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What are the potential drivers of currency returns in periods of market stress?

Using CLS alternative data up to October 2020 and the causaLens AI platform, we are providing insights into current FX market dynamics during risk-off and risk-on periods.

Q1/2021 | Data insights

In the study, we analyze whether the two periods share any common indicators and examine the potential impact on currency movements.

Risk-off periods and market reaction

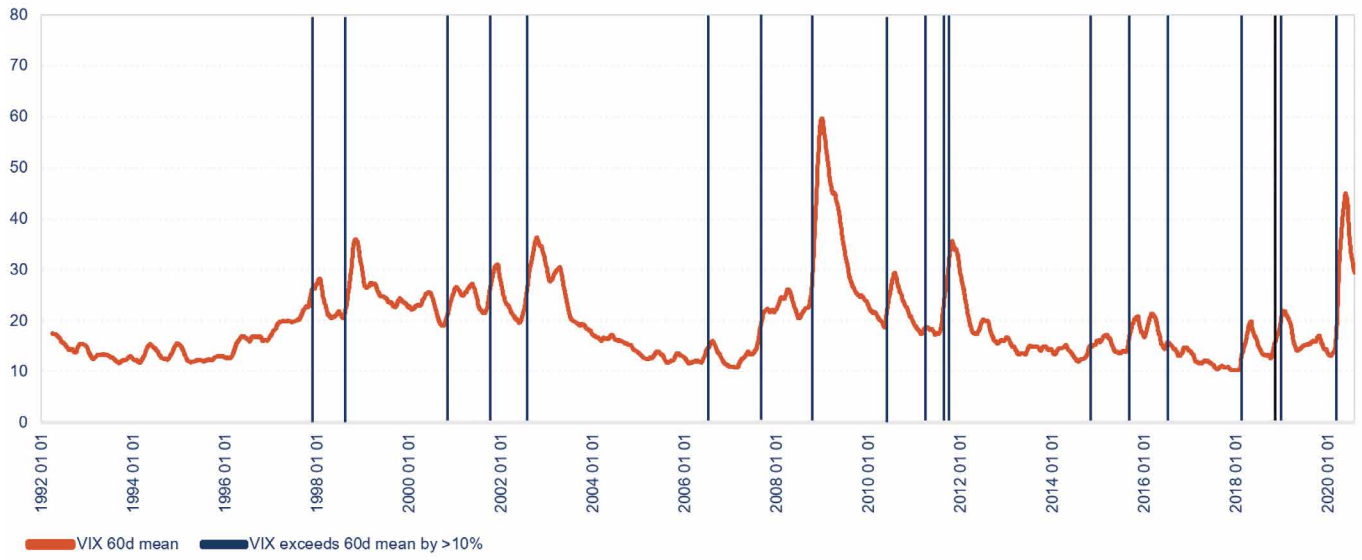
During periods of turbulent financial market conditions, investors tend to move away from riskier assets. The term "risk-off" is used to describe the risk sentiment where traders and investors reduce their exposure to risk and shift their focus to protecting their capital. A typical reaction during such risk-off events is to sell risky assets such as equities, corporate bonds and emerging market currencies, and buy safe havens such as gold, government bonds and the US dollar (USD).

Historically, such episodes of "risk-off" behavior follow a variety of economic events, such as periods of financial market stress, uncertainty around central bank policy and contracting economic data. Returns on currencies against the USD tend to be strongly correlated with each other during these stressed market periods as overall diversification across asset classes shrinks.

The most commonly used indicator of market turbulence is the so-called "fear index" – the VIX index (VIX). A risk-off episode is when the VIX moves 10 percentage points above its 60-day backward-looking moving average. In Figure 1, the start of the risk-off episode is indicated by the navy vertical lines. The clustering of such events is observed in the chart suggesting the VIX is characterized by periods of multiple risk-off episodes followed by calmer periods.

Figure 1: VIX 60-day moving average and start dates of risk-off episodes

60-day moving average of the VIX index along with periods where the VIX exceeded its 60-day moving average by more than 10%.



Currency behavior – normal periods versus risk-off episodes

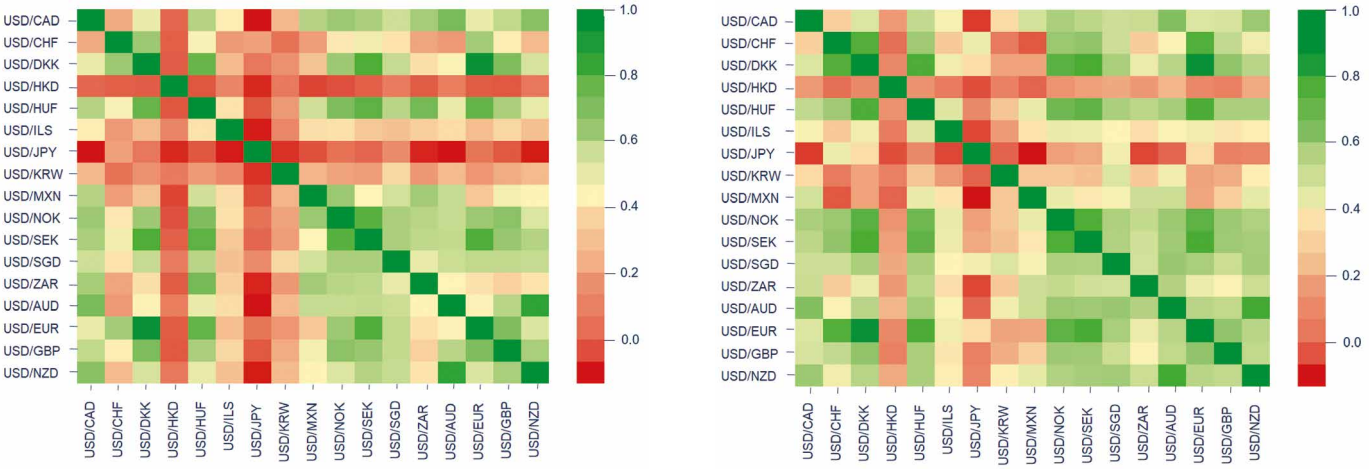
Risk-off episodes are also characterized by their impact on investor appetite for the USD. Figure 2 shows the correlation between daily spot returns for USD crosses, allowing us to examine how USD crosses correlate with each other during normal periods and risk-off episodes.

During risk-off episodes, USD crosses are strongly correlated with each other. This herd behavior is indicative of investor appetite for risk with a definitive flow away from riskier currencies to the perceived safety net of the USD.

The results indicate that only the Japanese yen (illustrated by light red and dark red boxes in Figure 2) bucks the trend and negatively correlates with the other currency pairs.[1]

Figure 2: 5-day returns during the full period 5-day returns during risk-off periods

Correlation coefficients between daily spot returns for the US dollar against various major currencies over the full period (left) and in risk-off episodes during that period (right).



Results

Apart from the JPY,MXN,KRW & ILS, the results show that other USD crosses behave uniformly during risk-off episodes illustrated by the increase of green colors at the bottom right hand corner. Below we examine potential drivers influencing this behavior and any common factors that correlate to the direction of USD movement.

1. The Hong Kong dollar behavior is not included as it is skewed by the USD currency peg.

Methodology

Signal testing – what factors drive currency returns during risk-off episodes?

causaLens's AI Platform processes a variety of economic factors and carries out predictive signal discovery at scale. By examining various economic factors we improved our understanding of what was influencing currency returns during risk-off episodes. For the purpose of this analysis, the following factors were included:

Fundamentals
- The country's current account balance
- International investment position
- Policy interest rates

Market risk and liquidity
- FX rate sensitivity (beta) with respect to VIX
- Volume beta with respect to VIX
- FX rate beta with respect to AUD/JPY
- Bid-ask spread
- Absolute spot return on an FX rate to its dollar volume (the Amihud ratio)
- Ratio of realized volatility of FX rate to its dollar volume

Based on FX options prices
- Implied volatility
- Risk reversal

Most of these factors are well known and widely used by applied researchers. However, prior to the release of CLS alternative data, volume-based liquidity factors were not sufficiently examined in relation to currency rates because such global FX volume data was not readily available.

The signal testing feature of the causaLens platform ranked each of the factors according to their correlation with returns during risk-off periods. Returns were calculated over 5, 10, 20 and 30-day analysis windows. By limiting the evaluation window from 5 to 60 days, we were able to test the robustness of any significant drivers and, in particular, identify behavioral changes between short term (5- and 10-day) and long term (20- and 30-day) analysis windows.

Results

The results for the short-term signal testing windows are shown in Figures 3 and 4. We found that after a risk-off episode was triggered, the USD returns were predominantly explained by volatility indicators such as the VIX and overall USD spot volume. As Figures 5 and 6 indicate, these same factors also persisted over the longer 20- and 30-day analysis windows, indicating that the knock-on effect on USD markets can reverberate for longer than the initial risk-off episode.

Figure 3: USD returns 5-days ahead

Factors for USD currency returns over 5 days in risk-off periods, as discovered using causaLens signal testing.
Significant absolute scores based on the corresponding p-value after adjusting for multiple significance tests are shown in dark blue.

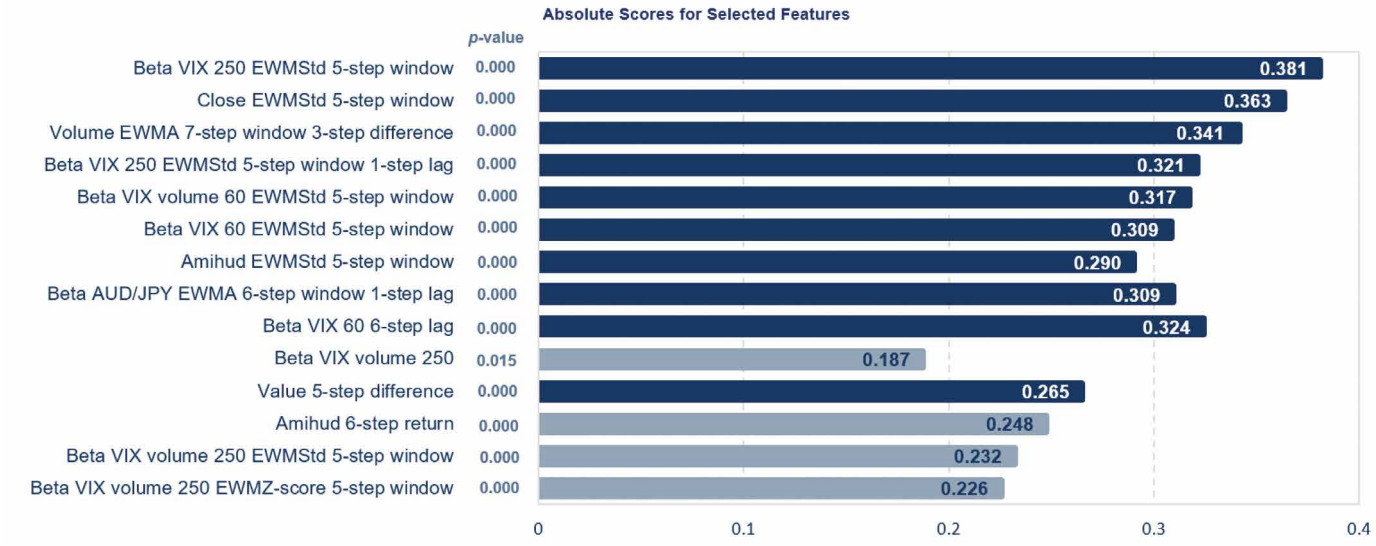


Figure 4: USD returns 10-days ahead

Factors for USD currency returns over 10 days in risk-off periods as discovered using causaLens signal testing. Significant absolute scores are shown in dark blue.

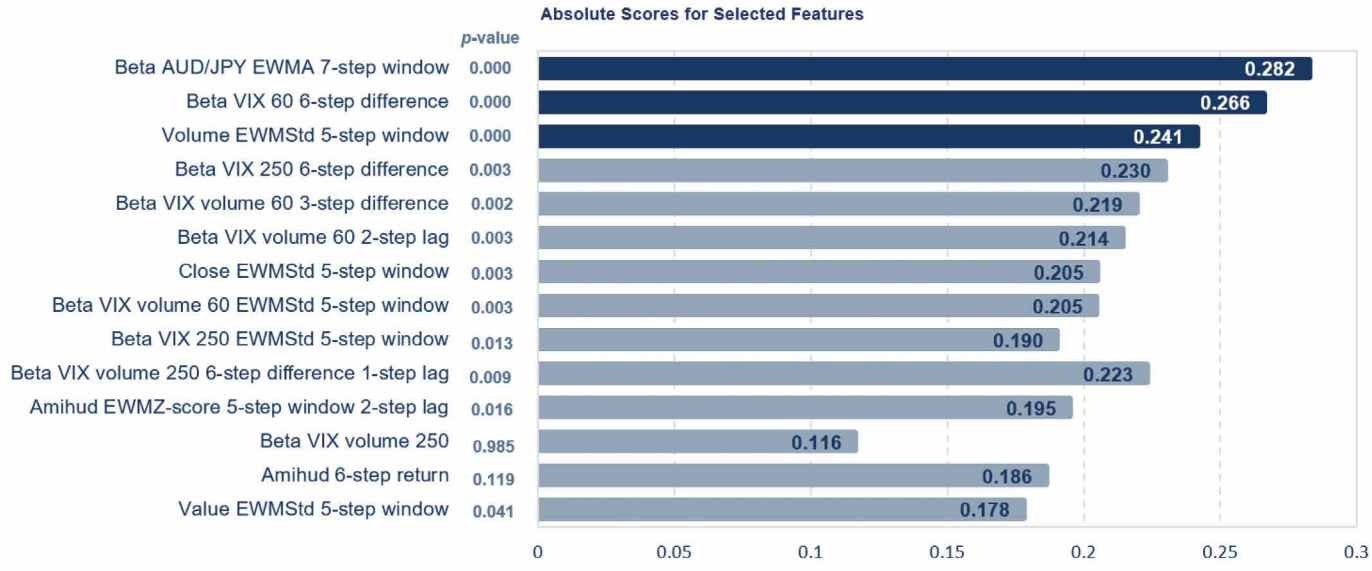


Figure 5: USD returns 20-days ahead

Factors for USD currency returns over 20 days in risk-off periods as discovered using causaLens signal testing. Significant absolute scores are shown in dark blue.

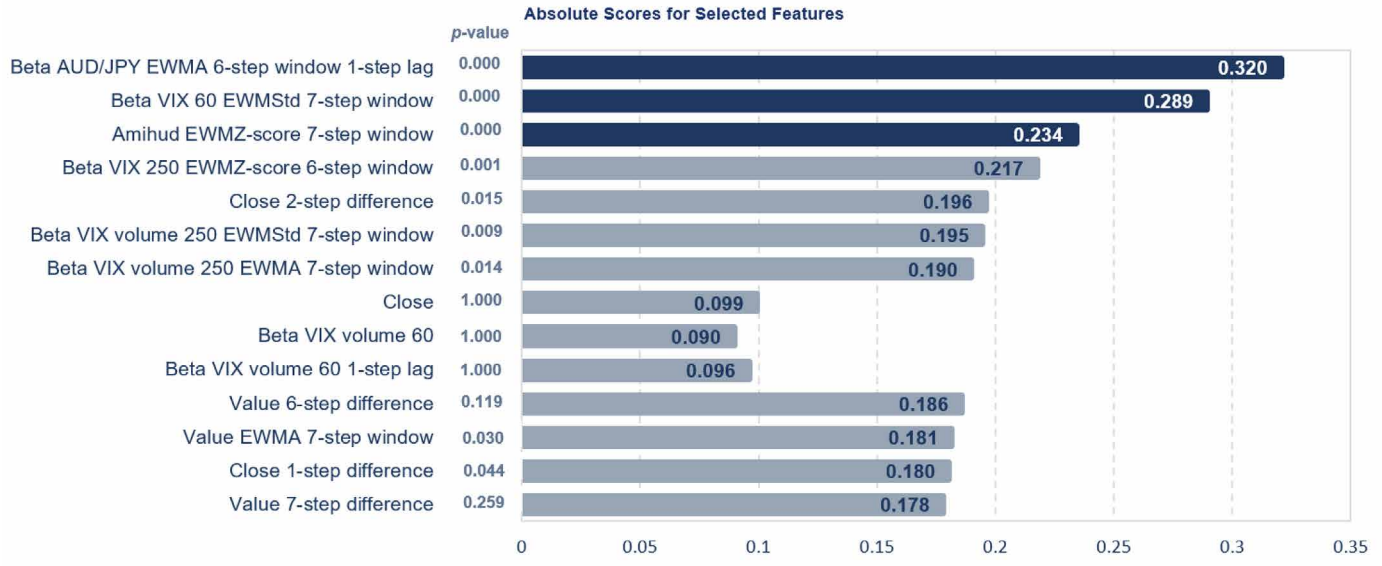
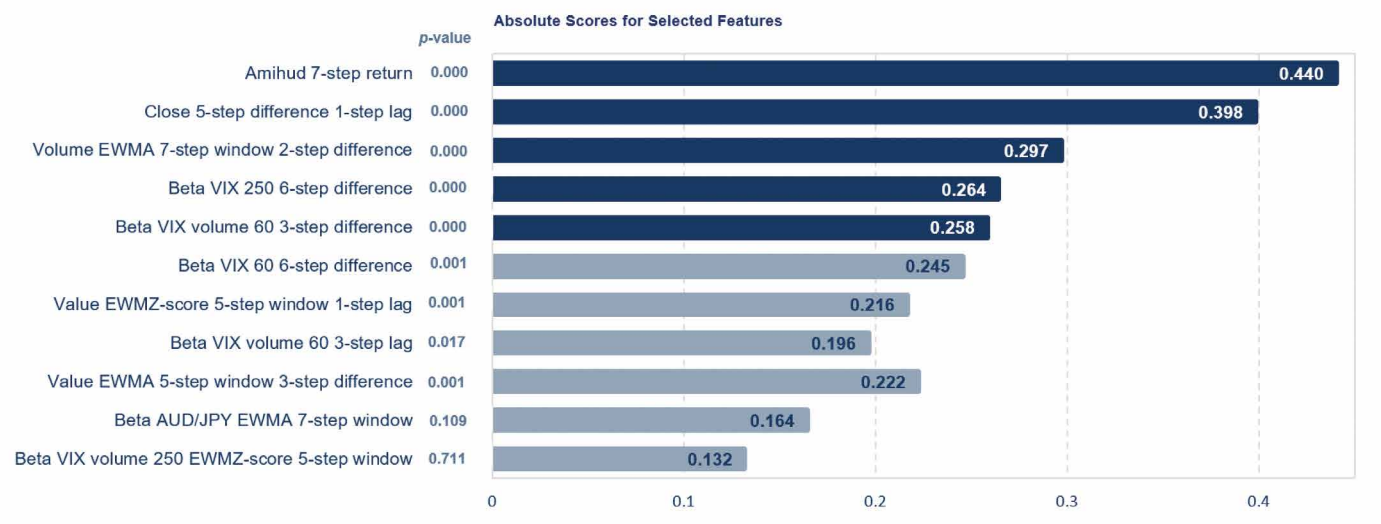


Figure 6: USD returns 30-days ahead

Factors for USD currency returns over 30 days in risk-off periods as discovered by causaLens signal testing. Significant absolute scores are shown in dark blue.



Conclusion

Financial markets have faced significant uncertainty in 2020 due to the Covid-19 global pandemic. As the uncertainty continues into 2021, market participants have an increasing need to leverage insights from data to better inform their decision-making processes.

Identifying periods of risk-off and risk-on behavior is a first step in understanding the shift in market dynamics. Investors and quantitative researchers can then construct a group of explanatory factors to use as the foundation for examining the effect of the market stress on various financial instruments.

In this study the causaLens platform and its machine learning based predictive technology generated advanced explanatory features for currency movement. Specifically, we found a statistically significant correlation between FX volume-based features and FX rate directions and their trajectories during the risk-off period. This suggests that by including CLS's FX volume data in trading models, market participants could potentially calibrate their strategies more effectively, especially during periods of market stress.

Background on data:

Since its launch in 2002, CLS has warehoused its market data by instrument (swap, spot, outright forward) for the 18 currencies it settles across 33 major currency pairs, creating the largest single aggregated source of FX executed trade data available to the market.

CAUSALENS

Background on the causaLens AI platform:

causaLens is pioneering a completely new approach to time-series prediction. Almost all current machine learning approaches, including AutoML solutions, severely overfit on time-series problems and therefore fail to unlock the true potential of AI for the enterprise. causaLens was founded with the mission to devise Causal AI, which does not overfit, and so provides far more reliable and accurate predictions. The platform also includes capabilities such as autonomous data cleaning and searching, autonomous model discovery and end-to-end streaming productization.*

* Source: causaLens website

CLS helps clients navigate the changing FX marketplace – reducing risk and creating efficiencies. Our extensive network and deep market intelligence enable CLS specialists to lead the development of standardized solutions to real market problems. Our innovative, forward-looking products make the trading process faster, easier, safer and more cost-effective – empowering our clients' success.

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