$$

*the volatility of $HP_i$ at time t over the previous K weeks*

In the long-term, high hedging pressure leads to positive returns due to the transfer of risk from Hedgers to Speculators, in line with the traditional view. If, however, Hedgers are currently hedging more (less), associated forward looking returns will be lower (higher). As touched upon in the introduction, this effect could be the result of either Hedgers facilitating Speculators' trading needs or Hedgers' superior knowledge of the supply-demand dynamics in their markets.

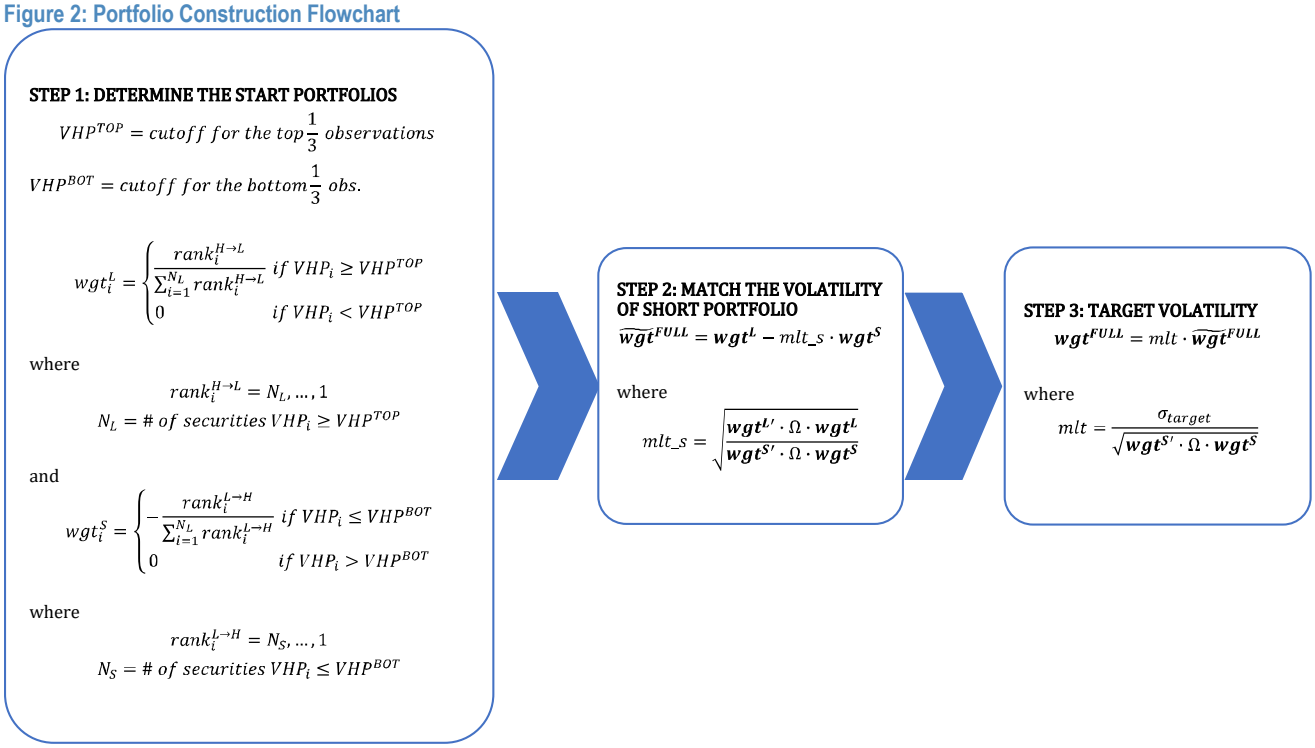
An important parameter in the calculation of VHP is K, the horizon over which we estimate the long-term hedging pressure. Academic articles like Kang, Rouwenhorst and Tang (2019) use a 1-year horizon, i.e. K=52 as long-term. While one year is an

obvious and intuitive choice, there is no compelling reason per se for using that specific horizon. We will therefore look at various windows K to assess the sensitivity of the results.

## Portfolio Construction

Portfolios to test the efficacy of VHP are long the highest tertile VHP commodities and short the lowest tertile VHP commodities. The long and short legs are constructed such that the weights are proportional to the VHP observations, i.e. the higher (lower) the VHP, the larger the weight in the long (short) portfolio. The weights of the short leg are then adjusted such that the volatility of the short leg is equal to the volatility of the long leg. Finally, the total portfolio (long – short) is adjusted in order to target 10% annualized volatility.

Figure 2: Portfolio Construction Flowchart




The covariance matrix we use in steps 2 and 3 consists of a combination of sample correlations and implied volatilities of 1-month at-the-money options on futures. The 'instant' nature of implied volatilities gives a good representation of the volatility at each point in time.

The portfolio is rebalanced weekly. Since the data is released by the CFTC on Friday after market close, the moment of portfolio rebalancing in the back tests is Monday's close[6]. In the sensitivity analysis we will also look at rebalances on Tuesday through Friday, where the latter represents a 1-week lag on the release date of the CFTC data.

Finally, the results are presented net of trading and running costs and in excess of the risk-free rate.

[6] If Monday is a US market holiday, the rebalance takes place at the close of the next business day

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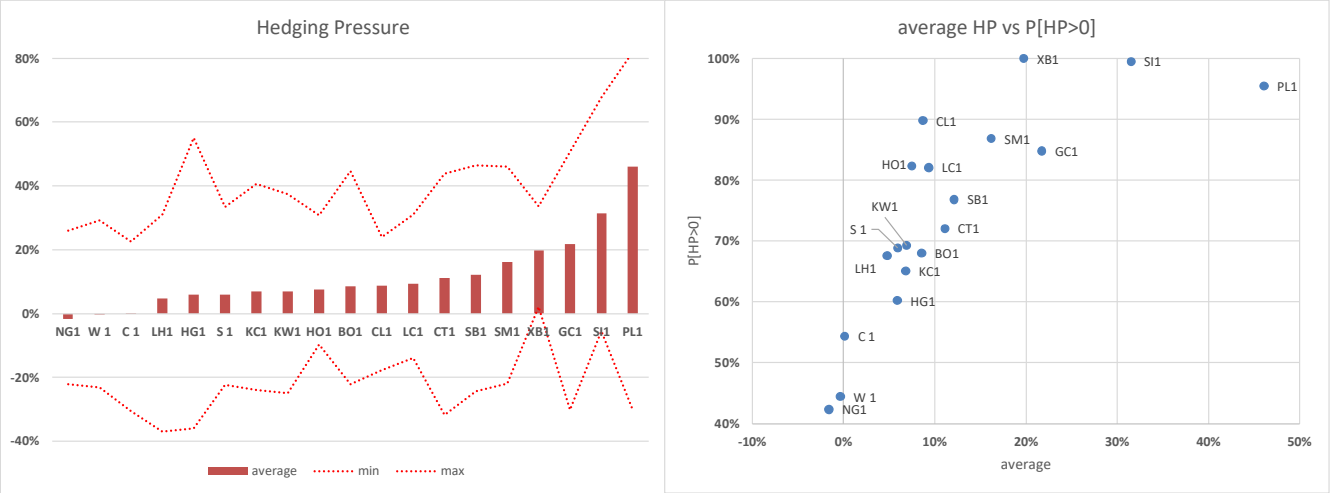
# Empirical Results

In this section we will present the empirical results of the 'Variation in Hedging Pressure' strategy. However, before jumping to the results, we will explore the overall characteristics of the hedging pressure data.

## Characteristics of Hedging Pressure

Figure 3 shows the average, minimum and maximum Hedging Pressure for the 19 Commodity Futures in our universe for the full sample from 1995-03-21 till 2022-02-22.

**Figure 3: Hedging Pressure - Long Term Characteristics**




Source: J.P. Morgan Quantitative and Derivatives Strategy

From the Hedging Pressures shown in the left panel of figure 3, we can easily see that on average, in most commodities the Hedging Pressure is positive. In other words, in all commodities except Natural Gas (NG1), Wheat (W 1) and Corn (C 1) the positions of Commercials over the sample are on average net short. Commodity producers are the dominating force within the group of Commercials.

There is, however, significant variability in these net short levels for all commodities. In the left panel it can easily be seen that the minimum and maximum Hedging Pressure levels are far off the positive average levels. Furthermore, for all commodities bar Silver (SI1) and Gasoline (XB1) Hedgers can run sizeable net long positions.

The right panel of figure 3 shows the average Hedging Pressure vs. the percentage of observations where the Hedging Pressure is positive. Even for commodities with high levels of Hedging Pressure, there are still negative net short (i.e. net long) positions in our sample. GC1 (Gold), for example, has average Hedging Pressure of around 22%. Still, Commercials have net long positions in 15% of all observations. It is unlikely that such variability in positioning is the result of varying hedging needs by Commercials but rather the result of tactical trading around their long-term hedging needs.

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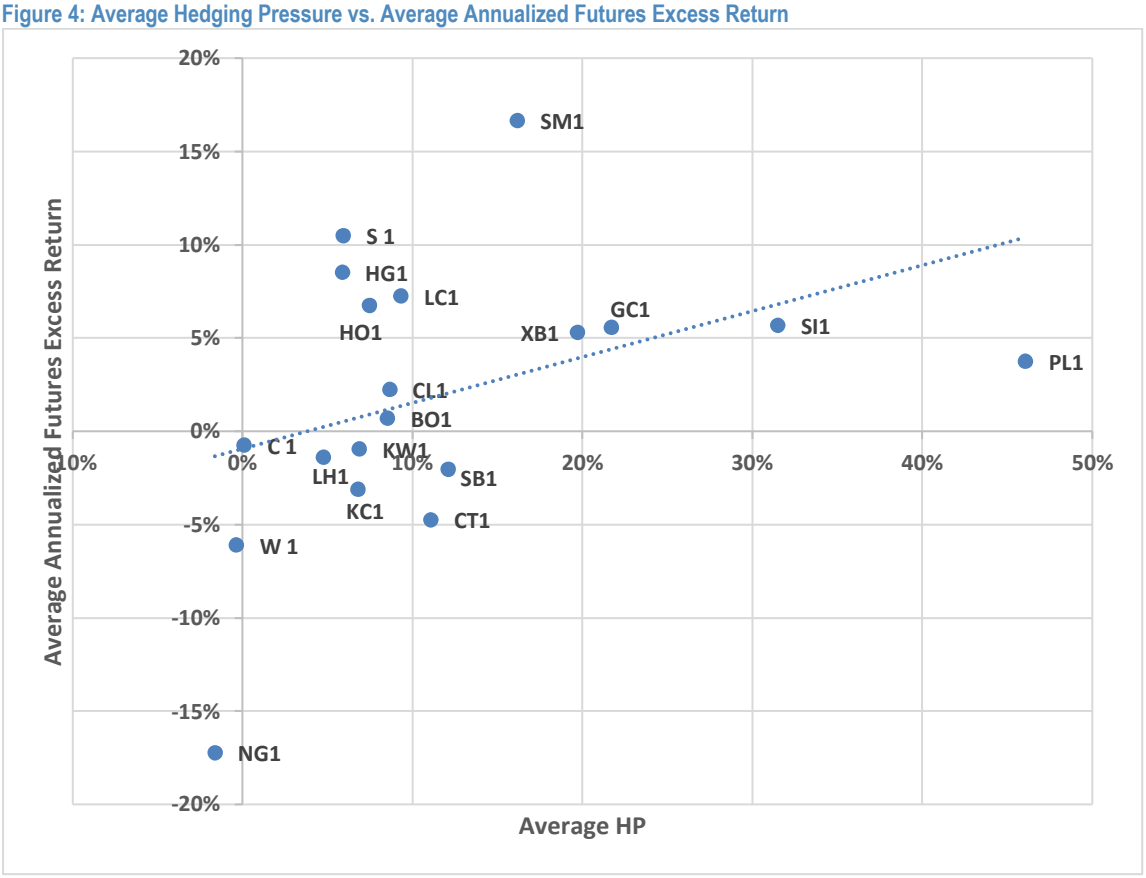
Before we turn our attention to the strategy employing Variation in Hedging Pressure, it is worthwhile to explore the relation between long-term Hedging Pressure and returns. As stated in the introduction, the traditional view of the interaction between Hedgers and Speculators is that Hedgers pay a premium to Speculators to assume the price risk of their products. Figure 4 shows the relationship between the average Hedging Pressure and the average Futures Excess Returns for the 19 Commodities that make up our investment universe over the period from 1995-03-21 till 2022-02-22.

Figure 4: Average Hedging Pressure vs. Average Annualized Futures Excess Return




Source: J.P. Morgan Quantitative and Derivatives Strategy

Regressing the returns on hedging pressure gives a slope coefficient of 0.25 (t-stat of 2.49) and $R^2$ of 15%. In other words, the traditional view of Hedgers paying a premium is confirmed by the data: higher levels of Hedging Pressure are associated with higher returns.

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## Variation in Hedging Pressure – Base Case Results

The results of the base case are presented in this section. In the initial test we will use K=52 to estimate the long-term hedging pressure. Figure 5 shows the cumulative performance to the strategy as well as the performance statistics of this base case.

Figure 5: Performance VHP strategy - K=52


Source: J.P. Morgan Quantitative and Derivatives Strategy

Table 3: Performance Statistics VHP strategy – K=52

| | H1 | H2 | Full |
|---|---|---|---|
| start | 1996-03-19 | 2009-03-10 | 1996-03-19 |
| end | 2009-03-06 | 2022-02-25 | 2022-02-25 |
| Ann Return | 4.72% | 3.93% | 4.34% |
| Ann Volatility | 9.46% | 10.07% | 9.77% |
| Sharpe | 0.50 | 0.39 | 0.44 |
| MaxDD | 22.07% | 16.37% | 22.07% |
| Skewness | 0.05 | -0.12 | -0.04 |
| Kurtosis | 0.69 | 0.87 | 0.81 |

Source: J.P. Morgan Quantitative and Derivatives Strategy

The strategy delivers a Sharpe ratio of in excess of 0.4 with good consistency over time, which for a single factor strategy in a relatively narrow universe is a very encouraging result.

Even though the results of this base case are strong, we believe it is worthwhile to obtain further insights into the length of the estimation window for the long-term Hedging Pressure, K. This will be the subject of the next section.

## What estimation window K?

Admittedly, the estimation window of 52 weeks is an appealing one from an intuitive perspective. It is easy to imagine that Hedgers work in cycles of a year and it therefore makes sense to calculate the hedging pressure accordingly. On the other hand, 1 year is arguably an arbitrary choice: Hedgers could easily have longer or shorter horizons in their activities.

To get a clearer picture on the role that the estimation window plays, we will run the strategy using a range of estimation windows. The objective is not to find an 'optimal' window K but rather to assess the sensitivity of the performance of the strategy to K. We will therefore use ranges from one quarter (K=13) through four years (K=208). Since we'll lose more observations for the longer estimation horizons, we'll present the results for these variants uniformly starting 1999-03-17 for consistency.

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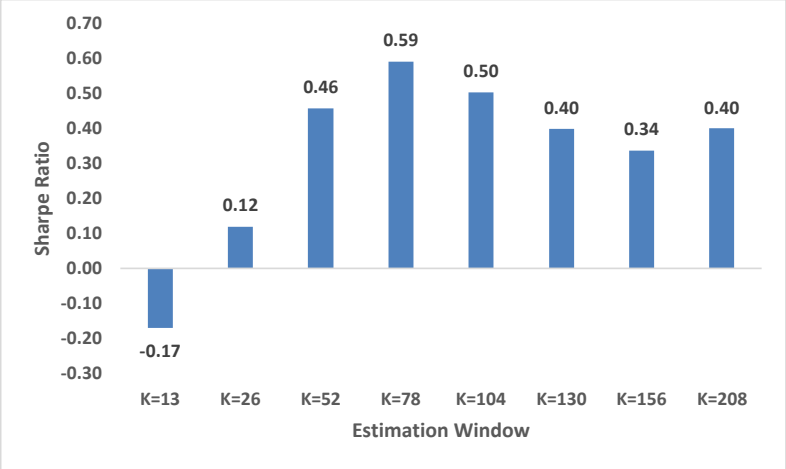
Figure 6: Sharpe Ratios of Estimation Window Variants

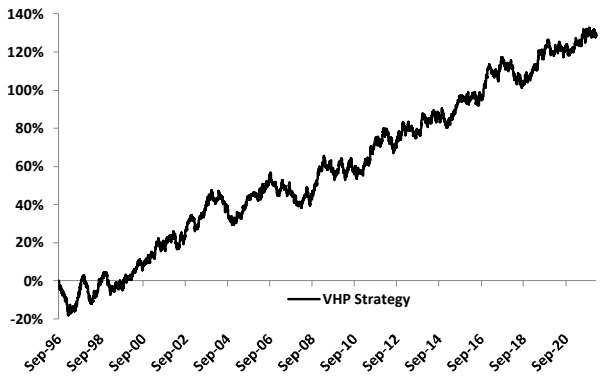



Source: J.P. Morgan Quantitative and Derivatives Strategy

These 'estimation window' variants show a clear pattern. Firstly, short horizons clearly don't work. Both one quarter (K=13) and half a year (K=26) show poor Sharpe ratios. Partly, these poor results will be down to higher transactions costs due to higher turnover but even gross of transaction costs, the results are poor both on an absolute basis as well as when compared to longer estimation windows. Secondly, in assessing the longer estimation horizons, it is quite clear that the medium range produces the best risk adjusted returns. A year and a half (K=78), two years (K=104) and one year (K=52) have the best risk-adjusted returns. Stretching the estimation horizon further, there is a drop-off in Sharpe ratios, though not dramatically.

Where does this sensitivity analysis leave us? We'd argue that it makes the case to lengthen the estimation window from K=52 to K=78. The Sharpe ratio is higher but more importantly, the sensitivity analysis shows us that longer estimation horizons maintain better Sharpe Ratios. Shorter estimation horizons, on the other hand show a pronounced drop in results. In order to move the strategy towards 'more robustness' we will therefore from this point onwards use K=78 as our base case. The full set of results for K=78 is shown below.

Figure 7: Performance of VHP Strategy - K=78




Source: J.P. Morgan Quantitative and Derivatives Strategy

Table 4: Performance Statistics VHP strategy – K=78

| | H1 | H2 | Full |
|---|---|---|---|
| start | 1996-09-17 | 2009-06-09 | 1996-09-17 |
| end | 2009-06-05 | 2022-02-25 | 2022-02-25 |
| Ann Return | 4.58% | 5.56% | 5.09% |
| Ann Volatility | 9.45% | 10.00% | 9.73% |
| Sharpe | 0.48 | 0.56 | 0.52 |
| MaxDD | 17.27% | 15.19% | 17.27% |
| Skewness | 0.10 | -0.10 | 0.00 |
| Kurtosis | 0.67 | 0.57 | 0.62 |

Source: J.P. Morgan Quantitative and Derivatives Strategy

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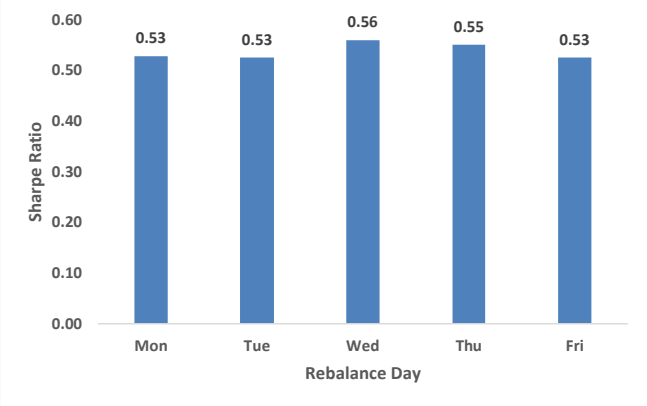
## Day of Rebalance

Another aspect that warrants attention is the day of rebalance. So far, we have rebalanced the portfolio on the closing levels of every Monday, using information that has been released by the CFTC after market close the previous Friday. This is in practical terms the earliest possible opportunity to act on the new information. What then is the effect of delaying the implementation or, in other words, how high is the alpha decay? To get sense of alpha decay, we ran the back test where the portfolio is rebalanced on subsequent days. The results of these tests are shown below.

Figure 8: Sharpe Ratios - Different Rebalance Days




Source: J.P. Morgan Quantitative and Derivatives Strategy

Table 5: Performance Statistics – Different Rebalance Days

| Rebalance Day | Mon | Tue | Wed | Thu | Fri |
|---|---|---|---|---|---|
| start | | | 1996-09-24 | | |
| end | | | 2022-02-25 | | |
| Ann Return | 5.14% | 5.13% | 5.51% | 5.47% | 5.23% |
| Ann Volatility | 9.73% | 9.75% | 9.84% | 9.92% | 9.93% |
| Sharpe | 0.53 | 0.53 | 0.56 | 0.55 | 0.53 |
| MaxDD | 17.27% | 16.74% | 17.01% | 17.08% | 17.05% |
| Skewness | 0.00 | -0.02 | 0.00 | 0.02 | 0.06 |
| Kurtosis | 0.62 | 0.59 | 0.92 | 1.01 | 0.88 |

Source: J.P. Morgan Quantitative and Derivatives Strategy

The alpha decay is very low: there is no discernible difference between the results of the different rebalance dates. The Sharpe ratio of the Friday variant, that incorporates 4 days additional lag, is the same as that of the base case.

Having determined the estimation window K and observed that the strategy has low alpha decay, we will investigate how dependent the strategy is on regimes.

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## Regime analysis

When regime analysis is considered, one typically thinks about how a strategy performs under different regimes of financial markets, like bull and bear markets in the various asset classes. Interesting as this 'traditional' regime analysis is, we'll take a different approach in this note.

The reason for an alternative regime analysis for this commodity risk premia strategy is that over the past decades, the participation of Non-Commercial market participants has increased significantly. This 'financialization of commodity markets' is potentially of importance for all commodity-based strategies but could be have an even bigger impact on a strategy that explicitly uses signals from positioning of the two main groups of market participants, like this VHP strategy.

If we want to analyze performance under regimes, we first need to identify these regimes. Market regimes are easily identifiable but how do we identify "market participants regimes"? Fortunately, the CFTC data provides us the means to do so: by dividing the sum of all Commercial positions by the sum of all Commercial and Non-Commercial positions, we'll get a good idea about the extent of the financialization of commodity markets. A high percentage indicates a 'Hedgers' market whereas a relatively low percentage points towards a 'Speculators' market. In formula:

$$pctComm_t = \frac{\sum_{i=1}^{I}\left(CS_{i,t} + CL_{i,t}\right)\cdot CVal_{i,t}}{\sum_{i=1}^{I}\left(CS_{i,t} + CL_{i,t} + NS_{i,t} + NL_{i,t} + NSprd_{i,t}\right)\cdot CVal_{i,t}}$$

*where*

$$CS_{i,t} = Commercial\ Short\ Position$$

$$CL_{i,t} = Commercial\ Long\ Position$$

$$NS_{i,t} = NonCommercial\ Short\ Position$$

$$NL_{i,t} = NonCommercial\ Long\ Position$$

$$NSprd_{i,t} = Commercial\ Spread\ Position$$

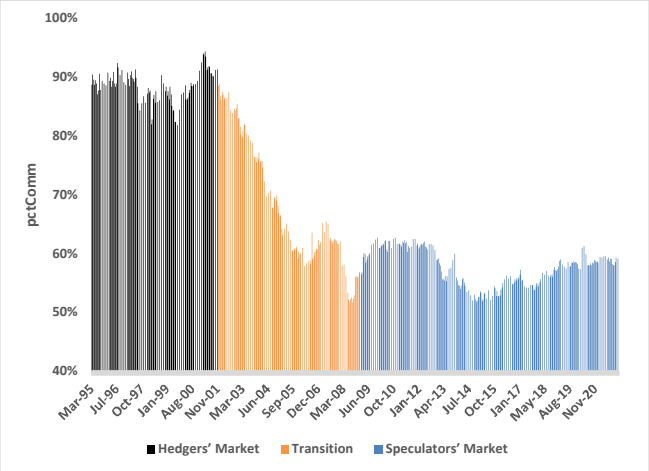
$$CVal_{i,t} = Contract\ Value$$

Figure 7 shows the *pctComm* over time. The picture is very clear and confirms the 'Financialization of Commodity Markets' hypothesis. There are three clearly identifiable 'regimes' in our sample: early on, Commercials dominate the market. They are responsible for between 80 and 90% of all outstanding positions during this time. Subsequently, there is a period where *pctComm* declines, almost in a linear way. In the more recent period *pctComm* has stabilized, ranging between 50 and 60%.

We will be using matching three periods for our 'market participants regimes' analysis:

1. Hedgers' Market: the period from the start of the sample till 2001-12-31 when Commercials are the dominant market group.
2. Transition: the period from 2001-12-31 till 2008-12-31 when the shift towards a greater participation of Non-Commercials takes place.
3. Speculators' Market: from 2008-12-31, when the balance between Commercials and Non-Commercials seems to have reached a new equilibrium

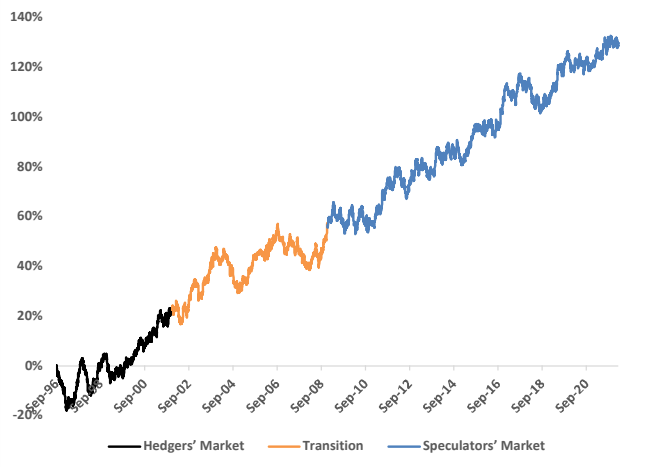
Figure 9: Commercial Positions as % of All Positions




Source: J.P. Morgan Quantitative and Derivatives Strategy

Having identified the Market Participants' regimes, we can assess how the VHP strategy performs during each of these.

Figure 10: Performance - Market Participants Regimes




Source: J.P. Morgan Quantitative and Derivatives Strategy

Table 6: Performance Statistics – Market Participants Regimes

| | Hedgers' Market | Transition | Speculators' Market |
|---|---|---|---|
| start | 1996-09-17 | 2002-01-02 | 2009-01-02 |
| end | 2001-12-31 | 2008-12-31 | 2022-02-25 |
| Ann Return | 4.42% | 4.78% | 5.52% |
| Ann Volatility | 9.42% | 9.45% | 10.00% |
| Sharpe | 0.47 | 0.51 | 0.55 |
| MaxDD | 16.74% | 17.27% | 15.19% |
| Skewness | 0.14 | 0.04 | -0.07 |
| Kurtosis | 0.45 | 0.69 | 0.63 |

Source: J.P. Morgan Quantitative and Derivatives Strategy

While the role of Commercials has declined significantly over the full sample, the performance of the VHP strategy is remarkably stable over the three distinct regimes. The highest Sharpe ratio is obtained during the 'Speculators' regime. Performance in the two other regimes is only slightly lower. The lowest Sharpe ratio is realized during 'Hedgers' Market' – this is still a more than acceptable 0.47. Maximum drawdowns and higher moments are also very similar across the three regimes.

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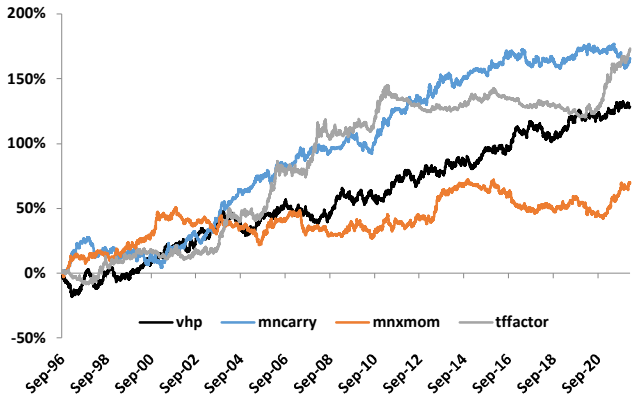
# VHP in Portfolio Context

The next step is to investigate how the VHP strategy works in the context of a wider portfolio of systematic commodity strategies. We will combine the VHP strategy with Market Neutral Carry[7] (labelled mncarry), Market Neutral Cross-Sectional Momentum[8] (mnxmom) and Trend Following Factors[9] (tffactor) in commodities. Given that VHP is built on data from a very different source than the market data underpinning the three other strategies, we'd expect VHP to have strong, diversifying characteristics.

**Figure 11: Performance of Selected Commodity Strategies**




Source: J.P. Morgan Quantitative and Derivatives Strategy

**Table 6: Performance Statistics and Correlations**

| | vhp | mncarry | mnxmom | tffactor |
|---|---|---|---|---|
| start | | 1996-09-17 | | |
| end | | 2022-02-23 | | |
| Ann Return | 5.04% | 6.49% | 2.72% | 6.83% |
| Ann Volatility | 9.73% | 9.16% | 8.21% | 9.29% |
| Sharpe | 0.52 | 0.71 | 0.33 | 0.73 |
| MaxDD | 17.27% | 21.75% | 27.28% | 22.80% |
| Skewness | -0.01 | 0.02 | -0.06 | -0.36 |
| Kurtosis | 0.62 | 1.28 | 0.94 | 4.93 |

| correlations | vhp | mncarry | mnxmom |
|---|---|---|---|
| mncarry | -1% | | |
| mnxmom | -23% | 6% | |
| tffactor | -14% | -4% | 24% |

Source: J.P. Morgan Quantitative and Derivatives Strategy

Realized correlations of VHP with the three other strategies are indeed low: it is effectively uncorrelated with Market Neutral Carry, whereas it exhibits negative correlations with both Market Neutral Cross-Sectional Momentum and Trend Following Factors.

The low correlations of VHP with the other three strategies give great diversification potential. To assess how well VHP diversifies, we'll construct two multi-strategy portfolios: one consisting of Market Neutral Carry, Market Neutral Cross-Sectional Momentum and Trend Following Factors (labeled 3-component), another with Variation in Hedging Pressure added (4-component). We use a risk-budgeting approach to construct the portfolios: given the design of the Trend Following Factors strategy, we want to increase the exposure to that component when its volatility is higher and decrease the exposure when the volatility is lower. The other components get allocations in line with their contribution to risk[10]. Finally, both variants are scaled up such that they target 10% volatility.

[7] "Market-neutral carry strategies", Tzotchev et al, 2018
[8] "Quantitative Perspectives on Cross-Asset Risk Premia: Disentangling momentum and carry in commodities, structural breaks in risk premia and latest model views", Tzotchev et al, June 2021
[9] "Quantitative Perspectives on Cross-Asset Risk Premia: Risk premia performance review, trend-following in factors and latest model views", Tzotchev et all, July 2021
[10] Using Equal Risk Budget for all components doesn't change the results materially, but 'dynamic' risk budgeting is a better fit to the nature of the underlying components

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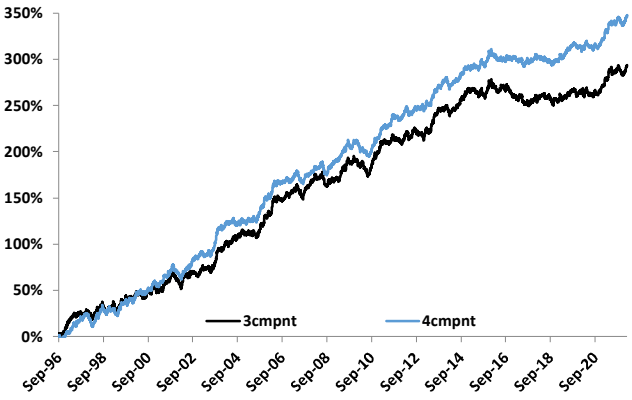
Figure 12: Performance of Multi-Strategy Portfolios




Source:

Table 7: Performance Statistics of Multi-Strategy Portfolios

| | 3-component | 4-component |
|---|---|---|
| start | 1996-09-17 | |
| end | 2022-02-23 | |
| Ann Return | 11.56% | 13.66% |
| Ann Volatility | 11.63% | 10.90% |
| Sharpe | 0.99 | 1.25 |
| MaxDD | 25.97% | 18.07% |
| Skewness | -0.07 | -0.08 |
| Kurtosis | 0.74 | 0.64 |

Source: J.P. Morgan Quantitative and Derivatives Strategy

From these results it is clear that adding VHP improves the performance characteristics of the multi-strategy portfolio: there is a 25% increase in Sharpe ratio and the maximum drawdown is reduced from around 26% to just over 18%.

The final aspect we will look at in this paper, is the applicability of the signal to FX markets.

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# VHP in FX

The first step in testing Variation in Hedging Pressure in FX markets is to reflect on the data to be used. Given that the division into Commercial and Non-Commercial is also available for FX futures, the easy solution would be to use the exact same data and variable for FX as we have used in commodity markets. This could, however, be problematic. Given the self-reporting nature of the Commitment of Traders reports, chances are that for FX (and other financial) futures an even higher degree of subjectivity enters the reporting process.

We therefore adapt the approach for FX Markets. To get around the ambiguity in reporting, we will move from using the 'Legacy' reports to the more detailed 'Traders in Financial Futures' (TFF) reports. In these reports, positions are broken down by the categories Dealer/Intermediary, Asset Manager/Institutional, Leveraged Funds and Other Reportables. Clearly, there are no categories that map directly to 'Commercials' in the TFF. This, however, is not a problem: we can re-formulate the VHP variable such that it is expressed in terms of Non-Commercial positions.

This re-formulation is based on the premise that Non-Commercial Long positions are like Commercial Short positions and vice versa[11]. From the TFF reports we will categorize 'Asset Manager/Institutional' and 'Leveraged Funds' as representative of the Non-Commercial category. This means that the alternative formulation of VHP is defined as follows:

$$HP_{i,t}^{TFF} = \frac{\left(AML_{i,t} + LFL_{i,t}\right) - \left(AMS_{i,t} + LFS_{i,t}\right)}{OI_{i,t}}$$

*where*

$$AML_{i,t} = Asset\ Managers\ Long\ Position$$

$$LFL_{i,t} = Leveraged\ Fund\ Long\ Position$$

$$AMS_{i,t} = Asset\ Managers\ Short\ Position$$

$$LFS_{i,t} = Asset\ Managers\ Long\ Position$$

$$OI_{i,t} = Open\ Interest$$

The long-term Hedging Pressure is the average of $HP^{TFF}$ as defined above at time t over the previous K weeks:

$$\overline{HP}_{i,t}^{TFF} = \frac{1}{K}\sum_{k=0}^{K-1} HP_{i,t-k}^{TFF}$$

We now can define the TFF variant of Variation in Hedging Pressure as:

$$VHP_{i,t}^{TFF} = \frac{\overline{HP}_{i,t}^{TFF} - HP_{i,t}^{TFF}}{\sigma_{HP_{i,t}^{TFF}}}$$

[11] The underlying assumption here is that the Non-Reportable and Other Reportable categories are relatively small

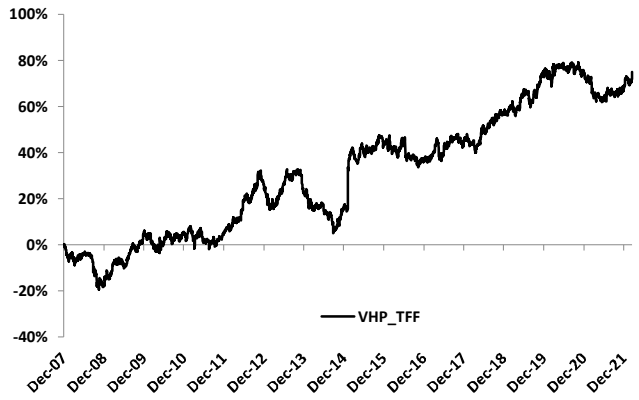
*where*

$$\sigma_{HP_{i,t}^{TFF}} = \sqrt{\frac{\sum_{t=0}^{-K+1}\left(HP_{i,t}^{TFF} - \overline{HP}_i^{TFF}\right)^2}{K-1}},$$

*the volatility of $HP_i^{TFF}$ at time t over the previous K weeks*

The TFF reports start in June 2006, so the result set will be on a shorter sample than for commodities. All other parameters will be the same as for Commodities: estimation horizon K we'll keep at 78 weeks and all portfolio construction settings are being kept the same. The investable universe are the 7 currencies from the G10 that have a traded Futures contract and for which the CFTC collects the positioning data. This latter condition excludes NOK and SEK futures, so the universe consists of JPY, AUD, NZD, CHF, EUR, GBP and CAD futures.

**Figure 13: Performance of VHP in FX**




Source: J.P. Morgan Quantitative and Derivatives Strategy

**Table 8: Performance Statistics VHP in FX**

| | H1 | H2 | Full |
|---|---|---|---|
| **start** | 2007-12-11 | 2015-01-20 | 2007-12-11 |
| **end** | 2015-01-16 | 2022-02-25 | 2022-02-25 |
| **Ann Return** | 4.74% | 5.82% | 5.28% |
| **Ann Volatility** | 12.33% | 10.92% | 11.65% |
| **Sharpe** | 0.38 | 0.53 | 0.45 |
| **MaxDD** | 24.82% | 16.07% | 24.82% |
| **Skewness** | 4.93 | -0.52 | 2.71 |
| **Kurtosis** | 103.58 | 7.35 | 67.84 |

Source: J.P. Morgan Quantitative and Derivatives Strategy

The VHP strategy works well in FX too. The Sharpe Ratio is 0.45 and is reasonably consistent over time. These results in FX confirm once more the robustness of the strategy

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# Appendix

## Investment Universe

### Table 9: Commodities

| CFTC Name | CFTC ID | Futures ID | alt ID |
|---|---|---|---|
| CRUDE OIL, LIGHT SWEET - NEW YORK MERCANTILE EXCHANGE | 067651 | CL1 | BCOMCL |
| #2 HEATING OIL- NY HARBOR-ULSD - NEW YORK MERCANTILE EXCHANGE | 022651 | HO1 | BCOMHO |
| GASOLINE BLENDSTOCK (RBOB) - NEW YORK MERCANTILE EXCHANGE | 111659 | XB1 | BCOMRB |
| NATURAL GAS - NEW YORK MERCANTILE EXCHANGE | 023651 | NG1 | BCOMNG |
| GOLD - COMMODITY EXCHANGE INC. | 088691 | GC1 | BCOMGC |
| SILVER - COMMODITY EXCHANGE INC. | 084691 | SI1 | BCOMSI |
| COPPER-GRADE #1 - COMMODITY EXCHANGE INC. | 085692 | HG1 | BCOMHG |
| CORN - CHICAGO BOARD OF TRADE | 002602 | C 1 | BCOMCN |
| SOYBEANS - CHICAGO BOARD OF TRADE | 005602 | S 1 | BCOMSY |
| SOYBEAN OIL - CHICAGO BOARD OF TRADE | 007601 | BO1 | BCOMBO |
| COTTON NO. 2 - ICE FUTURES U.S. | 033661 | CT1 | BCOMCT |
| COFFEE C - ICE FUTURES U.S. | 083731 | KC1 | BCOMKC |
| SUGAR NO. 11 - ICE FUTURES U.S. | 080732 | SB1 | BCOMSB |
| WHEAT-SRW - CHICAGO BOARD OF TRADE | 001602 | W 1 | BCOMWH |
| LIVE CATTLE - CHICAGO MERCANTILE EXCHANGE | 057642 | LC1 | BCOMLC |
| LEAN HOGS - CHICAGO MERCANTILE EXCHANGE | 054642 | LH1 | BCOMLH |
| WHEAT-HRW - CHICAGO BOARD OF TRADE | 001612 | KW1 | BCOMKW |
| SOYBEAN MEAL - CHICAGO BOARD OF TRADE | 026603 | SM1 | BCOMSM |
| PLATINUM - NEW YORK MERCANTILE EXCHANGE | 076651 | PL1 | BCOMPL |

Source: J.P. Morgan Quantitative and Derivatives Strategy, CFTC, Bloomberg

### Table 10: Currencies

| CFTC Name | CFTC ID | Futures ID | alt ID |
|---|---|---|---|
| EURO FX - CHICAGO MERCANTILE EXCHANGE | 099741 | EC1 | EURUSDCR |
| JAPANESE YEN - CHICAGO MERCANTILE EXCHANGE | 097741 | JY1 | JPYUSDCR |
| AUSTRALIAN DOLLAR - CHICAGO MERCANTILE EXCHANGE | 232741 | AD1 | AUDUSDCR |
| BRITISH POUND STERLING - CHICAGO MERCANTILE EXCHANGE | 096742 | BP1 | GBPUSDCR |
| CANADIAN DOLLAR - CHICAGO MERCANTILE EXCHANGE | 090741 | CD1 | CADUSDCR |
| SWISS FRANC - CHICAGO MERCANTILE EXCHANGE | 092741 | SF1 | CHFUSDCR |
| NEW ZEALAND DOLLAR - CHICAGO MERCANTILE EXCHANGE | 112741 | NV1 | NZDUSDCR |

Source: J.P. Morgan Quantitative and Derivatives Strategy, CFTC, Bloomberg

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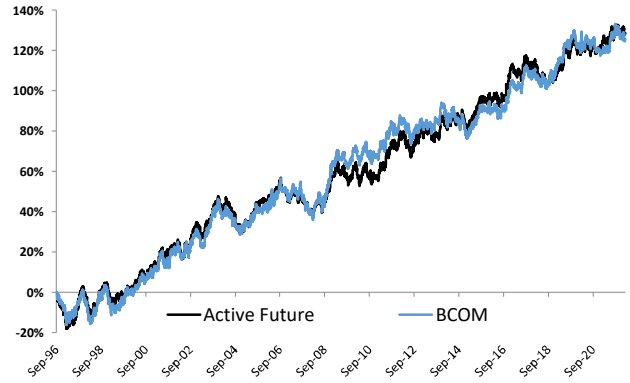
## Sensitivity with respect to instrument choice

### Figure 14: Performance Active Futures vs. BCOM Single Commodity Indices



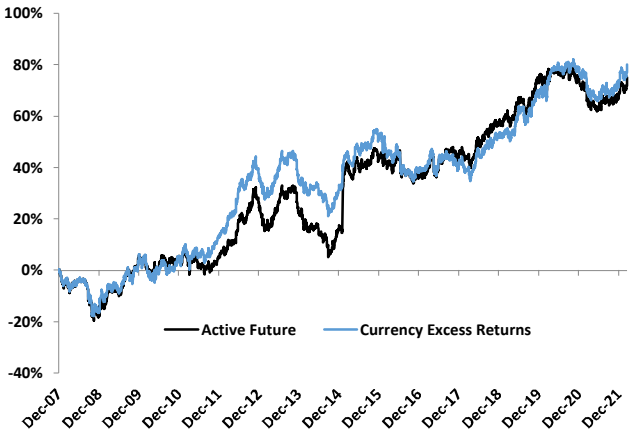

Source: J.P. Morgan Quantitative and Derivatives Strategy

### Table 11: Performance Statistics

| | Active Future | BCOM |
|---|---|---|
| start | 1996-09-17 | |
| end | 2022-02-23 | |
| Ann Return | 5.09% | 4.99% |
| Ann Volatility | 9.73% | 10.48% |
| Sharpe | 0.52 | 0.48 |
| MaxDD | 17.27% | 19.25% |
| Skewness | 0.00 | -0.02 |
| Kurtosis | 0.62 | 1.17 |

Source: J.P. Morgan Quantitative and Derivatives Strategy

### Figure 15: Performance Active Futures vs. Currency Excess Return




Source: J.P. Morgan Quantitative and Derivatives Strategy

### Table 12: Performance Statistics

| | Active Future | Currency Excess Returns |
|---|---|---|
| start | 2007-12-11 | |
| end | 2022-02-25 | |
| Ann Return | 5.28% | 5.63% |
| Ann Volatility | 11.65% | 10.98% |
| Sharpe | 0.45 | 0.51 |
| MaxDD | 24.82% | 23.04% |
| Skewness | 2.71 | 0.16 |
| Kurtosis | 67.84 | 5.95 |

Source: J.P. Morgan Quantitative and Derivatives Strategy

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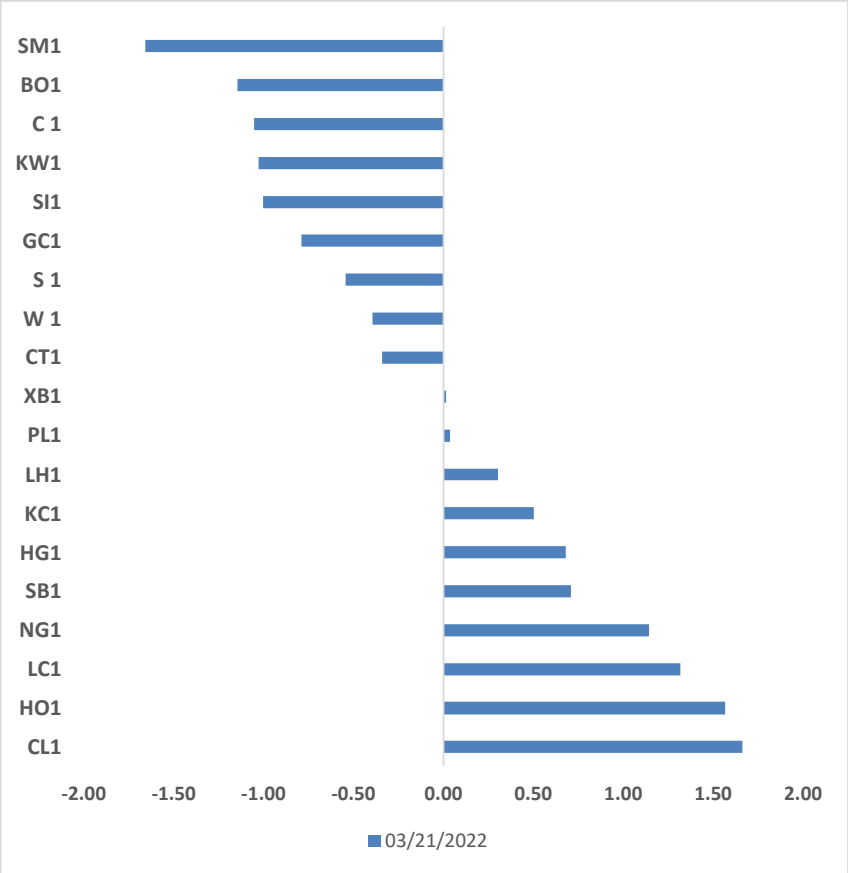
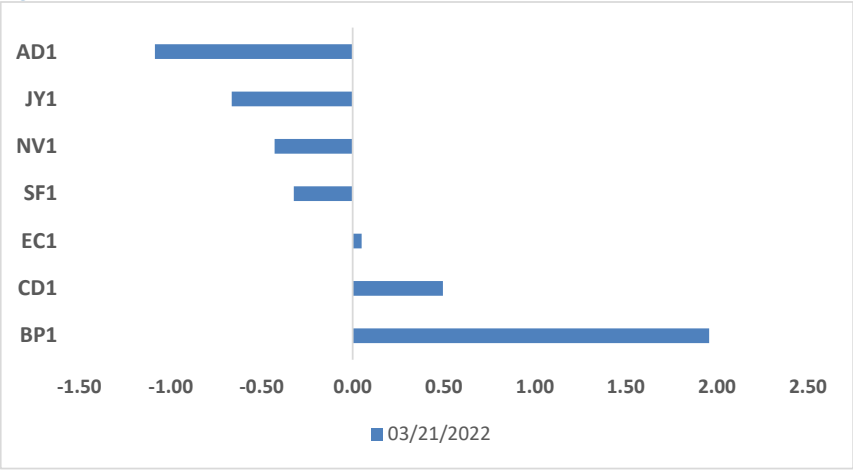
## Current Scores

Figure 16: Current VHP Scores




Source: J.P. Morgan Quantitative and Derivatives Strategy

Figure 17: Current VHP$^{TTF}$ Scores




Source: J.P. Morgan Quantitative and Derivatives Strategy

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