Cross Asset Strategy

With a mixed macro environment and range-bound markets, we upgraded our PCA tool to screen dislocations

- **At a time of mixed macro signals, handcuffed central banks and range bound markets, an upgraded framework to screen market dislocations could become a useful filter for trades.**
- **In this Note, we make some improvements to the original model with a focus on market neutral portfolios. Notably, we expand the number of markets to about 190; we introduce regularization; and we make both measures of Momentum and Value less dependent on a single lookback period.**
- **Out of the full list of markets, the framework identifies Energy Commodities (Brent/Heating Oil), Copper, ZAR, 30Y UKT and EM Corp HY as oversold/cheap. Conversely, Japanese stocks, long-end steepeners, soft Commodities (Cocoa/Sugar) and some FX pairs (GBP, PLN, MXN) screen overbought/expensive.**
- **However, our research showed that to successfully profit from dislocations, it is crucial to pair our tactical Value signal with Momentum. The backtest for our combined Value + Momentum market neutral strategy is solid from an absolute (Sharpe above 1, max drawdown/vol <2) and relative (better than momentum) perspective and is robust to different parameter specifications. We also show the detailed trading signals in the note.**
- **This work keeps us on the way to build a more systematic and actionable investment process. Relative to our recent work on portfolio construction and CMAs, however, this time the focus is on a different step of the investment process.**

Cross-Asset Fundamental Strategy

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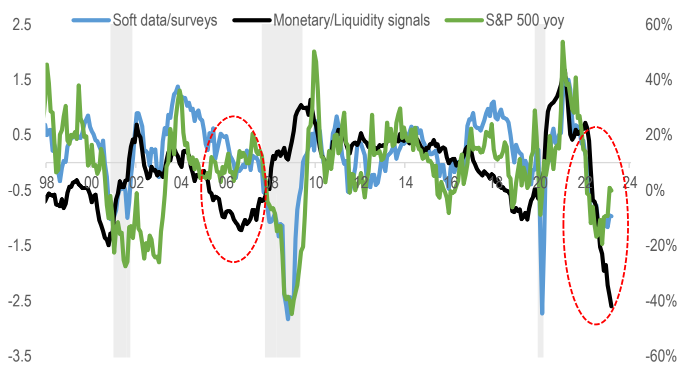
With a mixed macro and range bound markets, an upgraded tool to screen dislocations could become useful

At a time of mixed macro signals, handcuffed central banks and range bound markets... We have been discussing the macro and markets backdrop many times in recent months. Our baseline view remains solid and still expect end of cycle dynamics to become primary macro regime in 2023. That said, the incoming macro dataflow/newsflow has been mixed at best. On the activity side, a good visualization is the divergence between soft data/surveys and monetary/liquidity leading indicators (Figure 1). But the mixed signals don't stop there. Even within the relatively upbeat soft data, there has been divergence between manufacturing and services sector. On the inflation side, there is some contrast between improving inflation surprises (e.g. US CPI/PPI and China PPI/CPI last week) and internal/cross country breadth on one hand, and sticky inflation (in some sectors) and the recent increase in household inflation expectations on the other. Not to mention the potential implications that a sustained downtrend in the USD could have for the inflation picture at a time where the market already discount almost 75bp of cuts for the Fed in 2023 and core goods have already started to inflect higher. The price action in markets has somewhat mirrored this macro mixed picture. The strong momentum/trending backdrop of 2022 has given way to mean reversion and the recent weak performance of CTA accounts has been a reflection of this (Figure 2).

Figure 1: Mixed Macro signals

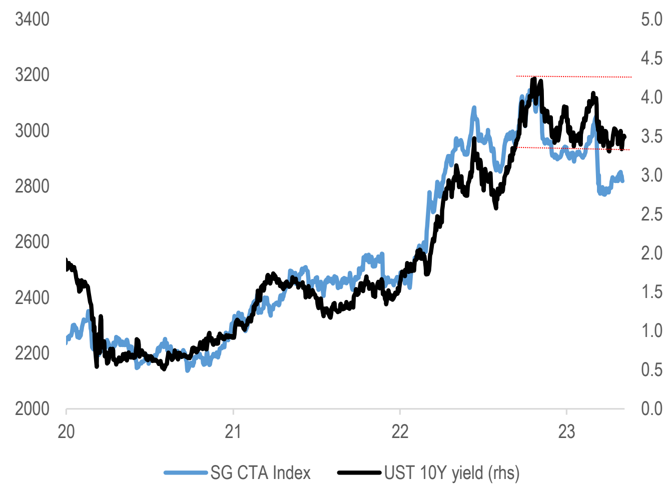
Composite of surveys vs composite of liquidity/monetary signals for the US vs S&P500 yoy return



Source: J.P. Morgan

Figure 2: Range bound markets

UST 10Y yield vs SG CTA Index



Source: J.P. Morgan

An upgraded framework for market dislocations could become a useful filter for trades. The original version's aim was to filter the price action and identify cheap/expensive markets out of a large group of assets. Said differently, the philosophy was to look for markets that performed out of line with the underlying factors driving returns and systematically take advantage of dislocations (i.e. buy underperforming/cheap markets and sell outperforming/expensive markets). Needless to say that this tool could become quite useful at a time where market are stuck in ranges. In addition, to successfully profit from dislocations, we also discovered that it was crucial to pair this Value signal with Momentum. Notably, we also showed that investors could construct profitable directional and market neutral portfolios based on these inputs.

In this update, we make some improvements with a focus on market neutral portfolios. As mentioned, our focus is on cross-sectional/market neutral portfolios, but we remind to our readers that one can also construct directional portfolios. By and large, the main changes we introduced can be summarized as follows:

- We expand the number of markets covered to about 190 (from 45 in our previous implementation). While doing so, we also add entirely new asset classes (e.g. Currencies, Volatilities, Inflation markets etc...).
- We shift to a regularized implementation to determine the Value scores.
- We make both our measures of Value and Momentum less dependent on a single lookback period.

We remain on our way to build a more systematic and actionable investment process. In recent quarters, our focus has been to make our investment process more systematic and more actionable. Relative to our recent work on portfolio construction and CMAs, however, this time we are more tactical and look at a different step of the investment process. We look at this stream of work as a complement to our regular discretionary Macro strategy pieces (The J.P. Morgan View, Global Asset Allocation and Alternative Investments Outlook & Strategy).

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The Dislocations and the Value/Momentum portfolio

In this section, we show the Cross Asset dislocations and the long/short Value + Momentum portfolio. Figure 3 shows momentum/PCA scores and ranks, the combined ranks and the current strategy signals. The smaller table on top summarizes the current asset class exposure and compares to end of March signals and to what's implied by the latest pure cross-sectional momentum signals. Compared to a momentum only portfolio, the strategy is more bearish on Equities/Commodities and it has flatteners on. There are also some notable changes from late March trade signals when the strategy was tactically taking advantage of oversold risk markets. The full list of PCA deviations is shown in Figures 4 and 5 and in more detail in the Appendix where we present dislocations separately for various asset classes. Out of the full list of markets the framework identifies Energy Commodities (Brent/Heating Oil), Copper, ZAR and UK 30Y yields as oversold/cheap. Conversely, soft Commodities (Cocoa, Sugar), Germany long-end steepeners, and some FX pairs (GBP, PLN and MXN) screen as overbought/ expensive.

Figure 3: The Value + Momentum Portfolio

Momentum, PCA deviation and PCA MSE scores and ranks. Last two columns show Composite Rank for current and previous month. +1/-1 means the model is/was long/short the corresponding markets. All positions are vol sized

	Composite signals May	Composite signal March	Momentum signals May
Equity	-3.0	9.0	2.0
Commodities	-3.0	-1.0	-1.0
FX	1.0	-6.0	2.0
Bonds	1.0	-5.0	-
BondSpread	2.0	-1.0	-4.0
Credit	2.0	4.0	1.0

	Asset Class	Momentum Score	PCA 1M Deviation Score	PCA 3M Deviation Score	PCA 12M Deviation Score	Momentum Rank	PCA 1M Deviation Rank	PCA 3M Deviation Rank	PCA 12M Deviation Rank	Composite PCA Score	Composite Score	Trade Signal
REITs	Equity	-0.53	-0.50	-0.05	0.68	16.98	19.50	40.88	66.04	44.30	7.59	-1
Inflation underperformers	Equity	0.04	-1.01	-0.97	0.16	50.94	9.43	14.47	44.03	12.03	8.23	-1
FTSE 250	Equity	-0.20	-0.60	-0.44	0.07	32.70	16.98	25.16	40.25	25.32	6.33	-1
Nat Gas	Commodities	-0.99	-0.24	-0.01	0.97	4.40	30.82	41.51	72.96	50.00	5.70	-1
Nickel	Commodities	-0.78	0.24	0.28	0.32	8.81	55.35	52.83	50.31	54.43	8.86	-1
Lead	Commodities	-0.36	0.15	-0.14	-0.40	23.90	51.57	37.74	26.42	34.81	6.96	-1
SEK	FX	-0.08	-0.49	-1.35	-1.38	42.77	20.13	6.92	9.43	6.33	3.80	-1
INR	FX	-0.57	-0.38	-0.97	-0.62	14.47	25.79	13.84	22.64	15.19	1.27	-1
SGD	FX	0.94	0.85	0.87	-0.50	88.05	80.50	76.10	24.53	58.86	96.20	1
CZK	FX	1.51	1.12	0.23	-1.23	94.97	88.05	50.94	11.32	44.94	93.04	1
BTC	FX	0.31	0.67	0.43	0.46	71.07	72.96	58.49	55.35	71.52	94.30	1
AA30Y	Bonds	0.15	1.75	1.38	0.33	61.64	96.86	89.31	50.94	88.61	97.47	1
Ger10Y	Bonds	-0.13	-0.75	-0.64	0.75	38.99	11.32	18.24	67.30	31.01	9.49	-1
JA10Y	Bonds	2.32	-0.25	-0.19	0.19	98.11	28.93	35.22	45.28	39.24	91.77	1
AA10Y	Bonds	0.44	1.26	0.80	-0.12	76.10	91.82	74.21	33.33	68.99	94.94	1
Ger2Y	Bonds	-0.22	-1.67	-1.25	0.56	30.82	1.26	9.43	59.12	18.99	4.43	-1
SW2Y	Bonds	-0.47	-1.08	-0.99	0.08	20.75	6.92	13.21	40.88	18.35	2.53	-1
AA2Y	Bonds	0.20	2.29	1.35	0.90	66.04	99.37	88.68	71.70	86.71	98.10	1
CA30Y CA10Y	BondSpread	-0.75	-0.40	-0.43	0.07	9.43	24.53	25.79	39.62	26.58	1.90	-1
JA30Y JA10Y	BondSpread	-0.61	-0.71	-1.41	-1.30	13.21	12.58	6.29	10.06	11.39	0.63	-1
Ger10Y Ger2Y	BondSpread	0.32	1.94	1.79	-0.03	71.70	98.74	95.60	36.48	84.18	98.73	1
SW10Y SW2Y	BondSpread	1.02	0.48	0.94	0.35	89.94	64.15	80.50	51.57	67.72	99.37	1
JA10Y JA2Y	BondSpread	2.77	-0.41	-0.26	0.46	99.37	22.64	32.08	55.97	39.87	92.41	1
NZ10Y NZ2Y	BondSpread	0.53	0.62	0.56	-0.16	77.36	71.70	62.89	32.08	55.06	91.14	1
BTP Bund	Credit	0.24	0.57	0.66	0.53	68.55	69.81	67.30	57.23	72.15	93.67	1
Bono Bund	Credit	0.33	0.89	1.55	1.46	72.33	83.02	91.19	84.28	90.51	100.00	1
PGB Bund 10Y	Credit	1.20	0.11	0.29	0.40	92.45	45.91	53.46	54.09	57.59	96.84	1
EM Corp HY	Credit	0.14	0.89	1.13	1.05	61.01	82.39	84.28	76.73	85.44	95.57	1
EM Sovs HY	Credit	-0.24	-0.83	-0.37	-0.36	28.30	10.69	28.93	27.67	22.15	5.06	-1
EM Frontier	Credit	-0.15	-1.70	-1.32	-1.14	35.85	0.63	8.18	13.21	9.49	3.16	-1

Source: J.P. Morgan

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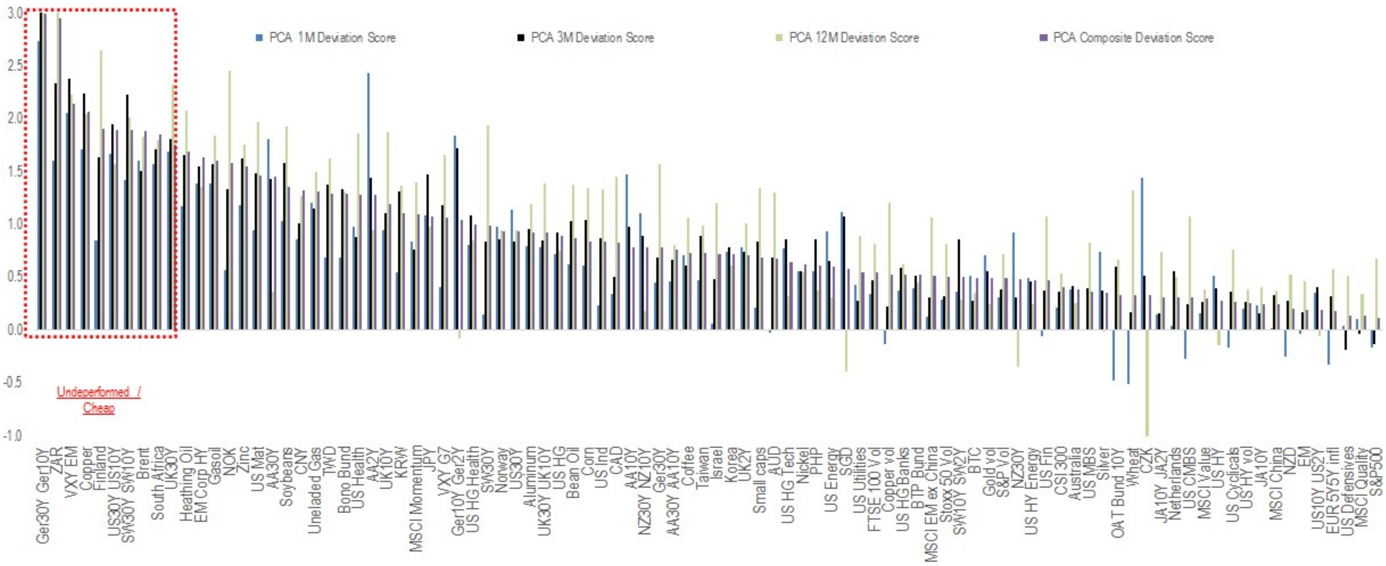
Figure 4: Top half

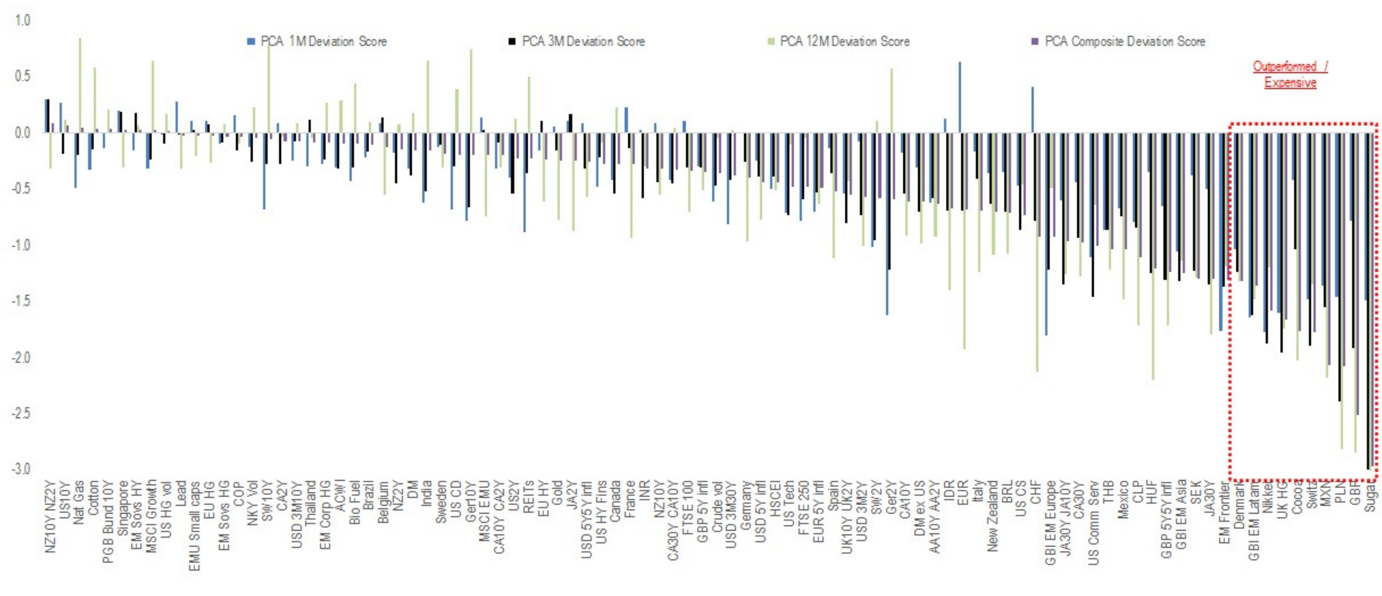
PCA 1M, 3M, 12M and Composite deviation scores. Markets sorted by Composite score. A higher (lower) value indicates markets have underperformed (outperformed).



Source: JP Morgan

Figure 5: Bottom half

PCA 1M, 3M, 12M and Composite deviation scores. Markets sorted by Composite score. A higher (lower) value indicates markets have underperformed (outperformed).



Source: JP Morgan

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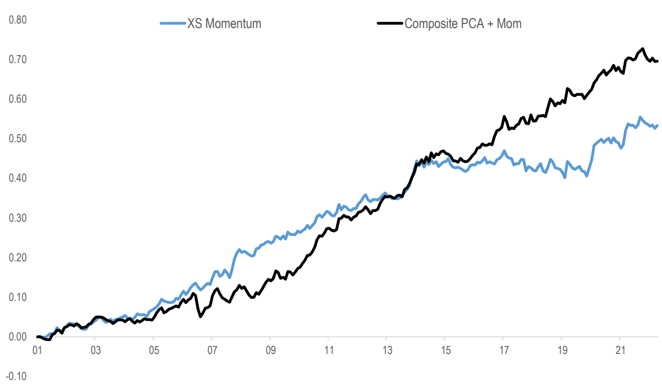
Signal generation and backtesting

The current strategy builds market-neutral portfolios. The framework combines Value and Momentum via various signals and construct a market neutral portfolio with 15 long and 15 short positions in the cross-asset space. All positions are leveraged, and positioning is scaled based on risk. The two pillars of the strategy are described below:

- **Momentum** is tracked via a momentum score. In this implementation we shift to a new measure of momentum that is less dependent on a single lookback period as it actually mixes various lookback periods.
- **Value** is measured by our PCA deviation signal. Importantly, this definition of Value is not fundamental, but it is statistical and it is mostly relevant to tactical investors. At a high level, the signal highlights to what extent prices/yields/spreads have deviated from the factors driving the price action over a certain period (we use three i.e. 1M, 3M and 12M) and therefore could be subject to mean reversion. We refer to our original note for more explanation on the construction/rationale behind this framework but we flag that the baseline strategy now relies on a regularization.

Figure 6: 6The combined strategy outperforms momentum

Cumulative return (vol scaled) for momentum and Composite PCA + Momentum



Source: J.P. Morgan

Figure 7: Performance statistics are strongest for the combined version

Performance statistics

	Average	Volatility	Max DD	Sharpe
XS Mom	2.5%	3.2%	-6.8%	0.77
1M PCA	-0.3%	2.2%	-16.3%	- 0.15
3M PCA	0.0%	2.3%	-13.1%	- 0.02
12M PCA	-0.5%	2.2%	-16.0%	- 0.23
Comp PCA	0.0%	2.3%	-15.4%	- 0.02
1M PCA + Mom	2.3%	2.6%	-4.2%	0.86
3M PCA + Mom	2.8%	2.7%	-4.4%	1.04
12M PCA + Mom	2.3%	2.7%	-4.4%	0.86
Comp PCA + Mom	2.6%	2.6%	-4.7%	1.01

Source: J.P. Morgan

The backtesting results are strong from both an absolute and relative perspective. Our backtest is on the 2002-2023 sample period but the data starts in 1999 as the first few years are needed to initialize models. For the baseline strategy we use 15 long and 15 short positions (all vol sized), 2.5bp transaction costs and 1 month for holding/ rebalancing period. The combined strategy relies on both Momentum and Value (based on 1M, 3M and 12M lookbacks). Performance has been strong from both an absolute and relative perspective. The strategy achieves a Sharpe around 1.00 and a Max dd to vol ratio below 2. More importantly, the profile of the cumulative return chart remains upward sloping and it has not flattened materially overtime (a common problem with many strategies that have become well understood/exploited). Interestingly, the results are also solid from a relative perspective. The combined strategy has better risk-adjusted performance metrics (Sharpe and ratio of max dd to vol) and a more attractive cumulative return profile that the analogous version solely based on Momentum or PCA deviation (Figure 5 and Figure 6).

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Figure 8: Combination of Value and Momentum is better than the individual strategies because of low correlation

Correlation matrix between return of L/S strategies and asset class returns

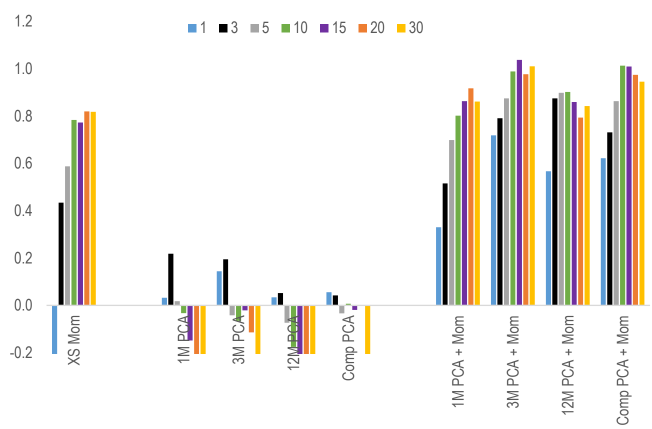
	Momentum	1M PCA Deviation	3M PCA Deviation	12M PCA Deviation	Comp PCA Deviation	1M PCA Dev+ Mom	3M PCA Dev+ Mom	12M PCA Dev+ Mom	Comp PCA Dev + Mom	Equities	Bonds
Momentum	1.00	- 0.42	- 0.57	- 0.65	- 0.58	0.72	0.69	0.72	0.70	0.03	0.06
1M PCA deviation	- 0.42	1.00	0.83	0.53	0.81	0.02	0.01	- 0.14	0.02	0.19	- 0.01
3M PCA deviation	- 0.57	0.83	1.00	0.74	0.93	- 0.19	- 0.15	- 0.22	- 0.15	0.15	- 0.02
12M PCA deviation	- 0.65	0.53	0.74	1.00	0.81	- 0.42	- 0.32	- 0.24	- 0.29	0.10	- 0.11
Comp PCA deviation	- 0.58	0.81	0.93	0.81	1.00	- 0.23	- 0.17	- 0.21	- 0.15	0.13	- 0.07
1M PCA Dev+ Mom	0.72	0.02	- 0.19	- 0.42	- 0.23	1.00	0.89	0.72	0.88	0.18	0.07
3M PCA Dev+ Mom	0.69	0.01	- 0.15	- 0.32	- 0.17	0.89	1.00	0.86	0.96	0.10	0.11
12M PCA Dev+ Mom	0.72	- 0.14	- 0.22	- 0.24	- 0.21	0.72	0.86	1.00	0.89	0.06	0.04
Comp PCA Dev + Mom	0.70	0.02	- 0.15	- 0.29	- 0.15	0.88	0.96	0.89	1.00	0.14	0.07
Equities	0.03	0.19	0.15	0.10	0.13	0.18	0.10	0.06	0.14	1.00	- 0.24
Bonds	0.06	- 0.01	- 0.02	- 0.11	- 0.07	0.07	0.11	0.04	0.07	- 0.24	1.00

Source: J.P. Morgan

In our view, the intuition behind the solid performance of the combined strategy is clear. Simply buying/selling a market because it is cheap/expensive (i.e. solely based on PCA deviation signal) shouldn't lead to an attractive risk-adjusted return profile. The cheapest/most underperforming assets aren't always Value trades or Value investments, but they could very well be Value traps. Similarly, those selling expensive/ outperforming assets are at risk missing out (think of Tech over the past decade). However, combining the PCA value/dislocation signals with momentum yields a stronger result because it effectively filters out lower quality trades and therefore lower the risk of committing the mistakes describe above. From a different perspective, the combined strategy gives robust results because our PCA deviation and Momentum strategies are negatively correlated (Figure 7).

Figure 9: The momentum/dislocation strategy is robust to different number of long/short positions

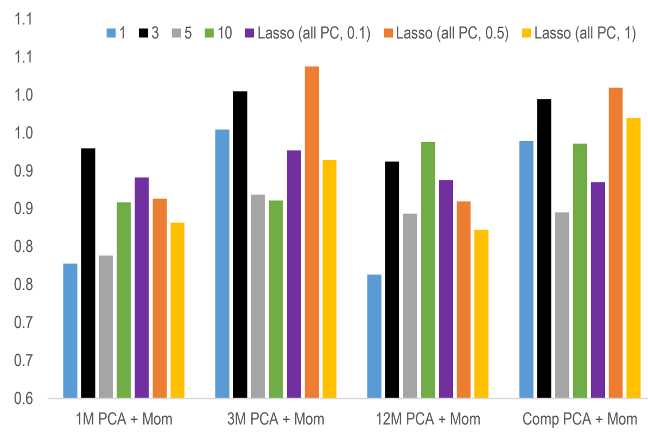
Sharpe Ratio vs number of long/short positions



Source: J.P. Morgan

Figure 10: but also different assumptions for the number of PCs

Sharpe ratio vs number of components



Source: J.P. Morgan

The results are also robust to alternative parameter specifications. Here we look at the how sensitivity/robust are the results of the backtest to variations in key strategy parameters**.**

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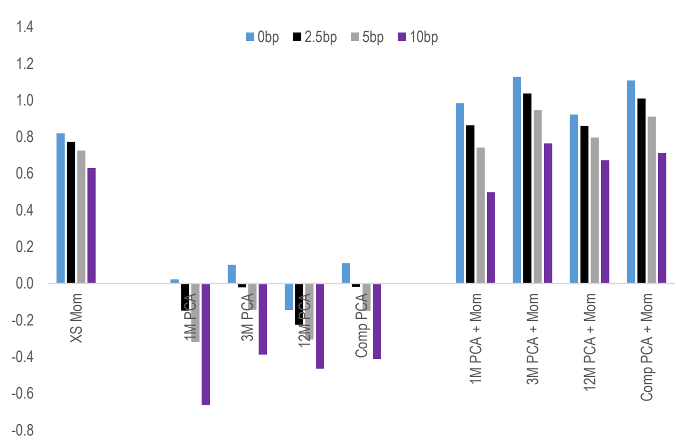
- First, we look at different options for the **number of long/short positions**. We run PCA with 1, ,3, 5, 10, 15, 20, and 30 positions on both the short and long legs**.** In general, results are robust (Figure 8). The combined strategy always does better than Momentum and the improvement in performance is stable around 0.2/0.3 in Sharpe ratio terms. Interestingly we observe that the PCA deviation strategy tends to improve when number of positions falls.
- Second, we consider different **number of PC**. Here we consider a range of options. We run standard PCA with 1, 3, 5 and 10 components alongside a Lasso version with all components but different choices for alpha (i.e. the parameter that controls strength of regularization). In general, the Lasso PCA formulation works better although using a small number of components (e.g. 3) does well too.
- Third we look at different assumptions for **transaction costs** (0, 2.5bp, 5bp and 10bp). Unsurprisingly performance drops with more expensive transaction costs. However, the strategy remain profitable even when these costs become extreme.
- Finally, we also looked at results of applying the strategy in each **asset class** separately. It is encouraging that the results also hold up here although they are generally weaker than the Cross Asset version. There are competing explanations for this. It could be that in some cases we don't have enough markets to make the strategy work efficiently (e.g. only 20 commodities markets vs about 160 markets for the Cross Asset version). It could also be that the cross asset element of the strategy is one of the key ingredients. Trading different asset classes enable the strategy to profit from strong momentum relative momentum across asset classes. Also, it is possible that strategies are less popular and explored than those that are more asset class specific. Hence, by being less exploited, there is more potential alpha on the table.

Figure 11: Results also holds with more demanding transaction cost assumptions

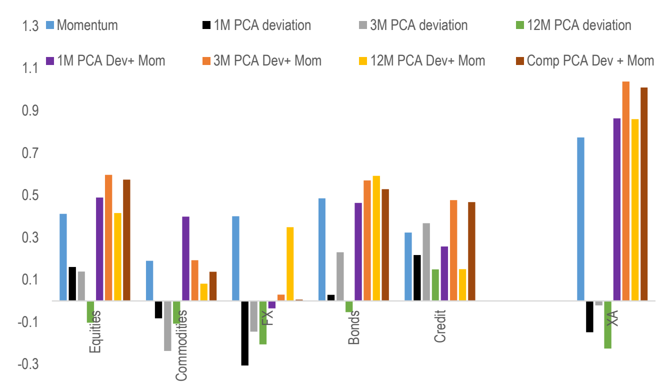
Sharpe Ratio vs trading cost assumptions



Source: J.P. Morgan

Figure 12: Finally, the strategy also works when done at the asset class level

Sharpe ratio of momentum vs combined strategy implemented separately in each asset class



Source: J.P. Morgan

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Conclusions

There are some final caveats to keep in mind. First, despite the latest changes, the framework has many remaining limitations. Perhaps the most important is the assumption of equilibrium at the start of each period. Effectively, this means that the model ignores any existing (longer-term) dislocation that is present at the start of the lookback period. Second, the framework combines Momentum and Value but does not include other likely relevant factors such as Carry. Finally, it is important to note that we will always view the signals from the strategy in the context of the fundamental picture, and our house view will be our criteria to clarify which of these dislocations are truly meaningful. Said differently, our house view will be the filter to separate Value Trades and Value Investments from Value Traps. Looking at the current environment, our house view remains bearish on stocks for a number of reasons. We have never had a yield curve so inverted and managed to avoid a recession. Stocks are expensive relative to real yields margins are in the process of rolling over. Finally, the banking stress we've seen in the US and Europe is the symptom of many years of easy money policy, which has now come to end thanks to the brutal hiking cycle. Rallies during yield curve inversion are not to be trusted given based on the historical precedents. So even as policy measures on the regional banks may reassure investors in the near-term that the current issues are resolved, there are a number of carry trades that could falter, and it is not possible to backstop them all. As such, in the midst of the current stock market correction, it is very possible to find things that the PCA mechanically thinks are 'oversold', but our view overall is to treat relief bounces as selling opportunities. So the advice of the PCA framework is not to be blindly followed. Of course, on a longer run perspective, the PCA framework is systematic and attempts to produce a respectable Sharpe ratio even without judgment or excessive parametrization, so we appreciate it for what it can do well: draw attention to things we might otherwise have missed. But we also stay alert to its shortcomings.

Cross Asset Strategy series

- *Meet CACTI, Our Cross Asset Crisis Tracking Indicator*from Apr 2023
- *3Y to 5Y Capital Market Assumptions: Stick to the late cycle playbook amid noisy macro and range-bound markets* from Mar 2023
- *Capital Market Assumptions: Robust modelling of 3Y to 5Y expected returns – Bayesian vs Traditional* from Dec 2022
- *Applied Portfolio Construction Research: Can you time your optimization technique?* from Oct 2022
- *What can save the 60/40?* from Jul 2022
- *What if the mean reverts?* from May 2022
- *Mind the gap in vol* from Mar 2022
- *The dislocations you shouldn't miss*from Feb 2022
- *Rising Rates and the 60/40*from Jan 2022
- *Systematic TAA based on market dislocations* from Dec 2021
- *Volatility risk premia and the 60/40* from Sep 2021

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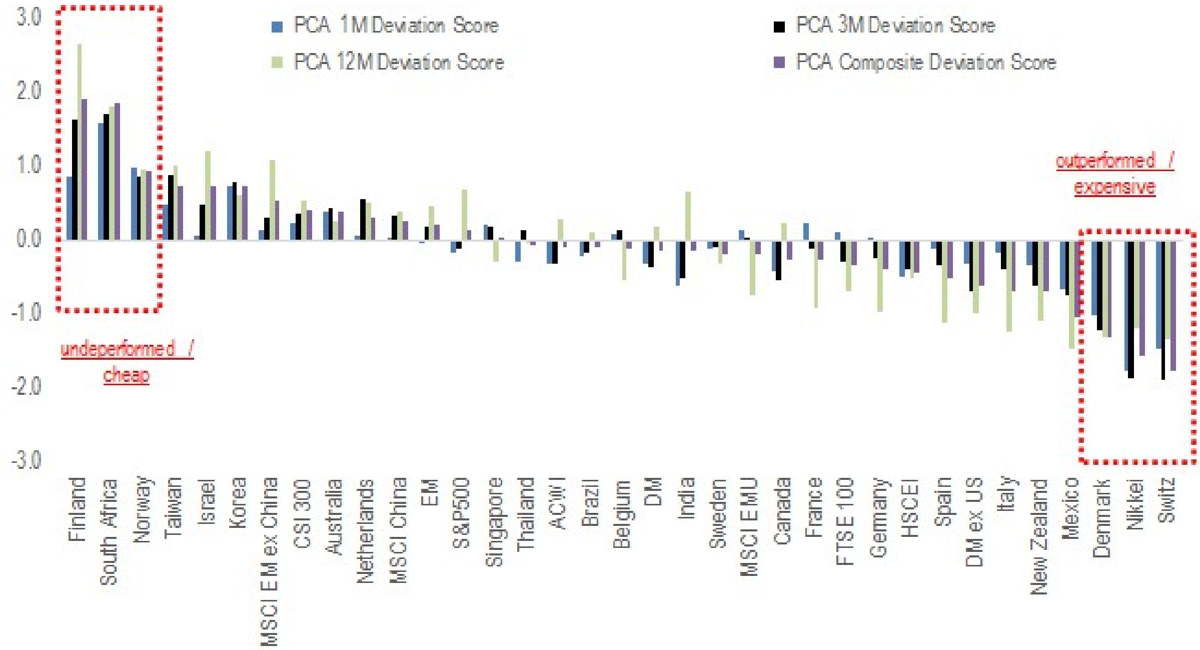
Appendix: Equities

Figure 13: Equities (regions)

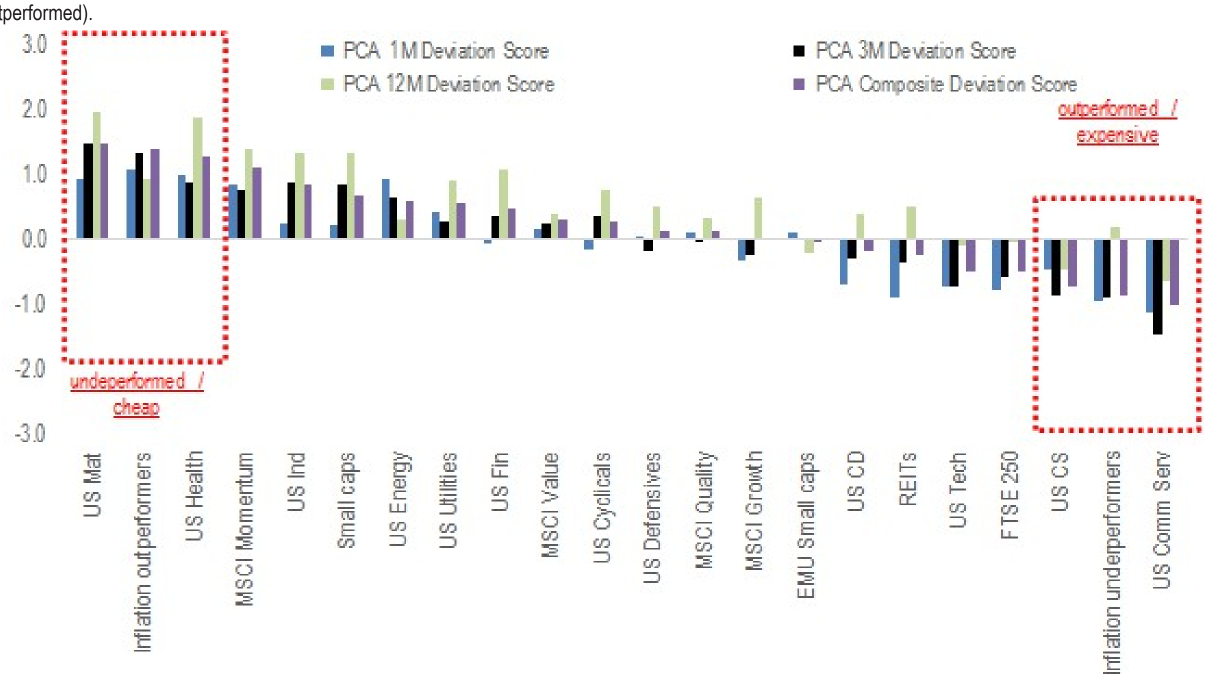
PCA 1M, 3M, 12M and Composite deviation scores. Markets sorted by Composite score. A higher (lower) value indicates markets have underperformed (outperformed).



Source: JP Morgan

Figure 14: Equities (sector, style, themes)

PCA 1M, 3M, 12M and Composite deviation scores. Markets sorted by Composite score. A higher (lower) value indicates markets have underperformed (outperformed).

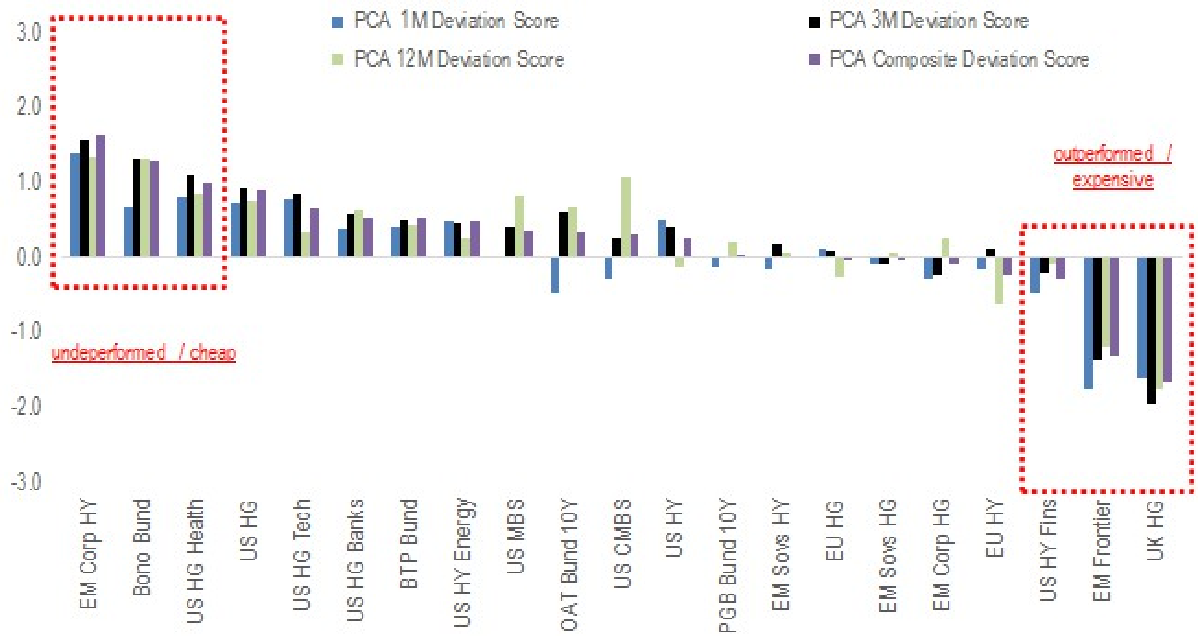


Source: JP Morgan

Appendix: Credit & Vol

Figure 15: Credit

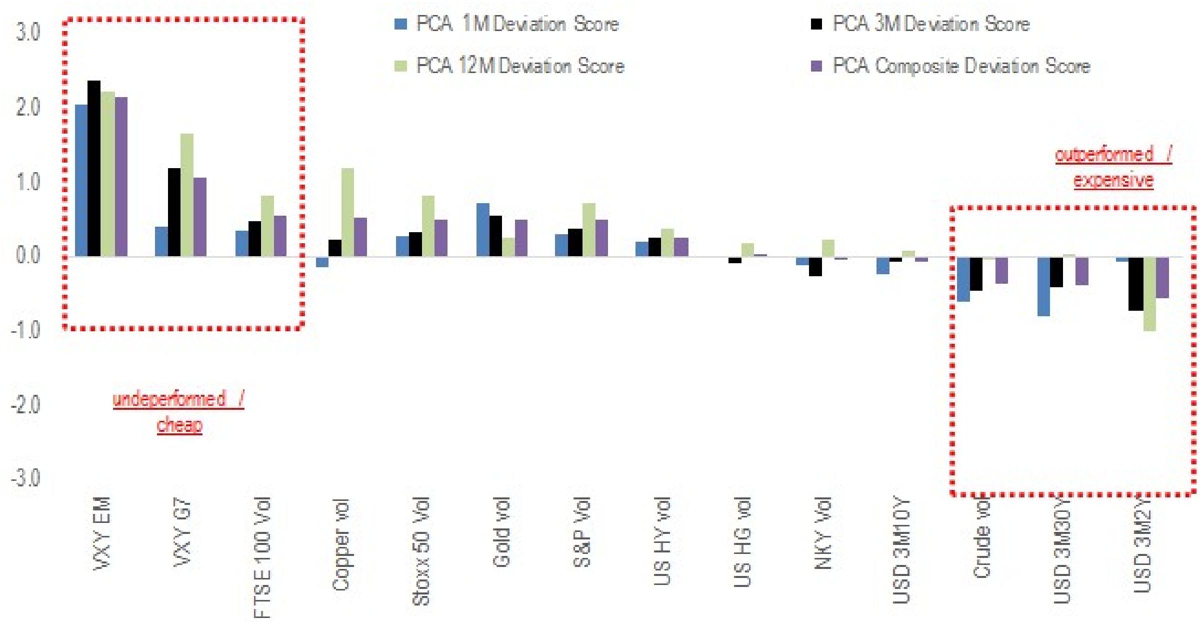
PCA 1M, 3M, 12M and Composite deviation scores. Markets sorted by Composite score. A higher (lower) value indicates markets have underperformed (outperformed).



Source: JP Morgan

Figure 16: Volatility

PCA 1M, 3M, 12M and Composite deviation scores. Markets sorted by Composite score. A higher (lower) value indicates markets have underperformed (outperformed).



Source: JP Morgan

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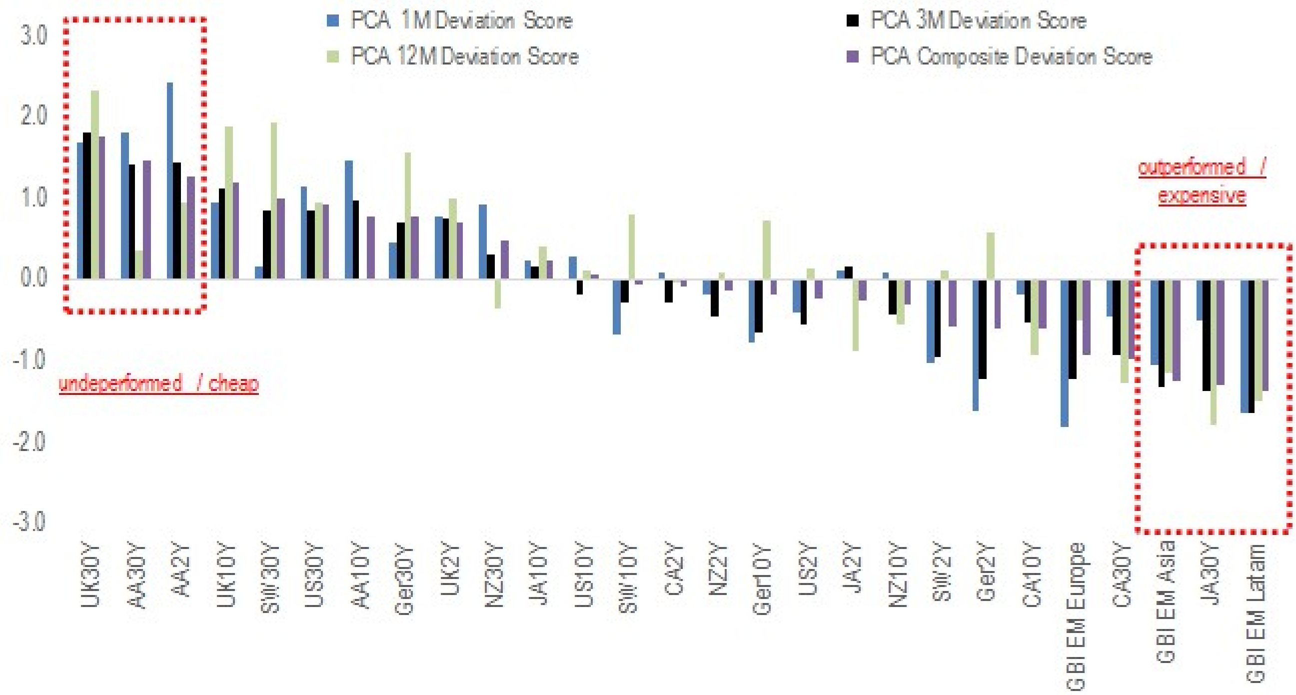
Appendix: Bonds, Curves and Inflation

Figure 17: Bonds (DM and EM regions)

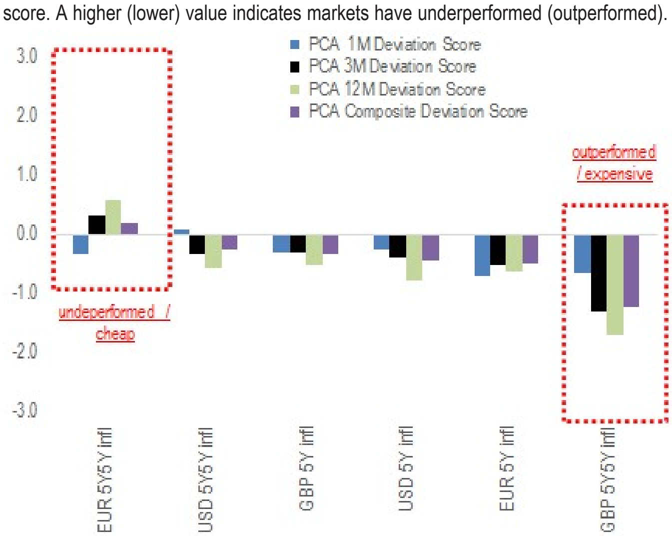
PCA 1M, 3M, 12M and Composite deviation scores. Markets sorted by Composite score. A higher (lower) value indicates markets have underperformed (outperformed).



Source: JP Morgan

Figure 18: Inflation (G4)

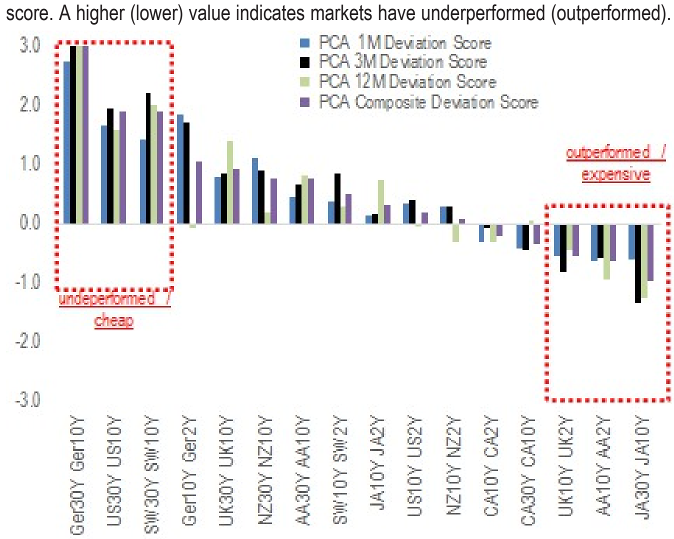
PCA 1M, 3M, 12M and Composite deviation scores. Markets sorted by Composite score. A higher (lower) value indicates markets have underperformed (outperformed).



Source: J.P. Morgan

Figure 19: Curves (DM)

PCA 1M, 3M, 12M and Composite deviation scores. Markets sorted by Composite score. A higher (lower) value indicates markets have underperformed (outperformed).



Source: J.P. Morgan

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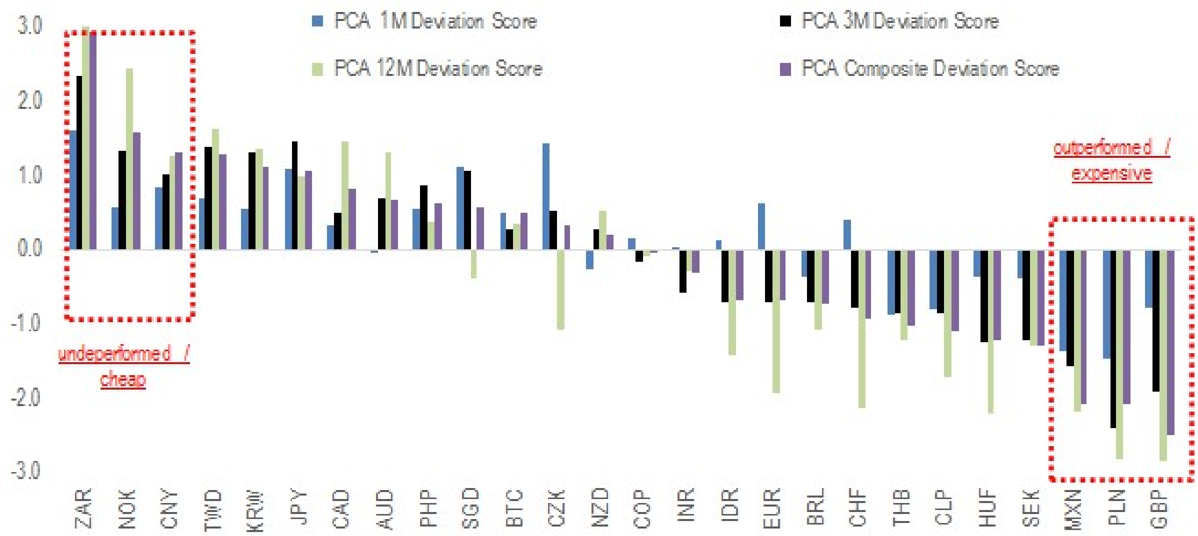
Appendix: Currencies and Commodities

Figure 20: Currencies

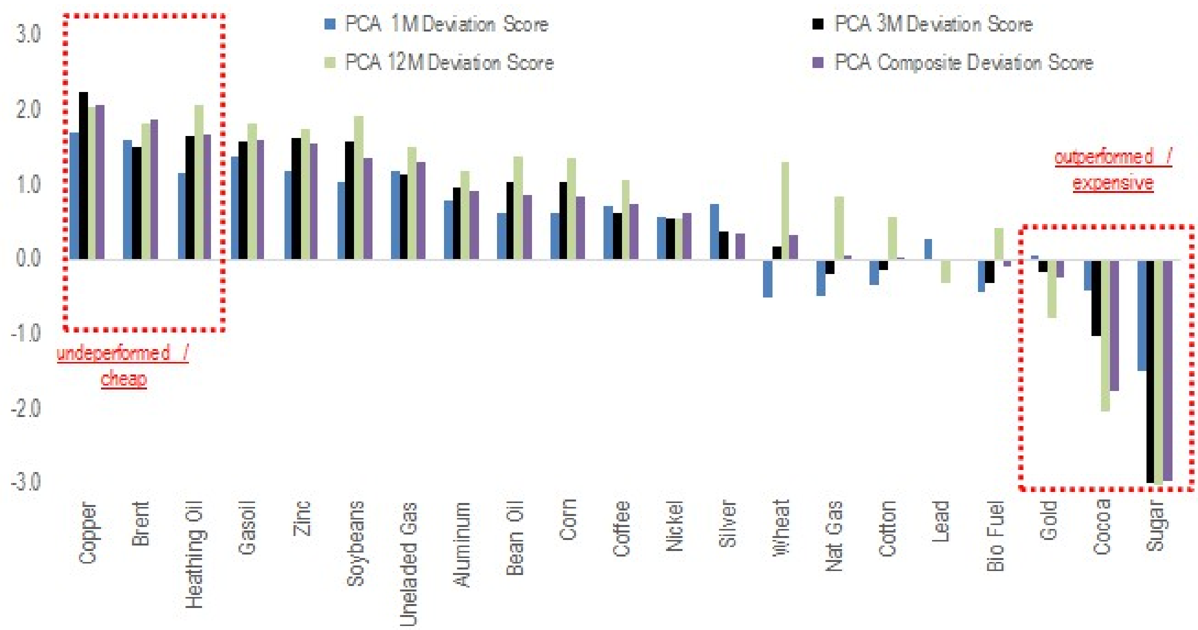
PCA 1M, 3M, 12M and Composite deviation scores. Markets sorted by Composite score. A higher (lower) value indicates markets have underperformed (outperformed).



Source: JP Morgan

Figure 21: Commodities

PCA 1M, 3M, 12M and Composite deviation scores. Markets sorted by Composite score. A higher (lower) value indicates markets have underperformed (outperformed).



Source: JP Morgan

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