J.P.Morgan

Global Quantitative and Derivatives Strategy
16 June 2020

2020 JPM Macro Quantitative and Derivatives Conference

Summary of Conference Presentations, Client Survey on Macro Outlook, Quant Investing and Alt Data / AI

J.P. Morgan hosted its 21st annual—and first virtual—Macro Quantitative conference on June 10. The conference was attended by ~3,400 investors representing ~1,400 institutions from across the world. The conference featured presentations from Asset Management One, BWGI, GSAM, Man AHL, Scientific Beta, Stanford, Trans-Canada Capital, Universa, UPS Pension, and Welton. Speakers at the conference deliberated on various aspects of Quant Investing including tail risk hedging, challenges facing Quant Investing industry, benefits of systematic macro strategies, impact of forever QE, the future of Value investing, alternative risk premia strategies, big data, machine learning, AI awakening, and its future. In this report, we have summarized the conference presentations highlighting the key insights from each talk. If you are interested in getting conference replays and approved presentations, please contact amanda.greenfield@jpmorgan.com.

We also conducted a survey asking our clients about their views on current macro conditions and future expectations, trends within the Quant industry, outlook on asset flows, risk management and adoption of volatility scaling, application of big/alternate data, and machine learning. Survey result details are provided on page 24.

- In terms of the macro outlook, almost 50% of investors expect a "W" shaped economic recovery and less than 20% expect a "V" shaped recovery. The biggest market concern remains a second wave of COVID-19. Only 18% of the investors expect S&P 500 to finish the year above 3,400, with the majority seeing it between 3,000 and 3,400. 45% of the respondents expect the 10-year bond yield to be between 0.5% and 1.0% and only 16% expect it above 1% by year-end. These survey results suggest that positioning / sentiment remains subdued, providing still good potential for upside market surprise.
- Investors perceive a collapse in liquidity as the greatest risk to Quantitative strategies. Other risks include Quant outflows/redemptions and market volatility shocks. Among the various Quantitative approaches, investors expect the largest inflows to be within ESG and CTA (trend following) strategies, while they expect the largest outflows from Risk Parity and Selling Vol strategies. Value style has had a strong run in recent weeks—50% of the respondents expect that to persist but only in the short-term. Less than 20% of investors believe this is the beginning of a longer term Value cycle.
- Volatility scaling has been a big topic within the investment community. Two-thirds of respondents claim to use some form of volatility scaling/targeting within their investment process, with the majority applying volatility scaling at the portfolio level, using a proprietary mix of realized and forward-based volatility measures. For those using realized volatility measures, the most common lookback window applied ranges between two and six months.
- In terms of Big Data/AI Strategies adoption, half of the respondents plan to use it as a tool to either enhance portfolio construction/risk management or existing strategies, while a ~fifth do not plan to use it at all. The number of practitioners (45%) evaluating alternative data sources (1-3) has increased significantly from last year (37%). Half of investors have found at least one "Alternate Data/ML based signal" that yields alpha.

Global Quantitative & Derivatives Strategy

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2020 I.I. All-America Research Poll
Equity Linked (Marko Kolanovic)
Thematic Research (Marko Kolanovic)
Quantitative Research (Dubravko Lakos)
Portfolio Strategy (Dubravko Lakos)

https://voting.institutionalinvestor.com/welcome

Narendra Singh	**US**
Arun Jain	US
Peng Cheng	US
Thomas Murphy	US
Bram Kaplan	US
Bhupinder Singh	US
Kamal Tamboli	US
Dobromir Tzotchev	EU
Khuram Chaudhry	EU
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See page 28 for analyst certification and important disclosures.

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Presentations Summary

With the world enduring pandemic, economic and political crises, Quantitative Investing and Risk Management are facing a challenging environment. The Global Macro Quantitative and Derivatives Strategy team has helped the investors with numerous thematic thought pieces in the recent period: Positioning and low risk of new lockdowns justify buying the dip, Market Risk Outlook, Updated COVID-19 analysis: Nursing homes, Political risks of pandemic, data favors further reopening, COVID-19 forecasts – providing updates and modeling details, S&P 500 back to highs? Quantifying Fed impact on the multiple; Sunshine – a factor in reducing COVID-19 spread, Pandemic in Emerging Markets – examining the positive impact of age, prevalence of BCG immunization, and climate, COVID-19 herd immunity and importance of regional datasets – Gangelt, Faroe, Iceland and UAE; Fed's historic pivot, Passing the apex and forecasting the recovery timeline, Internet of living things – big data can save lives and economies, Political choices and financial forecast, big data and early indications of US pandemic inflection, Great Liquidity Crisis materialized, but expecting some improvement into month-end.

Continuing the efforts to support clients with the most topical discussions the conference was targeted around COVID-19 crisis focusing on tail hedging, various techniques and data sources to help navigate the heightened volatility. The conference was attended by ~3400 investors representing ~1400 institutions from across the world. The conference was moderated by Marko Kolanovic, Global Head of Macro Quantitative & Derivatives Strategy and Dubravko Lakos, Head of US Equity Strategy & Global Quantitative Research. The conference featured presentations from Asset Management One, BWGI, GSAM, Man AHL, Scientific Beta, Stanford, Trans-Canada Capital, Universa, UPS Pension and Welton. Speakers at the conference deliberated on various aspects of Quant Investing: tail risk hedging in light of COVID-19, benefits of systematic macro strategies, impact of forever QE, challenges facing Quant Investing in heightened uncertainty, the future of value investing, risk premia strategies, big data, machine learning, AI awakening and its future, and others. In this report, we have summarized the conference presentations highlighting the key insights from each talk.

In recent years, investors have paid increased attention to Alternate Risk Premia as a source of returns uncorrelated with conventional equity and bond risk premia. Moreover, low global policy rates has inflated the valuations of these traditional assets and depressed their implied premia to decade low levels, adding to the attractiveness of alternate risk premia. In addition, application of Big Data, Machine Learning and Artificial Intelligence to risk premia investing remains a heavily discussed topic. At J.P. Morgan, we have published extensively on these topics, including detailed guides on Cross-Asset Systematic Strategies, Cross-Asset Momentum and Equity Risk Premia Strategies; a primer on Big Data and AI Strategies: Machine Learning and Alternative Data; US Factor Reference Book: Payoffs, Pitfalls and Analysis of 100+ Equity Factors and recently: COVID-19 Composite, 2019 Alternative Data Handbook, Automated Machine Learning, The Value Conundrum, Cross Asset Style Timing, Defensive Risk Premia, The quest for pure equity factor exposure.

Conference Presentations

Keynote Presentation and Discussion

Nassim Nicholas Taleb has had an atypical career path – he first became a trader and then he turned to mathematics to better formulate and express his ideas about tail risk events. Nassim's presentation focused on practical examples that demonstrated the failures of several cornerstones of modern financial theory – law of large numbers, portfolio theory and regression analysis to name just a few. As the sample size is typically not large enough to show tail events occurring investors should aim to clip the tail. Nevertheless, tail risk hedging is not for the novice and experience and details matter a lot. Furthermore, even if the exact recipe is provided, the success of the tail risk hedging requires discipline to sustain losses for a period of time.

The Q&A has revealed Nassim's position on several topical questions. Nassim thinks long vol type of industries are profitable in the long run and as an example he compared the profitability of real estate (long vol) and real estate lending (short vol). If we adapt during the current COVID-19 crisis going forward there will be stronger economic foundations. Businesses and portfolios that have done relatively well during the current COVID-19 period will do even better in the future. From a macro standpoint of view, hyperinflation is a tail risk as inflation can spike up rather quickly. Nassim views the transfer of risk taking from banks prop desks to hedge funds as a healthy development as hedge fund managers have

'skin in the game' and moral hazard is reduced. He likes AI but thinks that will not resolve the fundamental problem of tails in the financial market. Nassim's advice about writing books: write a book in such a way that even if it were written 30 years ago it would still have been interesting and understandable today.

The 3 Enduring Benefits of Systematic Macro; Will They Survive a QE Forever World?

The 3 enduring benefits of systematic macro investing, as presented by the speaker are: (1) fully uncorrelated returns to major asset betas (e.g. S&P 500, global HY, leveraged loans index) and alphas related to the betas; (2) systemic risk returns; (3) high return on deployed capital due to use of efficient instrument (futures, swaps, options). The benefits are captured by following a basic macro framework (data set >> analytical processes >> market forecast) and systemic approach which incorporates other investors' behavior, practices, standards, principal agent effects and data sets. Lastly, capital deployment is completed after incorporating the investor decision function. Several suggestions are offered to make the model durable and anti-fragile. The systems portfolio design is dynamic enough to respond to changing environment (e.g. low interest rate for long periods) by changing allocation in response to central bank's actions (e.g. direct buying of some assets for the first time). The model should remain resilient in forever QE world.

Tail Hedging: Cost, Reliability, Decay and the Need for Diversification

The speaker discussed his organization's hedging program framework. Their approach involves trading-off between 5 pillars: 1) Benefit – the size/frequency of positive returns, 2) Reliability – negative correlation to benchmark downside, 3) Convexity – the size of extreme positive returns, 4) Decay – the speed of giving up hedge gains, and 5) Cost – the size and frequency of negative returns. They create a diversified, dynamic portfolio of hedging strategies that optimizes across these 5 pillars, using an iterative process (Kalman filter) to add/remove/reweight strategies as new information is incorporated. What was different about the COVID-19 market crash from past drawdowns is that it was the shortest and highest volatility drawdown, with the most significant (negative) autocorrelation ever, making it all the more important to adjust from the Black-Scholes assumption of i.i.d. returns. The speaker also discussed implementation of a regime-dependent hedging strategy, where based on identification of the current regime, one can compare the option volatility surface to the empirical distributions within the regime to identify parts of the surface that look rich or cheap.

Weathering COVID-Crisis Turbulence - Multi-Strategy Fund Approach

The speaker describes their multi-strategy approach for the COVID-19-crisis turbulence. It consists of both a systematic (65-75% of risk) and discretionary (25-35%) components including market agnostic (i.e., market neutral), directional (i.e., best beta), beta control (i.e., efficient hedges) and relative value. These strategies together are designed to have uncorrelated returns and Beta control attempts to hedge the tail risks from both beta control and directional components. On the market agnostic side, the speaker cut allocation to vol selling by half in the past two years and also completely cut SX5E dividend strategy. On the directional side, he cut allocation to corporate credit while switching long equity futures to long term calls. On the beta control side, he increased allocation by boosting long variance on equity indices. On the relative value side, he took long positions on short-end US/Canada rates with tactical trading on equity/credit indices. Some of the key lessons from how these strategies played out include: 1) diversify; 2) don't fall in love with strategies; 3) VIX always pays, in the speaker's view; 4) low rates can go even lower; 5) do not overlook hedging when vol is low; 6) stay agile and beware of relative value towards the end of a cycle when correlations are going higher.

The AI Awakening: Implications for the Economy and Investors

The speaker discussed general trends in Machine Learning/AI. He expects that many companies will never go back to their pre-COVID-19 office situations and this prompted many questions about job losses due to automation. In order to answer these questions, his team analyzed the full text of 2 million job postings and used a Machine Learning classifier to try to identify which jobs are likely to be automated away in the near future. They found that while we already have the technology to do much of the work that people are currently doing, there is no occupation which can be completely

automated as of right now. He also addressed questions about what will happen when some of these jobs inevitably do get automated. He says that there is still a large part of the economy where a human is certainly needed such as jobs where human interaction is the focus (coaching, teaching, etc.) and that he expects this sector to grow.

Big Data Panel: Alternative Data in Investing During COVID-19 Crisis

Each speaker gave an introduction to recent developments they have made which can help investors. Armando Gonzalez from Ravenpack showed his COVID-19 Panic Index, Media Coverage Index, and Supply Chain Disruptions Index, all of which were able to quantify the effects of COVID-19 and possibly help investors to identify trading opportunities. Brian Callahan from 1010 Data showed time series of customer spending data such as restaurant spending vs general merchandise spending broken down by state. He noted that the data shows the recovery has been partially delayed by the protests. Thanh-Long Huynh from Quantcube showed satellite imagery data. This allows us to track industrial production in China by looking at pollution, maritime traffic, etc. The company also looks at job opening and tourism data. Andrew Bogan of Bogan Associates discussed his scientific sampling process where he sampled a large number of people from the general population in California to test for COVID-19 and found that the true death rate of COVID-19 is much lower than what the official numbers show.

ARP Risk Management – Theory vs Practice

Speakers discussed ARP risk management and methodologies to predict ex-post risk. At the asset level, a robust vol estimate is necessary to achieve target risk and holding-based vol estimates are better than strategy-based returns in predicting ex-post vol. At a portfolio level, historical vol is better at predicting subsequent risk than look through to current holdings. The speakers also discussed how asset correlations may either be too unstable or on average simply too low to be useful. Since ARP portfolios generally aim to be beta-neutral, to achieve hedge fund-type vol of ~10%, ARP portfolios are required to run 17x average leverage. At this target mean vol, the coincident annual return is ~8%. As realized portfolio vol rises, returns decline as well (i.e. +1SD Vol: coincident annual return is 5.2%, 2SD vol: 2.8%, >2SD: -9.5%). While Vol targeting is a requirement to achieve risk targets, they find that this can change the strategy return distribution during and post-event performance. Since no model can predict exogenous events, they found that drawdown controls are necessary in the long haul.

Intangible Capital and the Value Factor: Has Your Value Definition Just Expired?

The presenter started with an argument that book-to-market is no longer a valid value factor since it does not take the increasingly important intangible assets fully into account. Index providers have combined other accounting ratios to mitigate the problem which may not be the best solution. There are reasons to include intangible assets – it is risky, i.e., has embedded risk premia and there are behavioral biases of investors that also provided excess return. Academics have adjusted book value to include intangible assets. Unlike simple book-to-market factor, which has underperformed other standard value factors, the adjusted factor is shown to outperform them. Also, return of other value factors show significant exposure to quality but the adjusted factor has almost no exposure. Thus, adding adjusted book-to-market improves performance of multi-factor portfolio much more than any other standard value factors.

Investing in Risk Premia in the Face of Increasing Uncertainty

How to approach a stressed market environment? This was the key question under examination for the presentation. Solutions can be: Short risk assets (put-spreads, collars, put replication, trend following, intraday momentum), Long Vol (dynamic approach, relative value such as expensive short dated puts vs. cheaper long-dated puts), and Diversify or proxy hedge (long exposure to defensive assets). Defensive Strategy: Put replication (reliable but expensive), Intraday momentum (shorting when intraday momentum is strong but can't cover overnight gap), Dynamic Long Vol (buy VIX futures with term structure as tactical signal but sensitive to timing). Diversification across investment strategies alone is not sufficient – a defensive component is essential. A combination of direct hedge (expensive) and long vol strategies (less reliable) are useful and should be considered.

Antifragile Currencies

The speaker discussed a framework that attempts to search for baskets of currency pairs that will perform well when an investor's own portfolio does poorly. The basket is called antifragile because it is expected to improve when bad things happen, which is the opposite of fragile. It is important to note that the portfolio that does best when things go badly for the investor's main portfolio of course depends on the choice of this main portfolio or reference portfolio. The speaker takes the S&P 500 as the reference portfolio. Out of the 45 G10 currency pair crosses, he advises creating a basket by selecting 10 of these. Since the number of possible baskets is very large it is computationally infeasible to look at each possible basket so machine-learning methods for basket selection such as forward/backward stepwise selection were described.

Afternoon Keynote Presentation and Discussion

The interview began with discussion on how disciplined risk management processes were tested in March. The discussion continued along these lines: Rapid vol scaling helped tremendously by getting investors out of the way of trouble and early before the worst of the sell-off in March. From a macro strategy perspective, momentum did particularly well, even simple momentum relative to more engineered versions. April and May were more difficult because the speed of the recovery. Not a lot of examples of that quick of a recovery for models to benefit from across all asset classes. TIPS were a one-way market during the sell-off. The idea that such a large market could go so illiquid was surprising. Market color suggested that the cost of trading had gone up by a factor of 8-10x. Factor volatility has been quite dramatic and continues to be. This translates to ongoing pain for managers unless they're biased towards equities and against momentum factor. If they're balanced, then this has been a bad period for them.

The long term hope for value as a factor comes from a burst of inflation and higher rates and therefore discounting the longer dated cash flow that growth companies have. This does not feel imminent but could be possible if in the next few years de-globalization gains momentum and/or further longer term effects from COVID-19. There is a value component to be captured in the market but not necessarily low P/B and P/E. Value and Growth are not polar opposites. Value has lagged not necessarily because it's out of favor but because best performing 'value' could be high forecasted growth and no current profits, which leaves more rationally priced stocks behind. There's been more factor crowding, which will also likely be impactful.

The speaker argued that we still have a VIX double the historical long term average therefore running smaller notional positions vs. 6 months ago. Any risk exposure should be relatively small right now. Recent realized volatility of those portfolios has been high. Usually the market moves inform the risk but in Feb 2018, the VIX threw the market. Before 2004, VIX was an indicator. Once it became tradeable, volumes were relatively small therefore unlikely to be impacting itself. Since VIX is modeled off of a variance swap, it is heavily weighted towards deep out of the money options that do not trade that often. VIX has become less of an indicator over time but more of something that drives itself. The impact of VIX on out of the money options has been significant. People using it as an indicator need to recognize that it has a feedback loop built in. This will likely result in a higher than average VIX, that will be reflective of market strength.

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Detailed Notes on the Presentations

Keynote Presentation by Nassim Nicholas Taleb

Summary

- Nassim Taleb has had an atypical career path – he first became a trader and then he turned to mathematics to better formulate and express his ideas about tail risk events and how to protect society from tail risk.

- There is a domain referred to as Mediocristan (and hence the supreme law of Mediocristan) in which the theory behind the law of large numbers holds in practice and we can reply on the diversification concept in portfolio theory. For example, the heaviest person on the planet most likely represents only 30bsp from the combined weight of the heaviest person and 1000 randomly selected people.

- There is another domain named Extremistan in which the law of large numbers works very slowly. For example, the wealth of wealthiest person on the planet will represent close to 100% from the combined wealth of the wealthiest person and 1000 randomly selected people. Financial markets are in Extremistan and the diversification concept does not hold.

- In Mediocristan a six sigma event can be thought as the combination of two three sigma events. Variables from Extremistan should not be compared to variables from Mediocristan. Pandemics, wars and financial markets (especially derivatives) are extremely fat tail and we have to worry about the tail and not the body of distribution.

- Portfolio theory rests on strong assumptions and requires the knowledge of the volatility and the correlations in the future. It can be shown that empirically the law of large numbers does not work for the kurtosis. Similarly, regression analysis relies on the assumptions of the Gauss-Markov theorem.

- Financial economics is like a bunch of intertwined cables. We need to clip tail in order to avoid the pattern of consistent small gains followed by a substantial loss that is recurrent in finance.

- Businesses that buy the tail are profitable in the long run – for example real estate has been profitable (the individual owns the tail and the optionality) and real estate lending has been a losing business (short tail).

Q & A

- Q: Where do you see the biggest fragility in the world? Is it geopolitics?
  A: The presenter does not believe in geopolitical fragility but he used to believe in the biological one. Hyperinflation is a tail risk as the transition from price stability to hyperinflation is very quick.

- Q: Anything else that worries you, especially when it comes to public markets and quant investing?
  A: The move to electronic markets caused concentration and this can lead to multiple sigma moves as we saw in August 2007. If we adapt correctly to the pandemic world we will also have a stronger economic base. Any business that did well during the pandemics will do well in future.

- Q: Related specifically to the issue of 'skin in the game' where do you see the potential conflict in financial markets?
  A: In the past trading used to be done by banks but due to the Volcker rule the business migrated to hedge funds and that's a very good point in finance. Bailouts of shareholders go against the 'skin in the game' principle.

- Q: Any sort of books, authors, philosophers that you think are specific and impacted your thinking?
  A: All books and in particular very old books should be read. If you want a book to survive two things should be done: you make sure a person today can read it and you make sure a person 30 years ago will fully understand the book.

- Q: If you claim that some tail risk has always been money-losing, why do you think the market has not adjusted the pricing? Is the market still inefficient after such a long time?
  A: The beauty of the inefficiencies in tails is that even if investors are told what has to be done to be profitable they will not

follow the instructions. Long periods of time without profitability have to be sustained and nobody likes that. The idea of making money infrequently is incompatible with the compensation system in Wall Street.

- Q: How do you assess the cost of tail risk? How do you differentiate between different approaches?
  A: You have to have experience of what to own and one recommendation is to never buy the idiot's put – a put that is slightly out-of-the money and so expensive that there is no point in hedging.

- Q: Shall a good tail hedge not be levered?
  A: Leverage shall never be taken and tail risk hedging is the reverse of leverage. People buy insurance for their houses and cars but portfolio insurance is not bought as portfolios are externally managed and moral hazard exists. People transfer risks to the tail because they are less visible.

- Q: How do you see the role of AI in investing? Do you think it is hype?
  A: It takes time to understand AI. We can automate with AI in the Mediocristan domain but AI might not work in Extremistan. AI is successful in some applications and they have one thing in common – they are all thin tailed.

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The 3 Enduring Benefits of Systematic Macro; Will They Survive a QE Forever World?

- The 3 enduring benefits of systematic macro investing, as presented by the speaker are: (1) fully uncorrelated returns to major asset betas (e.g. S&P 500, global HY, leveraged loans index) and alphas related to the betas; (2) systemic risk returns; (3) high return on deployed capital due to use of efficient instrument (futures, swaps, options).

- The benefits are captured by following a basic macro framework (data set >> analytical processes >> market forecast) and systemic approach that incorporates other investors' behavior, practices, standards, principal agent effects and data sets.

- Lastly, capital deployment is completed after incorporating the investor decision function. Several suggestions are offered to make the model durable and anti-fragile.

- The systems portfolio design is dynamic enough to respond to changing environment (e.g., low interest rate for long) by changing allocation in response to central banks' actions (e.g., direct buying of some assets for the first time). The model should remain resilient in a QE forever world.

Q & A

- Q: Relating to negative interest rate policy, if we do see NIRP in the US, how do you see that? How do you see that potentially impacting systematic macro portfolios and also, if you could provide some comments in risk parity?
  A: Yes, I think negative interest rate policy as extension observe. There's no question for systematic macro as it reaches those boundary levels. The amount of price movement in a lot of the sovereign fixed income instruments will decline. Their ability to react and respond as volatility and correlation stabilizers will be lower.
  I think with systematic macro...Well, systematic macro has used them in the past to generate returns. It would be like any other asset or asset class that has gone quiet in the last 30 or 40 years.
  It simply would be traded less, because the managers themselves will try to focus their resources, and their capital, and their exposure where those capital flows are moving markets. I think you'll see less sector balance focused in fixed income and more will end up being reflected in other assets. Total exposure and total opportunity will effectively be similar.

- Q: How effective do you think usage of AI or ML? Could there be within systematic macro portfolios to try to model some of the nonlinearities?
  A: Our formal machine learning effort in our firm makes us a believer in certain aspects of it including some of the nonlinearities. To capture macro returns, like the alignment problem or the containment problem, the question is where would you apply AI to get the most return? Would you process data to get extra insights? Would you use the AI functions nefariously elsewhere by trying to simply influence the investor's reactions or the investor's confidence or the investors themselves, if you really wanted to create an edge?
  There isn't a dark side to machine learning, but there could be a dark side to large scale application of AI in trying to increase market returns by affecting the markets themselves.

- Q: Can you comment on adding tail hedging in the framework of your risk parity model you've demonstrated that uses fixed income equity and systematic macro?
  A: The tail risk hedging is a formal investment choice that really needs to be considered for risk asset protection. It won't be the right choice for many plans or many endowments. However, it's pre-positioning, being effective 100 percent at the time, and its ability to react is a matter of discussion. Using that Slide 15 framework will be helpful.
  For bear market protections, it is crucial to analyze intermediate to longer term response of strategies, if they do a great job, they wouldn't necessarily need or want tail risk hedging.
  For something more comprehensive, one would just simply have to weigh all of the types of strategies that are represented and analyze what allocation cost go to get them hedged.

Tail Hedging: Cost, Reliability, Decay and the need for Diversification

Summary

- The speaker discussed his organization's hedging program framework
- Their approach involves trading-off between five pillars: 1) Benefit – the size/frequency of positive returns, 2) Reliability – negative correlation to benchmark downside, 3) Convexity – the size of extreme positive returns, 4) Decay – the speed of giving up hedge gains, and 5) Cost – the size and frequency of negative returns.
- It is important to have proper governance and communication of the hedging program to stakeholders, and preferable to have a separate hedge function within the organization
- One also needs to consider a tactical vs. systematic implementation – while there's a place for both in a hedging program, the speaker views it as preferable to have a mostly systematic implementation to reduce reliance on market timing ability
- Some of the important considerations in a dynamic strategy include market patterns (volatility, auto-correlation and volatility term-structure), the strategy (hedging frequency, risk regime and governance), and liquidity (market liquidity and trade costs)
- One can model sell-offs under 3 different paradigms: a trend lower (like in the early '00s), fear environment (like in the GFC), and gap lower (like in 1987)
- The speaker's organization creates a diversified, dynamic portfolio of hedging strategies that optimizes across the 5 pillars, using an iterative process (Kalman filter) to add/remove/reweight strategies as new information is incorporated
- They regularly monitor aggregate Greek profiles of the hedging portfolio to ensure exposures are appropriate
- What was different about the COVID-19 market crash from past drawdowns? It was the shortest and highest volatility drawdown, with the most significant (negative) autocorrelation ever
- Typically volatility tends to get higher towards the end of a recession, so volatility could go higher in this episode if the drawdown were to continue
- Black-Scholes assumes IID, independent identically distributed returns (i.e. zero autocorrelation), which works fine in low volatility regimes, but not in high volatility regimes, so adjustments are needed. While volatility was record high during the COVID-19 crash, adjusted for auto-correlation it was less exceptional
- The speaker also discussed implementation of a regime-dependent hedging strategy. One can classify market regimes (e.g. high vs. low volatility) and construct empirical return distributions within each state. Then, based on identification of the current regime, one can compare the option implied volatility surface to the empirical distributions within the regime to identify parts of the surface that look rich or cheap

Q & A

- Q: How are autocorrelations calculated?
  A: With a 1-day lag, using a simple AR(1) model
- Q: Do you expect negative auto-correlation to persist and what drives it?
  A: It may, as it was driven by characteristics of the last sell-off such as its cause (a pandemic, rather than being financial in nature), structural flows, and poor liquidity (e.g., the market trading limit down one day, limit up the next, limit down again, etc.). While unsure whether it will persist, it's important to be aware that it can happen, to protect yourself against it.

- Q: Are you concerned about static hedging being better than dynamic hedging? Does that tell you that autocorrelation adjustment is necessary?
  A: We try to make around 95% of our hedging systematic, but include tactical tilts, as there are advantages to being tactical. We're looking at strategies that can offset a lot of the negative autocorrelation, such as intraday trend strategies, or at one point putting on an up-var package to offset some of the short gamma that had built up in the book. It comes back to the importance of monitoring the exposures, having a good governance structure, and communicating what you're doing.

Weathering COVID-Crisis Turbulence

Summary

- Multi-strategy approach consists of both a systematic (65-75% of risk) and discretionary (25-35%) components including market agnostic (i.e., market neutral), directional (i.e., best beta), beta control (i.e., efficient hedges) and relative value.

- These strategies together are designed to have uncorrelated returns and Beta control attempts to hedge the tail risks from both beta control and directional component.

- On the directional side, cut allocation to corporate credit while switching long equity futures to long term calls. Key take-away include that even low rates can go lower.

- On the beta control side, increased allocation by boosting long variance on equity indices. Key take-away is to not overlook hedging even when vol is very low.

- On the relative value side, took long positions on short-end US/Canada rates with tactical trading on equity/credit indices. Key take-away: including staying agile and nimble, beware of relative value towards the end of a cycle when correlations are going up.

- Cut vol selling programs twice due to poor risk / reward. Dividend strategy alpha started degrading quickly (sold front end dividends and bought back end). Also, reduced liquidity premia strategy on commodities and corporate credit.

- Increased allocation to efficient edges (e.g., quant equity short, FX, Vol Swaps, Credit Basis RV). The lesson is not to get hedging fatigue especially when volatilities are very low. This insurance is a constant ~1% drag.

- Discretionary portfolio: 20-30 trades focused on relative value, dislocation, mean reversion, positive carry, and convexity via US swap spreads, Bund vs. OAT, US credit decompression.

Q & A

- Q: Most underappreciated risks in global macro and how would you position to hedge it?
  A: Long term inflation is not well priced. Short term might be. Before, you had to pay for that insurance because central banks were targeting 2% but now it's not that high (i.e., cheap form of insurance to own). More risks are to the right side of the distribution than the left side. People are underestimating how much central banks + fiscal are spending in terms of liquidity to the system.

- Q: Interesting trading ideas for right now?
  A: Relative value between interest rate curves (e.g., Australian bonds vs. New Zealand bond spread). Relative value between North America and Europe. Vol strategies (selling) on the basis that vol will remain elevated after this crisis as risk gets repriced higher.

- Q: With respect to the strategies you've cut, how do you think about re-adding exposure?
  A: Dividends in Europe are risky and likely a political issue (not in previous backtests) so not in a hurry to add to that. Commodities may never be added back. Rolling out 4 new strategies in the next few weeks.

- Q: You mentioned you were active in some strategies, less so now. Was this the outcome of systematic process, how often do you change risk allocation or is this on the discretionary side?
  A: Don't really change allocation to major buckets. Do not attempt to tilt that too much. Allowing risk parity to go short which looks promising. The discretionary RV should feed into the systematic. Goal is to reduce the RV component of the book and go full systematic (theoretically).

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The AI Awakening: Implications for the Economy and Investors

Summary

- The speaker expects that many companies will never go back to their pre-COVID-19 office situations and this prompts many questions about job losses due to automation.

- In order to answer these questions, his team has analyzed the full text of 2 million job postings and used a Machine Learning classifier called job2vec in order to try to identify which jobs are most likely to be automated away in the near future.

- They found that while we already have the technology to do much of the work that people are currently doing, there is no occupation which can be completely automated as of right now.

- Overall, the growth of machine learning is currently accelerating. For example, TensorFlow, which is an open-source machine learning tool, has recently crossed 100 million total downloads and over 10 million downloads in the past month alone. Additionally, we are now crossing a key threshold where machines are almost able to visually identify objects as well as humans.

- He also studies how suitable different occupations are to remote work and gave a list of the most and least 'remotable' occupations as well as statistics on the fraction of remote workers by US state. Currently, about half of all Americans are now working from home.

- He has created an SMI Rubric (Suitability for Machine Learning) for work tasks and finds that although ML will affect all occupation groups it will affect lower wage workers the most.

- Business processes and models need to change. The workforce needs new skills and governments need to update policies. These changes are accelerating due to the COVID-19 pandemic.

- The winners will be those who think ahead, understand the effects of ML and other technologies on the nature of work and position themselves for success on the other side of the crisis.

Q & A

- Q: What will happen when large numbers of jobs eventually do get automated away?
  A: There is still a large part of the economy where a human is certainly needed such as jobs where human interaction is the focus (coaching, teaching, etc.) and that we expect that sector to grow.

- Q: What is a realistic timeframe for companies to incorporate AI/ML into their systems?
  A: Any company that is not already doing so is already way behind. The trick is to figure out which tasks are suitable for ML and the tools to do that are already here. The biggest barrier to incorporating it is culture, expertise and also knowing where to look.

- Q: Many clients have told us that while they do believe there is a benefit to using big data. There is also a very big cost. Can you comment on the cost /benefit analysis?
  A: Overall I think that companies are doing too little of this instead of too much. I have seen many companies investing in this with a lot of success.

- Q: What industries will not be affected by this?
  A: Industries where physical interaction is the focus such as coaching, teaching, etc.

CEO/Founder Panel: Alternative Data in Investing during the COVID-19 Crisis

Summary

- **Ravenpack** The speaker showed the company's COVID-19 Panic Index, Media Coverage Index, and Supply Chain Disruptions Index, all of which were able to quantify the effects of COVID-19 and possibly help investors to identify trading opportunities. The Panic Index used 22,000 information sources of when COVID-19 was mentioned along with panic language. The index rose significantly several days before the number of COVID-19 cases began to rise and peaked on March 30. It is now at a 3 month low but remains at a relatively high level.

- **1010 Data** The speaker introduced time series of customer spending data such as restaurant spending vs general merchandise spending broken down by state. He noted that the data shows the recovery has been partially delayed by the protests. He also said that previously systematic data users had shied away from the more granular level data that he provides such as state level spending. However, during the crisis, he has noticed a shift and that now these customers are looking at this granular data as a way to confirm various hypotheses they may have about the COVID-19 reopening dynamics.

- **Quantcube** The speaker showed satellite imagery data and noted that they have a large amount of historical satellite data available. This allows investors to track industrial production in China by looking at pollution, maritime traffic, etc. The company also looks at job opening and tourism data and has tracked tourism city by city in both China and Europe. He also noted that when studying the effects of COVID-19 on the Chinese economy, it is important to look at Chinese New Year to Chinese New Year instead of year to year.

- **Bogan Associates** The speaker discussed his scientific sampling process where he sampled a large number of people from the general population in California to test for COVID-19 and found that the true death rate of COVID-19 is much lower than what the official numbers show

Q & A

- Q: Is it true that COVID-19 articles are highly correlated with negative sentiment?

- A: **RavenPack:** They used to be very highly correlated to the point where most COVID-19 articles were negative sentiment articles. However, now we are starting to see positive sentiment COVID-19 articles.

- Q: Do you only use English articles?

- A: **RavenPack**: No. We use many languages and convert them all into our own language, 'Ravenpack speak.' We found that sentiment was negative in every language.

- Q: Are your users fundamental and looking at sectors or are they macro investors?

- A: **1010Data**: They are both.

- Q: What does your nowcast say now about the recovery?

- A: **Quantcube**: We expect the recovery in the US to be faster than in Europe. We can see that from the consumption nowcast data, which directly impacts US GDP. For Chinese GDP we don't expect a V shaped recovery. We can see less industrial production and we also expect high inventory.

- Q: When did you first see COVID-19 effects in China?

- A: **Quantcube**: In mid-January we could begin to see the impact. We didn't see any pollution in February so we knew there was no industrial production. The north part was not affected as much as the south part.

- Q: Your research showed a 10 fold multiplier in the true infection rates when compared with the standard rates. Was this unexpected to you?

- A**: Bogan:** Our hypothesis before we began the study was that it would be higher but we were not sure how much higher it would be. By the way, New York was at over 20% infection rate. This means that the fatality rate from the virus was much lower than the official numbers. This is good news that improves my sentiment as an investor.

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ARP Risk Management – Theory vs Practice

Summary

- Risk management and methodologies to predict risk and challenges in alternative risk premia portfolios. ARP strategies are non-correlated and exhibit low correlation to traditional market betas.

- At the asset level, a robust vol estimate is necessary to achieve target risk. Holding-based vol estimates are better than strategy-based returns in predicting ex-post vol.

- At a portfolio level, historical vol is better at predicting subsequent risk than look through to current holdings.

- Asset correlations may either be too unstable / noisy or on average simply too low to be useful.

- Since ARP portfolios generally aim to be beta-neutral, to achieve similar hedge fund-type vol of ~10%, ARP portfolios would be required to run 17x average leverage.

- At this target mean vol, the coincident annual return is ~8%. As realized portfolio vol rises, returns decline as well (i.e., +1SD Vol: coincident annual return is 5.2%, 2SD vol: 2.8%, >2SD: -9.5%).

- While Vol targeting is a requirement to achieve risk targets, they find that this can change the strategy return distribution during and post-event performance. Since no model can predict exogenous events, they find that drawdown controls are necessary in the long haul.

Q & A

- Q: What analysis should replace the correlation in portfolio construction?
  A: Find conditional correlations more useful for asset classes and styles, not in a portfolio optimization point of view but more in respect to allocation. Correlations are unstable and need to monitor and stress / measure during ongoing basis and adjust dynamically.

- Q: Have you looked at ways to make correlations less noisy. For instance, take correlation into account only when they are statistically significant, otherwise treat it as uncorrelated.
  A: Generally skeptical about using any form of parametric type of estimation on correlations. Estimating vol for very short windows is probably more statistically significant.

- Q: When thinking of optimal half-life measure, which variable are you trying to predict, i.e., is the forward looking vol also measured over a similar time period?
  A: From a variable perspective, what is relevant are using holdings of strategies and portfolio turnover. What you're trying to predict is a function of rebalancing period to some extent. If you're going to make a decision about style allocations (assuming a dynamic rebalancing period and you rebalance when your styles come out of line), the accuracy level is when you expect those styles to come out of line. What you care about is predicting the volatility of the individual strategies in order to ensure that you're as close as possible to your ex-ante risk targets over the course of a month. Those betas and the t-stats that we look at are really, "What is my estimate of volatility today?" against, "What is my I realized volatility of that one month hence?"

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Intangible Capital and the Value Factor: Has Your Value Definition Just Expired?

Summary

- Presenter started with the argument that book-to-market is no long a valid value factor since it does not take increasingly important intangible assets fully into account. If one thinks of the value factor as a risk premium, something that gives exposure to systematic risks, it would be misleading to only account physical capita investments.

- Index providers claim that they can avoid the problem by avoiding book to market value altogether. Their value definition will use other valuation ratios, things like earnings-to-price, sales-to-price, and other valuation ratios, which may not be the best solution.

- There are reasons to include intangible assets – it is risky, i.e., has embedded risk premia and there are behavioral biases of investors that also provided excess return. Academics have adjusted book value to include intangible assets.

- For estimating knowledge capital, look at the R&D expenses that are reported and capitalize them. Look at the R&D expenses, and then just depreciate these expenses over time, and that gives an estimate of the knowledge capital.

- For estimating organizational capital, the standard approach in the literature is to look at SG&A. Part of that of that can be seen as an investment into organization capital, e.g., training, advertising, etc.

- From an investor's perspective, if there's no independent information from an additional factor the investor is just increasing exposure to already known factors (i.e., potential factor overlap).

- Looking at a standard set of 6 factors (i.e. the market, size, value, momentum, low investment and high profitability), a value definition that only gives you exposure to profitability for example is not value-add because you already have profitability exposure.

- Unlike simple book-to-market factor which has underperformed other standard value factors, the adjusted factor is shown to outperform them. Also, return of other value factors show significant exposure to quality but adjusted factor has almost no exposure. Thus, adding adjusted book-to-market improves performance of multi-factor portfolio much more than any other standard value factors.

Q & A

- Q: is the intangible adjusted valuation measure that you have been referring to, is that consistent across time, sectors, countries, size?
  A: Yes, and that's in line the results of the paper that was published based on long-term US data. The speaker looked separately at a small/large value factor. The speaker also looked at consistency across time. Investors believe that intangibles were recent phenomenon. Intangible adjusted valuation seems to be a consistent over time. Even if one looks at 1975 to '85 and the following decades, this improvement is actually visible consistently across, and is not particularly strong in the recent period.

- Q: What do you think of alternative methodologies? Do you think these can provide useful information? How would you compare yours to those?
  A: There's >50 value definitions. The important message from the results is, whatever definition you use when you evaluate that, make sure to account for factor overlap.

- Q: Would you say that the traditional value factors (e.g., P/B) that it doesn't reflect the true value risk premia without intangible capital embedded in?
  A: Yes, I think the key idea behind the value factor is clearly this idea of cost reversibility. You're taking extra risk and there's a difference between firms that carry a lot of capital and firms that are more flexible. The value factor has also been referred to as a premium for risk of inflexibility (i.e., operating leverage). When you think about intangible capital, you can't assume that intangible capital is 100% flexible. The same inflexibility also holds for companies that have a lot of intangible capital.

- Q: When you say that intangible assets are not necessarily properly shown or presented in balance sheets, would there be like a counter argument to say that perhaps they are being shown in the income statement?
  A: Ignoring intangible assets will have an impact on earnings, e.g., you're expensing items that are not actually expenses related to the current period, but they're actually things that create value and create capital for the company. Currently, the standard P/B assumes that intangible capital is zero/almost zero, with some exception of some tangible capital that may be appear on balance sheets. Even a fairly simple estimation of intangible capital is probably going to be more reasonable than staying at zero.

- Q: Certain sectors have much more intangible assets than others. Wouldn't the intangible book-to-price approach effectively lead to a bigger overweight in IT, tech, communication type stock and make the results look better?
  A: These factors will drive implicit sector biases. The value factor definition will clearly have quite typical bias to UW technology stocks and OW utilities, for example. These biases survive after the intangible adjustments. You can account for this directly by creating a sector-neutral version of the factor.

- Q: Can you just talk about the other side, the risk of assigning too much value to intangible capital and moving too much in this direction, and at some time in the future, intangible capital just simply starts to become obsolete.
  A: There is this view that just standard book value should be used because adding back intangible capital is inherently difficult to value and there's a risk of estimation error. There's lots of economic research finding that there is an investment crisis. However, it's not that firms invest less. It's just that the investment has shifted to intangibles. The intangible adjustments recommended is very much aligned with getting a reasonable measure of how much firms invest and what the capital stock is. The speaker argued that it is better to put a value on intangible capital and add this capital to the balance sheet than just assuming it is zero since that is too conservative.

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Antifragile Currencies

Summary

- The speaker discussed a framework that attempts to search for baskets of currency pairs that will perform well when an investor's own portfolio does poorly. He is careful to determine what it means to perform poorly. There are many ways to describe market 'shocks' and two examples he gives are unrestricted drawdowns and fixed time interval drawdowns.

- The basket is called antifragile because it is expected to perform well when bad things happen to the main portfolio, which is the opposite of fragile. The concept of antifragility has caught the attention of the media and practitioners since the publication of Taleb's book "Antifragile: Things That Gain From Disorder" in 2012.

- It is important to note that the portfolio that does best when things go badly for the investor's main portfolio of course depends on the choice of this main portfolio or reference portfolio. He takes the S&P 500 as the reference portfolio for simplicity.

- He considers using the universe of 45 G10 currency pair crosses and advises selecting a basket of 10 pairs from this universe.

- Since the number of possible combinations of choosing 10 pairs out of a possible 45 is very large, it is computationally infeasible to look at each possible basket. This is where machine learning comes into play.

- He describes the use of standard machine learning methods (forward and backward stepwise selection) to select 10 pairs as best as possible.

- He notes that when an investor buys such a basket of crosses, he is buying insurance, not a risk premium and therefore the antifragile basket should have a negative carry. However, there is room to mitigate this negative carry by sorting crosses based on value and momentum.

Q & A

- Q: Each market shock is different. How can you be sure that this sample is representative of the next shock?
  A: That is impossible. This model just uses historical data. If something has never happened before then the model will not be able to see it.

- Q: Which EM currency pair are you most bullish on currently?
  A: I would prefer not to comment on that.

- Q: Can you comment on the weightings of the crosses in the basket?
  A: I used inverse volatility for the weightings because I did not want the weighting scheme to be another complexity layer. The optimization would become very slow and I don't think that the basket would change very much.

- Q: Did you consider liquidity in your choice of currency crosses?
  A: I did not use liquidity in the model. We are only using G10 pairs so I don't think liquidity makes much of a difference here.

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Investing in Risk Premia in the Face of Increasing Uncertainty

Summary

- Under normal environment, diversification works. However, diversification across investment strategies alone is not sufficient - a defensive component is essential.

- Correlations are deceiving since a stress period is much less frequent and compressed relative to the overall cycle. For this reason, averages are less useful compared to conditional approach.

- How to approach a stressed market environment? Short risk assets (put-spreads, collars, put replication, trend following, intraday momentum), Long Vol (dynamic approach, relative value such as expensive short dated puts vs. cheaper long-dated puts), and Diversify or proxy hedge (long exposure to defensive assets).

- Defensive Strategy: Put replication (reliable but expensive), Intraday momentum (shorting when intraday momentum is strong but can't cover overnight gap), Dynamic Long Vol (buy VIX futures with term structure as tactical signal but sensitive to timing).

- A combination of direct hedge (expensive) and long vol strategies (less reliable) are useful and should be considered.

Q & A

- Q: How do you weight / blend different strategies?
  A: Use equal risk across assets and styles factors.

- Q: Among different hedging strategies, which ones do you prefer and how do you rank these strategies?
  A: Not about choosing one or the other but rather using multiple strategies (long and short term strategies are all helpful).

Afternoon Keynote Presentation & Discussions

Summary

- The interview began with discussion on how disciplined risk management processes were tested in March. The discussion continued along these lines: Rapid vol scaling helped tremendously by getting investors out of the way of trouble and early before the worst of the sell-off in March. From a macro strategy perspective, momentum did particularly well, even simple momentum relative to more engineered versions. April and May were more difficult because the speed of the recovery. Not a lot of examples of that quick of a recovery for models to benefit from across all asset classes. TIPS were a one-way market during the sell-off. The idea that such a large market could go so illiquid was surprising. Market color suggested that the cost of trading had gone up by a factor of 8-10x. Factor volatility has been quite dramatic and continues to be. This translates to ongoing pain for managers unless they're biased towards equities and against momentum factor. If they're balanced, then this has been a bad period for them.

- The long term hope for Value as a factor comes from a burst of inflation and higher rates and therefore discounting the longer dated cash flow that growth companies have. This does not feel imminent but could be possible if in the next few years de-globalization gains momentum and/or further longer term effects from COVID-19. There is a value component to be captured in the market but not necessarily low P/B and P/E. Value and Growth are not polar opposites. Value has lagged not necessarily because it's out of favor but because best performing 'value' could be high forecasted growth and no current profits, which leaves more rationally priced stocks behind. There's been more factor crowding, which will also likely be impactful.

- The speaker argued that we still have a VIX double the historical long term average therefore running smaller notional positions vs. 6 months ago. Any risk exposure should be relatively small right now. Recent realized volatility of those portfolios has been high. Usually the market moves inform the risk but in Feb 2018, the VIX threw the market. Before 2004, VIX was an indicator. Once it became tradeable, volumes were relatively small therefore unlikely to be impacting itself. Since VIX is modeled off of a variance swap, it is heavily weighted towards deep out of the money options that do not trade that often. VIX has become less of an indicator over time but more of something that drives itself. The impact of VIX on out of the money options has been significant. People using it as an indicator need to recognize that it has a feedback loop built in. This will likely result in a higher than average VIX, that will be reflective of market strength.

Q & A

- Q: How did quants do through the COVID-19 sell-off?
  A: Disciplined risk management processes were tested in March. Rapid vol scaling helped tremendously by getting investors out of the way of trouble and early before the worst of the sell-off in March. From a macro strategy perspective, momentum did particularly well, even simple momentum relative to more engineered versions. April and May were more difficult because the speed of the recovery.

- Q: What will be the permanent changes to the quant industry based on what just happened (past 2-3 months)?
  A: One thing we learned about liquidity, we usually are a giver of liquidity and attempt to not be a taker on exchanges/OTC. Spreads widened substantially and electronic market makers withdrew significantly, so compensation for providing liquidity was much better. Taking liquidity became dramatically more expensive - large bifurcation between liquidity taking and providing strategies. Discretionary tend to want to trade more urgently so seeing more activity from them and consequently higher trading costs. History has not been a good guide in preparing for the current market environment. Having responsive systems remains important and does come down to crowding. You can build slow strategies with easily available software, so seeing more crowding so doing things at the same time as other people. More technical and faster strategies fared better as a result. Fundamental quant macro has been a standout since there are fewer people left doing it. The less crowded areas were relatively good or less affected by the same people trying to do the same things at the same time. Another good area was convertible arbitrage.

- Q: Thoughts on relative value strategies that suffered through the period?
  A: TIPS were a one-way market during the sell-off. The idea that such a large market could go so illiquid was surprising. Market color suggested that the cost of trading had gone up by a factor of 8-10x. Some of it was caused by heavily levered players putting on relative value trades. The Fed effectively helped alleviate the pressure on those players. Last time around,

CBs intervened but they didn't outright save certain funds. This time around, it's a bit different. It would be unsurprising to see a proactive response from regulators on the amount of leverage HFs can run. More likely in fixed income (RV strategies) as opposed to equities, etc. More echoes of LTCM than 2008.

- Q: Value has been underperforming for some time, what is your view on Value recovery or do you find it to be more long-term impaired?
  A: Factor volatility has been quite dramatic and continues to be. This translates to ongoing pain for managers unless they're biased towards equities and against momentum factor. If they're balanced, then this has been a bad period for them. The long term hope for value as a factor comes from a burst of inflation and higher rates and therefore discounting the longer dated cash flow that growth companies have. This does not feel imminent but could be possible if in the next few years de-globalization gains momentum and/or further longer term effects from COVID-19.

- Q: How do you compare crowding today vs. previous periods?
  A: One aspect to look at would be Value. There is a value component to be captured in the market but not necessarily low P/B and P/E. Value and Growth are not polar opposites. Value has lagged not necessarily because it's out of favor but because best performing 'value' could be high forecasted growth and no current profits which leaves more rationally priced stocks behind. There's been more factor crowding which will also likely be impactful.

- Q: Did vol scaling contribute to the sell-off?
  A: Vol scaling is used more by Quants versus Discretionary managers. Quants tend to also worry more about their footprint in the market and trading costs than Discretionary managers which may trade more slowly. From the perspective, vol scaling should have had a slighter impact. However, when moving significant amounts of money, it's hard to not have an impact. In most of these events, there has usually been a macro fundamental event that's causal. No matter how carefully you do it there would be an impact. Quants tend to be cautious about their alpha and the costs of achieving that alpha so they tend to spread that volume more. The speaker argued that it wasn't a primary or secondary driver, but will admit that it did have an impact. From a modeling perspective, stop losses have similar characteristics (a blunter tool and binary). Constantly adjusting position sizes does not match with Discretionary style.

- Q: What were your thoughts on COVID-19?
  A: There's an enormous amount of parameter sensitivity when it comes to modeling a pandemic. Your ability to make model errors is large. Pinning yourself to one outcome is probably overconfident. It does not seem like a tail event as it does seem to reoccur, however the ability to forecast is very low. We still have a long way to go in terms of the pandemic from a market and real economy perspective.

Client Q&A

- Q: What are the risks of a retail fueled rally?
  A: This may have already happened. We did see pension fund rebalancing but many funds did not rebalance at the end of March and therefore not participating in the rally. So far, it does seem like it has been retail driven.

- Q: Prime brokerage data seems to suggest that hedge fund net and gross leverage is higher relative to history, while CTAs are still low, what do you think?
  A: To be clear, this is equity prime brokerage (usually not available for other asset classes). The speaker argued that we still have a VIX double the historical long term average therefore running smaller notional positions vs. 6 months ago. Any risk exposure should be relatively small right now. Recent realized volatility of those portfolios has been high.

- Q: Could you estimate AUM invested in factors?
  A: Hard to pin down an exact number. Simpler strategies seem to be much larger relative to the more complex ones. There are some similarities in the basic effects as well.

- Q: Do current moves suggest a permanent move in the VIX?
  A: Usually the market moves inform the risk but in Feb 2018, the VIX threw the market. Before 2004, VIX was an indicator. Once it became tradeable, volumes were relatively small therefore unlikely to be impacting itself. Since VIX is modeled off

of a variance swap, it is heavily weighted towards deep out of the money options that do not trade that often. VIX has become less of an indicator over time but more of something that drives itself. The impact of VIX on out of the money options has been significant. People that are using it as an indicator need to recognize that it has a feedback loop built in. This will likely result in a higher than average VIX, that will be reflective of market strength.

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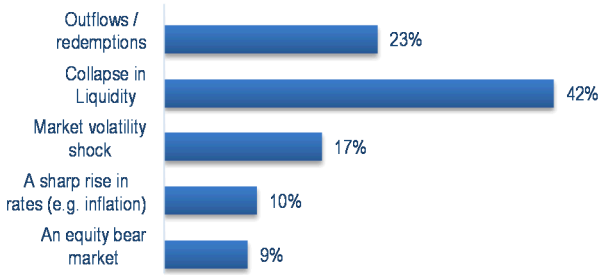
Attendees Survey Results

As is traditional during the conference, a survey was conducted on Alternative Risk Premia investing, Big Data, Machine Learning and Election. Participation varied in the questions around 400 investors. The key findings are summarized below:

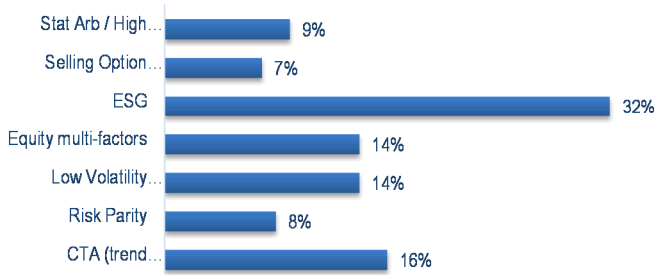
Key findings from questions on Quantitative Investing

- Investors perceive greatest risk to the quantitative strategies come from Collapse in Liquidity (42%) followed by outflows / redemptions (23%) and Market Volatility shocks (17%). Similar to last year, very few investors believe bear market (9%) or inflation (10%) is the major risk to quantitative strategies; implying most implementations are normalized for macro impacts.
- Investors perceive largest inflow in the quantitative approach come from ESG (32%) followed by CTA (16%), Low volatility factors (14%) and Equity multi-factors (14%). Different from last year, very few investors believe Risk Parity (8%), Selling Option Volatility (7%) and Stat Arb/ High Frequency (9%) influx the money.
- Almost half of the respondents consider Risk Parity (31%) and Selling Option Volatility (24%) to have largest outflow over 12 months among the various quantitative strategies. Fewer investors suspect outflow in CTA (15%), Low Volatility factors (14%), Equity multi-factors (10%), ESG (2%), Stat Arb / High Frequency (4%).
- When asked about the use of volatility scaling/targeting, 35% of participants claimed no use, increased from last year (21%). Of the rest 65% of investors who use some form Vol targeting/scaling, more than half of them use it at portfolio level.
- Among the users of Vol targeting/scaling, majority use mix of realized volatility and implied volatility (22%) and weighted realized volatility (19%). A quarter of the users use simple realized volatility and very few use purely implied volatility (VIX/short dated or longer dated).
- The two most popular measures of realized volatility used for vol scaling/targeting are 2-3M vol (19%), 4-6M vol (14%) and 7-12M vol (12%). 9% prefer longer than 12months vol and only 8% prefer shorted duration vol.
- Investors expect value outperformance to bounce in the short term (50%) and many also expect it to be the beginning of the longer term outperformance (18%).

Q1: What do you perceive as the greatest risk to Quantitative Strategies you manage / invest in?



Q2: Which Quantitative investing approach will see the largest inflows over the next 12 months?



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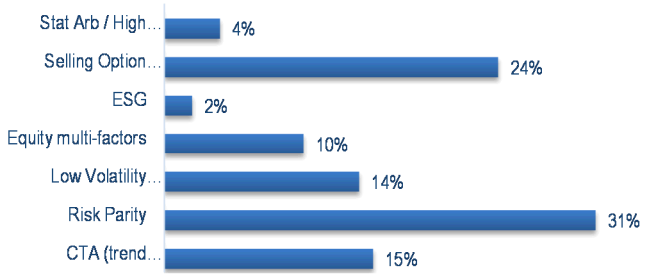
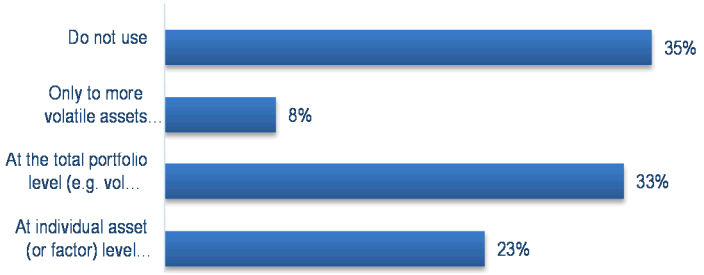
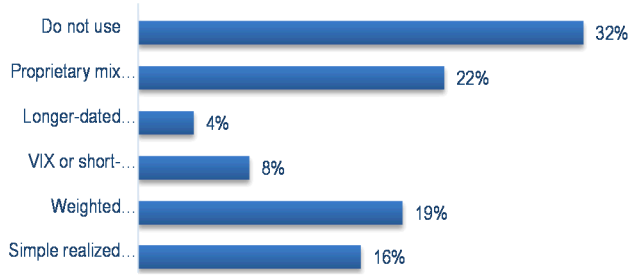
Q3: Which Quantitative investing approach will see the largest outflows over the next 12 months?



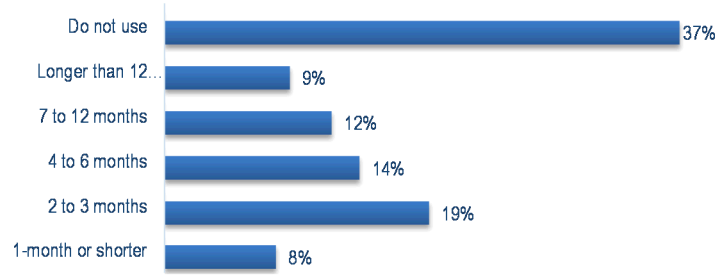
Q4: If you use volatility targeting / scaling within the investment process, at what level is it applied?



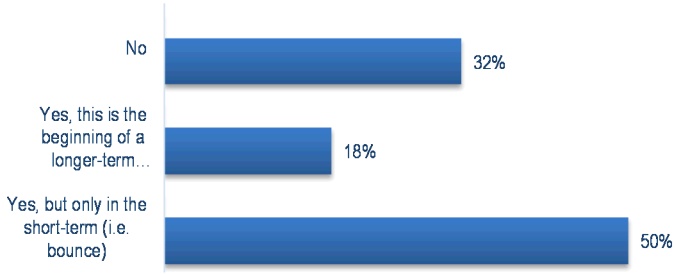
Q5: If you use volatility targeting / scaling, what type of volatility measure do you reference?



Q6: If you use volatility targeting / scaling based on realized volatility, which window (or exponential half-life) is closest to your methodology?



Q7: Will the recent Value outperformance continue?



Source: J.P. Morgan survey

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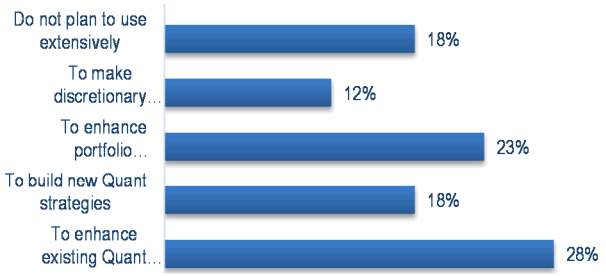
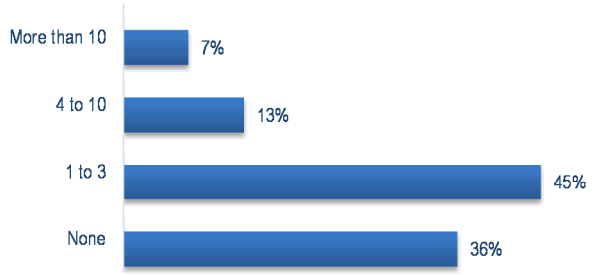
Key findings from questions on Big Data/AI Strategies Adoption

- Investors view big data/machine learning as a tool to enhance existing quant strategies (28%), to enhance portfolio construction / risk management (23%), to build new quant strategies (18%) and to make discretionary call / trades (18%).
- The number of alternative data sources evaluated by conference attendees (and their immediate teams) remains low. 45% had analyzed between 1-3 new data sets, while 36% had analyzed none at all. This shows a small increase in evaluation efforts since last year.
- Majority (~50%) of investors have found Alternate Data/ML based signals not yielding any alpha. 44% of investors were successful in generating few (1 to 3) signals and 4% generated more than 3 signals.

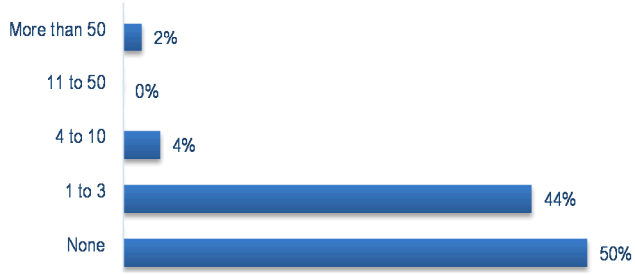
Q13: How do you plan to use Big Data / Machine Learning within your investment process?



Q14: How many new/alternative data sets have you (your immediate team) evaluated in the past year?



Q15: Of the various Alternative Data / Machine Learning based signals that you have researched, how many are actually yielding alpha?



Source: J.P. Morgan survey

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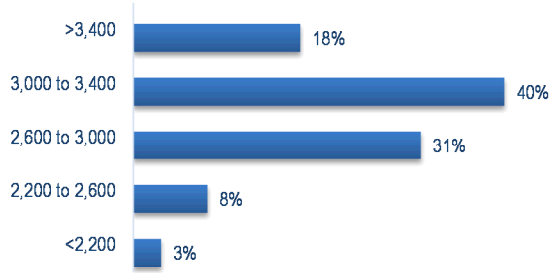
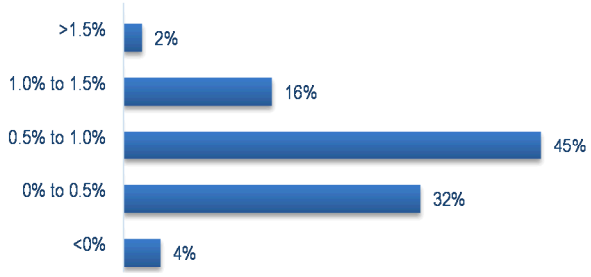
Key findings from questions on Current Macro Conditions

- Investors' expectations on S&P 500's yearend level had a negative fat tail with peak in the range of 3000 to 3400. They mostly (45%) expect 10 year bond yield to range between 0.5% to 1.0% by the year end against 32% of respondents expecting it to be between 0% - 0.5%.
- Almost half of the respondents (47%) expect a W shaped recovery followed by 28% U shape, 18% V shaped and 7% L shaped recovery.
- Investors were concerned about; the second wave of COVID-19 (40%) along with prolonged recession (23%), Geopolitical tensions between US and China (22%) and US political and social unrest (15%).
- Majority (58%) of the investors anticipate Trump not to be re-elected as US President. 42% of the investors anticipate re-election of Trump.

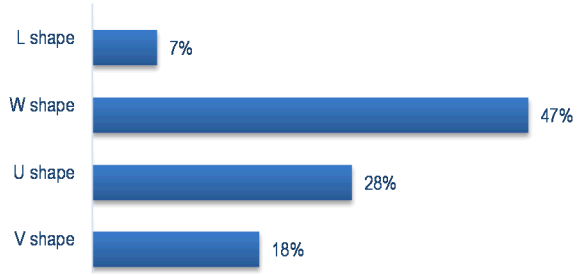
Q8: Where do you see the S&P 500 by the end of this year?



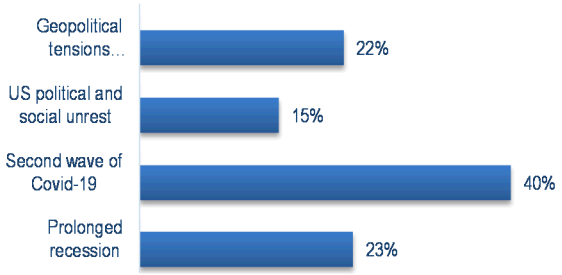
Q9: Where do you see the US 10 Year Yield by the end of this year?



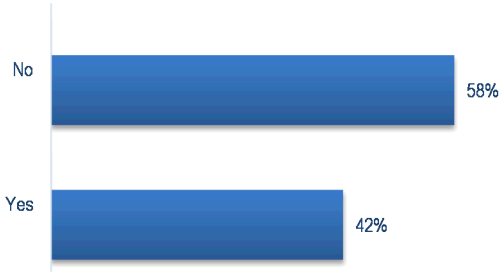
Q10: What will be the shape of this economic recovery?



Q11: What is the greatest risk for the market over the next 12 months?



Q12: Will Trump get re-elected in 2020?



Source: J.P. Morgan survey

Risks of Common Option Strategies

Risks to Strategies: Not all option strategies are suitable for investors; certain strategies may expose investors to significant potential losses. We have summarized the risks of selected derivative strategies. For additional risk information, please call your sales representative for a copy of "Characteristics and Risks of Standardized Options." We advise investors to consult their tax advisors and legal counsel about the tax implications of these strategies. Please also refer to option risk disclosure documents.

Put Sale: Investors who sell put options will own the underlying asset if the asset's price falls below the strike price of the put option. Investors, therefore, will be exposed to any decline in the underlying asset's price below the strike potentially to zero, and they will not participate in any price appreciation in the underlying asset if the option expires unexercised.

Call Sale: Investors who sell uncovered call options have exposure on the upside that is theoretically unlimited.

Call Overwrite or Buywrite: Investors who sell call options against a long position in the underlying asset give up any appreciation in the underlying asset's price above the strike price of the call option, and they remain exposed to the downside of the underlying asset in the return for the receipt of the option premium.

Booster : In a sell-off, the maximum realized downside potential of a double-up booster is the net premium paid. In a rally, option losses are potentially unlimited as the investor is net short a call. When overlaid onto a long position in the underlying asset, upside losses are capped (as for a covered call), but downside losses are not.

Collar: Locks in the amount that can be realized at maturity to a range defined by the put and call strike. If the collar is not costless, investors risk losing 100% of the premium paid. Since investors are selling a call option, they give up any price appreciation in the underlying asset above the strike price of the call option.

Call Purchase: Options are a decaying asset, and investors risk losing 100% of the premium paid if the underlying asset's price is below the strike price of the call option.

Put Purchase: Options are a decaying asset, and investors risk losing 100% of the premium paid if the underlying asset's price is above the strike price of the put option.

Straddle or Strangle: The seller of a straddle or strangle is exposed to increases in the underlying asset's price above the call strike and declines in the underlying asset's price below the put strike. Since exposure on the upside is theoretically unlimited, investors who also own the underlying asset would have limited losses should the underlying asset rally. Covered writers are exposed to declines in the underlying asset position as well as any additional exposure should the underlying asset decline below the strike price of the put option. Having sold a covered call option, the investor gives up all appreciation in the underlying asset above the strike price of the call option.

Put Spread: The buyer of a put spread risks losing 100% of the premium paid. The buyer of higher-ratio put spread has unlimited downside below the lower strike (down to zero), dependent on the number of lower-struck puts sold. The maximum gain is limited to the spread between the two put strikes, when the underlying is at the lower strike. Investors who own the underlying asset will have downside protection between the higher-strike put and the lower-strike put. However, should the underlying asset's price fall below the strike price of the lower-strike put, investors regain exposure to the underlying asset, and this exposure is multiplied by the number of puts sold.

Call Spread: The buyer risks losing 100% of the premium paid. The gain is limited to the spread between the two strike prices. The seller of a call spread risks losing an amount equal to the spread between the two call strikes less the net premium received. By selling a covered call spread, the investor remains exposed to the downside of the underlying asset and gives up the spread between the two call strikes should the underlying asset rally.

Butterfly Spread: A butterfly spread consists of two spreads established simultaneously – one a bull spread and the other a bear spread. The resulting position is neutral, that is, the investor will profit if the underlying is stable. Butterfly spreads are established at a net debit. The maximum profit will occur at the middle strike price; the maximum loss is the net debit.

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