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Quantitative Perspectives on Cross-Asset Risk Premia

Performance review, timing systematic long rates vol, fundamental rates value and latest model views

Risk premia performance review

We analyze the performance of risk-premia strategies in March across different styles and asset classes. We also discuss the trend-following March performance jitters and elaborate why we think the long-term benefits of trend-following as a defensive strategy remain intact.

Timing systematic long rates vol

Long dated USD swaption straddles performed well last year, as rates skyrocketed and implied vol sprang back to life. They also recorded gains during the market turmoil that followed the fall of SVB last month. Looking ahead, what are the near term prospects for that trade? Using a new approach to decomposing P&L, we analyse the risk vs reward trade-off for this strategy.

Fundamental Rates Value Strategies

After using market based rates value strategies, FX-hedged yield pick-up and z-scored term spread, we developed a Fundamental Rates Value strategy that uses macro-economic fundamentals to determine the fair value of government bond yields. Our Fundamental Rates Fair Value model uses the point-in-time macro-economic database available through the JPMorgan Macrosynergy Quantamental System and a dynamic feature selection process. We show that the difference between market yields and these fundamental fair values can be used for a profitable trading strategy.

Latest views from macro, time-series and machine learning models

We also update our style-timing model with latest predictions from various quant models, and show the active tilting in our Black-Litterman portfolio.

Global Quantitative and Derivatives Strategy

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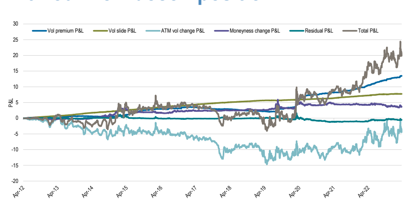
Cumulative performance trend-following system since 2020

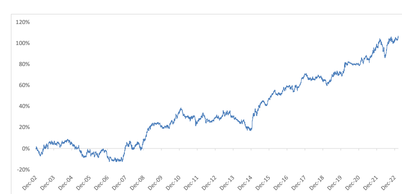
Source: J.P. Morgan Quantitative and Derivatives Strategy.

Explaining the P&L of a long 10y20y straddle with our new decomposition



Source: J.P. Morgan Quantitative and Derivativs Strategy

Cumulative performance Fundamental Rates Value Strategy



Source: J.P. Morgan Quantitative and Derivatives Strategy.

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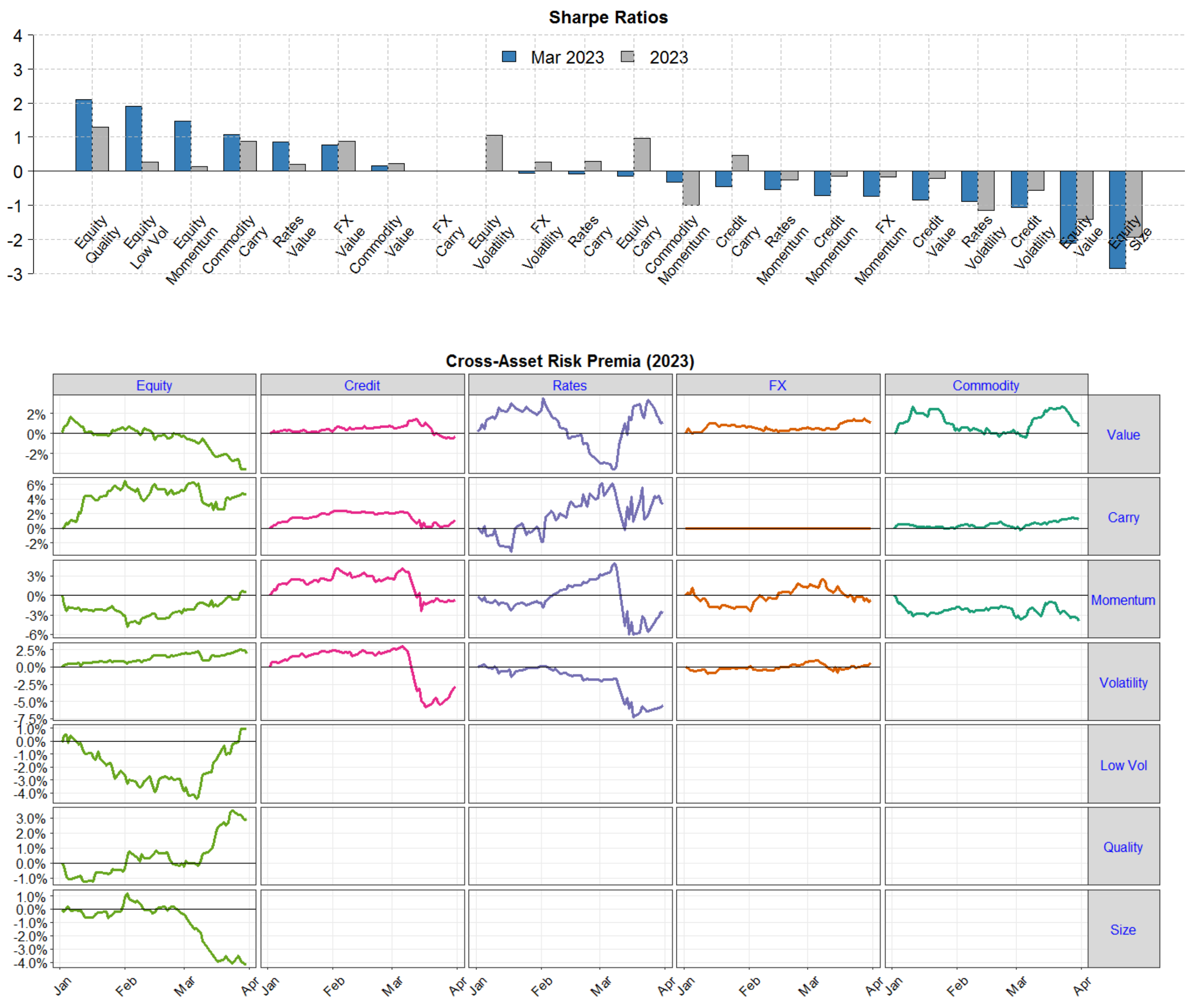
Recent Risk Premia Performance

After a exuberant January and a reversal in risk sentiment in February, events in March were dominated by jitters about the health of the banking sector. Bankruptcies of Silicon Valley Bank, Silvergate Bank and Signature Bank as well as the forced take-over of Credit Suisse by UBS triggered a large drop in government bond yields. This re-pricing in bond markets had implications on risk premia performances, with Equity Quality, Low Vol and Momentum posting strong returns, whereas Equity Size and Value suffered. Rates Momentum (Trend) also posted a negative return although not as badly as might have been expected. At the end of this section we take a closer look at the March performance of Trend strategies in more detail

Figure 1: Recent Sharpe ratios of risk premia



Source: J.P. Morgan Quantitative and Derivatives Strategy

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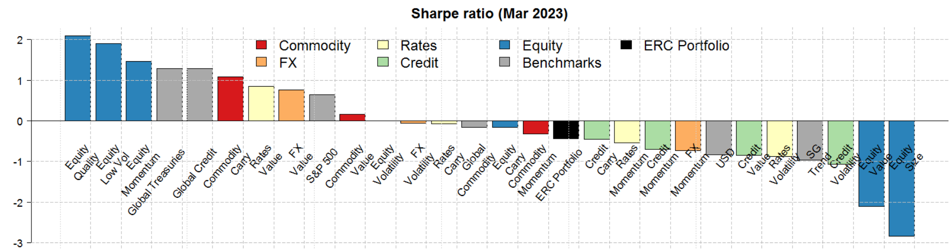
Figure 2 shows a comparison of Sharpe ratios of the Risk Premia strategies with those of the main asset classes. The ERC-portfolio of risk premia strategies was down in March.

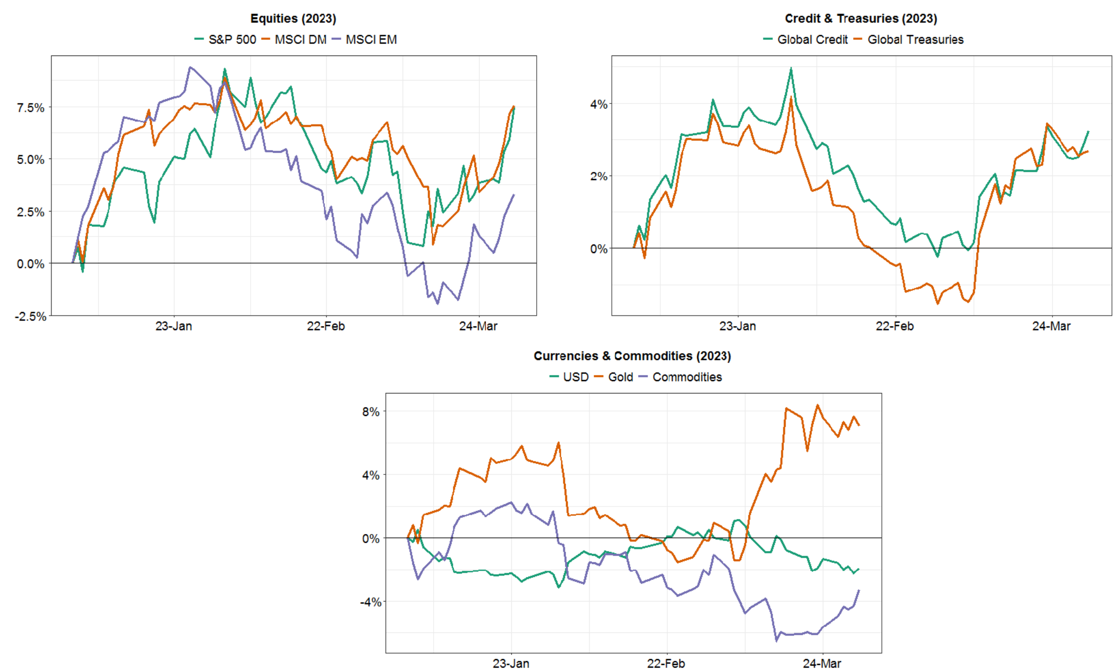
Figure 2: Recent Sharpe ratios of risk premia



Source: J.P. Morgan Quantitative and Derivatives Strategy

In Figure 3, we show the performance of markets across asset classes in 2022. Bonds performed strongly in March, with the drop in yields also supporting Equities. Gold spiked on the back of the banking turmoil.

Figure 3: Markets Performance YTD



Source: J.P. Morgan Quantitative and Derivatives Strategy

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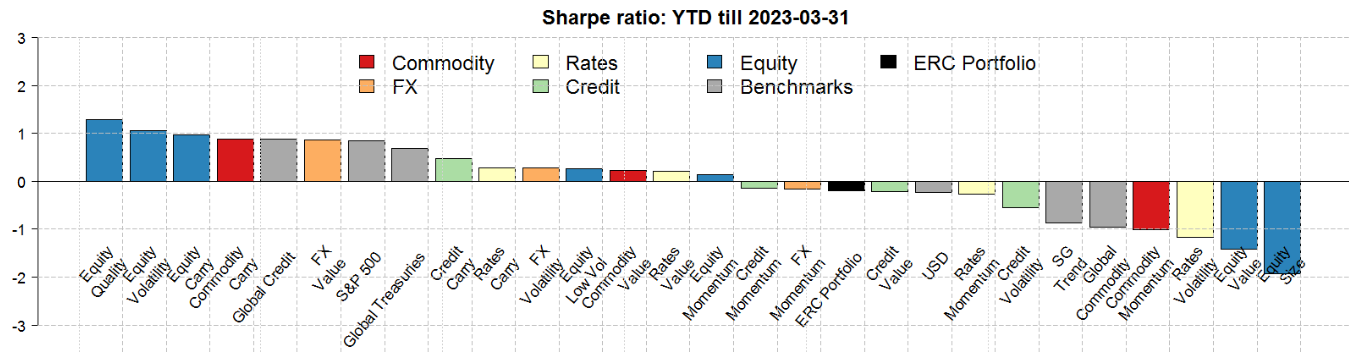
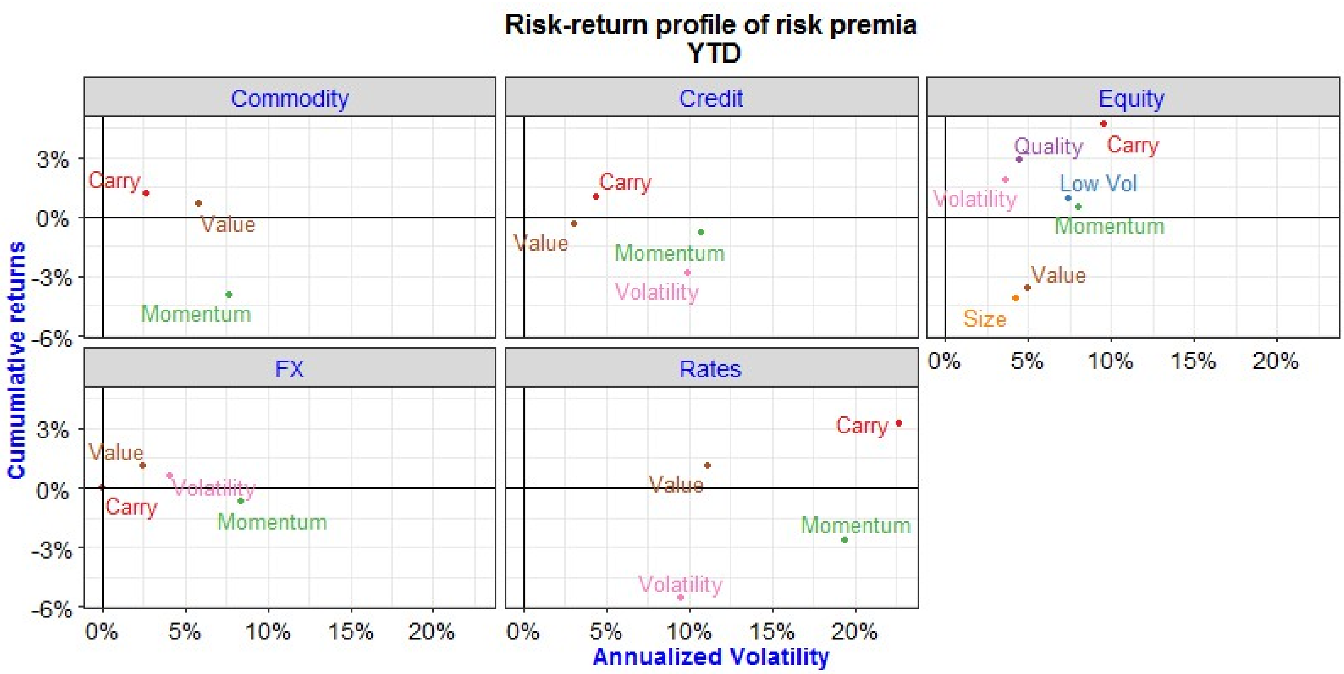
Focusing on YTD performance in Figure 4, we see that the ERC Portfolio of Risk Premia just dipped into negative territory for the year. Strong performance of Equity Quality, Volatilty and Carry is off-set by poor performance in Equity Size and Value as well as Rates Volatility.

Figure 4: YTD Sharpe ratios of risk premia versus market benchmark



Source: J.P. Morgan Quantitative and Derivatives Strategy

Figure 5: YTD risk-return scatter plot



Source: J.P. Morgan Quantitative and Derivatives Strategy

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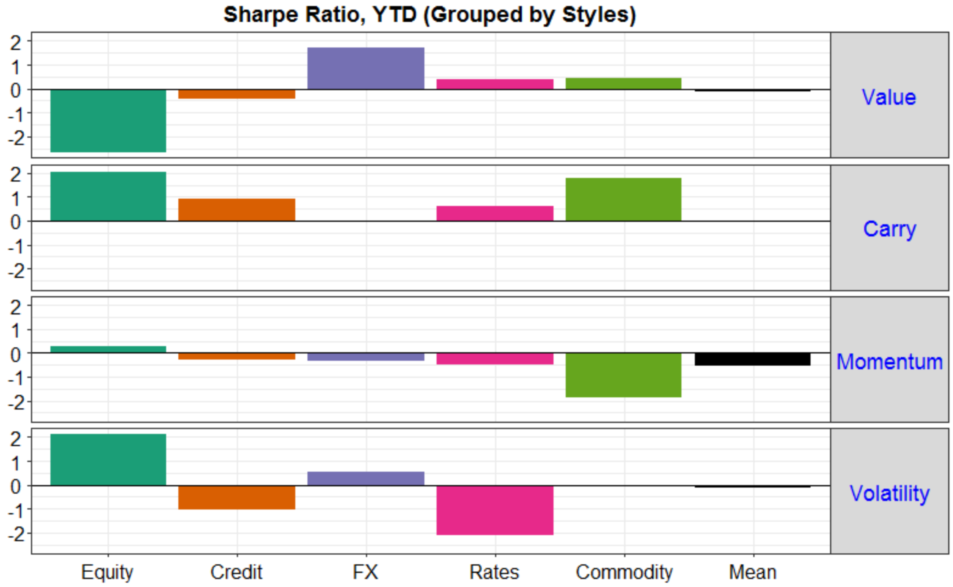
Figure 6 groups the Risk Premia strategies into styles and we compare their Sharpe ratios.

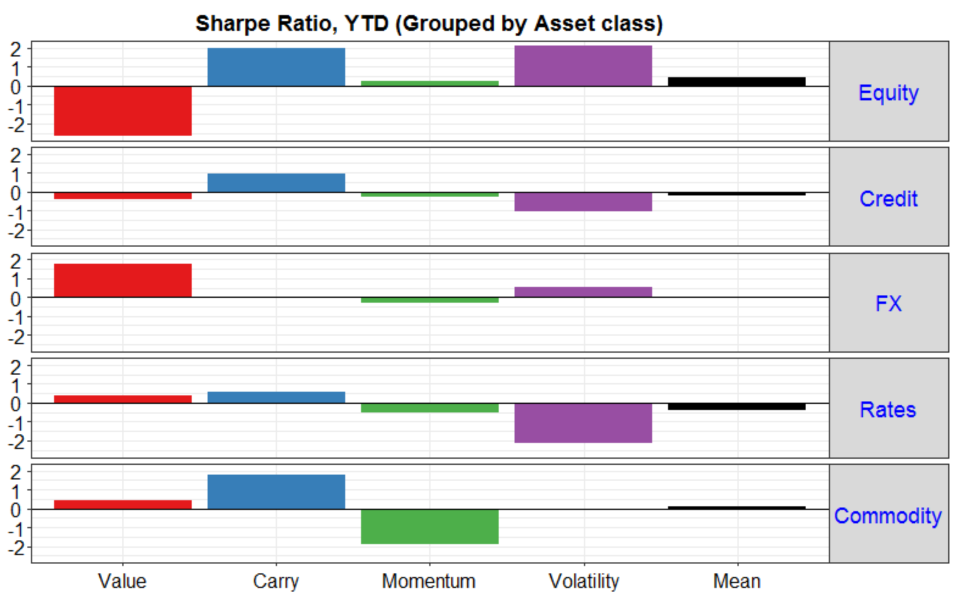
Figure 6: Risk Premia Sharpe ratios by style



Source: J.P. Morgan Quantitative and Derivatives Strategy

Figure 7 groups the Risk Premia Sharpe ratios by asset classes.

Figure 7: Risk Premia Sharpe ratios by asset class



Source: J.P. Morgan Quantitative and Derivatives Strategy

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March trend-following jitters - long-term hedging properties are intact and undoubted

Trend-following was the clear winner in risk premia space during 2022 and as a matter of fact was one of the very few investments that produced positive returns in what proved to be a difficult year. We have already discussed the strong performance of trend-following in our publication on trend-following revival and we rightly pointed out the advantages of the rates trend-following systems at the start of the FED hiking cycle in Rising Rates and the 60/40 and in tailored systematic strategies for rates-up protection.

The abrupt reversal of the previous bearish fixed income trends in early March (that also coincided with falling equity markets) naturally propagated to the trend-following performance and a few eyebrows were raised with a bit scepticism towards the "crisis alpha" and long "volatility" elements of the tend-following systems. Our research-based cross-asset trend-following system lost ~6% in March with losses mainly concentrated in fixed-income trend-following system (approx.-8% in March).

Figure 8: Cumulative performance trend-following system since 2020

Source: J.P. Morgan Quantitative and Derivatives Strategy.

Table 1: Performance statistics

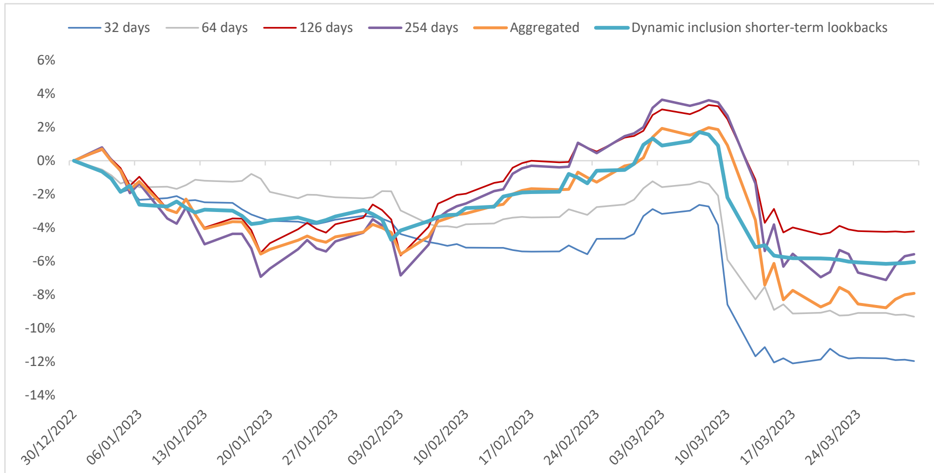
	Jan'20-Mar'23	Jan'20-Dec'22	Jan'23-Mar'23
Annualized Return	10.80%	13.65%	-23.99%
Annualized Volatility	12.27%	12.46%	9.34%
Sharpe Ratio	0.88	1.09	-2.57
Drawdown	15.45%	11.18%	7.53%

Source: J.P. Morgan Quantitative and Derivatives Strategy.

Below we elaborate on some misconceptions about trend-following and its role as a defensive strategy.

First, there is no magic systematic signal rooted in momentum that can capture reversals. Reversals are captured by mean-reversion strategies as discussed in Defensive Risk Premia but such strategies will stumble when trends are strong. As shown in the graph below it has not been a question of using a fast or slow signal. Even the approach that dynamically includes faster signals based on transactions costs and volatility as inputs would have stumbled (please see p.30-34 in Designing robust trend-following system) .

Figure 9: Cumulative performance of the fixed income trend-following system different look-back periods



Source: J.P. Morgan Quantitative and Derivatives Strategy.

Second, by design trend-following is long trends. Bearish trends in risky markets are inherently associated with higher volatility and trend-following usually delivers strongly in such environments - hence the natural association between trends and higher volatility. But it shall be clarified that the profits of the trend-following system arise due to the stronger trends, not due to the higher volatility -especially if the trend-following system is properly risk managed- even if the two go hand-in-hand on occasions. Stronger and more persistent trends entail more profitable trend-following system and generate the convexity of the system (please see p.7-9 in Designing robust trend-following system).

Third, there also seems to be misapprehension about the profit generation mechanism of fixed income trend-following . The fixed income futures already incorporate the market expectations about the future rates. So in case rates consistently realize above (the market underestinated the rates level) or below (the market underestimated the rates level) the trend-following system will be profitable. If rates realize as expected (even if they are going up or going down), there will be no profit opportunities for trend-following. It is the surprise element that creates the profit opportunity and this surprise element shall persevere in the same direction at least for some time.

Last but not the least, as it has already been discussed on several occasions trend-following allocations shall be strategic ones (especially during high uncertainty periods) and they are very difficult to time. The table below shows the largest 1 year (non-overlapping) profits of our trend-following system (x-axis) and the subsequent returns in 3 months, 6 months and 1 year (y-axis). As evident by the scatter plots below there is no strong case for reversal in trend-following fortunes after a good run.

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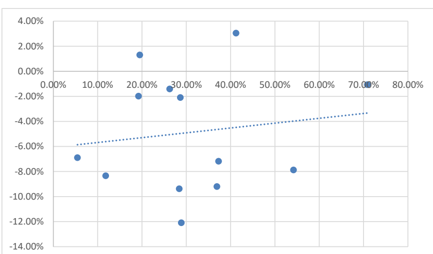
Table 2: Biggest 1Y trend-following returns and subsequent returns

	Max 1Y	Next 3m	Next 6m	Next 1Y
10/03/2003	70.9%	-1.1%	-8.9%	10.9%
13/04/2015	54.2%	-7.9%	-9.0%	-5.9%
22/01/1997	41.2%	3.1%	1.5%	10.0%
27/12/1993	37.3%	-7.2%	-8.5%	-12.1%
27/09/2022	**36.9%**	**-9.2%**	**-14.3%**	
26/01/2018	28.9%	-12.1%	-12.4%	-17.5%
05/10/1998	28.7%	-2.1%	-8.4%	-9.2%
22/03/2001	28.4%	-9.4%	0.3%	-9.5%
14/03/2008	26.2%	-1.4%	-6.5%	11.5%
24/02/2021	19.5%	1.3%	-0.5%	2.6%
18/02/2011	19.2%	-2.0%	2.7%	0.5%
11/05/2006	11.8%	-8.3%	-7.2%	-5.0%
17/05/2013	5.4%	-6.9%	-7.4%	-8.0%
Average	31.4%	-4.9%	-6.0%	-2.6%

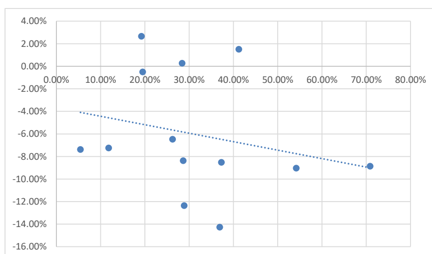
Source: J.P. Morgan Quantitative and Derivatives Strategy.

Figure 10: Max 1Y return vs 3M follow-up return



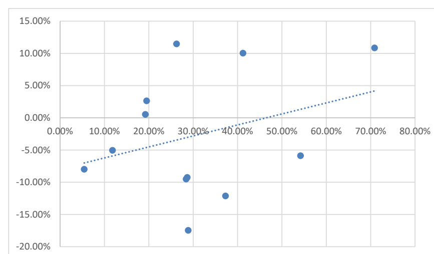
Source: J.P. Morgan Quantitative and Derivatives Strategy.

Figure 11: Max 1Y return vs 6M follow-up return



Source: J.P. Morgan Quantitative and Derivatives Strategy.

Figure 12: Max 1Y return vs 1Y follow-up return



Source: J.P. Morgan Quantitative and Derivatives Strategy.

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Timing systematic long rates vol: a quantitative take

Long dated rates vol did well as an asset class lasts year, as rates skyrocketed and rates volatility came back to life. Can it do as well this year?

Rewriting P&L for interest rates swaption

In our February monthly, we applied a newly developed P&L attribution method to swaptions. This approach was initially introduced by Daviaud et al. in Risk , and further developed in How close to realised should implied vol trade?

Its objective is to overcome some of the limitations of the classical, Greeks-centric approach to option P&L decomposition, and in particular to produce an explicit link between an option's total P&L and the difference between implied vol at inception and realised through the life of the option.

The classical approach splits P&L across local Greeks and add them up across time. It is therefore local by nature. By contrast, our new approach can be thought of as a global way to understand P&L. In particular, it is well equipped to characterize and measure the so-called path-dependant component of the option's P&L, or in other words the fraction of P&L which is not linked to the total amount of realised volatility.

This framework is especially well suited to study the performance of option-based systematic strategies, as it allows us measure the trade off between the various P&L drivers at play, and because it is capable of detecting significant P&L contributions which may go unnoticed when using the classical approach.

Our case study: long USD 10y20y straddles

In what follows, we apply this methodology to a strategy which goes long USD 10y20y straddles. Each straddle is delta-hedged daily using Bachelier delta and live implied vol. It is held for a year, at which point it is unwound and rolled into a new ATM 10y20y straddle. At inception, a straddle is bought every week, in a size inversely proportional to implied vol and to the PV01 of the underlying, to keep a fairly constant level of risk.

For simplicity's sake, all results are shown at mid.

When we introduced it for rates swaption on p27 of our February monthly, the new P&L attribution formula contained five blocks:

- **A volatility premium term.** That term is proportional to the vol premium, defined as the difference between realised vol during the life of the option and implied vol at inception. This measures the impact of *how much* vol realised.
- A **Vega term**, which is much simpler than in the classical decomposition. Here it is proportional to the total change of implied vol since inception, and to the unwind vega (i.e. to vega evaluated at the time when we observe cumulated P&L).
- A so-called **gamma covariance term**, which measures the impact of *where* vol realised. As explained in How close to realised should implied vol trade? that term is analogous to the classical decomposition's vanna and volga terms. It is the main measure of the path-dependant effects.

- Two other terms, which we call the **dGamma** and **residual drift terms**.

In Figure 13 below, we have

- Lumped the dGamma, residual drift, and gamma covariance terms into a Residual P&L term. We have also added a fourth term, which measures the P&L impact of the covariance between the underlying's PV01 and the swaption's P&L. For simplicity's sake in our February monthly we assumed that that term was negligible.
- Split the vega term into three terms. The total change of implied vol since inception can be written as a sum of : the change of ATM vol as the option ages; the change of (fixed maturity) implied vol as the forward moves away from the option strike; and the change in ATM implied vol. Since the Vega term introduced above is proportional to the change in implied vol, this split immediately becomes a P&L split.

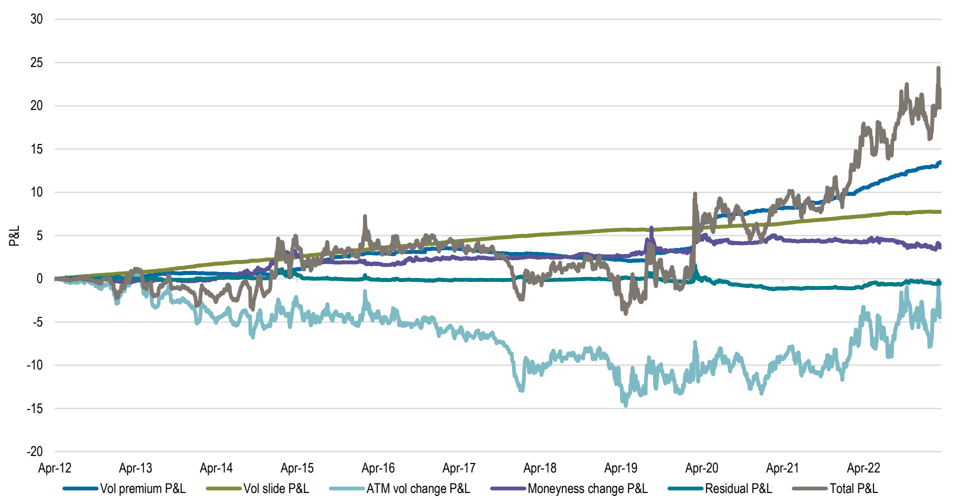
Long dated USD straddles: a robust way to gain exposure to implied vol, and to outperform it.

There a few immediate take aways from this chart:

- Buying long dated 10y20y USD straddles is a robust way to gain exposure to USD 10y20y ATM implied vol, while outperforming it.
- USD 10y20y straddles benefit from two strong sources of upward drift, or carry: the vol slide, as the vol curve for long dated expiry and tenors is inverted; and the vol premium, which is negative for these same tenors.
- The P&L impact from the change of moneyness has also helped the strategy historically, but in a less predictable manner than the vol slide and vol premium.

Figure 13: Explaining the P&L of a long 10y20y straddle with our new decomposition.

P&L is no longer described in terms of local Greeks, but instead in terms of global macro features.



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

A straightforward relationship between vol parameters and vol P&L

Unlike the classical P&L decomposition, our new decomposition provides an explicit link between the macro variables that drive the P&L, and the P&L itself. In particular,

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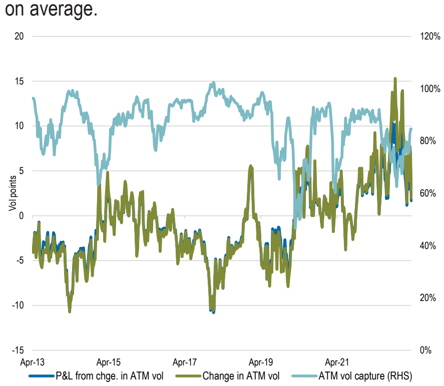
the link between the change in implied vol and the assciated P&L is straightforward: the latter is roughly equal to the former multiplied by the trade's vega at the time of observation. Figure 14and Figure 15 below illustrate this. For all the options involved in the backtest above, they show the change in implied vol and the corresponding P&L at the end of each (1Y) holding period. Each straddle is scaled so as to have unit vega and underlying PV01. As a result, all P&L figures can be read in vol points. In both figures, the cyan lines shows the ratio of the P&L and implied vol change. That value oscillates around 0.85, the average vega after 1y.

As explained in our February monthly, one would expect the corresponding ratio for the vol premium to oscillate around 1, once we scale the vol premium by the pro rata of the holding period as a function of the option's maturity. In Figure 16 below that ratio averages 1.07 over the past 10 years.

Figure 14: P&L - ATM vol

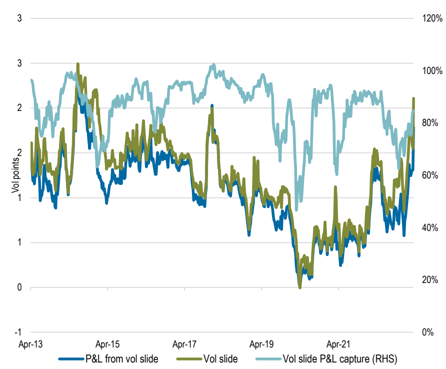
1bp change in ATM vol translates into 0.85bps of P&L, on average.



Source: J.P. Morgan Quant. and Deriv. Strategy

Figure 15: P&L - Vol slide

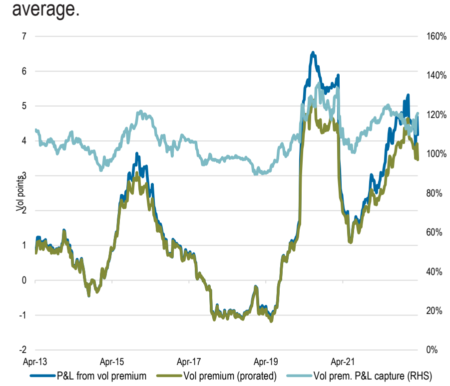
The same applies to the vol slide.



Source: J.P. Morgan Quant. and Deriv. Strategy

Figure 16: P&L - Vol premium

1bp of vol premium generates 1.07bp of P&L, on average.



Source: J.P. Morgan Quant. and Deriv. Strategy

10y20y straddles exhibit hardly any skew or smile P&L

Figure 13 shows that the four remaining components of the P&L add up to not much (the Residual P&L line). Figure 17 shows how each of these four contributors perform.

The main takeaway is that the gamma covariance term, which captures the P&L impact of the correlation between the underlying swap rate and the instantaneous realised volatility, does not contribute much. Note that this was not obvious ex-ante: that term was the largest contributor when we carried out a similar analysis for SPX straddles, and it also contributed very significantly to the performance of foreign exchange straddles. The fact that we are dealing with a very long dated option here might explain the absence of any significant skew or smile term.

Another difference with similar analyses undertaken with other asset classes is that the Residual drift P&L here isn't negligible. Upon inspection, the main driver is the ratio of vega by implied vol, multiplied by the quadratic variations in implied vol. This is anecdotal, but worth flagging nonetheless as this term does not appear in the classical P&L decomposition, and because it contributes to the option carry.

Lastly, the annuity can generate significant noise at time through its correlation with the (non-annuity part of the) swaption P&L , but cumulatively its effect is comparatively small.

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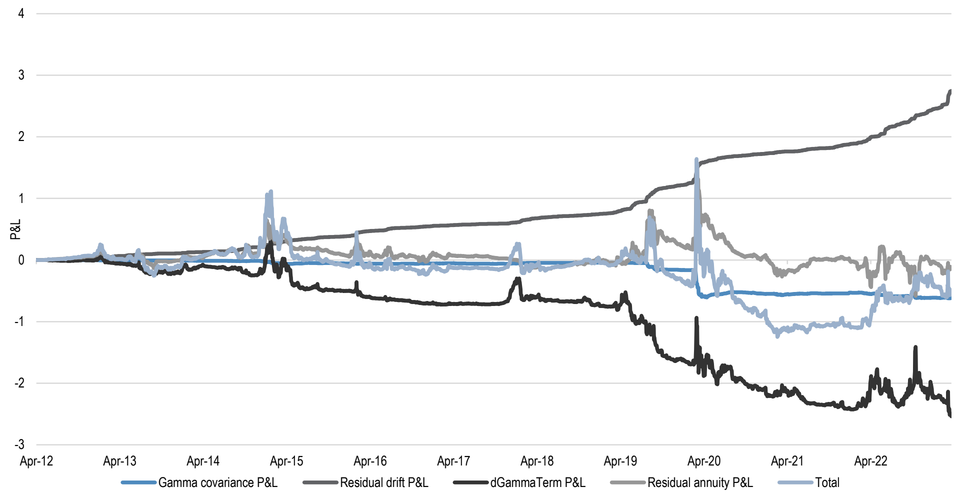
Figure 17: Four other sources of P&L, which have largely offset each other over the past decade.

The gamma covariance effect, which captures the impact of where vol realised, does not appear to play a big role here.



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

A quant take on timing

Now that we have a detailed understanding of the P&L and its drivers, can we try to form a view on future performance?

A strong carry-to-risk ratio

As we saw on Figure 13 one of the most consistent engine drivers for 10y20y straddles has been the vol premium and the vol slide. And as Figure 15 and Figure 16 explain, each vol point of these vol differentials generate \$0.85 and \$0.1 of P&L on average, for a 10y20y straddle in \$1 vega held for one year. Multiplying the historical vol premium and vol slide by these two coefficients gives us a measure of the historical carry, as illustrated in Figure 18below. The total carry from these two sources is \$2.4 on average over the past 10 years. By contrast, USD 10y20y ATM vol has averaged a (normal) volatility of 7.1 points over the same period. To turn that number into a P&L, we need to multiply it by the average vega exposure during the holding period. If vega at inception is \$1, and the average vega after 1y is \$0.85, the average vega through the life of the trade is probably somewhere in the middle, so \$0.925. Multiplying that by the 7.1 vol of vol gives us \$6.6.

So all in all, over the past decade the trade would have paid us \$2.2 a year on average to be exposed to \$6.6 worth of yearly volatility. This is a strong result, especially since this trade has negative beta to risk: unlike most carry trades, it tends to make money when risk aversion rises.

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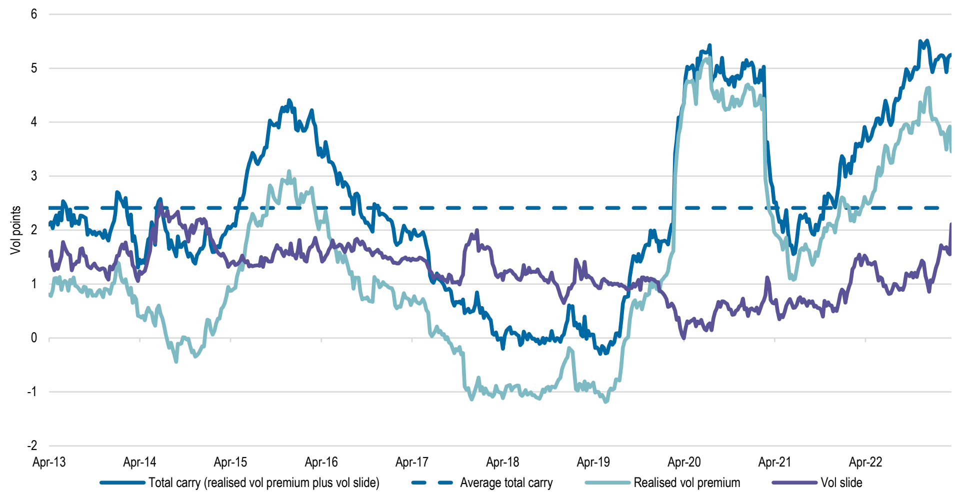
Figure 18: Our P&L decomposition method allows us to calculate total carry for the trade.



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

Vol should realise above today's implied, if history is any guide.

Judging from last decade, the trade's volatility premium is likely to remain positive for the foreseeable future. Figure 19 shows the rolling 1y realised volatility over the past decade, versus today's implied 10y20y vol (66bps). On an absolute basis, realised vol only crossed that level during a period of two years or so, around 2018 and 19. And when it did it took approximately 16 months for realised vol to get there, after it reached a peak of 94bps around Jan 2016.

Recent market data do not point in the direction of a crash in realised vol either: 10y20y vol has realised around 80bps over the past 3m, and 85bps over the past month. The swaption market does not anticipate that the realised vol of 10y20y should come down fast either: the implied vol for a 1y straddle on a 9y20y swap should trade in the vicinity of 79bps at the time of writing.

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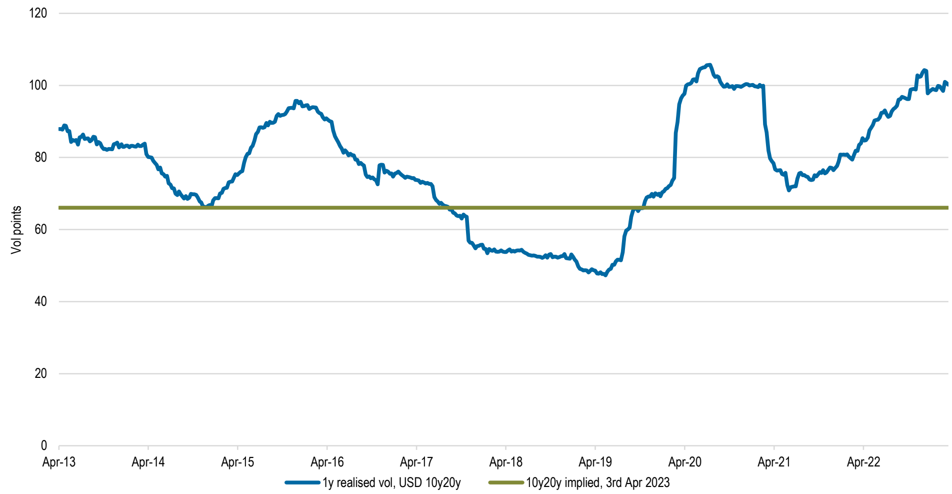
Figure 19: Rolling 1y realised vol, versus today's 10y20y implied

Over the past 10 years, 1y vol realised below today's implied during a 2y period only.

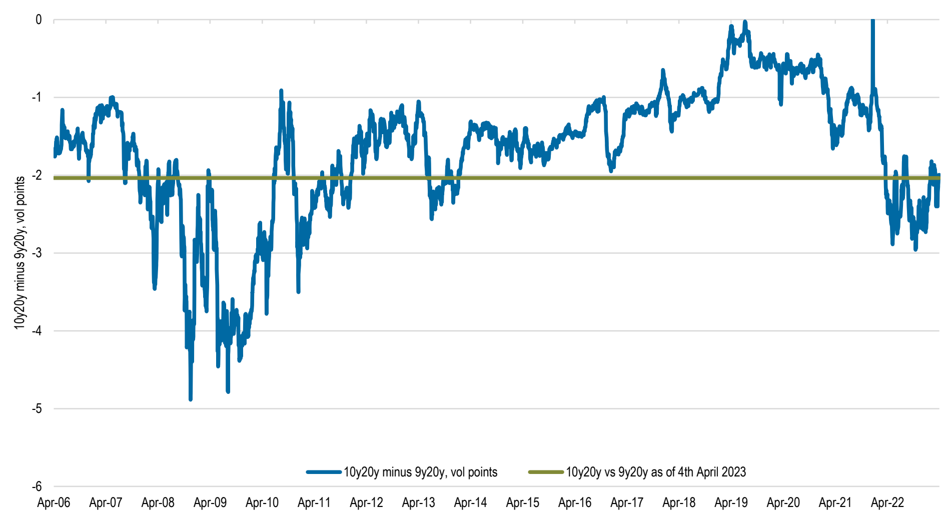


Source: J.P. Morgan Quantitative and Derivatives Strategy,

And the term structure of implied vol is significantly inverted.

As we explained in our November 2022 monthly, the term structure of ATM vol is inverted for long dated expiry and tenors. This is the source of the positive vol slide in Figure 13 . The stronger the inversion between 10y20y and 9y20y, the higher the vol slide. As of today, that inversion stands at -2bps approximately. As Figure 20 illustrates, that level is on the low end (14% percentile) of what we have witnessed over the past ten years.

Figure 20: Historical term structure slope (ATM implied vol, 10y20y minus 9y20y)



Source: J.P. Morgan Quantitative and Derivatives Strategy.

What about ATM implied vol?

The evidence above points towards resilient carry P&L in the near term. What about the other main performance driver for the strategy, namely the level of ATM implied vol?

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As our USD Rates Strategy colleagues point out in a recent report, the correlation between rates and implied vol has recently turned negative. And negative correlation is predominant during periods of Fed easing. This mechanism should be supportive for vol in the medium term, as the Fed's tightening cycle comes to an end.

Consistent with this, our USD Rates Strategy colleagues initiated a bullish Vega exposure in the 10y10y sector on March 17th, with the additional rationale that the trade stands to benefit from the similarities between the current environment and the aftermath of the GFC.

Conclusion

- Our new method provides a comprehensive and intuitive description of the performance of a typical long rates vol strategy.
- The **vol premium**, the **vol slide** and the **change in ATM vol** are the main P&L drivers for this trade.
- **Path-dependant effects** (i.e. the P&L impact of *where* vol realises) **do not play much of a role here**. This is radically different from what we observed for straddles in equity and FX, and is probably due to the long dated nature of the swaption under study.
- Because it provides an explicit link between the P&L drivers and the P&L itself, our new method makes it easier to assess the trade's risk-reward profile.
- If we think of a 10y20y swaption straddle as a carry trade whose downside risk is tied to 10y20y implied vol, and if we take the point of view of the systematic investor, then the current environment is favourable to this trade:
    - **Carry P&L should be resilient near term**, both from the vol premium and from the vol slide.
    - And **implied vol should be well supported** in the upcoming phase of monetary easing, as pointed out by JPM Rates Strategists.
- On the downside, investors remain exposed to a sharp drop in 10y20y implied drop, which we cannot rule out. But as laid out above, we think that the current risk vs reward balance is favourable to this trade , especially in the context of a systematic strategy.

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Fundamental Rates Value Strategies

Value strategies in Interest Rate space aim to exploit deviations of market yields from their fair value. Determining fair value yield levels typically depends on the use of market data of related instruments. We have recently, for example, written about the use of FX-hedged yield pick-up and the z-scored term-spread as anchors for 10 year Government Bond yields and shown that both these market-based factors can successfully be used as signal to run Value strategies in Interest Rate space.

While these market based metrics are clearly good indicators of value, there should also be a link between macro-economic fundamentals and market yields. Items like GDP growth, unemployment, government finances have a clear intuitive appeal when it comes to drivers of government bond yields. We face two main problems, though, in using macro-economic variables in a rates fair value model. The first issue is that often macro-economic variables are restated and therefore typical macro-economic time-series aren't a reliable representation of the state of affairs of variables at each point in time. The second issue is that while macro-economic variables can be important to yield levels, the importance of individual variables may vary considerably over time: sometimes the unemployment matters greatly but at other points in time it may be much less of an influence.

JPMaQS stands for J.P. Morgan Macrosynergy Quantamental System. It is a service that makes it easy to use quantitative-fundamental ("quantamental") information for trading, be it algorithmic strategies and discretionary trader support. It allows quick and cost-efficient backtesting. Historically, quantamental information has come in formats that are too messy to trade on. Publication time stamps have been disregarded and forgotten, history has been compromised by revisions, models are being applied with hindsight, and data records suffer from countless missing observations, value errors, undocumented distortions, and structural breaks. All this explains why most trading programs prefer market data. JPMaQS strives to clean up this mess for the benefit of all market participants.

In Fundamental Rates Value Strategies, we present an approach to using macro-economic fundamentals that addresses both issues. To get around the first issue we will be using the macro-economic data from the J.P. Morgan Macrosynergy Quantamental System (JPMaQS). JPMaQS offers a unique point-in-time database of macro-economic variables, The point-in-time nature enables us to avoid problems with respect to re-stated data. With respect to the issue of time-varying importance of macro-economic variables, we have chosen to use dynamic variable (or feature) selection. This 'dynamic feature selection' addresses the time-varying nature of macro-economic drivers of government bond yields.

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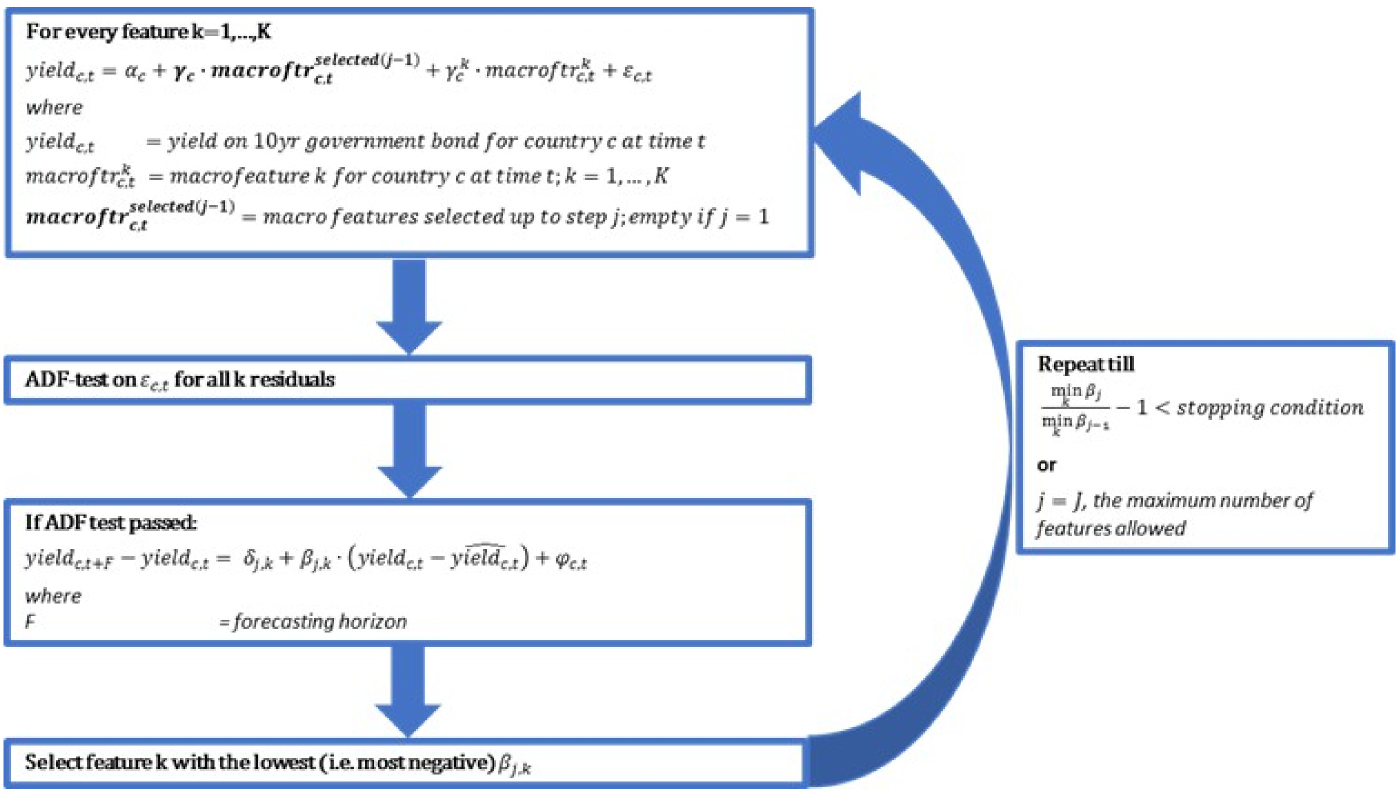
Set-up

The approach shares common features and augments the iterative feature selection algorithm presented in [oil replication systematic strategies.](#)

We use an iterative process to select the features in our fair value model over three year rolling windows. Since our objective is to profit from reversal of the market yields back to their fundamental value, we select the features based on how well the residuals of the fair value model predict the future changes in yields in-sample by calculating a 'reversal coefficient'. Since both yields and the macro-economic features are potentially non-stationary, we apply the Augmented Dickey-Fuller test to the residuals before calculating that 'reversal coefficient'. We continue to add features until the reversal coefficient exhibits insufficient marginal improvement or when we get to three features.

The flow chart of the feature selection process is shown in Figure 21.

Figure 21: Flow chart feature selection



The selected features will be used for the next year to generate (deviations from) fair value. We move the selection window forward one year and repeat the process.

The candidate list is comprised of 142 features for 6 countries -US, Canada, UK, Germany, Japan and Australia from JPMaQS. The features are from 4 different groups: Financial Conditions, Macroeconomic Balance Sheets, Macroeconomic Trends and Shocks & Risk Measures. The latter contains mainly market-based, yet still fundamental, features. Financial Conditions is formed of features that generally combine economic statistics with market data. Macroeconomic Balance Sheets and Macro-Economic Trends, finally, are in general the groups that rely most heavily on economic statistics. While the classification is useful to grasp the background to each feature, we will allow the features to be selected irrespective of which group the feature is from.

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This means that it is possible that we have more than one feature from a specific group in our model. The data starts in 2000, which means that with a 3 year look-back period for the feature selection, the first year for testing the fair value strategy is 2003.

Empirical Results

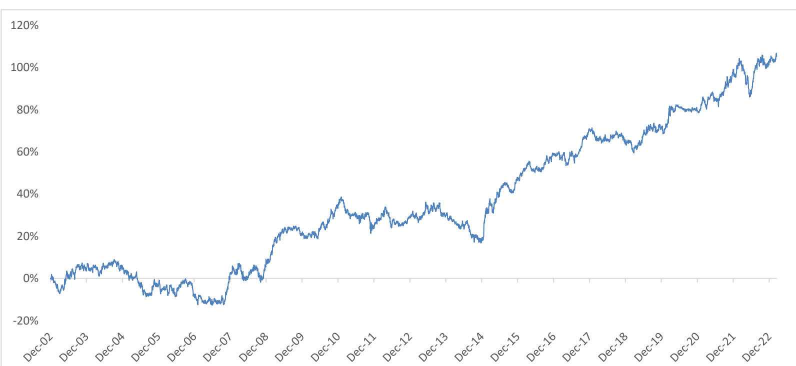
Selected features

While the complete list of the selected features can be found in the research note, here it suffices to note that the selected features are dominated by the groups 'Financial Conditions' and 'Macroeconomic Trends'. No features from 'Shocks & Risk Measures' are selected; features from 'Macroeconomic balancesheets' only show up 5 times out of a possible 21 x 3 = 63 slots. For the selection samples 2009-2011 and 2012-2014 the process can't find any features satisfying the ADF-test. For both these samples, we therefore carry over the previous samples' features. As for individual features: 'Real IRS Yield 5' year and 'External Merchandise Trade' are are selected most frequently.

Trading the Deviation from Fundamental Fair Value

Using the selected features, we estimate the fair value yields and calculate the deviation of the market yields from these fair values. Question is whether we can use this deviation from fundamental fair value (DFFV) as signal for a Rates Value strategy. In order to test the merits of DFFV as an investment strategy, we take the DFFV signal, and optimize the portfolio such that it has maximum exposure to the DFFV signal while the ex-ante portfolio volatility is maximum 10%. The portfolio is delta-neutral at rebalance and neutral to the beta on the 10yr US Treasury Future. The DFFV signal is lagged by 2 days to represent conditions we would face in reality. Finally, the portfolio is rebalanced weekly and all results are net of transaction and running costs. Figure 22 and Table 3 show the results of the DFV strategy:

Figure 22: Cumulative performance of DFFV-strategy



Source: J.P. Morgan Quantitative and Derivatives Strategy.

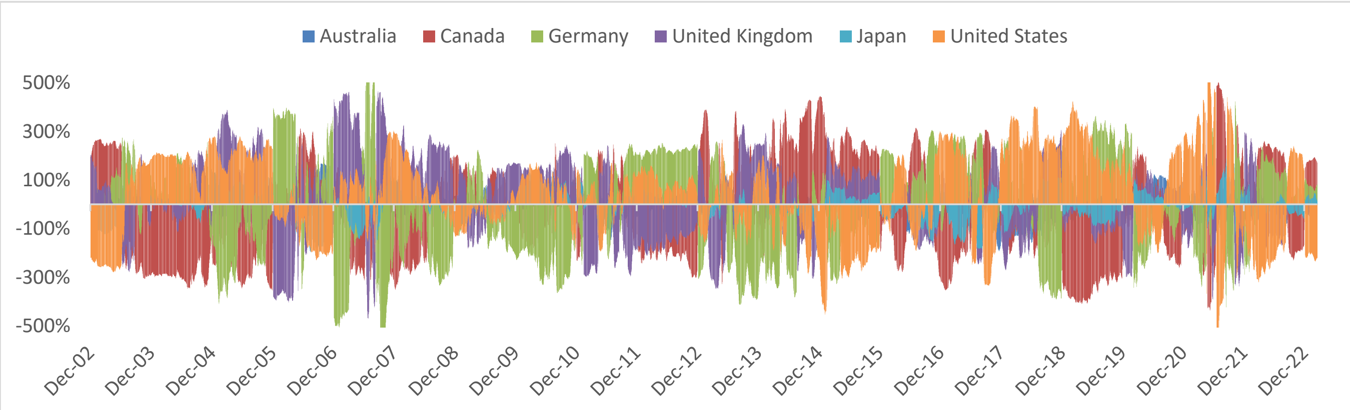
Table 3: Performance statistics

	H1	H2	Full
sdate	2003-01-01	2013-02-08	2003-01-01
edate	2013-02-06	2023-03-17	2023-03-17
ann avg ret	2.97%	7.53%	5.21%
ann std	10.39%	10.56%	10.48%
sharpe	0.29	0.71	0.50
maxdd	20.4%	18.2%	21.2%
skew	0.05	0.07	0.06
kurt	1.53	2.26	1.90

Source: J.P. Morgan Quantitative and Derivatives Strategy.

The DFFV-strategy generates a Sharpe ratio of 0.50, which on a narrow universe and using a signal that mainly relies on slow moving inputs is very respectable. Admittedly, the performance is generated somewhat unevenly, with the Sharpe ratio in the second half of the sample above that of the first half. Besides the top line performance, it is also of interest how the strategy generates its returns. Obviously, we would like a dynamic holdings pattern so we are not dependent on structural long or short positions in individual markets. The nominal weights in Figure 23 shows there are no structural biases:

Figure 23: Nominal weights DFFV-strategy

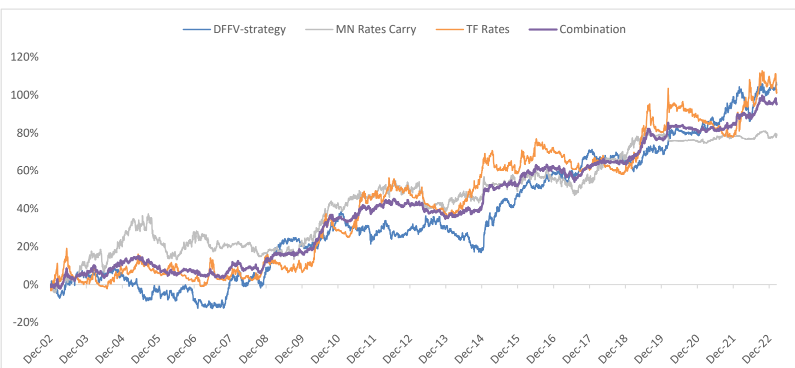


Source: J.P. Morgan Quantitative and Derivatives Strategy.

Interaction with other Rates Risk premia strategies

In this final section we will present the interaction of the DFFV strategy with two other well-known rates risk premia: Market-Neutral Rates Carry and Trend-Following in Rates[1] .

Figure 24: Cumulative performance rates risk premia strategies



Source: J.P. Morgan Quantitative and Derivatives Strategy.

Table 4: Performance statistics

	DFFV-strategy	MN Rates Carry	TF Rates	Combi-nation
sdate	2003-01-01			
edate	2023-03-17			
ann avg ret	5.21%	3.89%	5.02%	4.71%
ann std	10.48%	10.18%	10.68%	6.20%
sharpe	0.50	0.38	0.47	0.76
maxdd	21.2%	22.9%	23.1%	11.3%
skew	0.06	-0.02	-0.35	-0.10
kurt	1.90	4.00	6.42	2.50
correlations				
MN Rates Carry	-0.6%			
TF Rates	-2.4%	11.9%		

Source: J.P. Morgan Quantitative and Derivatives Strategy.

Besides the performance characteristics of the individual strategies, the low correlation of these Rates Risk Premia is noteworthy. The highest correlation is between Market-Neutral Rates Carry and Trend-Following in Rates but this is a still very low 12%. The correlation of the DFFV-strategy with both Market-Neutral Rates Carry and Trend-Following in Rates is 0% for practical purposes, underscoring the potential of the DFFV-strategy in a portfolio of (Rates) Risk Premia.

1. In a future note we will look to build a diversified rates values multi-strategy with this DFFV-strategy, FX-hedged yield pick up and z-scored term-spread. The low correlations between these components (highest correlation among these three is 22%) is promising for the combination.

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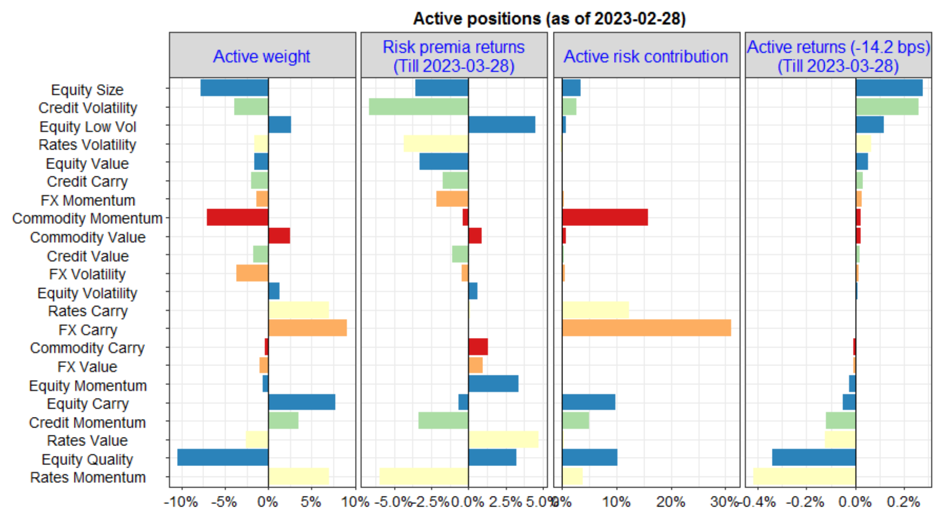
Reviewing the Risk Premia portfolio

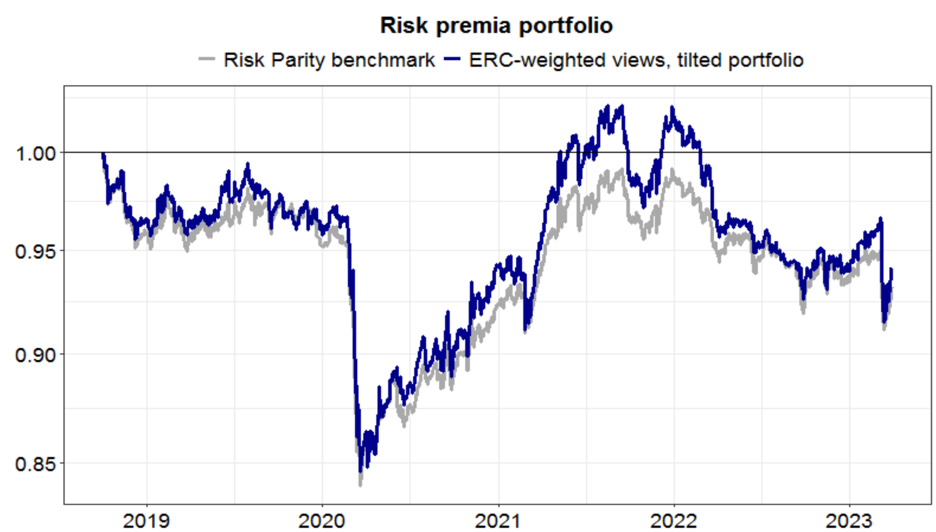
In A Quantitative Framework for Cross-asset Style Timing, we developed a tilting mechanism to tactically time the exposures of risk premia. In Figure 25, we compare the tilted portfolio (based on weighted views from different models) with the erc benchmark. The underweights in Equity Size, Credit Volatility and overweight in Equity Low Vol contributed positively to the active return in March. Overweights in Rates Momentum and underweights in Equity Quality and Rates Value detracted.

Figure 25: Reviewing the tilted risk premia portfolio



Source: J.P. Morgan Quantitative and Derivatives Strategy

Figure 26: Performance of the cross-asset risk premia portfolio



Source: J.P. Morgan Quantitative and Derivatives Strategy

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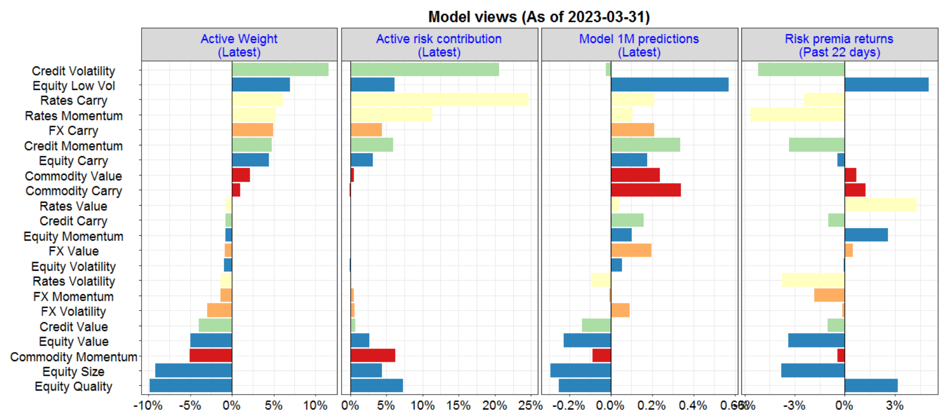
Latest Model Views

In A Quantitative Framework for Cross-asset Style Timing, we introduced an approach to construct views from a large set of models (macro-regime, time-series, Machine Learning), and implemented such views to tilt a cross-asset risk premia portfolio relative to the risk parity benchmark. Figure 27 shows the latest active weights, active risks and model predictions.

Figure 27: Latest active positions relative to risk parity



Source: J.P. Morgan Quantitative and Derivatives Strategy

Figure 28 shows the details of the model predictions (i.e. aggregated forecasts and the weighted average from each of the 5 groups of models).

Figure 28: Model portfolio and some more details on model forecasts

	Aggregated Forecast (bps)	Aggregated Forecast / Volatility	Model Forecasted Returns (bps, weighted) (Sum to Aggregated Forecast)					Notional (x 100) (5% Vol Target)				Risk (%)		
			Benchmark	Economic Regime	Macro & Financial Forecasting	Time Series	Comprehensive	Risk Parity	Tilted Portfolio	Active Tilting	Active Tilting / Volatility	Vol	Portfolio Risk Contribution	Active Risk Contribution
Equity Value	-22.8	-0.12	-10.6	-4.1	4.0	-10.4	-1.7	14.4	9.5	-5.0	-0.8	6.5	1.4	2.6
Equity Quality	-25.2	-0.16	11.3	-0.6	-4.1	-17.5	-14.3	17.1	7.3	-9.8	-1.8	5.5	0.6	7.3
Equity Carry	17.8	0.08	-1.9	8.5	-0.1	7.2	4.1	11.9	16.3	4.5	0.6	7.9	6.2	3.1
Equity Momentum	10.1	0.04	8.5	-0.8	5.4	-2.6	-0.4	11.5	10.7	-0.8	-0.1	8.1	2.8	0.1
Equity Low Vol	57.1	0.28	12.5	2.3	8.2	30.8	3.4	13.2	20.2	7.0	1.0	7.1	7.6	6.2
Equity Size	-29.2	-0.22	-15.7	-3.4	-4.7	-3.2	-2.3	20.8	11.6	-9.2	-2.0	4.5	1.0	4.4
Equity Volatility	5.6	0.04	3.5	6.9	-5.4	3.0	-2.4	17.4	16.5	-0.9	-0.2	5.4	2.9	0.1
Credit Value	-14.0	-0.11	-4.5	2.1	5.3	-3.3	-13.5	21.9	17.9	-4.0	-0.9	4.3	2.2	0.7
Credit Carry	16.2	0.15	-4.2	8.8	2.0	10.0	-0.4	25.2	24.5	-0.7	-0.2	3.7	3.1	0.0
Credit Momentum	33.8	0.12	-17.2	-1.5	11.7	22.3	18.5	9.3	14.0	4.8	0.5	10.1	7.5	6.0
Credit Volatility	-2.3	-0.01	-14.4	6.9	0.6	2.6	1.9	12.0	23.5	11.5	1.5	7.8	12.6	20.6
Rates Value	4.0	0.02	7.8	3.7	-2.6	-0.4	-4.5	10.3	9.7	-0.7	-0.1	9.1	2.9	0.1
Rates Carry	21.0	0.05	-2.0	6.9	9.3	6.6	0.3	5.8	11.9	6.1	0.4	16.2	13.8	24.7
Rates Momentum	10.5	0.03	-10.6	10.4	10.5	-4.5	4.7	7.4	12.6	5.3	0.4	12.7	9.6	11.4
Rates Volatility	-9.2	-0.05	-15.7	0.5	0.1	3.4	2.5	13.5	12.2	-1.4	-0.2	6.9	2.6	0.2
FX Value	19.6	0.23	2.7	6.0	4.2	4.8	1.8	31.7	30.8	-0.9	-0.3	3.0	3.1	0.0
FX Carry	21.0	0.09	3.5	15.9	2.6	1.5	-2.6	11.0	15.9	4.9	0.6	8.5	6.8	4.4
FX Momentum	-0.7	0.00	-3.1	3.6	2.3	-1.0	-2.5	8.9	7.5	-1.4	-0.1	10.6	2.3	0.5
FX Volatility	9.4	0.06	-1.7	4.4	-0.9	2.1	5.4	18.1	15.2	-3.0	-0.6	5.2	2.3	0.6
Commodity Value	23.8	0.13	7.4	6.5	7.6	1.7	0.6	14.4	16.5	2.2	0.3	6.5	4.3	0.5
Commodity Carry	34.0	0.23	5.2	7.2	5.9	9.0	6.7	18.4	19.4	1.0	0.2	5.1	3.6	0.1
Commodity Momentum	-8.6	-0.03	-0.9	3.8	-15.3	2.9	0.8	9.5	4.5	-5.1	-0.5	9.8	0.7	6.3
									Total				Total	

Source: J.P. Morgan Quantitative and Derivatives Strategy

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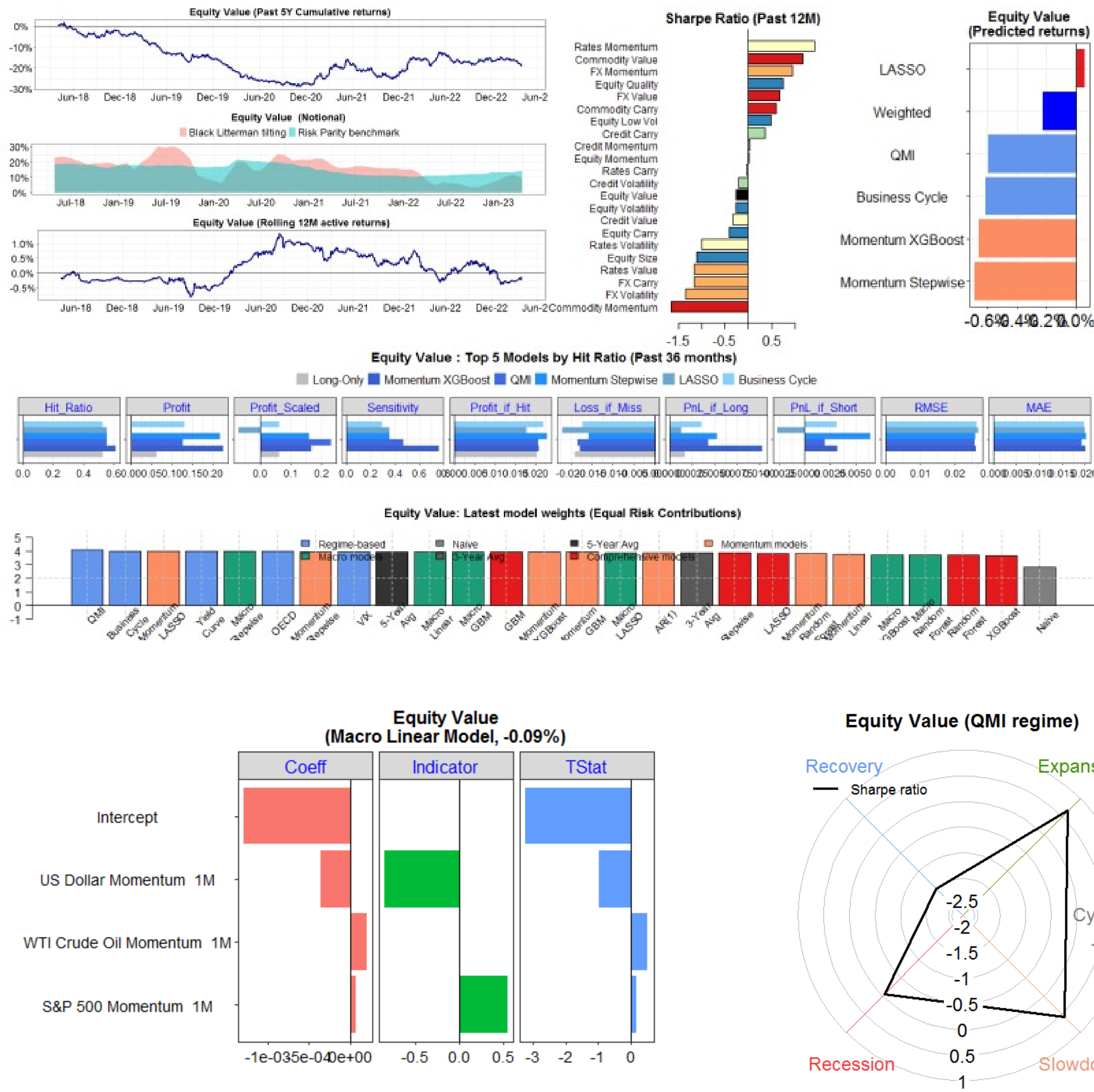
Equity Value

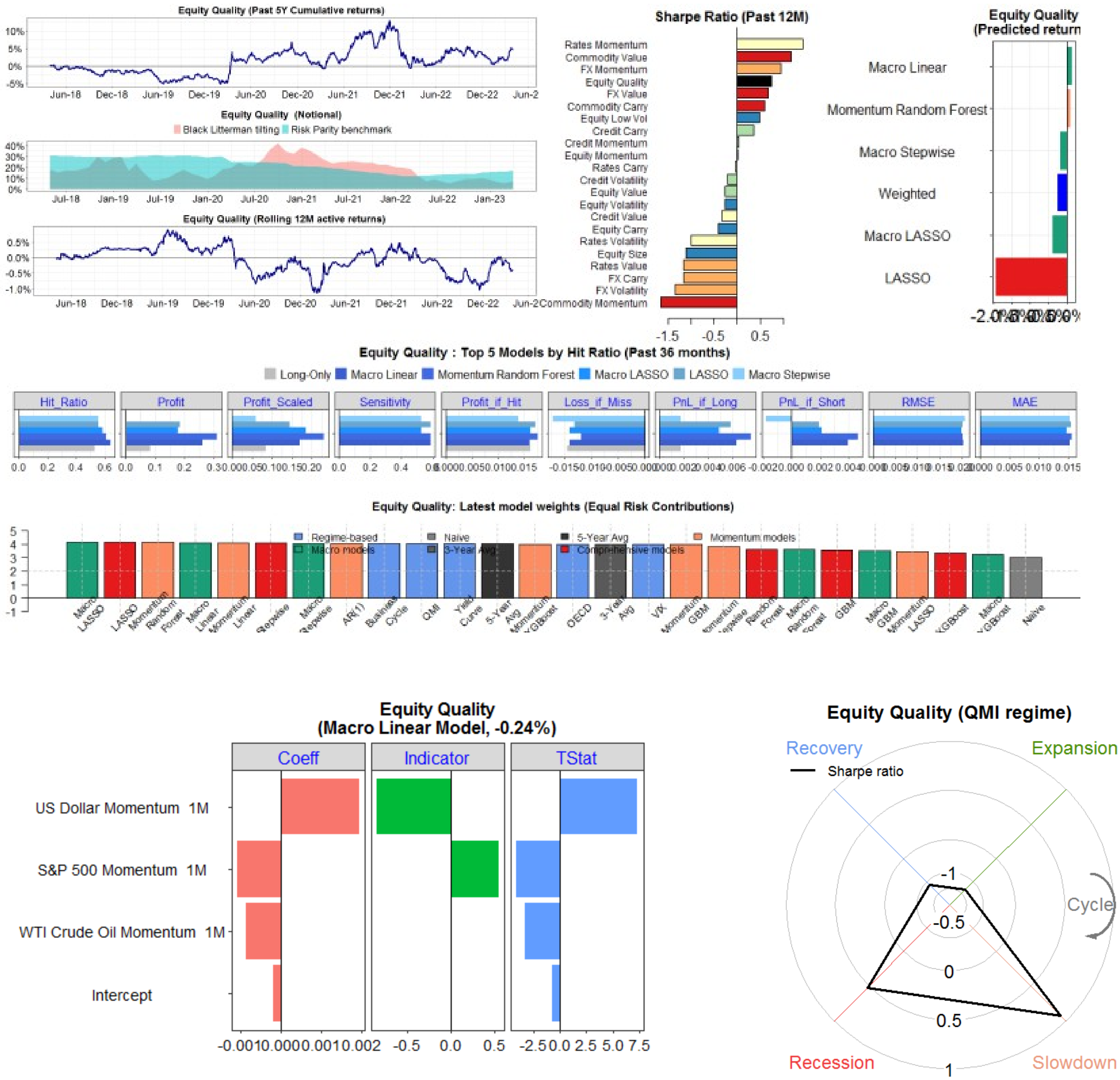
Figure 29: Equity Value



Source: J.P. Morgan Quantitative and Derivatives Strategy; Bloomberg Finance L.P.; RavenPack; EPFR

Equity Quality

Figure 30: Equity Quality



Source: J.P. Morgan Quantitative and Derivatives Strategy; Bloomberg Finance L.P.; RavenPack; EPFR

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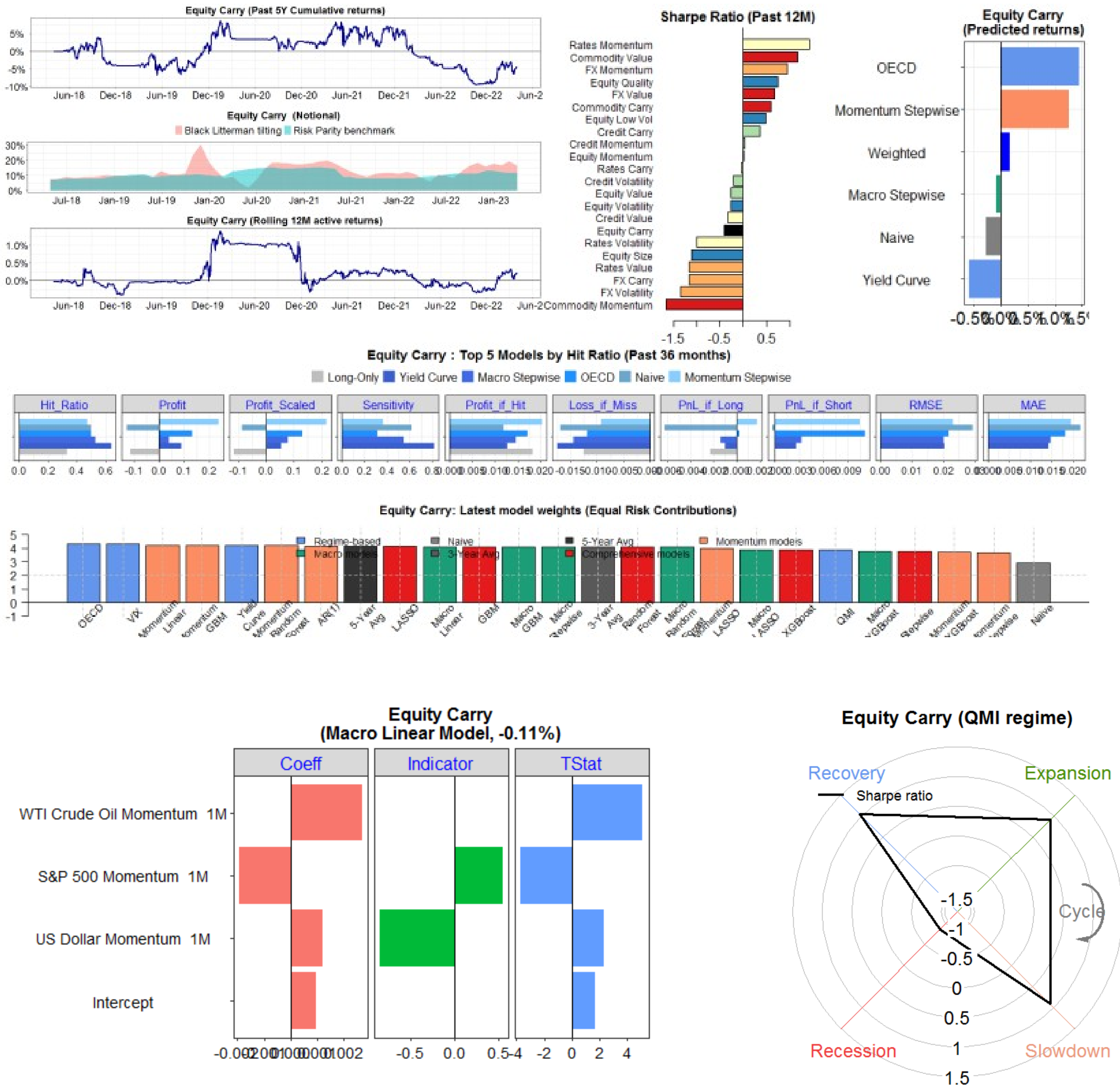
Equity Carry

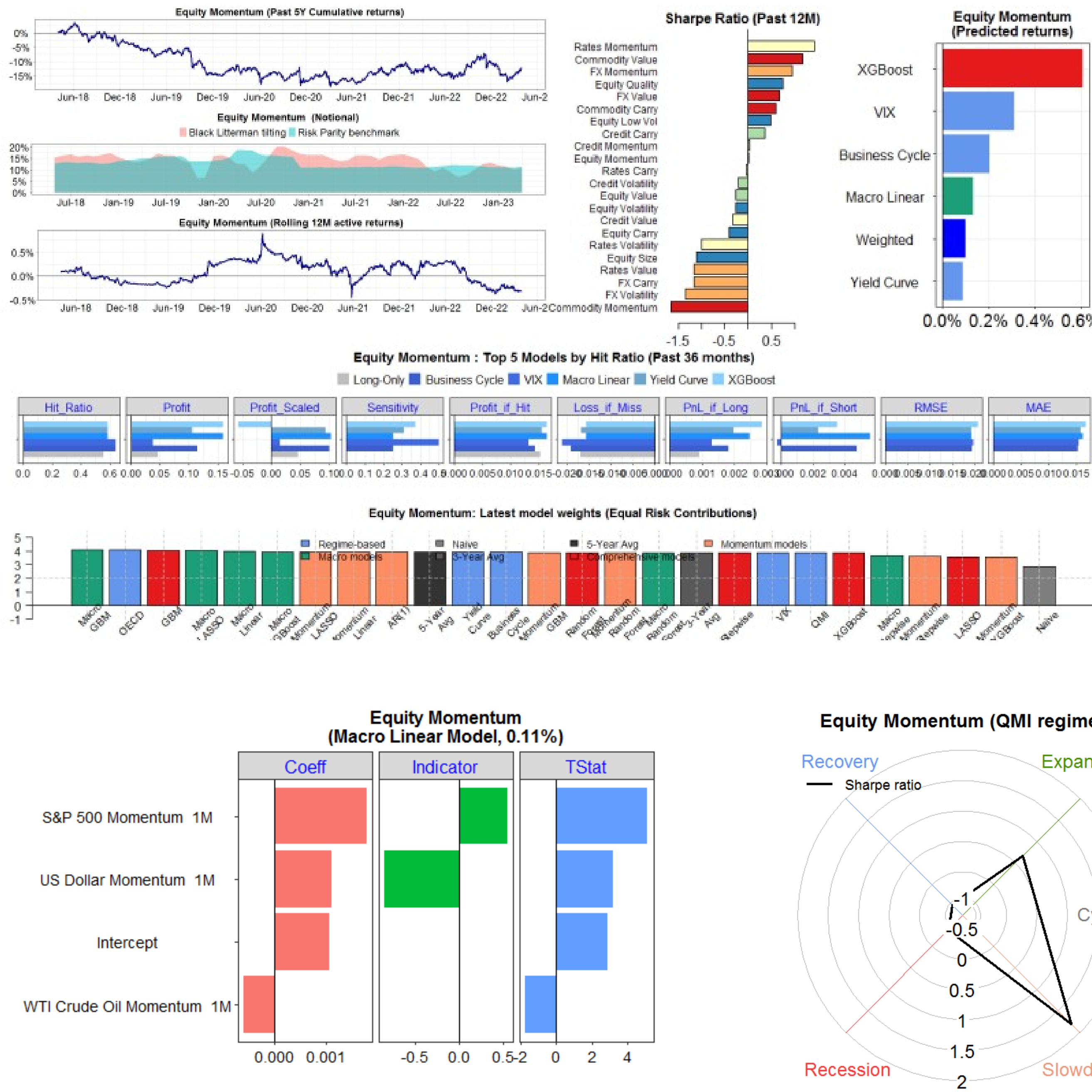
Figure 31: Equity Carry



Source: J.P. Morgan Quantitative and Derivatives Strategy; Bloomberg Finance L.P.; RavenPack; EPFR

Equity Momentum

Figure 32: Equity Momentum



Source: J.P. Morgan Quantitative and Derivatives Strategy; Bloomberg Finance L.P.; RavenPack; EPFR

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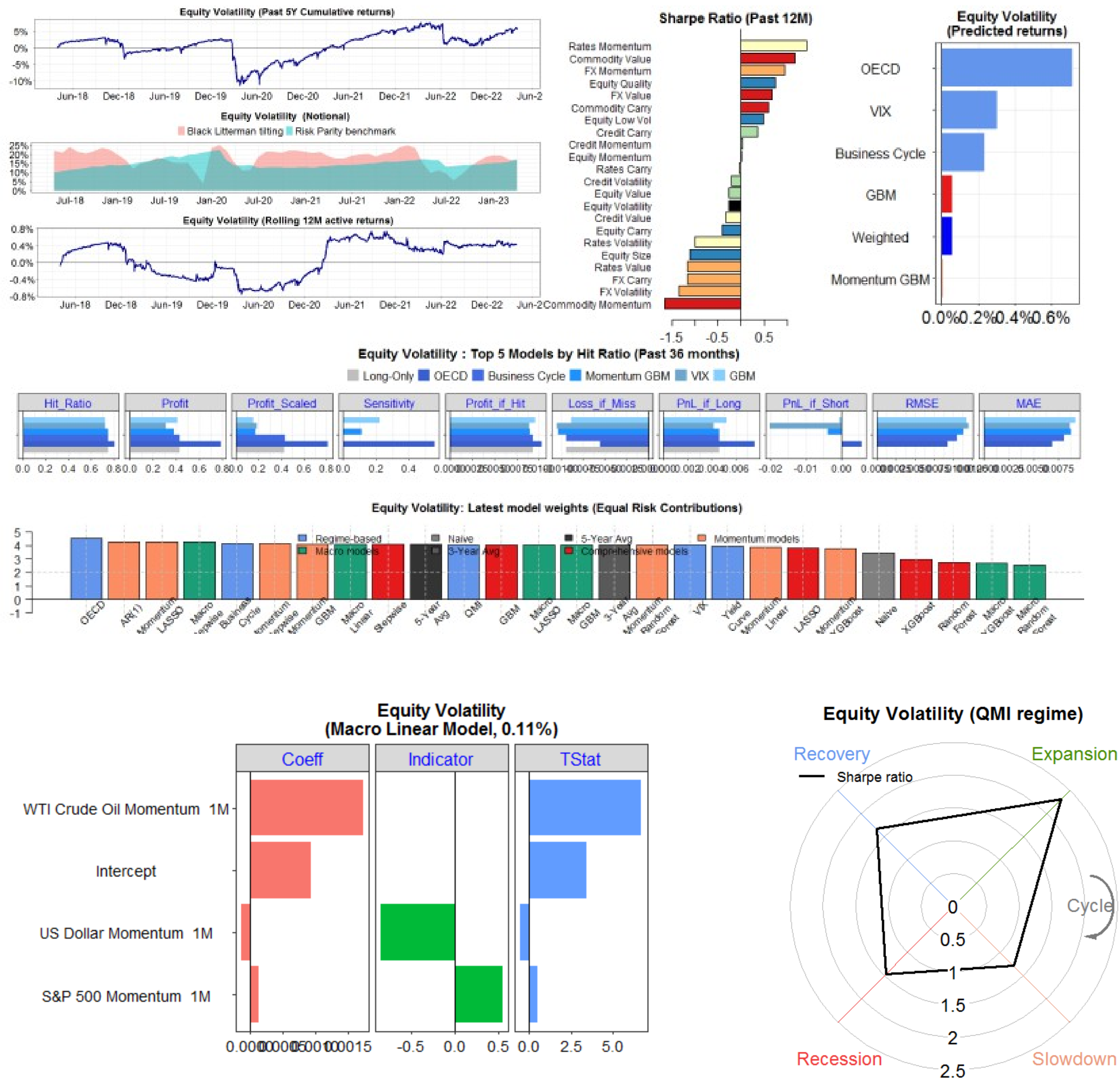
Equity Volatility

Figure 33: Equity Volatility



Source: J.P. Morgan Quantitative and Derivatives Strategy; Bloomberg Finance L.P.; RavenPack; EPFR

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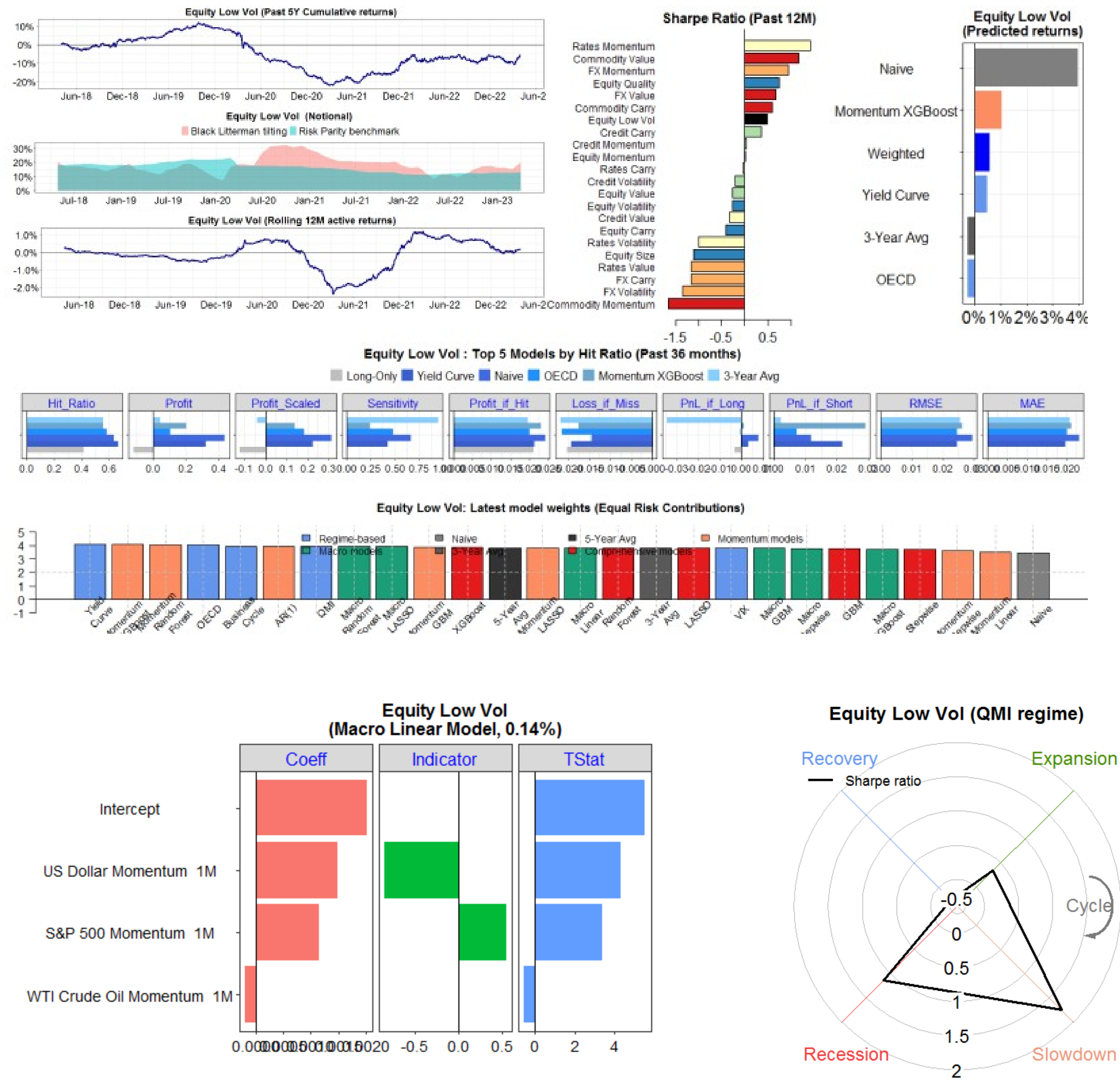
Equity Low Vol

Figure 34: Equity Low Vol



Source: J.P. Morgan Quantitative and Derivatives Strategy; Bloomberg Finance L.P.; RavenPack; EPFR

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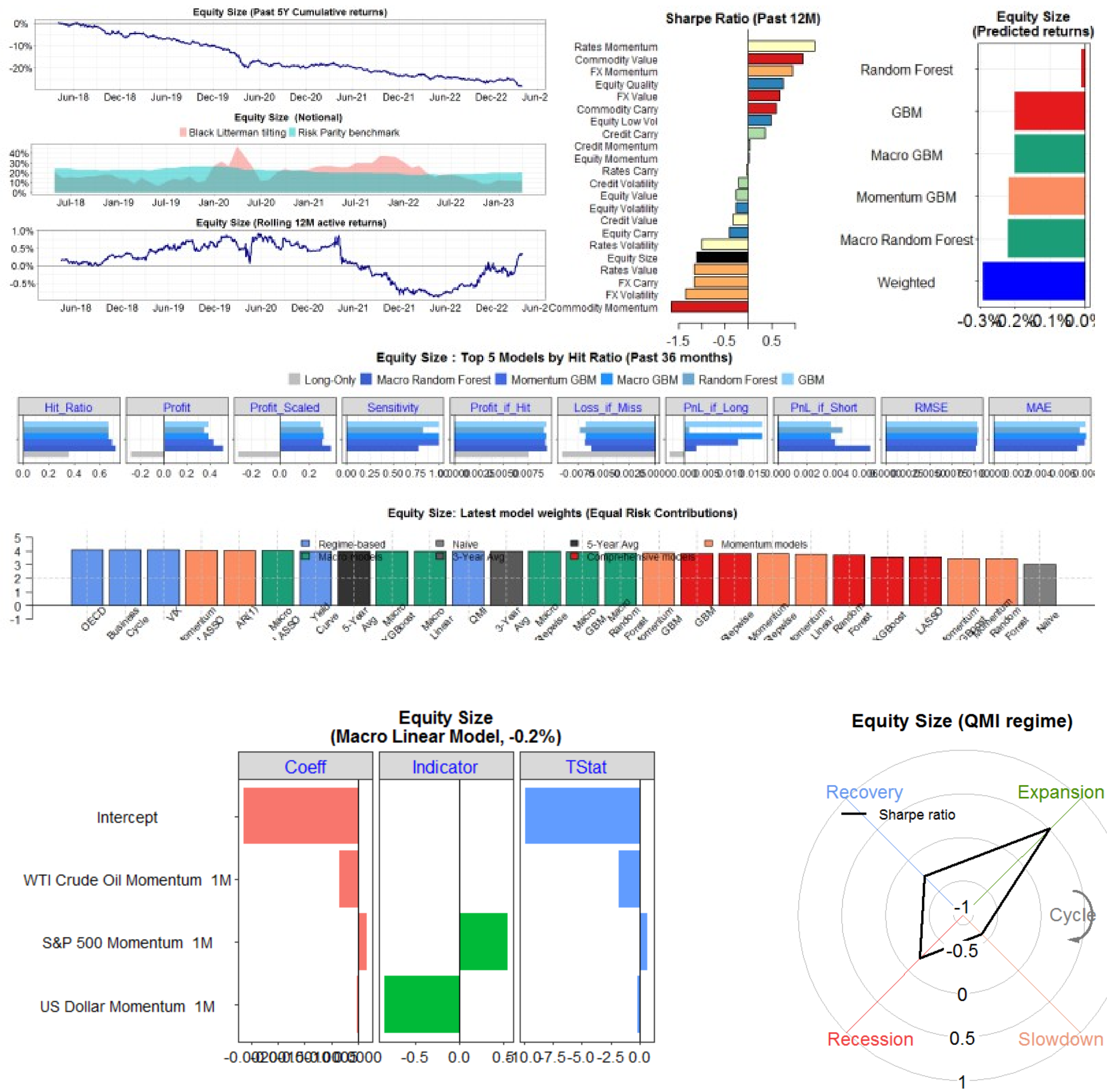
Equity Size

Figure 35: Equity Size



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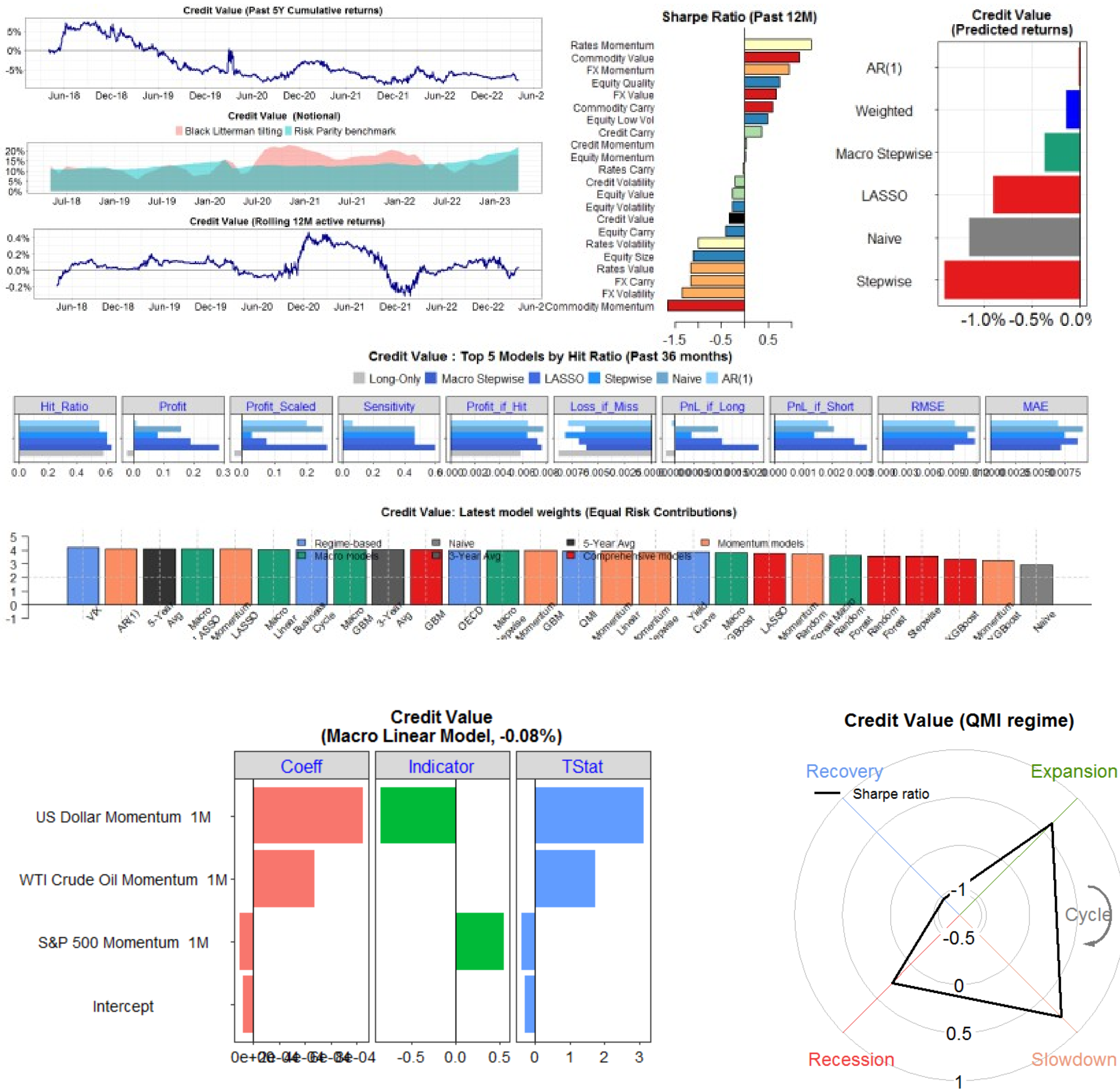
Credit Value

Figure 36: Credit Value



Source: J.P. Morgan Quantitative and Derivatives Strategy; Bloomberg Finance L.P.; RavenPack; EPFR

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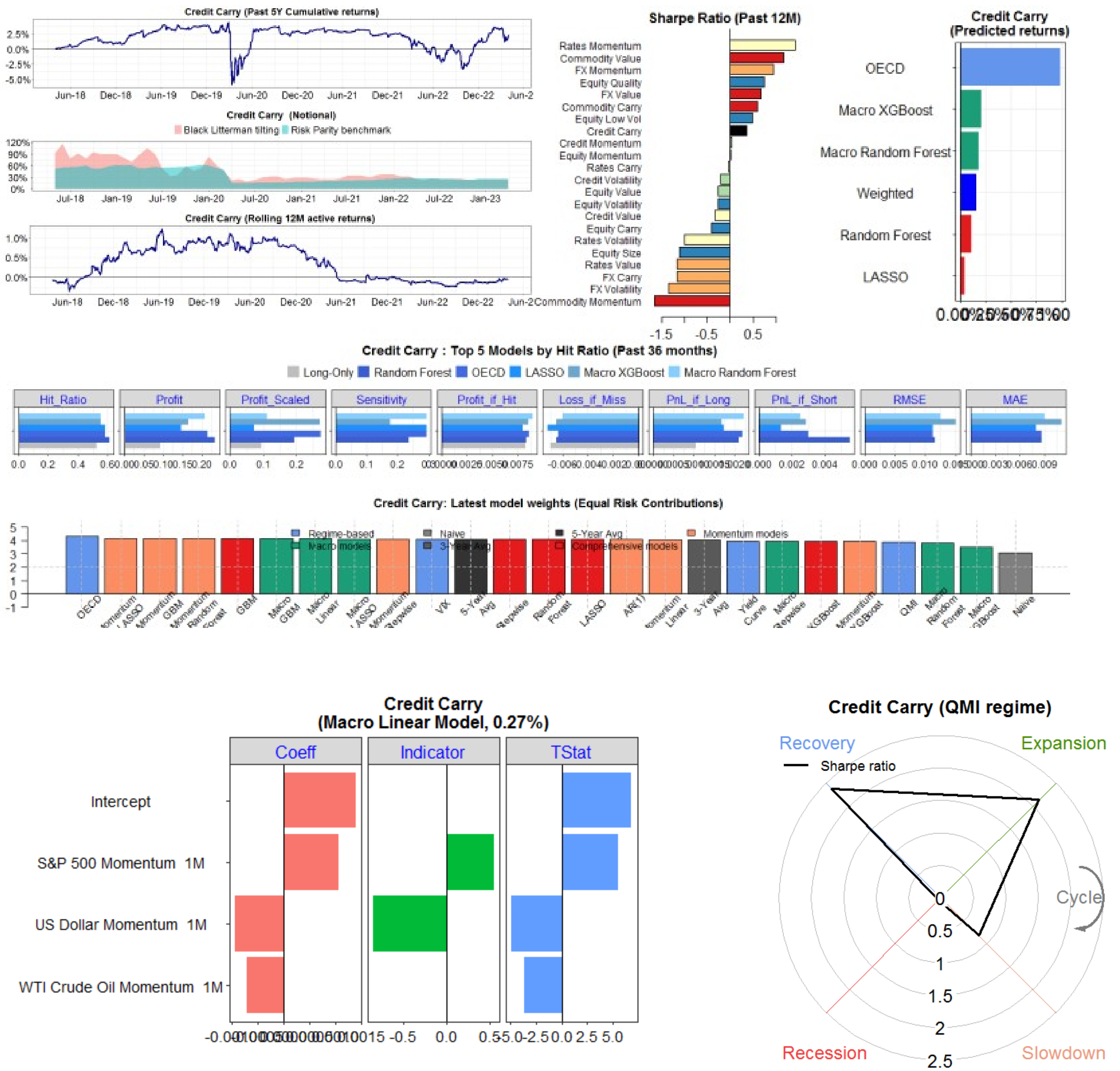
Credit Carry

Figure 37: Credit Carry



Source: J.P. Morgan Quantitative and Derivatives Strategy; Bloomberg Finance L.P.; RavenPack; EPFR

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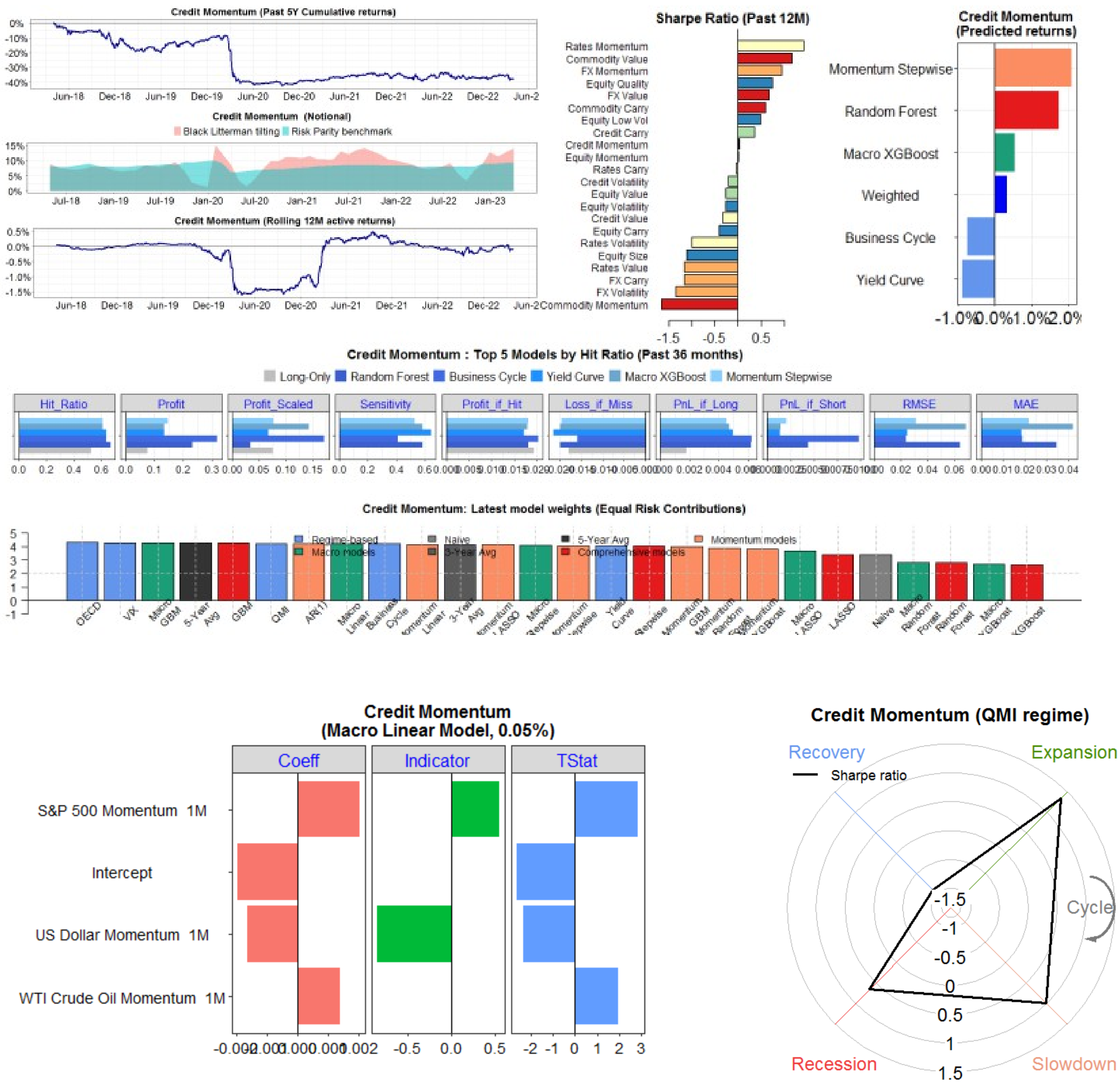
Credit Momentum

Figure 38: Credit Momentum



Source: J.P. Morgan Quantitative and Derivatives Strategy; Bloomberg Finance L.P.; RavenPack; EPFR

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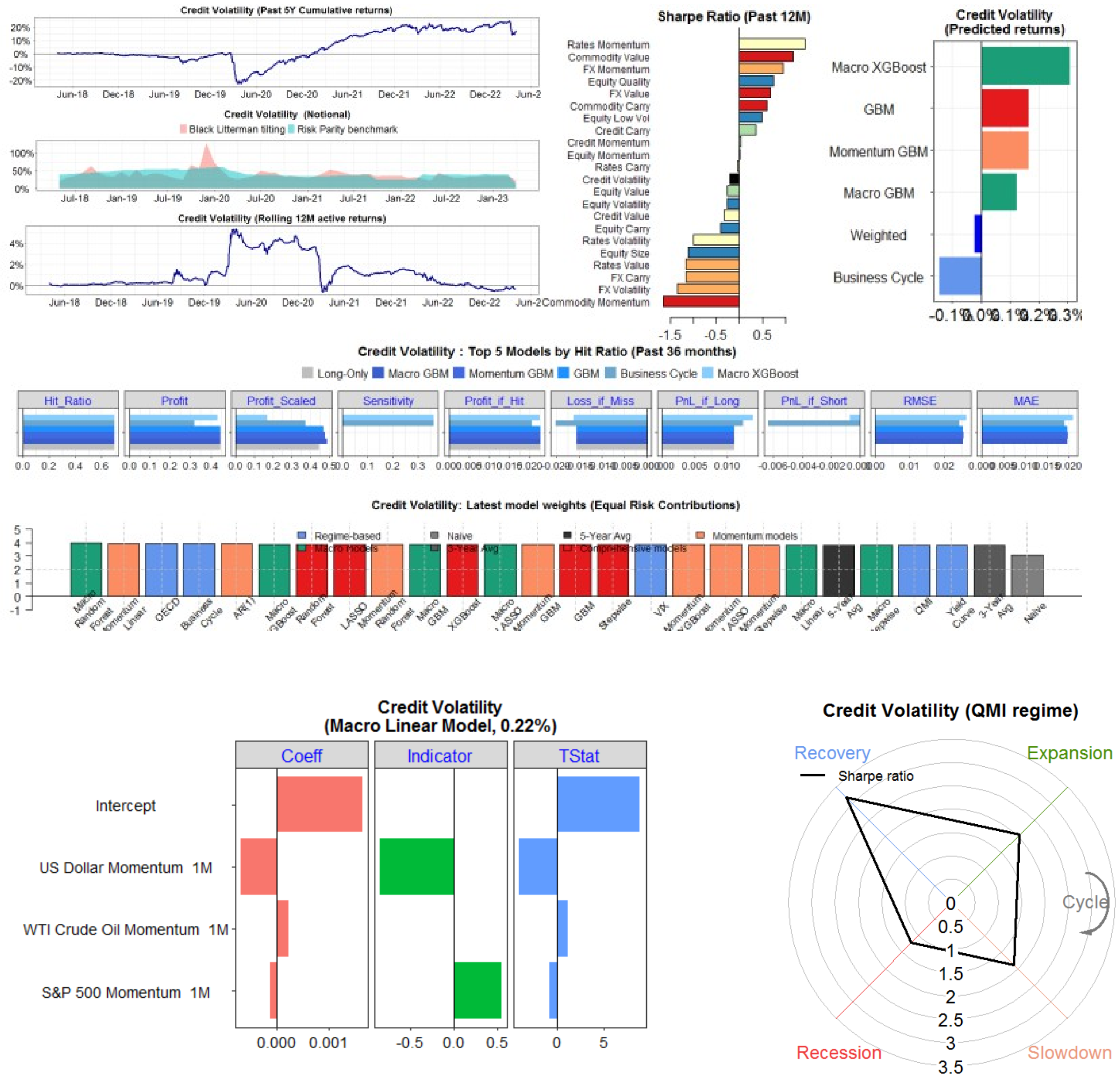
Credit Volatility

Figure 39: Credit Volatility



Source: J.P. Morgan Quantitative and Derivatives Strategy; Bloomberg Finance L.P.; RavenPack; EPFR

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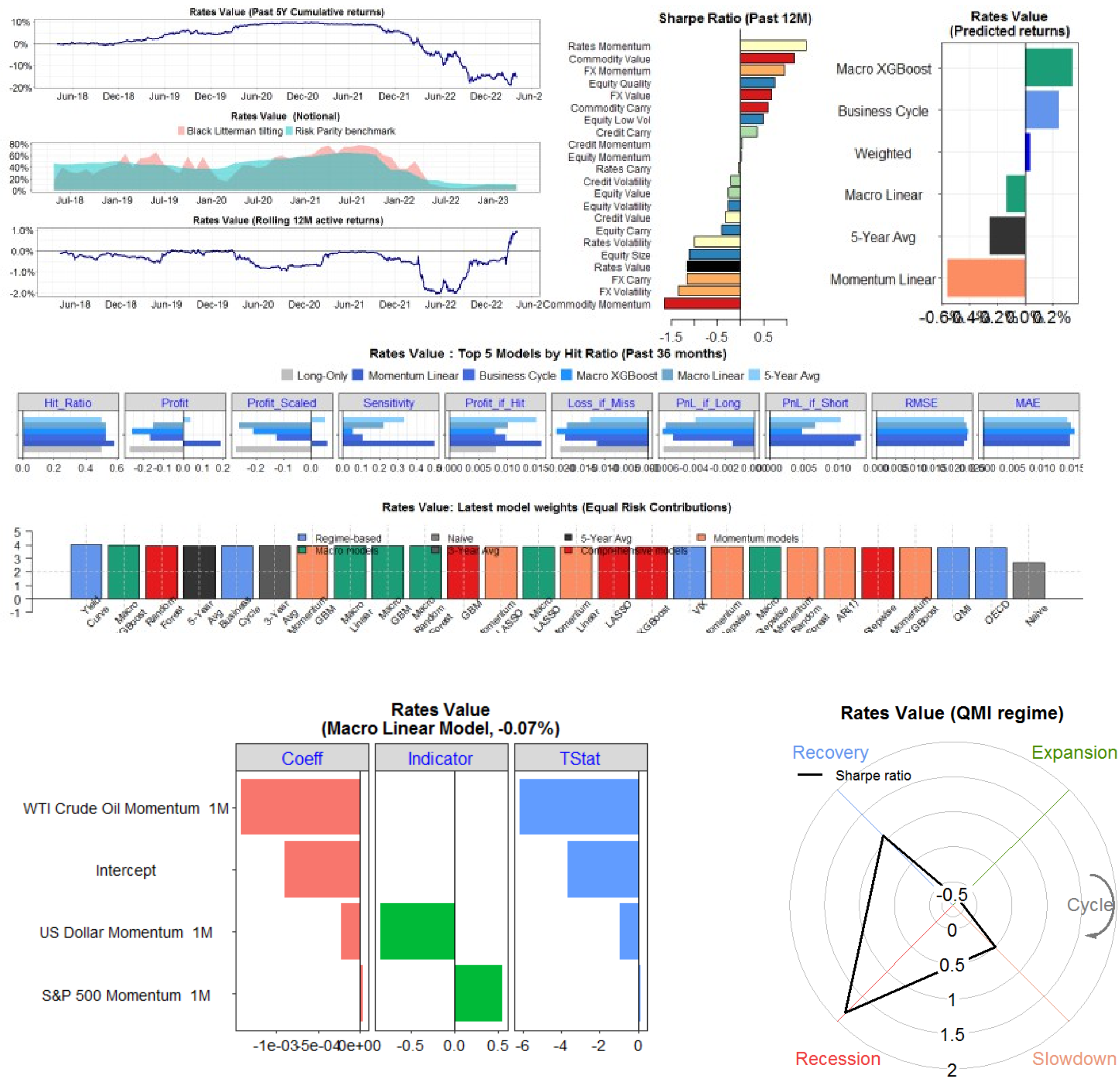
Rates Value

Figure 40: Rates Value



Source: J.P. Morgan Quantitative and Derivatives Strategy; Bloomberg Finance L.P.; RavenPack; EPFR

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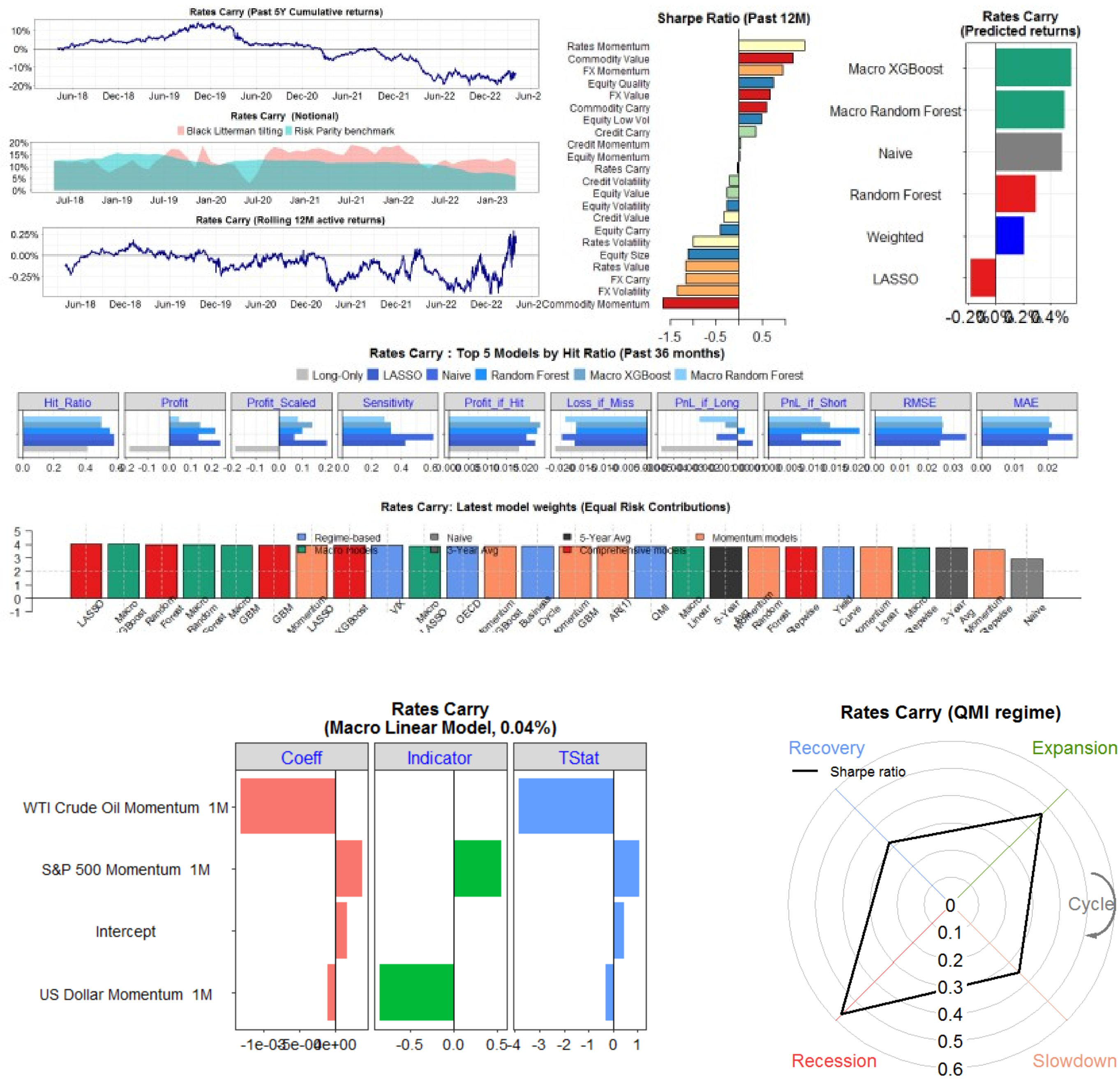
Rates Carry

Figure 41: Rates Carry



Source: J.P. Morgan Quantitative and Derivatives Strategy; Bloomberg Finance L.P.; RavenPack; EPFR

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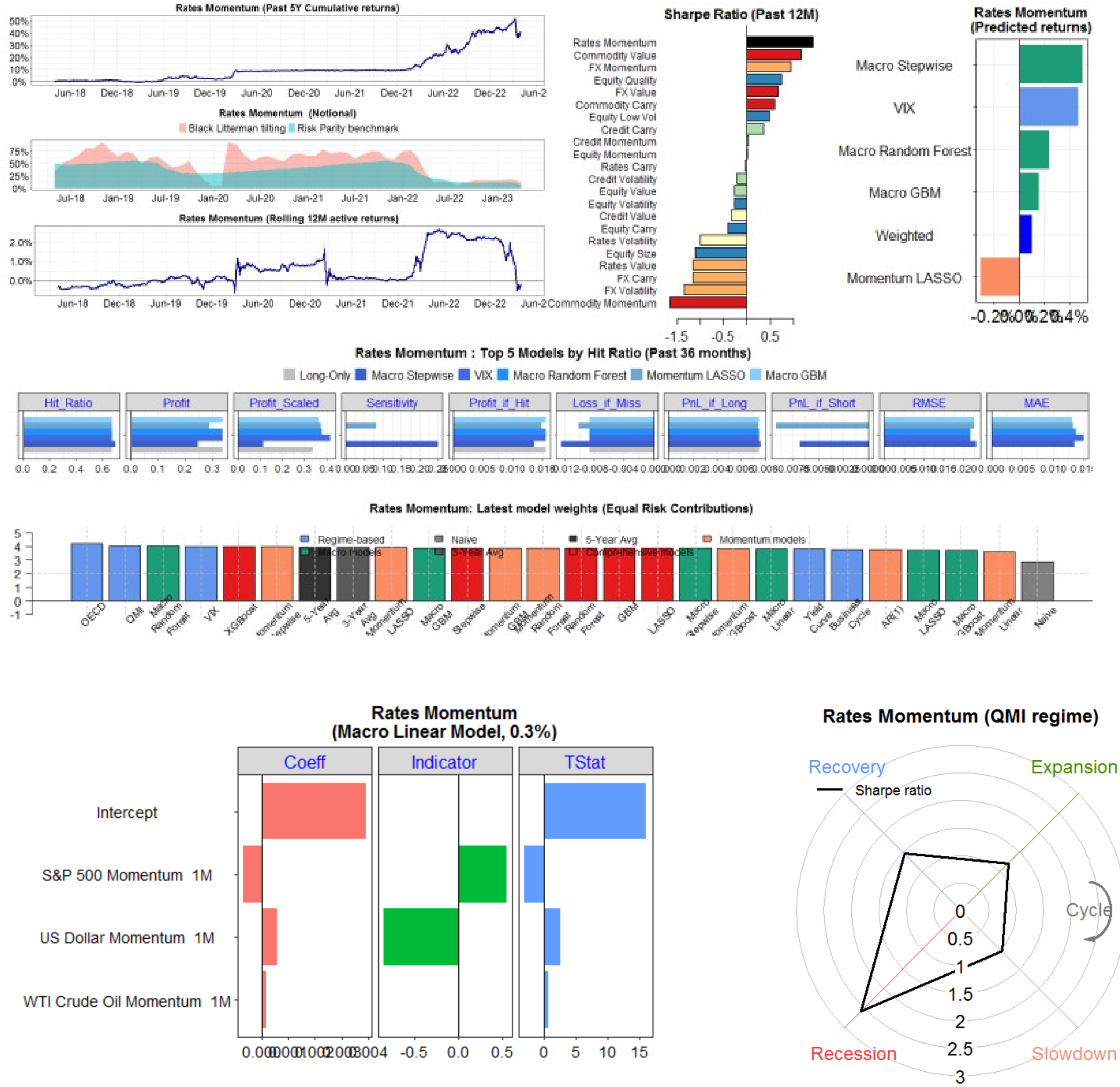
Rates Momentum

Figure 42: Rates Momentum



Source: J.P. Morgan Quantitative and Derivatives Strategy; Bloomberg Finance L.P.; RavenPack; EPFR

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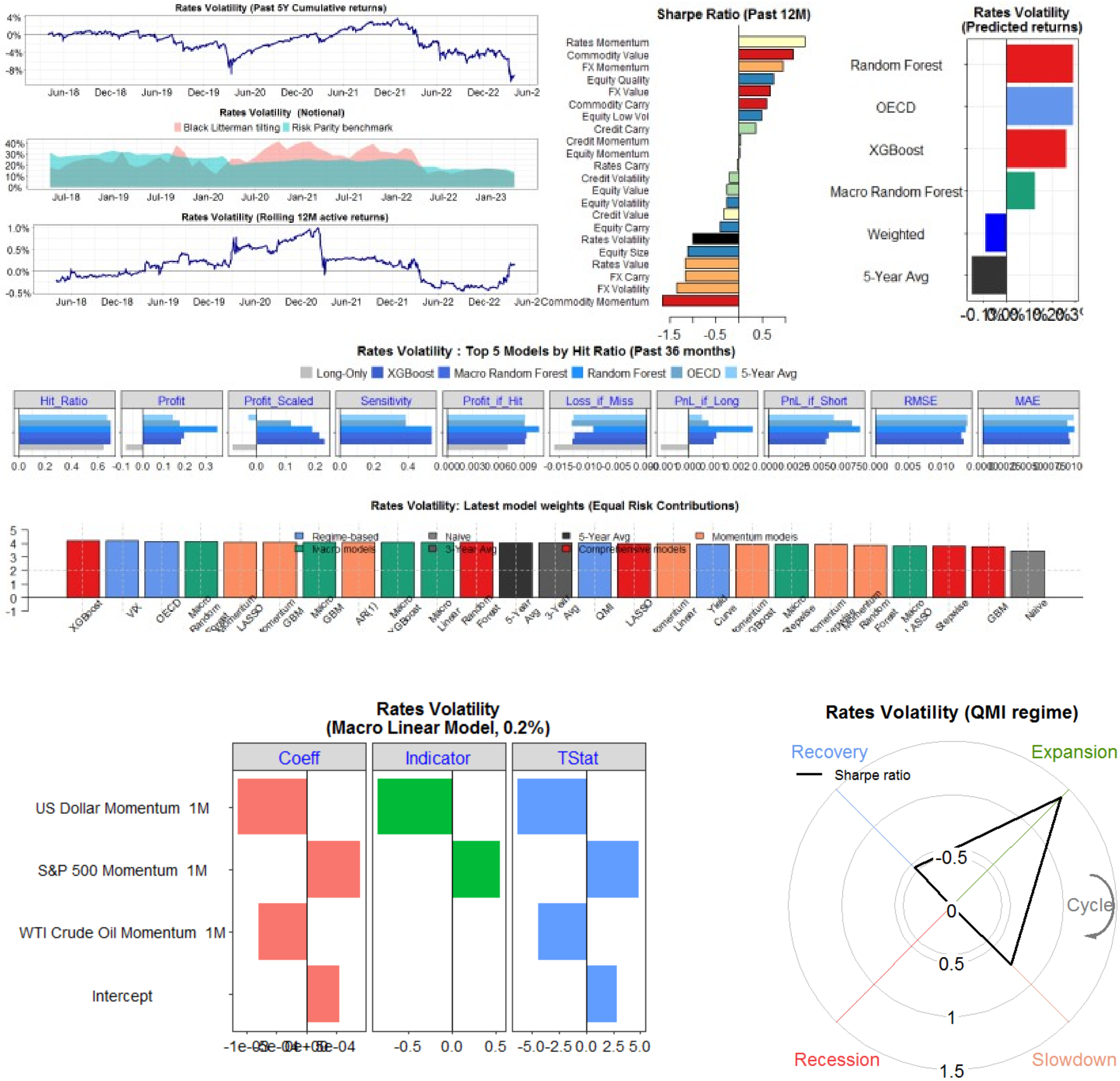
J.P.Morgan

Rates Volatility

Figure 43: Rates Volatility



Source: J.P. Morgan Quantitative and Derivatives Strategy; Bloomberg Finance L.P.; RavenPack; EPFR

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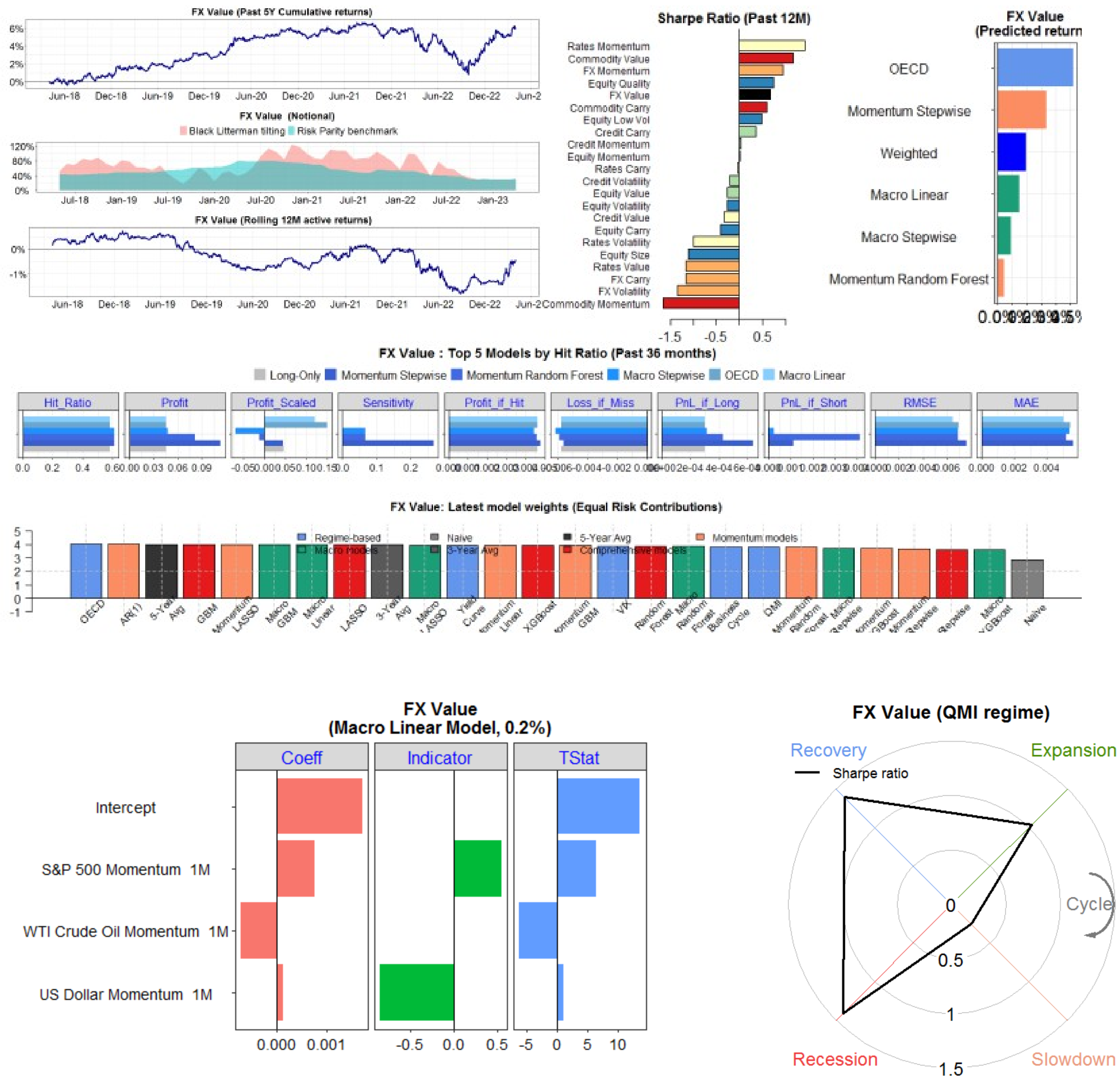
FX Value

Figure 44: FX Value



Source: J.P. Morgan Quantitative and Derivatives Strategy; Bloomberg Finance L.P.; RavenPack; EPFR

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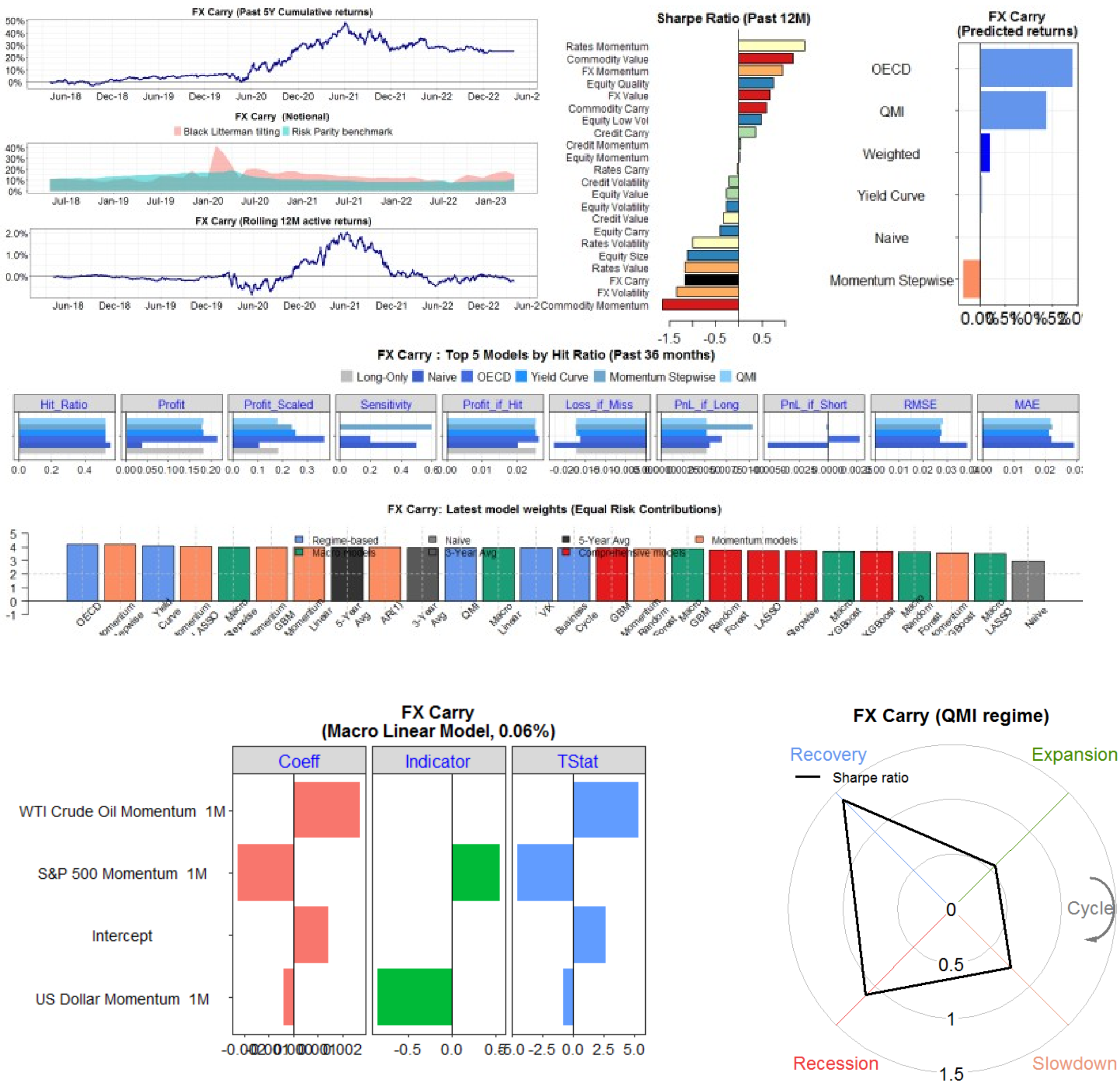
FX Carry

Figure 45: FX Carry



Source: J.P. Morgan Quantitative and Derivatives Strategy; Bloomberg Finance L.P.; RavenPack; EPFR

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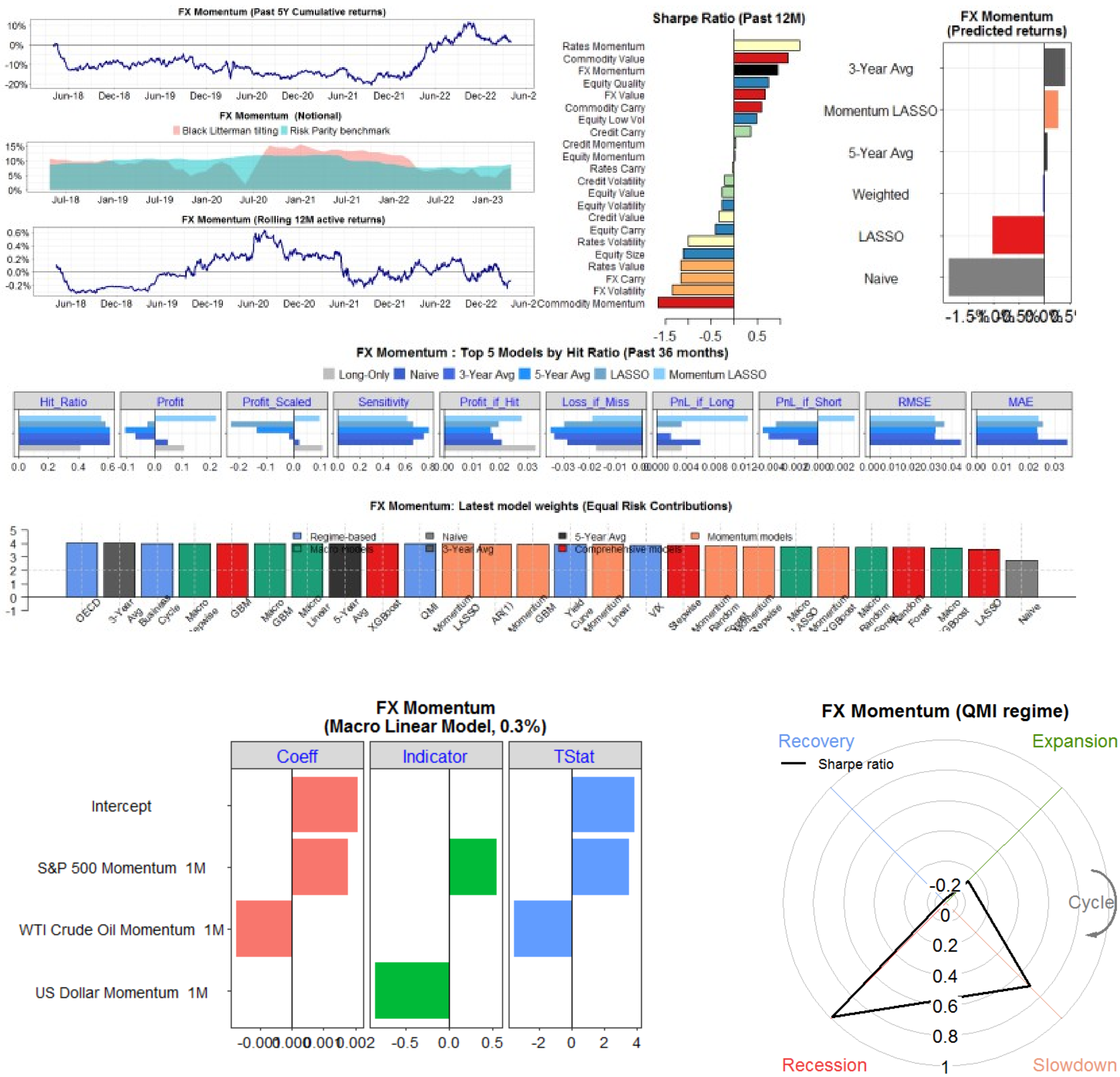
FX Momentum

Figure 46: FX Momentum



Source: J.P. Morgan Quantitative and Derivatives Strategy; Bloomberg Finance L.P.; RavenPack; EPFR

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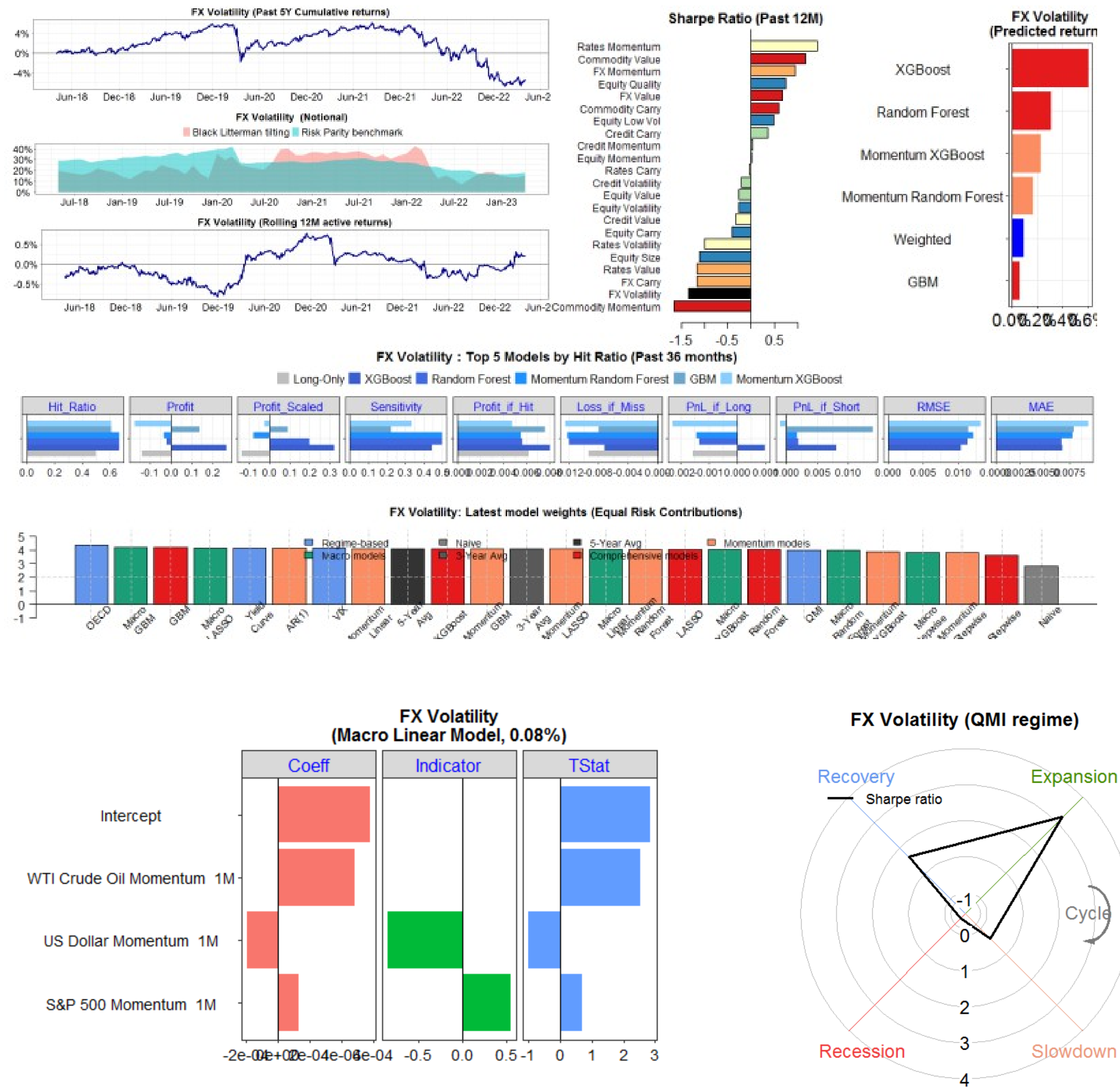
FX Volatility

Figure 47: FX Volatility



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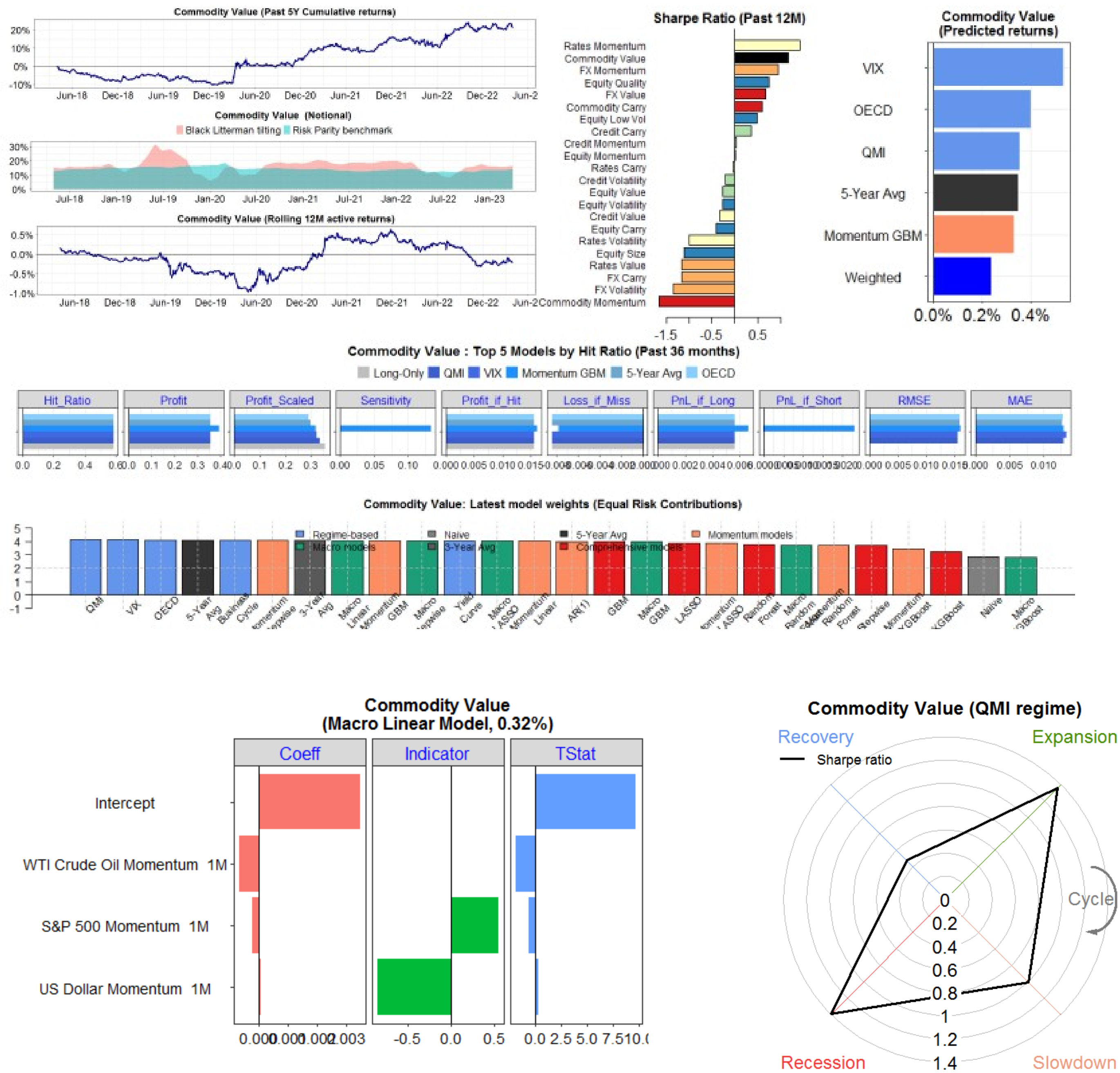
Commodity Value

Figure 48: Commodity Value



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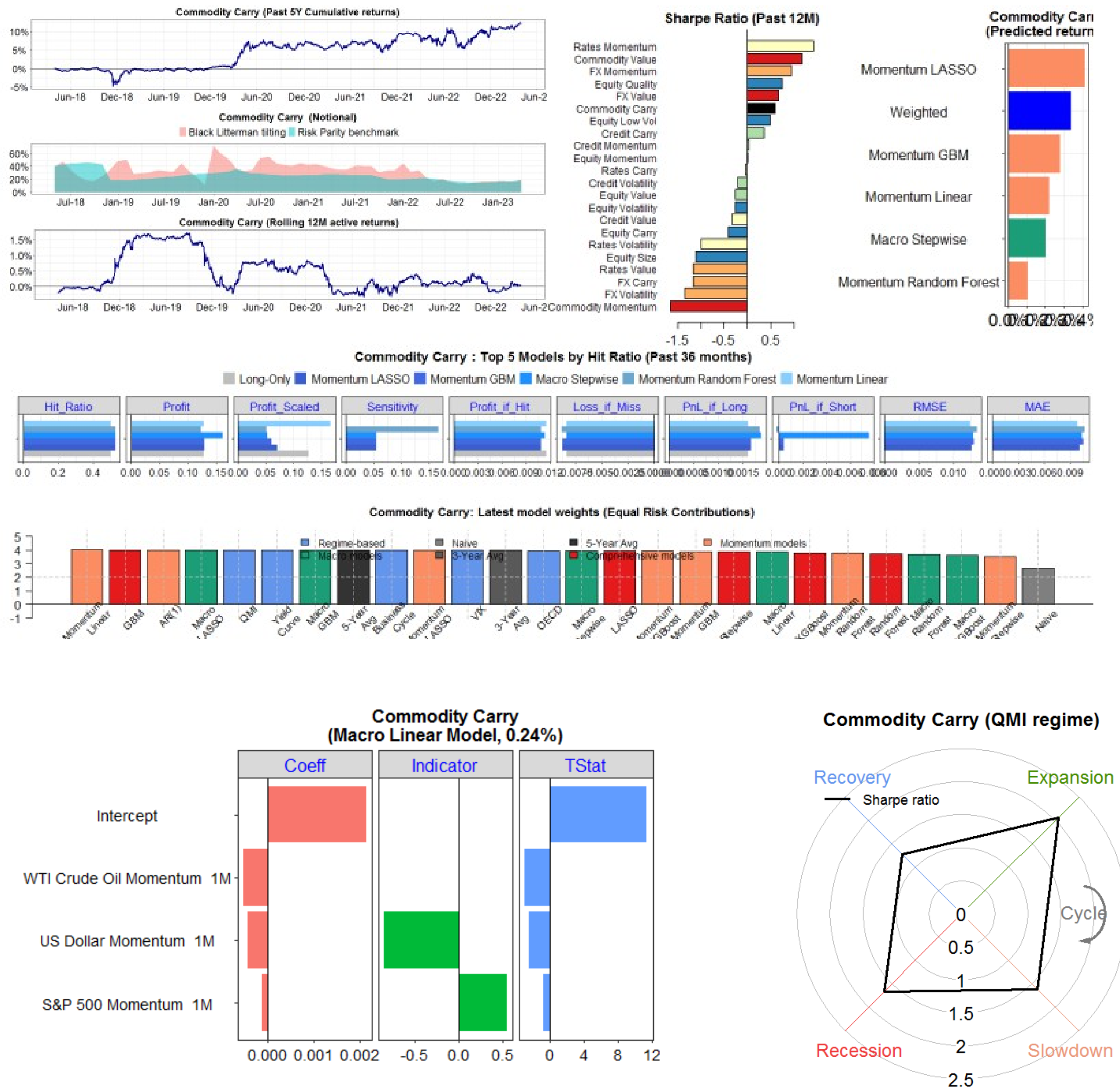
Commodity Carry

Figure 49: Commodity Carry



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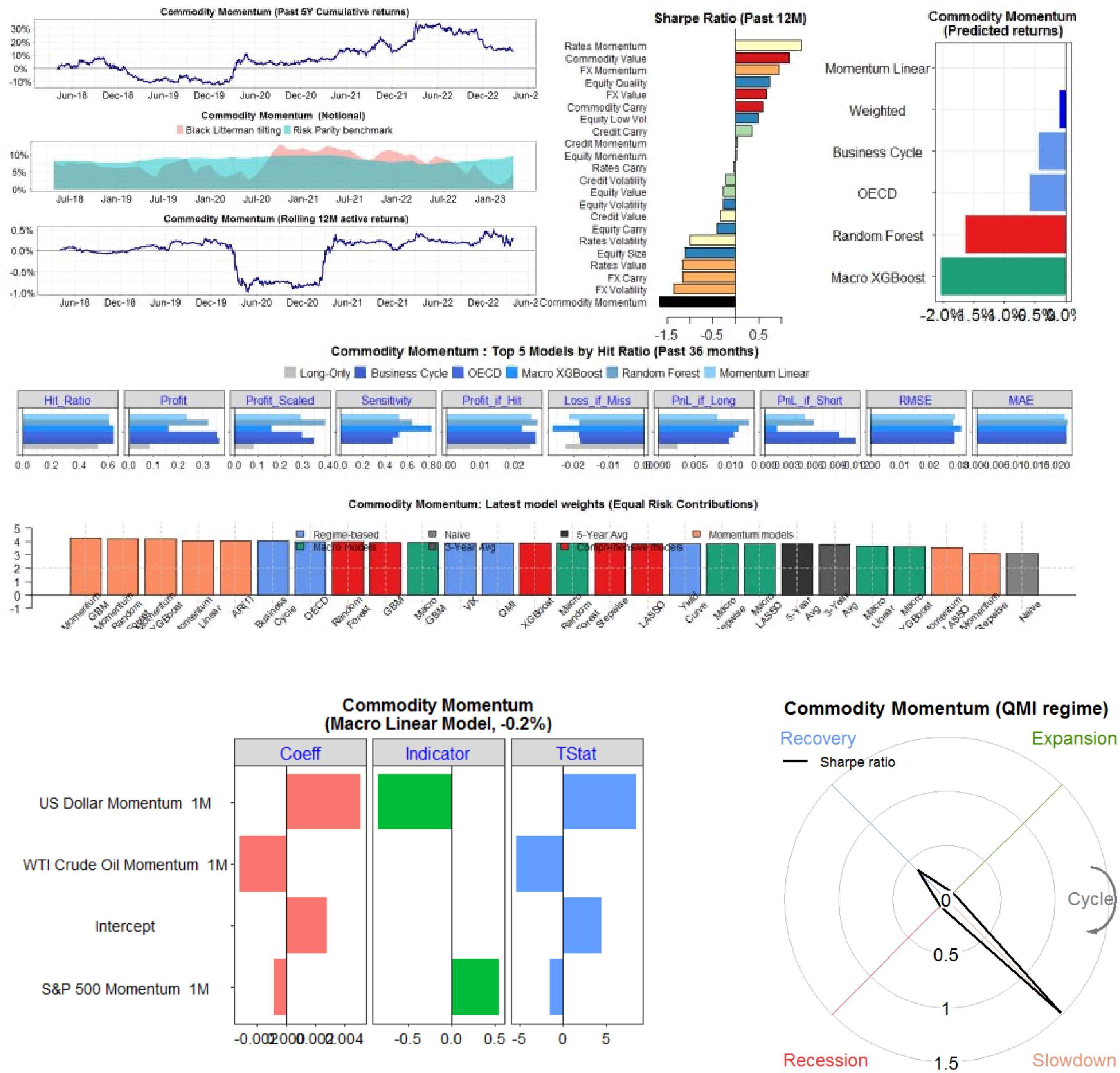
Commodity Momentum

Figure 50: Commodity Momentum



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18 January 2019: Business cycle, crowdedness measures for equity styles, and implications of the JPM Equity Outlook

6 December, 2018: Risk premia sensitivity to rates/equities, implications of JPM 2019 FICC outlooks and our latest timing forecasts

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