

Opalesque Roundtable Series '17

INVESTOR ROUNDTABLE

Opalesque Roundtable Series Sponsor:

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Editor's Note

Data Science, AI and the Half-Life of Strategies: Opalesque Investor Roundtable

In a widely circulated investor letter which I published under the title [“Turmoil in Quant Land.”](#) Neal Berger examined why some of the more ‘pedestrian’ quant strategies that worked beautifully for so many years have **stopped working**.

Maybe new technology is the reason why trades crest and fall: *Whenever a new technology has come in, that has made the old trade obsolete.* This has happened to trend following, statistical arbitrage, high frequency trading, and already starts happening in some big data strategies.

What was cutting edge or bleeding edge even two years ago such as utilizing satellite imagery to count the number of shopping carts at every single Walmart in the United States and comparing that to the day before and the day before, or, to get housing data out of China by measuring the slope of the shadow from satellites to determine how fast buildings are going up – believe it or not, all of that has already become pedestrian, says Berger. Big data strategies may work best when the investment manager uses *data that cannot be purchased or that is not publicly available* and rather creates proprietary data sets to try to find an edge in the market.

It checks all the boxes!

Every strategy that has positive expectancy has a certain half-life, unless it's truly a structural inefficiency where the edge providers dwarf all of the hedge fund money that's available to capitalize by a substantial amount.

The problem from an allocator's perspective is separating the wheat from the chaff. If you want to raise money for a fund today, the quickest way to do it is to put a marketing presentation together that references big data, machine learning, artificial intelligence and cryptocurrencies and all of sudden you've got a fund that people are interested in. *It checks all the boxes!*

But, what are some of the strategies that continue to work, are still robust, and in certain cases cannot be arbitrated away by the move toward AI and robots trading against robots? Berger thinks that in a world where experiments with AI bots playing games like AlphaGo, Chess or Dota 2 leave humans with not an iota of chance and believing that this isn't being applied to the markets is naïve: *“You're competing against a bot that has simulated 100,000 years of equivalent human experience, I would say it's naïve to assume that you can beat that bot as a discretionary trader. That's not a business anymore in my opinion.”* (page 27, 29-30).

The Opalesque 2017 INVESTOR Roundtable, sponsored by Cohen & Company, took place in New York with:

1. Christopher Ferraro, [CIO, Galaxy Investment Partners](#)
2. Kieran Cavanna, [Founder and CIO, Old Farm Partners](#)
3. Neal Berger, [Founder and CIO, Eagle's View Capital Management](#)
4. Gaurav Chakravorty, [CIO, qplum](#)
5. Neil Datta, [Director, Risk Management, Optima Fund Management](#)
6. Corey McLaughlin, [Co-President, Investment Industry Services, Cohen & Company](#)

The group also discussed:

- How did Gaurav Chakravorty and his team turn \$10,000 to over seven hundred million in profits in just three years? What is he working on now? (page 4, 8-9, 27-29)
- Who is the “sucker at the poker table” in this new investment world order? (page 9, 30, 31) Why investors should watch leverage and the money flows (page 13)
- Constrained by Mandate: The downsides of handcuffing a hedge fund manager (page 10)
- Which are some of the non-trivial structural and technical problems investors and managers are facing to get involved in trading cryptocurrencies? Will returns in cryptocurrencies get eroded as well over time? (page 12)
- Which types of different strategies can cryptocurrency hedge funds actually execute? (page 16-18). ICOs: a remarkable resemblance to the IPO market pre-dotcom bubble (page 19-22). Risks and governance in ICOs (page 22)
- Co-investment: Possibly the most exciting area in the hedge funds of funds space (page 5, 13, 15)
- What edge or what inefficiency is being created because of the move towards passive indexation? (page 14 -16)

- How to profit from the fact that hedge funds' core holdings almost always outperformed the track of the actual fund (page 25)
- Learning the rules from data: Where will data science and artificial intelligence be in five years? (page 27)
- AI's seminal turning point: AlphaGo Zero's 100:0 victory shows that "after thousands of years improving our tactics, computers tell us that humans are completely wrong: Not a single human has touched the edge of the truth of Go" (page 28)
- What is new in AI and deep learning? (page 28-31)

Enjoy!

Matthias Knab
Knab@Opalesque.com

Participant Profiles



(LEFT TO RIGHT):

Matthias Knab, Kieran Cavanna, Christopher Ferraro, Gaurav Chakravorty, Corey McLaughlin, Neal Berger, Neil Datta

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Introduction

Gaurav Chakravorty
qplum

I'm Gaurav. I have a background in machine learning algorithms and many other aspects of computer science. I attended the University of Pennsylvania where I was inspired by Dr. Steele's course on Financial Time Series at Wharton. This course helped me realize that a lot of what I learned in the engineering school can be applied to financial markets directly. Since my first job in 2005 I have been working in this field.

I started in what is now called high frequency trading. Back then it was just called trading. *I got \$10,000 to see what I could make out of it at Tower Research Capital. Over the period of 3 years, I built a group of 50+ engineers and we converted that \$10,000 to over seven hundred million in profits.* I became the youngest partner at the firm at the age of 24. All of this became possible mostly because of a new technology that found a niche in the market that was not exploited.

Things have changed. High-frequency is not a 20 Sharpe strategy anymore. However, I have continued with my work of using machine learning in different strategies. I believe in data science and not in old school quant based financial engineering.

I'm the co-founder and CIO of qplum. We use machine learning to build an end-to-end AI-driven trading system. The hard part is really being able to do this "end-to-end" in an automated manner and not including any sort of human decision making. What that means is you have to be better than the best human portfolio managers (PMs) today. The way to be better is to have more trading strategies, and to research and fine tune each of those strategies more than human PMs and make a complete trading system. That's what we are working on, building an end-to-end AI driven asset management company.

Christopher Ferraro
Galaxy Investment Partners

My name is Christopher Ferraro. I graduated from Yale University in 2006 with a dual degree in Applied Mathematics and Economics. I began my career at BlackRock Kelso Capital, a business development investment company focused primarily on in junior debt and structured equity securities of middle market companies. It was an incredible time to begin a career in finance; being able to live through one of the great bull markets and then the financial crisis during the earliest parts of my career was an invaluable experience. Shortly thereafter, I left BlackRock and joined Highbridge to work in their first Direct Lending and Special Situations Fund. We deployed nearly \$2 billion of capital in some of the best risk-adjusted returning investments I've ever seen and returned the entire first fund with low double digit returns within 18 months.

In 2017, I was fortunate enough to meet **Michael Novogratz** and made the decision to pursue something a bit more entrepreneurial and left Highbridge to join Galaxy Investment Partners, his start-up family office, as his CIO focusing on private markets investing.

At Galaxy, we are focused on a range of different principal investment strategies, including traditional venture capital, private debt and equity, and macro trading – but our most exciting business right now is our burgeoning cryptocurrency business, which covers the entire ecosystem from early-stage venture investing to trading in the largest, most liquid digital properties. It is truly an exciting time right now to be active in those markets.

Kieran Cavanna
Old Farm Partners

I am Kieran Cavanna. I run Old Farm Partners which is a hedge fund allocation strategy. It's a fund of hedge funds in a sense that we allocate to smaller and mid-sized hedge funds, but we also do many co-investments that could be with managers we are invested with and also with some that we are not invested with. Co-investments for us are liquid strategies, either equity, credit or global macro driven. Today we have 10 co-investments in our fund that include long only thematic, short only thematic, single stock longs and global macro thematic.

Before I started Old Farm about 18 months ago, I led the managers selection team at **Soros**. I have been allocating hedge funds for about 17 years.

Neil Datta
Optima Fund Management

My name is Neil Datta. I started my career at Smith Barney, working in back office operations and learning intricacies behind how Wall Street works. Then I spent some time in government service; using forensic accounting techniques to find tax evaders. Back on Wall Street, I joined Arden Asset Management in 2007 to manage their external manager operational due diligence efforts. Most recently, for the past 6 years, I have been managing operational risk at Optima Fund Management, which started 30 years ago as a classic "fund-of-hedge funds" shop but now is a diverse multi-billion dollar alternative asset manager.

Corey McLaughlin
Cohen & Company

I'm Corey McLaughlin, and was the managing member with Arthur Bell. We have recently joined forces with Cohen & Company, where I am the Co-President of the Investment Industry Services practice along with my partner and friend Chris Bellamy. I have been with Arthur Bell for over 19 years, so I've been in the alternative investment industry for a long time and have a significant amount of experience and expertise. We have provided services to all types of hedge funds, and we are very involved and have emerged as a thought leader in the cryptocurrency space.

Some people reading this might wonder why we merged with Cohen & Company. At Arthur Bell, our vision was to be the premiere firm to the alternative investment industry, as we were focused solely on that space. We met Cohen & Company about eight years ago and shared a lot of similar values. Cohen & Company specialized in public funds while Arthur Bell specialized in the private fund space. Both firms have a holistic view and share the same values on how we service our clients. Therefore, being able to have experience and expertise with both public and private funds, particularly as many investment advisers launch both types of funds, puts our firm in a better position where we can service the entirety of our clients' needs. Lastly, Cohen & Company and Arthur Bell share common cultures and values which makes the combination of our firms so compelling and powerful. We are excited to form one company and become the dominant firm in the investment industry.

Neal Berger
Eagle's View Capital Management

I'm Neal Berger, the founder and CIO of Eagle's View Capital Management. I've been in the Wall Street industry for 30 years. First half of my career, I was a proprietary global macro trader most notably with the hedge fund Millennium Partners. I've been investing in hedge funds for more than 20 years.

Eagle's view is known for investing in non-correlated, niche oriented, often capacity constrained strategies that seek to capitalize upon inefficiencies in the market where the demand-supply equation for edge remains fertile. Eagle's View is not in the prediction business and we do not spend 10 minutes per year thinking about where the markets or the world is heading as we believe we have no edge to make such grandiose predictions. We are simply in the observation business seeking to **examine the market micro-structure and changing landscape** in the search for positive expectancy and market neutral opportunities where an edge exists.

When I started in the hedge fund industry 22 years ago, there was approximately \$50 billion in the business. Today, the industry has grown substantially and there is north of \$3 trillion invested in hedge funds. We believe it is increasingly difficult to find positive expectancy and edge within the mainstream hedge fund strategies. As such, we've avoided those strategies because we believe they are no longer fertile and are too often simply a diluted proxy for long equities. This has been our philosophy and approach for quite a while now.

We invest in niche oriented markets such as strategies exploiting congestion across the electricity grid in the United States, capitalizing upon inefficiencies within shipping derivatives, various forms of algorithmic pattern recognition, IPO flipping, and other capacity constrained and inefficient opportunities. We have a mandate to invest in markets that are liquid. We continue to seek to invest in markets that are more fertile for inefficiencies versus a lot of the mainstream strategies that were formally quite attractive to us 20 years ago.



Tested & Trusted.

Cohen & Company's Investment Industry Services Division is focused on audit, tax and advisory services exclusively for the investment community, and now includes the tested and trusted experience of Arthur Bell.

Our firms are truly better together. Our passion for the investment industry inspires us to know it from the inside out, and energizes our professionals to be highly engaged with our roster of clients worldwide.

Learn more about the recent Arthur Bell merger with Cohen & Company at **cohencpa.com/arthur-bell**

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Matthias Knab

Neal, with your permission I published or made available to a larger audience a commentary you wrote to your investors. I called it "[Turmoil in Quant Land](#)," and there you were specifically examining why some of the quant strategies that worked beautifully for so many years mysteriously stopped working. Could you please tell us more about that phenomenon?

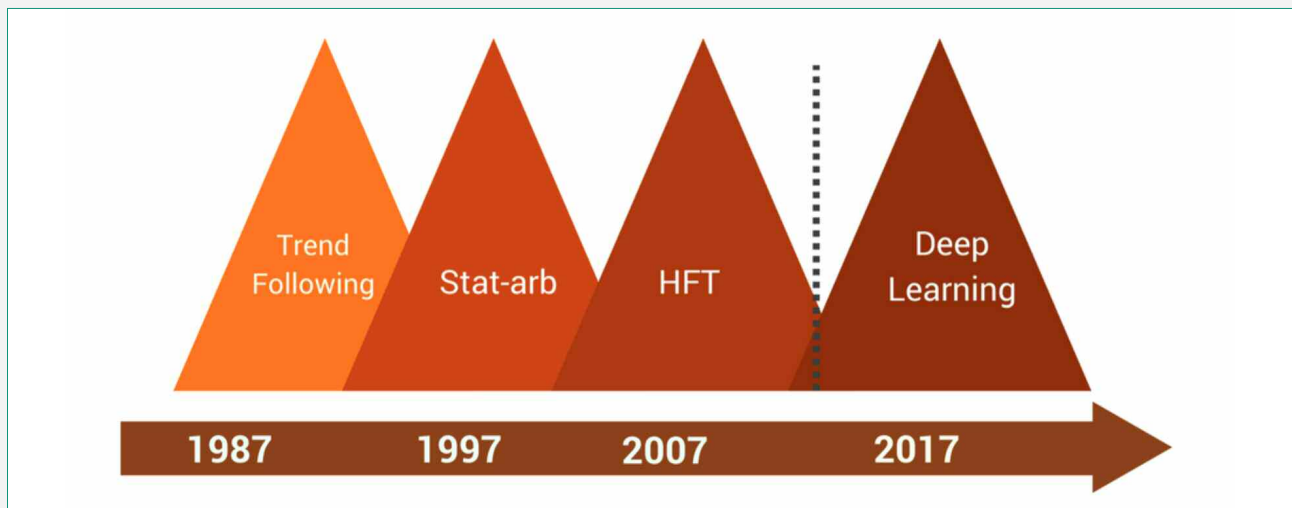
Neal Berger: Well, the simple answer is that within the more **pedestrian quant strategies** – and you can interpret the word pedestrian anyway you want, we have our own definition of it – the demand-supply equation for inefficiency is really becoming increasingly less fertile as every single day passes.

On the demand side, increasing amounts of money are flowing into quantitative hedge funds. These "edge demanders" are increasing their sophistication levels, and their availability of data especially with the technological revolution that we're going through right now. At the same time, on the supply side, the "edge providers" are diminishing quite rapidly. Historically those edge providers have been active traders and as we all know, there's been a massive shift of investment toward passive investing and towards indexation. So, the demand-supply equation for inefficiency has changed in a substantial way as more money comes into quant. There is less juice available for all of these brilliant quantitative managers to capitalize upon. I am referring to the market neutral, zero sum game, absolute return quantitative strategies where there has to be an edge provider on the other side of the trade losing money.

So, simply put, we just think that the demand has now outstripped the supply of inefficiency, and pedestrian quant has become a very crowded space. We are seeing that in lower returns across numerous quant strategies that have historically been quite successful in the past.



Gaurav Chakravorty: Neal, you mentioned that overcrowding is the main reason why older quantitative strategies have not been working. However, our belief is that the dominant quant trade has changed over time due to the availability of new technology. New technology is why trades crest and fall. If you allow me, I'd like to show you an industry research paper we published:



You will probably agree that in late 1980s the dominant quant trade would have been trend-following. Then roughly in the late '90s quants shifted to statistical arbitrage ("Stat Arb") and equity long/short. When Stat Arb came crashing down in the first week of August 2007, among all the reasons that were proposed, overcrowding of the trade was the most prevalent one.

However, [Andrew Lo's paper](#) lists many of the same reasons for the Quant meltdown as the [Brady commission](#) did about the Black Monday crash of 1987! Roughly around the quant meltdown, media starts talking about a new trade, high frequency trading ("HFT"). But ten years later, HFT revenues are 1/10th of what they were and the reasons given for that are once again, overcrowding, low volatility, increasing amount of money flowing into it.

My contention is that **the next ten years will be about Deep Learning**, but let's talk about that later. If you look at past periods when the dominant trade goes out and a new one comes in, I think, you would have heard the same reasons such as "volatility isn't there," or that "investors have gotten smart, and there is overcrowding in the trade." But I feel **it's about technology!** I feel that *upheavals in quant-land have happened in the past when a new technology has come in that has made the old trade obsolete.*

Let's look at trend following. It is a trade where you buy stocks that have been going up for six to nine months and you sell the ones that have been losing money over six to nine months. Trend-following is a trade that one could literally do with nothing more than Excel, and one could manage a lot of money with very little technology.

The next trade is Stat Arb, which is an expanded form of pairs trading, which then required a lot more technology. It involved trading around 3,500 stocks together with razor thin margins. This needed a lot more technological investment. That's why it started in banks that could invest a lot into people and systems needed for this trade.



And then you have the emergence of high frequency trading. HFT requires a lot of flawlessly built technology that is not just massive but also super fast! One of my friends at a leading HFT firm was saying they have more technology than what is needed to run the City of New York!

So, I think yes, you're right that there seems to be less alpha in older trades, but I think also there's new technology today that one can use to derive alpha that has been hiding in plain sight for years.

Neal Berger: I quite agree and this is why I prefaced my comments with the words "pedestrian quant strategies," and you named some of those. We haven't invested in trend following for many years. After John Murphy wrote "Technical Analysis of the Futures Market" and everybody became a trend follower, sophisticated people found it pretty easy to reverse engineer one moving average crossing another, and so it became an antiquated strategy.

Stat Arb obviously was a very successful strategy much longer than I thought it would last and still certain iterations of it are successful.

High frequency trading obviously became a technological arms race.

As a result of the technological revolution that we are going through right now, the availability of data both in terms of the quantity, in terms of the ability to store the data, and the ability to use the data has changed markedly over the last few years.



The problem from an allocator's perspective is separating the wheat from the chaff. *If you want to raise money for a fund today, the quickest way to do it is to put a marketing presentation together that references big data, machine learning, Artificial Intelligence and cryptocurrencies, and all of sudden you've got a fund that people are interested in. It checks all the boxes!*

There are people that are doing some pretty sophisticated things in the deep learning or the big data space. However, what was cutting edge or bleeding edge even two years ago such as utilizing satellite imagery to count the number of shopping carts at every single Walmart in the United States and comparing that to the day before and the day before, or, to get housing data out of China by measuring the slope of the shadow from satellites to determine how fast buildings are going up – believe it or not, *all of that has already become pedestrian.*

People with nearly unlimited amounts of capital, the most brilliant minds in the world are all looking for the same things. There are the big and sophisticated multi-strategy funds and others of that ilk, all looking for these sorts of things. So from an allocator's perspective, it's hard to really determine who's got the goods and who's just utilizing an image of a robot on their front cover of their presentation as a marketing tool – it's hard to separate the wheat from the chaff.

We are invested in some of these types of strategies and funds. Some of them are small funds that we think are doing some interesting stuff in geolocation and things like that, and some of them are part of larger funds where they have divisions utilizing bleeding edge information and technology to find an edge.

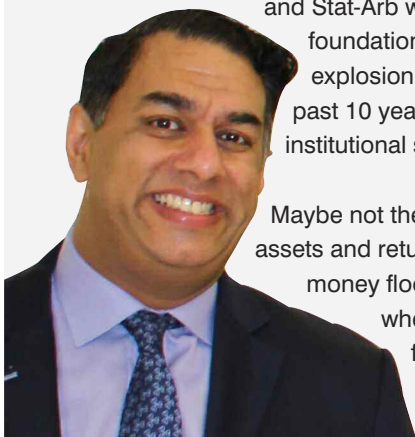
Therefore, I quite agree with you that logically it seems like there's a lot of opportunity given the amount of information that's out there. At the same time, this is no secret, and a lot of people with a lot of money are trying to capitalize upon this. People have machines that can read the headlines, understand the headlines, and react to the headlines faster than you can even read the first letter of the first word.

By the way, the idea of the old fashion trader staring at a screen waiting for that earnings announcement and then trading based upon it – they are **the sucker at the poker table**. If people know that the number of cars in a parking lot at Target department stores – and I'm just using random companies here – has increased 20% quarter over quarter and the number of shopping carts in use has increased similarly, they already know that there's going to be a substantial uptick in their revenues for the quarter. The smartest money in the world is already long prior to the earnings announcement and they are selling to the more antiquated guys who are buying after the headline hits the newswires.

Again, I quite agree with you, Gaurav, and that's why I try to make a very strong distinction between pedestrian quant strategies which are some of the old fashioned ones that you referenced, versus the bleeding edge ones or cutting edge ones. For an allocator, it's a challenging job and that's what we get paid for to a large extent, to separate the wheat from the chaff, who's good and who's not.

Neil Datta: I have a question for the group. How much of this do we attribute to the fact that, like everything, high frequency and Stat-Arb was kind of nouveau at same point and it became mainstream when endowments, foundations, and large institutional investors were piling in? We can also make the argument that the explosion of the ETF space has kind of lifted all equity markets, and with the influx of money over the past 10 years into these strategies the dynamic has changed to the detriment of some of these large institutional shops which over the years have just printed returns.

Maybe not the firms Neal talked about, but a lot of the more "CTA-esque" type managers have bled assets and returns were poor. I guess the gist of it is "what and why did we see those changes?" Is it the money flooded into the strategies? And will be seeing the same for example for cryptocurrencies where at some point it's going to become institutional and investable for larger strategies forward looking 10 years?



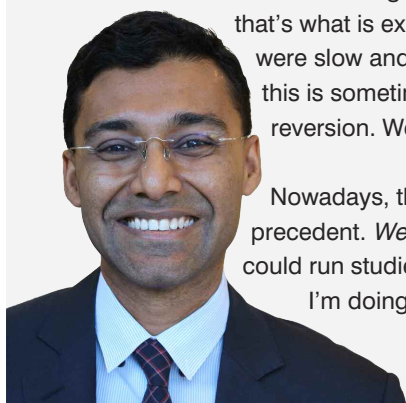
Neal Berger: Maybe Chris can talk more about cryptocurrencies, but in my opinion, **every strategy** that has positive expectancy, unless it's truly a structural inefficiency where the edge providers dwarf all of the hedge fund money that's available to capitalize by a substantial amount, **has a certain half-life**. People find out about it, other practitioners get involved in this space, and they arbitrage out that inefficiency that was once there. It's the job of an allocator to stay at the forefront of being aware of the new strategies that have positive expectancy and are robust in today's environment, while at the same time being aware of strategies that are degrading and their inefficiencies are losing efficacy as the economic or market micro structure changes. For example, as we have discussed, the advent of high frequency trading certainly has some impact on traditional Stat Arb, and how does that interplay? Does it degrade the edge of certain types of Stat Arb enough so that traditional Stat Arb is no longer an attractive strategy?



I guess we are working under the premise that there's always an edge somewhere, at least we hope so, or otherwise we're going to be out of business. With volatility as low as it is, it becomes more challenging to find inefficiencies because when you are looking for structural inefficiencies, volatility is your friend. I'm not just talking about equity volatility, rather, volatility in any market. I think one of the reasons people are focused on cryptocurrencies, and maybe Chris can chime in later as well, is because it's the only thing that's exciting these days and there's just nothing else that's moving around.

Gaurav Chakravorty: So Neil Datta asked why are some large quant firms not making money. That is an excellent question.

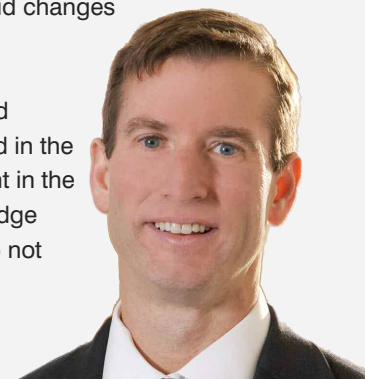
In my opinion, these large AUM quant firms are **constrained by their mandate**. They have to keep following the strategy they have been marketing for 20 years or so. For example, AQR cannot suddenly stop doing risk parity or momentum, that's what is expected from them. On the one hand, I was trading for a family office, and until 2007 things were slow and we were doing some sort of short term mean reversion, and when volatility picked up- and this is sometimes not a sudden thing but more gradual- we saw that we could not be doing slow mean reversion. We then moved to faster price prediction strategies.



Nowadays, this trade is called "high frequency trading." There was no name then, there was no precedent. *We were able to change our mandate depending on where we saw greater opportunity.* We could run studies and say, "Hey, this is working. Let's try it out tomorrow." And then, five days later, that's all I'm doing. Being this nimble is not possible for some large funds.

Corey McLaughlin: I just wanted to check if I am hearing you right because what you are pointing out here poses a major challenge for hedge funds or quant managers. That challenge seems to be keeping up with rapid changes in technology.

It sounds as though certain managers are going to have to invest dramatically in technology and innovation so they don't become stale or experience a dynamic similar to what Atari experienced in the 1980's; for those who are old enough to remember Atari. Atari was a dominant force at one point in the 1980's, but that went away very quickly as the technology changed rapidly. So it sounds like hedge fund managers and quant managers need to stay on top of technology changes so that they do not become obsolete.



Neal Berger: Well, let me clarify that what I'm referring to here is a small segment of what people consider to be the hedge fund industry. The hedge fund industry is not homogeneous – too many people in the press or in general talk about hedge funds as though hedge funds are a homogenous asset class when in fact that industry is made up of many idiosyncratic strategies. What we were having an initial discussion about is the market neutral, non-correlated, often quantitatively driven type hedge funds strategies that are looking for edge and inefficiencies.



However, apart from those, there's a whole contingent of hedge fund managers who are long, long/short, etc. trying to beat S&P by trying to time the market, pick stocks, or, other strategies such as global macro, event driven, distressed, activist, etc. These Funds would not suffer from some of the things that we have been discussing because it's not necessarily as relevant to them. I am talking about a specific element or segment of the hedge fund industry, not necessarily the entire broader hedge fund industry which encompasses a lot of strategies. No activist manager would be thinking about the kind of things that where we have been discussing so far in this Roundtable, it's a different strategy.

Matthias Knab

Chris and Kieran, you are also allocating to managers, can you tell us more how you see the industry and what specifically do you do when allocating to external hedge fund or alternative investment managers?

Christopher Ferraro: We do allocate to managers on a selective basis, despite the fact that our main business is primarily focused on direct investment of our balance sheet. So, I can probably provide a slightly different perspective. In short, we primarily look for earlier-stage managers who are experienced in and focused on idiosyncratic markets or strategies that clearly have not seen the kind of influx of capital (broadly) that other more traditional markets or ideas have had over the past 8 years. Much in the same vein that Neal and Gaurav have articulated, we find it incredibly hard to allocate capital to managers on a long-term, locked-up basis when capital can move so dynamically today and can very quickly “crowd out a trade” and mean revert (or worse).

And of course, as a manager's success grows, and their fund grows, there is always the inherent risk to scaling and a potential divergence of incentives between the LP and the GP. As an investment firm with direct investment professionals on payroll, the bar for a manager to perform for us with a high Sharpe ratio on an after-tax / after-fee basis is incredibly high. These are the things that we think about all the time when considering allocating to an external manager.

I'd like to say, incidentally, that I think what Neal said about all strategies having a half-life is really insightful and that perhaps this half-life may even be accelerating, too, now for each new strategy. It would be quite interesting to me to see if the triangles in Gaurav's graphics, which are now equally spaced out over 10-year intervals, will continue that way, or if technology will have a meaningful impact in reducing the windows that we, as investors, have to identify alpha and extract it.

Now, turning to cryptocurrencies, I probably don't even have to point out that this is where volatility is happening – and it's occurring on a daily basis in a way that we just don't see anywhere else in any of the other traditional capital markets. So, while there are a lot of people talking about wanting to get involved in the space from a trading perspective because of the market inefficiency, the reality is that **the cryptocurrency space poses a lot of non-trivial**



structural and technical problems just to get involved in trading the assets. And so, part of our bet in even entering the space from a trading perspective has been that we have an incredible head start, and we think that it is going to take a lot of folks a longer-than-average amount of time to figure certain things out. So, in the end, we think the cryptocurrency space actually will provide managers an opportunity to find alpha and hold on to it for an extended period of time.

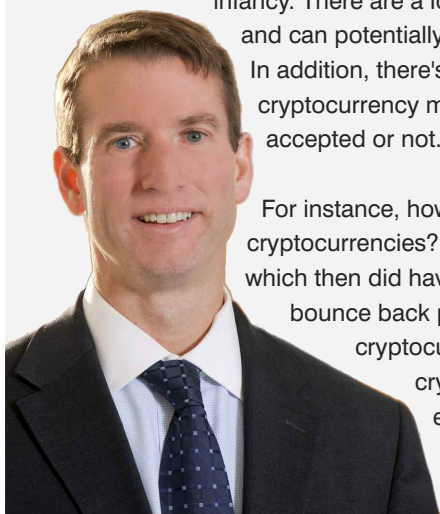
Just to provide an example, I'm not sure that we have ever before seen (or even contemplated) a world in which autonomous, decentralized exchanges could be set up anywhere in the world, allowing access to anyone in the world to instantaneously trade asset pairs, with incredibly thin volume one day and incredibly heavy volume the next. Just to be able to participate and trade these kinds of markets takes a lot of time and a lot of technical research – and this is just the sufficient condition to have a seat at the table.

In most other more traditional markets, you just don't have this sort of limitation today. This kind of technological advance, these decentralized "mini-markets," are popping up with increasing frequency and providing those participants who are knowledgeable an ability to find unique pools of liquidity nearly instantaneously and with low friction. Of course, this too is solvable, and over time market participants will learn and access to this space, too, will become more ubiquitous. However, for now, the lack of simple access paired with the non-trivial learning curve needed just to understand the asset class and the potential for parabolic returns makes this just one of the most interesting markets to be in at the moment.

Matthias Knab

Would you think that returns in cryptocurrencies get eroded as well over time, because there might be that half time mechanism or the institutional money flows leveling all things off over time as we discussed it earlier?

Corey McLaughlin: I think it's a hard question to answer. Cryptocurrencies today, in my opinion, are very much in their infancy. There are a lot of inefficiencies in terms of pricing across the different exchanges that currently exist and can potentially be arbitrated. That factor alone is a sign of where the space is in terms of its life cycle. In addition, there's the unknown of how regulations and governmental agencies will impact the cryptocurrency markets. There are fundamental questions on whether cryptocurrencies will globally be accepted or not.



For instance, how is the SEC or the U.S. government going to respond to the growth and demand of cryptocurrencies? We have seen that China did not accept certain aspects of the cryptocurrency space which then did have short term impacts on the values of the currencies. With that said, the values did bounce back pretty quickly. One other question is whether a governmental agency will issue its own cryptocurrency at some point. If that occurs, what impact does that have on the values of other cryptocurrencies? To me, the cryptocurrency space is still in its early stages, and it will be extremely interesting to see how it evolves.

Kieran Cavanna: I don't allocate directly to the cryptocurrency space, but I guess like many others I look at the shock and awe going on in the space.

I want to come back for a moment to our discussion on quant funds and how the unabated inflow of funds affect our space. In all my years in the industry, I've never seen anything like the growth of a hedge fund firm which I will not name that went from three billion in 2009 to fifty billion today. And on top of that, use an enormous amount of leverage. At the same time, the last 18 months has been weak collectively in quantitative trading space.

The thing I'm watching is the **leverage and the money flows**. There are a lot of firms that have extraordinary amounts of leverage, I would say five to six times, particularly in market neutral equity funds and then some of the bigger multi strategies are more like ten times on an undiversified basis in these strategies. In a way it is like a prisoner's dilemma when you have so much money coming what matters a lot is what is happening at the other guy's firm. Broad deleveraging by a big firm will affect quantitative and discretionary strategies.

And at the same time we are seeing **fundamental strategies** putting up great returns, on an unleveraged basis. A TMT fund we are in has a 50% net exposure and is up a bit more than 50% net this year, and really, unlevered is the key here. At the moment we are seeing a reassertion of fundamental discretionary type of strategies, great on a net adjusted basis. Market going up is driving equity funds for sure, but we are seeing reasonable spread of returns on longs and shorts. Our market neutral equity TMT guy was running like plus or minus 10 but now he is up 19%, that's real alpha there on a gross of 140. He has been going slightly more short as the market keeps moving up as short opportunities present themselves.

I had already mentioned that we also do a lot of **co-investment** which possibly is even the most exciting area of our business. We live in a very big world and there are a lot of great ideas out there. An example we have is a co-investment in a company called Recruit Holdings which is a Japanese company that owns indeed.com, the largest job site in the world which is growing at 60% a year.

The key here is that we are getting access at zero and ten type fees and we have been surprised to the upside with the creativity of the ideas. Of course, a single stock investment is much more volatile and we size it accordingly. If you build a book of co-investments, you can address some of that through diversification. And they are not all long; we actually have two macro co-investments and one short-only thematic trade.

These co-investments also tend to be idiosyncratic trades which generally means less crowded, and again, the alignment is much better with funds. We all talk and debate about fees, but incentive alignment is what I look for. For example, when you are a \$10 billion hedge fund and charge 1.5% and 20, imagine what incentives that manager has? No matter what they say, they are looking at \$150m per year in management fees, and are incented not to jeopardize that fee stream. I think the combination of co-investments and investments with smaller hedge funds is much better alignment than can be had at industrial-sized hedge fund firms.

I agree with Gaurav that there are great opportunities in the quant / machine learning and AI space. It's very difficult for a non-programming person to understand what exactly these managers are doing, if they even will tell you at all. Especially in machine learning I am seeing some odd assertions as if it were the second coming of investing. But I know enough to know that there are some fakers and some are the real deal. It is harder for a more fundamental investor to identify both frankly. I agree with Neal Berger about the wheat and the chaff, that's the hard part and so far I have avoided quantitative strategies that are highly levered for that reason, because I don't have that skillset.



Neal Berger: I would like to hypothesize as to one reason why the stock pickers might be doing as well as they're doing recently, as I've noticed this too. I think that it has to do with the move toward **passive indexation**. As the market microstructure changes and investing behavior changes, one door closes and another one opens.

I have been grappling with the question what edge or what inefficiency is being created because of the move towards passive indexation? I don't think it's a secret that Vanguard runs a very large S&P 500 tracking fund. When an index fund gets an inflow, they are bookkeepers at the end of the day, and they will cover every number on the board. They will not delineate good companies versus bad or change their procedure when they get dollars in for the day. For example, they won't say, "We want to buy just this company because it's a good company" or "We don't want to buy that company." They just cover every number on the board because that's what they have to do in tracking the S&P 500.



So they are buying all the companies across the board without any delineation whatsoever, and conversely if they see outflows, they would be selling stocks across the board. As such, I think these conditions create an opportunity for the stock pickers to actually do some work and say, "Look, these companies are fundamentally good companies at fair prices and these companies are over-valued because the index funds have come in and bought them too high." So while index funds are pushing certain stocks away from their fundamental value, ultimately, over some time horizon, things come back to fundamental fair value. In my view, individual stock pickers who are attempting to delineate between the good companies and the bad companies are beneficiaries of the move toward passive indexation and the indiscriminate buying and selling by the index funds. So that's one hypothesis I might propose as to why some of these guys are doing so well recently.

Gaurav Chakravorty: I wanted to address briefly Kieran's point about fees. An alignment of fees could come in many different ways. It could be lower fees, it could be less management fees or it could be sort of more the private equity model where fees are paid out only at redemption and only if the manager has made money over the life of the investment. But that's a tough pill to swallow for many managers, both financially and operationally.

For instance, if you ask any hedge fund, even the large ones such as AQR and Bridgewater, "Can you shift to a structure that you only get paid if you make money?" I don't think they would move very easily. Large allocators have been trying to change the fee model. For example, [Teacher Retirement System of Texas](#) along with Albourne has been promoting what I think is a more modest proposal of "1 or 30," but even that is facing backlash from some of their managers.

So, more and more investors are actually asking, "What am I paying for?" You see it in lower fees but also in more creative structures. I think that will help the quant space.

For example, here at qplum, we are coming up with a true partnership model where we re-invest the incentive fee back into the same strategies along with the clients instead of redeeming it. The investors only pay if we have made money for them.

Now, about the stock pickers – while you have some good examples with good returns, you also hear about other examples. For example, you also hear about how value has had a horrible year. You also heard Warren Buffet say that it's very, very hard to beat the market now. What he was doing can now be technically replicated in an ETF with 15 basis points in fees. Are you sure you are not generalizing a few good stock pickers into believing that discretionary stock picking is back?



Kieran Cavanna: I don't have a precise answer on that, but I do think that I like evidence I am seeing out there to counter this. I like numbers and solid evidence, and I'm seeing some excellent returns; though the markets are running and this is fueling long-short, the quality of the returns are very solid.

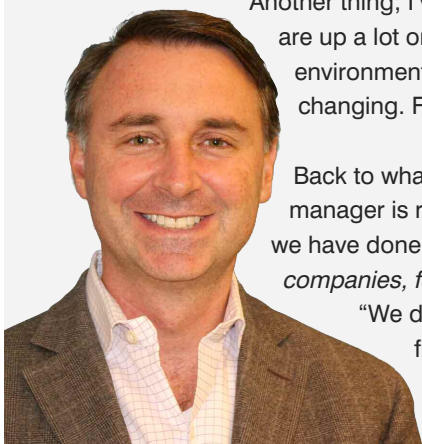
I would agree with Neal Berger and his thoughts about the changing market structure as a consequence of the trillions going into passive and indexing. And for some managers that also meant fewer shorting opportunities.

Managers shorting from 2009 onward just massively struggled, and at this point most of the short sellers I know are nearly all gone or have diversified their businesses. Credit Suisse shut down their Short Biased index and I asked why and they said, "Because there aren't enough constituent funds anymore." There's one or two obviously, but maybe not enough for a meaningful index. I am not a fan of short only, but this is a sign of the times.

A manager that I invested with gave me an example of a *telecom company that had flat revenue growth for five years and single digit bottom line growth, but the stock had doubled in that 5 years*. Why is that? It's probably just flow driven based on the massive inflows of index money. I personally think passive flows have created massive inefficiencies that good long-short managers will be able to exploit as soon as the pace of index flows slow, and ETF volume starts to shift.

Another thing; I've not experienced this in a long time, but today we are seeing what we saw in 2007; funds are up a lot on a long side, and flat and in some case up or down a little on the short side. The environment since 2009 has much to do with the lack of good short alpha, but it looks to me to be changing. Frankly I think it has already started to change back to a better alpha environment.

Back to what works for us, we like managers who have a certain expertise. Like we have the healthcare manager is really good in medical devices and that guy has produced some of the best co-investment we have done so far. *And when I talk to a more general manager, they won't be looking at spinal companies, for example, because that's very specific knowledge*. A general manager might tell you, "We don't do financials and we don't biotech." But boy, you may be missing a lot in biotech and financials, so we look for some managers who are demonstrably good in these spaces.



Christopher Ferraro

Focusing back onto the discussion regarding the historical tidal wave of passive investment and indexing, the uni-directional equity market movements, and the dearth of volatility in traditional markets, the question that we ask ourselves almost every day and I'd pose to the group is "Presumably, this, too, will have to lose at some point. But where should we be looking to understand when it will lose and how that loss will manifest itself?"

Gaurav Chakravorty: That is a good point, Chris. You are asking if we are going to see a bout of high volatility after this prolonged phase of passive indexing. I am very sure that volatility will increase in the years to come. However, we can separate the notion of volatility vs more trading opportunity. I think the real question behind that is, "Can inefficiency come back with higher volatility?"

Let me give you some data to support the claim that market volatility might come back. Right now, if you look at the total U.S. household wealth of about \$96 trillion, according to the most recent Federal Reserve, about [52% is allocated to equities](#). That's much higher than before. For instance, the previous peak in equity allocation was before the financial crisis and even then it was just 37% of net household wealth.



Since the 1950s, the largest drop in US household wealth was just 5%, apart from the financial crisis where the wealth drop was 18%. Investors typically panic if their wealth drops by even 5%.

Since US investors have 52% invested in equities and if equities were to drop just 10%, we will lose more money than we have lost in any crisis since the 1950s, apart from the financial crisis. It is very likely that we'll panic. We don't like to lose money, we don't know how to deal with a severe drop in wealth. This means that there is sure to be panic selling. I mean, 10% is nothing in equities, right?

So I agree with you that in the coming years, if the market catches a cold, we might start seeing panic selling. However, I am not so sure what inefficiency that brings. I don't think twenty-year old trading strategies like trend-following and Stat Arb that are floundering now will suddenly start making money. I think their time has gone.

Neil Datta: I'd like to add one interesting point back to the shorting aspect. We do a lot of work with fundamental TMT managers and a number of them are pointing to two main drivers. One is the disappearance of prop desks and so they are not around as liquidity providers or to take the other side of a trade, and this has affected short borrow rates and things like that.



To understand the other driver let's go back 20 years ago when the business model of the prime broker was evolving. It was a relatively new business that investment banks have been doing particularly to service hedge funds. The shorting aspect that prime brokers were offering was effectively a free service. But with the disappearance of prop desks and that huge profit center which was the bread and butter for all these banks being gone, these banks now have to make money elsewhere, and now they are changing rates in short borrows, and making it harder and more expensive. That also ties with what we said earlier about the rising tide lifting all boats. Stocks are rising and it's more expensive and harder to short crappy companies now than it was in the past.

Neal Berger: I'd like to go back to our conversation about cryptocurrencies given that we have Chris here in the room and that Mike Novogratz is obviously very big in cryptocurrencies. Obviously, it's a very hot topic for people these days.

I'm not necessarily a believer or a non-believer. I think nobody knows however, from my perspective, **there are really only a few things that the 200 or so cryptocurrency hedge funds in the pipeline or that have already started can do in cryptos.**

Number one, **go long** cryptocurrencies and pray they keep going up. I don't need to own a 2/20 hedge fund to buy cryptocurrencies. I know how to do it, and if I didn't, I could hire someone for a few hundred dollars to set me up with a cold storage wallet, a Coinbase account, a GDAX account, and then I could buy some cryptocurrencies.

Number two is to apply a **traditional trading** approach, whether it's trend following or use some sort of traditional technical analysis to try to time in the market in and out, which I personally don't think is a good strategy.



Third, as Corey alluded earlier, the idea of doing **cross exchange arbitrage** where there are certain disparities whereby you can buy bitcoin on one exchange and sell it simultaneously at a higher price on another exchange. The problem with that strategy is that the cryptocurrency exchanges that have the higher price are usually exchanges where you'll find a reason for that high price. They have either been hacked or they are somewhere in some unregulated country where you're lucky if you are going to get your money out. Is that really an arbitrage? You're buying on Kraken, Coinbase, or Gemini, I believe those three are regulated U.S. exchanges, and then you're selling on some esoteric exchange at a hundred dollars higher, good luck getting your money out. If you do, you're getting paid that premium for assuming the risk that the Mt. Gox guy will be running off with your money.

Finally, I've seen people who are trying to trade the **relative value** between cryptocurrencies such as bitcoin versus ethereum versus Litecoin or even bitcoin versus fiat versus ethereum. It seems like a very difficult game because it's a very illiquid and very thin market.

I personally believe that bitcoin will be going to go up many, many multiples because it's really just a demand-supply game. It's not (yet) easy to buy for the common man. There's a lot of pent-up demand for it. I think large quantities are held by a handful of guys, Mike Novogratz might be one of the guys but obviously, we know some of the others – Tim Draper, Marc Andreessen, "Satoshi" – and guys like that.

I think these guys are waiting as the public outcry for cryptocurrencies continues to be strong with prices rising, there may be an ETF that will make it easier for people to buy. If that happens, the buying from the ETF into a thin market could send the price to astronomical highs. If you look at GBTC which has traded as much as about a 100% premium over the underlying price of bitcoin, it just shows you how much demand there is to buy it in a way that's familiar to people other than to plug in a KeepKey cold storage wallet, get a Coinbase account, and try to buy it directly.

When that happens – I don't know what the current market cap of bitcoin is but I think it's approximately \$80 billion or so – it's not unreasonable to think that since it's trading at \$6,000 now that the market cap could go to \$800 billion. All of a sudden it's trading at \$60,000. There are only 4.5 million more bitcoins to mine and it's becoming increasingly harder to mine. Each incremental bitcoin becomes increasingly harder to mine. So, putting aside any mining that might happen over the next year or two, an \$800 billion market cap for bitcoin is not unreasonable and the price goes from \$6,000 to \$60,000. It's a chip shot from there to go to a \$100,000, approx a \$1.5 Trillion market cap on Bitcoin while still being in a bubble that may ultimately burst. People can make a lot of money in a speculative mania.

I think at a certain level, if it ever started to threaten fiat currencies, governments would really start to step in because that's really the only control they have over the people – that they control the currencies. I highly doubt that we can use it as a substitute for fiat currencies.

So Chris, I'm curious about all these new hedge funds that are coming into the business of trading cryptocurrencies, what they're going to do other than just be long cryptocurrencies?

Christopher Ferraro: Neal – you've just articulated a number of points, and I'll try my best to address the core of them; however, from a macro point of view, your last point is plainly and simply why we are in the business.

There is a long-term supply-demand game playing out that we believe is still in the very early innings. This is the beginning of a decentralized revolution, and cryptocurrencies are going to play an instrumental role in that revolution. Bitcoin is, and we think will continue to be, the bellwether of the space and the fundamental store of value. Ethereum has emerged as the first of many public utilities that allow new technologies to access and operate on top of the blockchain. And the multitude of fiat currency that is building up and excitedly waiting to get into the cryptocurrency space, will in all likelihood start in bitcoin and ethereum. That macro flow is something that we believe will play out over a long period and has the potential to unlock the

"animal spirits" and provide convexity that we haven't see in quite some time.

Regarding your question as to what are the hundred or more cryptocurrency hedge funds that are raising money this year going to do?

I think the simple answer is they are just going to be long. The average person, or average cryptocurrency hedge fund manager for that matter, can't really get short today, and if they can, it's only in a highly inefficient way on the exchanges. If you do that, you're taking on a lot of risk – first, because the exchanges are not secure and second, because they will stop you out before you have a chance to post margin. So, you can't really stay on short in the way you'd want and over the timeframe you'd need.

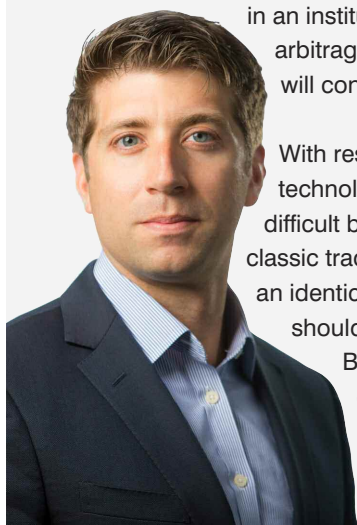
Let me just add here that what I am saying is not a plug for what we are doing in any way. Our fundamental view is that there are a lot of deeply technical drivers that, along the way, will cause extreme bouts of volatility with many peaks and troughs in what we believe will be a directionally bull market.

And so, we believe that a successful strategy in the space should consist of a deeply technical team of blockchain researchers who are trolling reddit, blockchain coding forums, conferences, etc. all day long understanding what is happening in the community, paired with a seasoned team of macro markets traders who understand the human psyche when it comes to buying and selling assets.

Rather than just paying someone to buy and hold Bitcoin for you, we believe investors should expect a manager to be able to consistently sell high and buy low through the volatile bull market cycle we are seeing. And, they definitively should expect a manager to have the presence of mind to trim exposure in advance of major corrections to preserve capital.

To provide an example, you'll see periods of high volatility in the markets when there is an announced (or speculated) hard-fork in one of the currencies. These forks are typically driven by technical or even philosophical disagreements in the developer, user, or mining community. And those events are non-trivial to sentiment in the currency. *If you're not spending all day talking to people in the community – and by the way, it's a global community which is the most interesting thing about all this – it's very hard to have an informed perspective on what is truly going on, and thus what position you should have in the market.*

In terms of the arbitrage, we actually do believe that there are numerous opportunities out there where price differences for like assets on different exchanges exist well in excess of whatever risk premium one should ascribe to the underlying exchange or currency. And, in the case of a fiat currency arbitrage, being able to interact with the traditional currency markets in an institutional way should drive additional high Sharpe alpha. But the opportunity doesn't stop in arbitrage – there will be numerous market-making opportunities and OTC block trade opportunities that will contribute to this strategy, as well.



With respect to a relative value, currency-to-currency trade, given how nascent most of these technologies / crypto assets are, it's hard for me to disagree with your point regarding that being a difficult bet. I'll provide one example that is out there in the community – the ethereum versus ethereum classic trade. Here you have two cryptocurrencies that exist on the same exact network – in fact, they share an identical history up until the DAO hack and I'm not sure there is a compelling reason why everyone should use only ethereum to develop ERC 20 tokens v. sharing network capacity with ethereum classic. But, the developer community for one reason or another HAS chosen ethereum to develop most of the new projects on and yet there is a twenty to one valuation difference between the two chains.

Neal Berger: One of the things I heard is that the mining power will go to where the price is highest and will add supply there. So, if the price is higher in a particular crypto, more miners will be going to that crypto because they will make the most money by mining that particular crypto. This will add supply and drive the price back lower over time. Ultimately, that demand-supply dynamic might keep some of the spreads in line.

I'm not necessarily a believer in that – it may be true but it may not be tradable on a short-term basis because it's a longer term, slower moving shift in mining as price disparities arise.



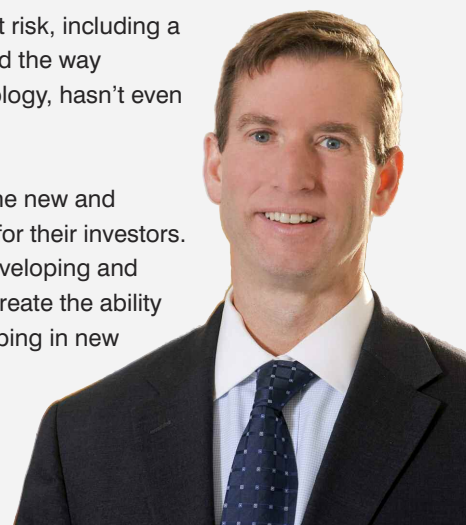
Christopher Ferraro: Right, so there is generally a self-correcting mechanism with miners going to where the price is highest – but this isn't universal and not all cryptocurrencies that are mined use the same hardware / technology. Plus, there are also a ton of actively traded cryptocurrencies that have already been pre-mined and don't involve this self-correcting economic mechanism as described – they are driven by a more pure supply/demand equation inside that particular ecosystem. In a lot of ways, the cryptocurrency tokens that underlie truly decentralized platform plays resemble the health of the GDP (or prospective GDP) of that platform.

The other interesting place in crypto is the **ICO space** which has a remarkable resemblance to the IPO market pre-dotcom bubble, but with a twist – regulation hasn't quite caught up to it and consumers can directly access it. And so, it is fraught with significant risks and the potential for a lot of bad behavior. We are selectively in that space and participate in backing projects that we believe have a reasonable chance of building something not just interesting, but also actionable within the next 12-months. That's why we focus particularly on protocol layers versus "dApps." We are just selectively picking our spots and not getting overexposed.



Corey McLaughlin: I agree with your comment about ICOs as there can be significant risk, including a risk of bad actors. However, the use of Blockchain technology is in its early stages, and the way Blockchain technology can be used, particularly the smart contract Blockchain technology, hasn't even started to be fully realized.

The attractiveness of some cryptocurrency managers is their ability to stay on top of the new and innovative ways to use Blockchain technology and to use that to help generate alpha for their investors. Before investing in ICOs, cryptocurrency managers focus on understanding what's developing and what's occurring while determining where there are opportunities that arise that may create the ability to get the multiples that you referenced. Blockchain technology is, and will be, developing in new and different ways as did the internet when it first started. That can create investment opportunities.



Neal Berger: Most ICOs can't even be sold to U.S. persons or entities. There's a lot of government regulation and we have some indications from the SEC as to how they are going to look at these offerings, although, we don't have clear guidance as of yet. As such, they are fraught with a lot of uncertainty on the regulatory side.

From a hedge fund's perspective, you need to deal with things like the custody rule if you are SEC registered. So, if you have your money on say some unregulated non-US exchange, the SEC may ask, "is that appropriate to have your cyber assets in custody there?" Obviously, as a family office, you can do what you want, but if you are running other people's money, I am not sure how the SEC is going to view that.

I look at ICOs as angel investments. You really have to look through to the underlying business and say, "Is this a good business or not?" There is probably a business of being an ICO flipper and understanding which ICOs are going to be hot based upon who has backed them or what kind of buzz they are getting, so maybe there is some short-term money to be made but it's not scalable.



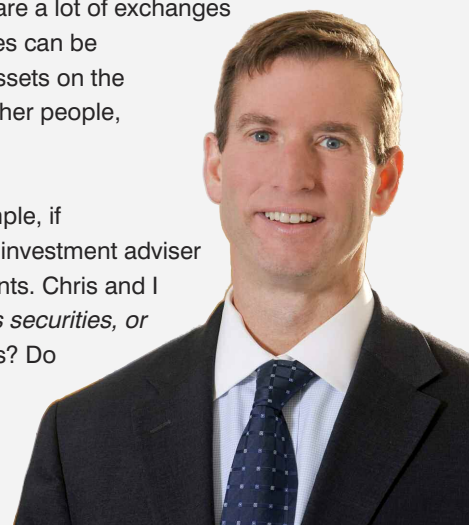
Regarding the longevity of a particular ICO, it's no different than a company raising angel capital, just a different funding channel with money coming from people who were mining bitcoins in the early days and now they find themselves with \$200 million worth of bitcoins. They may throw \$100,000 into every ICO that comes along in the hopes that they'll hit one big. Sometimes this works, sometimes it doesn't.

But again, the question is can a US person or US entity buy an ICO these days? Number two, are you concerned at all about the regulatory aspects of doing so, especially if you're doing it with other people's money, the custody rule issue and all those sort of issues?

Corey McLaughlin: I agree, the custody issue is a big issue. Also, back to Neal's point about the interest in GBTC, I think a lot of that is driven by the fact that the layperson in society doesn't understand how to deal with the whole **cyber security aspect of holding these assets**. They just aren't there yet. They are interested in investing and using cryptocurrencies, but many aspects are just a little bit too technical for them.

In my opinion, the **custody question** is one that needs to be addressed. I think there are a lot of exchanges operating in really good ways out there, but failures such as Mt. Gox and similar failures can be devastating. Therefore, having some kind of guidelines around segregation of client assets on the exchanges and how the exchanges protect the assets they are holding on behalf of other people, including their cyber security practices, are critically important.

In addition, regulatory requirements for custody are really important as well. For example, if cryptocurrency managers are managing client assets that go over the SEC registered investment adviser threshold, they need more clarity on how they meet the qualified custodian requirements. Chris and I were talking about this before we even started the Roundtable: *Are these coins/tokens securities, or are they commodities?* Then, what does that determination mean for custody of assets? Do you need a qualified custodian or not? There are no clear answers to these questions now, and that causes some challenges for cryptocurrency managers.





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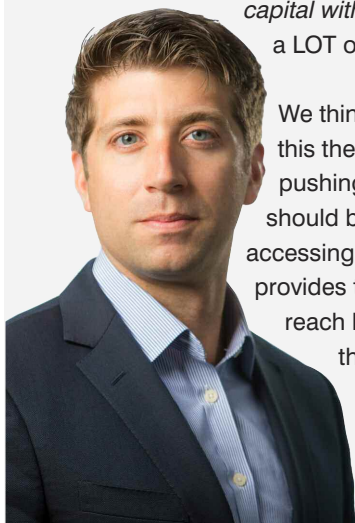
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Christopher Ferraro: The primary issue around limitations on buying ICOs is really an issuer related problem as to whether or not the issuer may be selling unregistered security to investors. *If you are a qualified institutional buyer (QIB) or an accredited investor here in the U.S., then there is no problem with actually purchasing a token in an ICO. Reselling it, however, raises more questions,* but we think ultimately the regulators will treat exchange-traded transactions in the same way that they deal with other resales of securities in the broader market. In the end, it all comes down to how the issuer created its token and therefore how the issuer is allowed to distribute it to holders.

I agree with Neal that structurally ICOs look a lot like venture capital *except that the liquidity comes a lot sooner.* I would say that many ICO participants are playing this as a game of access, and then – regardless of whether the project works or not – selling into a broader market who didn't have access in the first place. It is an angel investment with an active micro-secondary market for the paper / token.

But, to me, the more intellectually honest question regarding ICOs is *"what is a company / project ACTUALLY doing then they issue a token?"* Are they crowd-funding a project? Are they pre-selling revenues? Are they issuing equity?

The attraction / temptation to raising \$20 million, \$30 million, \$100 million, or even \$200 million of non-dilutive capital is certainly there, no questions. However, I think every investor needs to ask themselves: *when has a company, that's most likely just a small team of maybe two, three or four developers, ever been given \$100 million of unrestricted cash on their balance sheet in advance, and what's the probability that that team will produce something useful after having been given all that capital with no governance?* Human nature is not something easily avoided in this case, and so, we spend a LOT of time considering the raise size of an ICO in terms of assessing its probability of success.

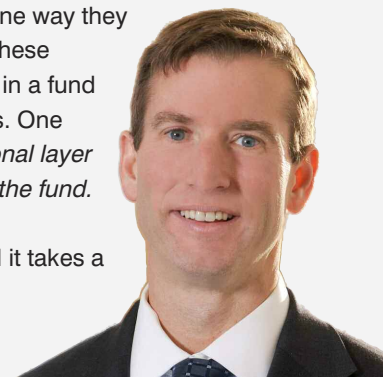


We think that there are a small group of people who are involved in the space who are thinking about this the right way – Blockchain Capital, for example, who are primarily venture investors – and are pushing for improvements such as governance rights for ICO lead investors. As an example, there should be mechanisms that allow for a company who raises \$50 million throughout their ICO to start by accessing, say \$5 million of it until they produce a **milestone**. And by the way, the underlying technology provides that there could actually be a smart contract that doesn't unlock the other \$45 million until they reach Milestone 2 and Milestone 3, and so on. In that way, there would also be an incentive structure for the entrepreneurs to actually do what they say they are planning to do, because today, unfortunately, that actually does not exist. In my mind, that's the single biggest issue in terms of fundamentally turning a capital raise from an ICO into something that's valuable in the long term.

Corey McLaughlin: To Chris' point about the SEC, the recent guidance applies to entities that are issuing ICOs and making sure they are complying with the private offering mechanisms and regulations as opposed to just gathering money.

We have begun to see ICOs being used in different ways than raising money to develop technology. The way ICOs are being used gives an example of the innovation that is occurring related to this structure. One way they are being used is as a way to raise capital in funds for managers to then trade that capital. In these situations, a manager would issue a coin or token. That coin or token is essentially an interest in a fund that's trading. That fund could be trading cryptocurrencies, private equity, or other instruments. One interesting aspect of raising capital this way is that the *coin or token allows an inherent additional layer of liquidity on an exchange that allows it to trade in a decentralized way outside of the NAV at the fund.*

This is an example of how the use of ICOs are still evolving. It's really interesting to watch, and it takes a lot of effort to stay up to speed on these developments.



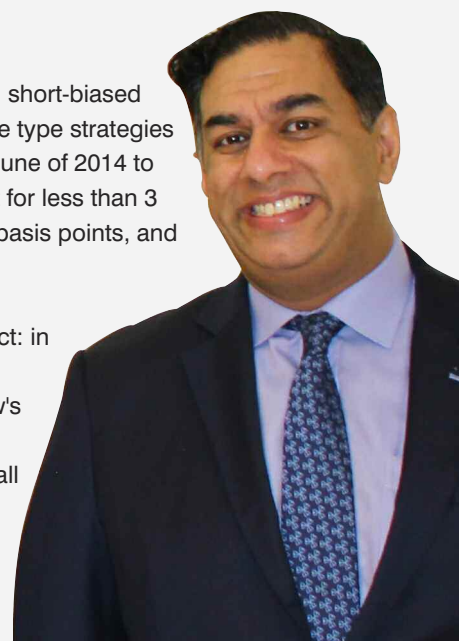


Gaurav Chakravorty: I have a question for Kieran and the other funds of funds investors. Kieran mentioned that there's less interest in short biased funds. Do you also see less interest than before in a long/short or a very strict market neutral mandate? Do you see allocators now asking people, "Hey, you have to be market neutral everyday!" or do you see more demand for an absolute return mandate?

Neil Datta: Great question, and I think the answer is yes. I think that, generally speaking of the equity long/short space, the consensus is that people are waiting for the other shoe to drop. We have had a run-up since March of 2009 and allocators are looking for where the legs run out. And in that regard, I think people are not necessarily looking for a Black Swan-type funds but guys that are market neutral or at least have the ability to be nimble in choppy markets and don't bleed to death in the process.

We have had that mandate for the past two years, and it's hard. The larger, well-known, short-biased hedge fund managers haven't done well, and there are challenges for volatility arbitrage type strategies as well. We invested in a manager that had a really compelling three-year track. From June of 2014 to June of 2017 he annualized at probably 30%, so insanely strong AND consistent, albeit for less than 3 years. We invested June 1st. And since June 1st until now, they are probably up a few basis points, and it's startling.

We had to call the manager we asked about it, and he mentioned a really interesting fact: in the history of the VIX, something like 75% of its worst days ever all happened this past summer. It's really sort of an eye-opening statistic, and we can debate the why's or how's but, I think that, plus the whole ETF conversation, it's hard to make money on the short side consistently in schizophrenic markets such as these. And biggest question is, we all see the writing on the wall... the correction is coming, who's going to profit from it and who's going to be nimble enough to get out of the way when the sky is falling?



Kieran Cavanna: Broadly, allocators are investing with market neutral and CTA and macro related funds to find positive returning, non-correlated strategies. This is what Neal does and what I do, just a bit differently.

Along these lines, there has been an **explosion of money chasing quantitative strategies run in the market neutral format**. Also, macro in general hasn't worked very well and CTAs have been tough now for a while now. For us, global macro discretionary strategies have worked well, at least so far we are making money. I like macro, done right.

We had a good run actually in my prior firm, and emerging market macro lately has been just great. You have huge moves in Brazilian rates and India is reforming its financial markets rapidly. You have South Africa and Turkey really struggling and going the other way in terms of reforms. So, there is a lot going on in EM markets while a lot of the developed market macro strategies haven't been so good lately.



But in terms of achieving positive returning non-correlated strategies, I think the best place is *low net, low leveraged equity long short*. For instance, we have a market neutral fund running at 180 gross, and the manager is annualizing 13.5% with slightly negative correlation to Russell and the overall portfolio since 2009. That is just perfect for an equity focused strategy like we run. Overall our net equity exposure is about 35% at the moment and a fund like this is highly additive to risk and return.

So, coming back to Gaurav's question, I think there is demand for market neutral, but actually people want things that they perceive as non-correlated. I just see a lot of risks in the more traditional non-correlated strategies that investors gravitate towards because of high leverage, massive money flows into these strategies, and other factors.

Corey McLaughlin

I'm curious how allocators are managing to deal with the changing landscape. The industry keeps evolving, and I am interested in how allocators are staying on top of the developments, or do you just focus on one area and disregard the others as noise? There are so many developments to stay on top of such as, cryptocurrencies, AI, different private equity or less liquid investments, etc.

Kieran Cavanna: My view is that you have to go with your edge wherever it may be. It's too hard to go to the latest strategy that's hot for whatever reason.

I mean, if you allocate in the institutional space, I would say that no one I know has an allocation to crypto, maybe a little bit via the GBTC ETF only. I am always trying to learn and not rely on just what has worked in the past though, but chasing the new new thing isn't what I do.



Corey McLaughlin

Are you worrying it might be late?

Kieran Cavanna: No. I mean, there are no called strikes in this business. We are having a pretty good year so far with a low net equity exposure and diversified macro exposure and a smattering of co-investment opportunities that overall are producing great results.

If I deliver this and really know what I own and what risks we are taking, I view that as my main job. We are not trying to beat everybody and you don't get extra points for originality. I just want to do what we do well and deliver what we promised to investors.



Neil Datta: As we all know, a lot of equity strategies and fundamental stock pickers have done well this year. The CTAs and energy guys have just been decimated, and particularly the legends of the industry have struggled.

If you are a macro investor and you look at your macro holdings which for the past 10 to 15 years have performed poorly, what do you do with your investments and with that money? Do you look at it in terms of more diversified macro versus global macro? But I think going back to the question, our CEO, Dixon Boardman, has a quote that he is okay missing some weddings as long as he misses all the funerals.

When it comes to cryptocurrencies, we are definitely applying the wait-and-see approach right now. I regularly get calls from our investors in terms of how do we invest in it, is it safe? I think it definitely is a Wild West to some extent.



Gaurav Chakravorty

Neil, you mentioned CTAs are bad at the moment and equity stock pickers are doing better or doing great. Do investors care about absolute returns or more about alpha over 60-40?

Neil Datta: That's a great question. We went through the intellectual exercise of looking at returns particularly in the long/short space and we came to the conclusion that if you look at the well-known equity long/short managers and you peel out their **core holdings, their core holdings almost always outperformed the track of the actual fund**. You can debate why that is, but we noticed trend apply to a very diverse group of funds and strategies.

About a year and a half ago, our team at Optima put together our first standalone, the Optima Star fund where we were picking stocks based upon public filings of some of consistently best-performing managers, and it's been successful. This goes to your point, where do you find alpha these days? Is the two and twenty model broken when you can replicate hedge fund returns in a relatively low-fee environment – I think that's compelling for investors.



Neal Berger: I'd like to address a couple of the questions that were posed, starting with how do we stay on top of the changing landscape with all these things going on?

At the end of the day, this is what we get paid for and this is where we add value. Eagle's View runs seven fund of funds. We also have a hedge fund advisory business in addition to a multi-strategy hedge fund. A lot of people – maybe rightly so in some cases – have been cynical of the need for fund of funds as simply as an extra layer of fees. If you are investing in a bunch of the most well-known hedge funds in the world – Blackstone and others have that space covered – it's a different business.

I think what we are getting paid for is exactly for staying on top of the changing market and the changing inefficiencies that exist and trying to capitalize upon those inefficiencies. We also get paid for our ability to determine when strategies have degraded and no longer have positive expectancy. There have been many great opportunities over the years. For example, many years ago, we played the international time zone arbitrage trade in mutual funds – not late day trading, but, the arbitrage between time zones before Spitzer caused mutual funds to go to fair value pricing. More recently, over the last couple of years we played the degradation of leveraged ETFs due to the path dependency and the tracking error issues by shorting the double and triple long ETFs and shorting the double and triple short ETFs, until the prime brokers raised the borrow costs so high that the strategy degraded.

We did get a little bit involved in the high-frequency trading space. It's hard to get capacity in that space unless you are willing to invest in the infrastructure, but we were able to capitalize a little bit on that. So, it's my job and that is what I'm getting paid for to be aware of *what inefficiencies are degrading and what inefficiencies are becoming more robust*. Frankly, we just had an extensive conversation about cryptocurrencies. I'm not a cryptocurrency expert but I think I was able to speak fairly knowledgeably for a non-expert because these are the type of markets we need to study to determine whether there's inefficiency and an edge that might be appropriate for our investor base. That's why I know something about cryptocurrencies because I've studied it. At this moment, I have determined it's not an appropriate fit for our investor base. But this is exactly what I do and what we are paid for.

So, what do we find that's working? First of all, less and less is working, so that is the first answer. It's important to recognize that and *sometimes staying away from certain strategies is equally important as getting into them*.

The hedge fund industry is by and large, in broad strokes, a diluted proxy for the equity market – plain and simple. It's no coincidence that when equities go up, the average hedge fund is up and when equities go down, the average hedge fund is down.

This is why Eagle's View has made the conscious decision to run our funds without correlation to equities since I believe people can obtain equity exposure in much cheaper and easier ways. People invest with us because they seek diversification and a return stream that they cannot find elsewhere. A truly non-correlated source of alpha.

With respect to Gaurav's question about investors being interested in market-neutral or in more holistic returns, the answer is *when the market is going up, they want the returns and when the market is going down, they want you to be market-neutral*. That's my simple answer. However, we have to stay disciplined and do what we do, regardless of what's happening with the market. Right now, it seems like the markets are never going to have a down day again and volatility will never come back.

I've been in the business 30 years, I don't know when things will turn, **I'm not in the prediction business**, I have no idea. I have no idea what the catalyst will be, when it's going to happen, or if it's going to happen. It could go on like this for the next five years. All I know is that this is not what I'm selling to my investors. I'm selling my investors a non-correlated source of alpha if they want to buy that just like they would buy a money-market fund which is obviously non-correlated. Of course, we have to outperform money-market funds, but there is over \$1 trillion of dollars in money market funds because people want non-correlation. There's also trillions of dollars in bond funds so clearly there is investor demand for investments that lack correlation to equities.



I said that the broad hedge fund industry is largely a diluted proxy for the equity markets and that fewer and fewer uncorrelated strategies are actually working, so what we are doing is consolidating our portfolio down to those strategies that continue to work, are still robust, and in certain cases cannot be arbitrated away by the move toward AI and robots trading against robots.

In addition to electricity trading, shipping derivatives, etc., there are also opportunities in the municipal bond market. That's one of the few markets that is still very opaque. Price discovery is not as robust as it is elsewhere. It's a relationship driven, broker-driven business, and yet it's a mainstream product. We are not investing with managers that are long munis necessarily because that's not what we do. Rather, we are invested with some actively traded muni portfolios with guys that we believe have the right relationships and the right experience in the space.

With respect to Gaurav's space, yes there are some people doing deep learning and using **alternative datasets**, data that really cannot be purchased or that is not publicly available. You can't get it on newswires and it cannot be purchased even from a third party service provider. *I am more interested in managers that are using proprietary data sets that they have created themselves to try to find an edge in the market.* There are some guys doing that who we like.

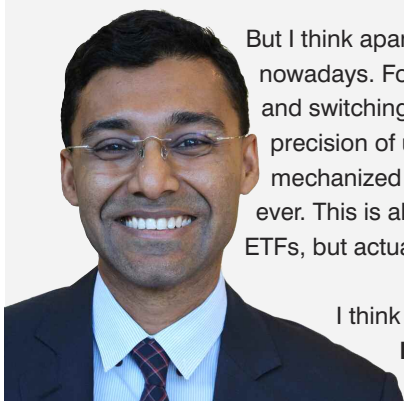
Finally, we have also invested with success with some of these people that call "*publication activists*," or as they would call themselves, "research activists." We all know some of the people who do deep forensic analysis on companies for a number of months then go on TV and they talk about the company, and the company will react if the analysis is good.

We had some volatility arbitrage type managers that have been a drag on our portfolio, so I finally said to myself, "Look, I'm not in the prediction business. I have no idea what and when volatility in markets will happen. We all know the VIX is low and volatility is low. Could it stay low for the next five years? Absolutely! I can't sit there and dig my heels in and say, 'I'm just going to sit with these people for years,' until volatility explodes. I'm just not in the prediction business and I have no idea when volatility is going to explode or if it's going to remain low."

Matthias Knab

I want to dive a bit deeper into artificial intelligence. Gaurav, where do you see data science and artificial intelligence in five years? How do you see the space develop?

Gaurav Chakravorty: Like Neal explained earlier, nowadays there's a lot of talk on AI and if you write about that in your pitch deck, you kind of look more presentable.



But I think apart from AI being merely a buzzword, there's a lot of action happening in that space nowadays. For instance, you hear about firms like BlackRock letting go of their human portfolio managers and switching to machines. That means they are switching to the rules that they have coded in. You have precision of using coded systems or algorithms at a large scale. We are now warming up to using just mechanized trading procedures knowing that tomorrow something would happen that we have not seen ever. This is always a possibility in finance. But we are now open to using algorithms. And it's not just ETFs, but actually *most of the money is now being traded by machines across several markets.*

I think the progression can be thought of as follows. **First you have got the feeling, then you have rules, and AI is about learning the rules from data.** *So not just rules that you*

thought are good rules, but autonomously learning the rules from data. I think that in the next five years we will invest a lot in learning the rules from data to keep costs low, to have less key man risk, to be able to adapt to a new market conditions which is obviously what our job is. So for a number of business reasons, I expect AI to be used more going forward.

Matthias Knab

Right. I don't know if you saw the recent news about the AlphaGo team out of London? So you'll remember that a few months ago a computer beat the best human player in the game of Go. The way how the AI scientists trained the computer was by letting the computer "watch" human players and thus learn the rules from humans. What they did now was completely different – they just gave the system the rules and then let the computer play against itself and learn the rules as Gaurav says from the data.

So they ended up having two different AI systems able to play Go on very high levels, and they let the two play 100 games against each other. It turned out that the system who learned to play without human input (called AlphaGo Zero) beat the other who modeled its rules by watching humans play 100:0.

In fact, Ke Jie, another human who lost against AlphaGo, stated that *"After humanity spent thousands of years improving our tactics, computers tell us that humans are completely wrong... I would go as far as to say not a single human has touched the edge of the truth of Go."*

Gaurav Chakravorty: I'll take a couple of minutes to explain to you what is happening in AI and why is it new. Matthias raises a very good point here.

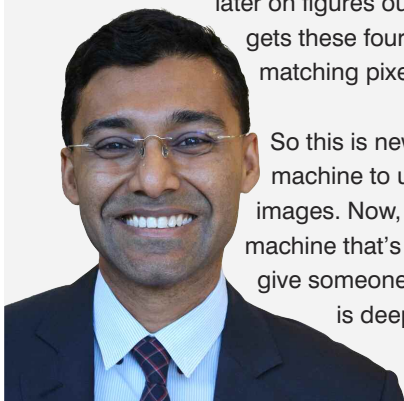
The technology here is essentially called, "**deep generative models.**" You can think of a tennis player finding someone who has say issues with just one shot or one move, and so he is just trying hard to get better at this thing that he doesn't play well, which is exactly how high performance athletes sort of improve themselves. They are good at nine things out of ten, and the one thing they are not good at, they keep practicing, right?

So overall, what is new in AI and deep learning? This is the first time where we are using a machine learning algorithm that is spending a lot more time finding the summary of the data. Let me explain. I am holding now a bunch of paper and texts in front of you. What you and I would do with it is *we would read this text before we will start figuring out how can we use this in our work tomorrow.* But first, let's just try to understand it, this is the first step. We don't have a prediction. We are not trying to see how can I make money from it right now, no? This is what humans do. They spend a lot of time understanding. In other words, we try to throw garbage out.

If you think of linear regression or every other machine learning we used up until five years ago, back then, we just took the data, and tried to predict. That's very different than what we do, and this is exactly what we do in AI today.



Gaurav Chakravorty: Yes, that's it! And the things you already know are stored in your brain at a very high level. Like they say that a newborn cannot see, and what they really mean is that it cannot recognize. Initially, a newborn just gets data and then later on figures out, "Okay the difference between light and dark, these are points I need to focus on." Once it gets these four corners, that's a shape. So when a newborn recognizes their mother's face, they're not just matching pixels to what they have seen before. It's a higher level of learning which we were doing earlier.



So this is new and what Matthias was referring to, deep generative learning, is now you can get a machine to use the same network, use the same model to let's say, take a recognition to now feed in images. Now, suppose this is a machine that you built to recognize Barack Obama's face and this is a machine that's just throwing in images, okay? And this machine learns that this guy doesn't do well when I give someone else's face, and that's what it keeps throwing in. It's just like the tennis player example. This is deep generative learning.

Corey McLaughlin

I have a question for you as I'm not an expert in the field. Does deep generative learning create solutions for what have historically been limitations of AI? Are we reaching an inflection point where this is now opened up?

Gaurav Chakravorty: Yeah very good question, Corey. Historically, the biggest limitation of AI was that we didn't have enough data. Let's say you want Facebook to do a very good job of recognizing which pictures you are in. That requires you to tag every picture you are in, and then you can do that. But before we had less data, so in that example, we did not have enough labeled images for the machine to learn. But now you have that.



Neal Berger: I'm not an AI expert, but I have seen is some amazing things in AI.

To me, there is no such thing as a good trader anymore, period.

To think that the old fashioned, "I'm a good trader, I'm a tape reader," is naïve in a world where experiments with AI bots playing games like AlphaGo or Dota 2, and believing that this isn't being applied to the markets is naïve.

You're competing against a bot that has simulated 100,000 years of equivalent human experience, I would say it's naïve to assume that you can beat that bot as a discretionary trader. That's not a business anymore in my opinion.

We are taking these developments into account, and this is what I meant when I said that I don't want to invest in areas that are dominated by robots are trading against robots. You have the smartest robots in the world trading against the other smartest robots in the world. This is not a space I want to be investing in because it's a technological arms race of who has a better AI bot. It's not a fertile playing field. There needs to be a sucker to provide the juice to these bots.

As human beings, when we learn, we come in with certain biases. For example, when we learn trading, we start studying economics and the growth of companies. If the economy is growing, the stock market should go up we are taught. The AI bot has no such preconceived notions whatsoever, it couldn't care less. Maybe it says, "If it's sunny outside today, the market is going to go up." It will test any kind of crazy hypothesis it could possibly test, and this has actually happened for example in poker.



AI bots have learned to play poker in a way that's quite counterintuitive to how most poker players have been taught to play. As such, it has become extremely difficult to play against these AI bots because they are making moves that are very counterintuitive to what is normally expected from human beings.

In fact, some of the best poker players in the world are now trying to understand how the AI bot is thinking and what the AI bot is looking at, even though it may be completely unconventional. It may have nothing to do with what the cards are on the table. Human players are trying to learn how the bot is developing these strategies from inputs through trial and error where human beings would never imagine that there could be any interplay. Gaurav, you are certainly the resident expert I think here at the table, maybe you want to make a follow-up comment if you have any.

Gaurav Chakravorty: I think firstly, everybody here on the table knows AI in the sense that everybody understands what AI is, the part of AI that you guys don't know is just procedural. So, we have all seen AI, but more importantly we have seen this general concept of learning rules from data.

However, the question that I think we don't ask ourselves enough is **why are we using AI?** Why should we use AI? And as you may have thought, I'll give you some data points.

Globally, the asset management industry manages about \$164 trillion. Investors pay more than \$1 trillion in fees every year, and that's not going down. Presumably, we are paying this every year to improve the system but the system isn't improving because we keep paying it every year. Investors are paying for it every year and not benefitting from the research, the developments in the community in the long run.

In 1952, Benjamin Graham wrote a paper ["Toward a Science of Security Analysis."](#) In 1952, they didn't have computers. But Graham wrote about **a trustworthy tool**. The last lines of the paper are "security analysis may begin--modestly, but hopefully--to refer to itself as a scientific discipline."

I think that's the goal and I don't see a way to achieve this goal without AI. I don't see a way of reducing this \$1 trillion in fees without machine intelligence – with machine intelligence doing the simpler work, so that the work that is remaining is of a higher order.



Neal Berger: For me, I prefer to traffic in spaces that AI just can't get involved in. It's as simple as that. Some of the strategies I mentioned before, the research activists, the guy who goes on TV and has found something that allows him to move the market. That's not something an AI bot can arbitrage away. That's why I often look at these more capacity constrained and niche-oriented markets. For some of the brightest and most sophisticated players in this world, it doesn't make sense for them to expend their energies and their time in a smaller niche-oriented market where the nominal amount of dollars that they can make doesn't move the needle for them and so their efforts are better spent elsewhere.



I'm looking for the areas where the AI bots are not being deployed because they're too smart for me, unless I had the smartest AI bot in the world, which is probably a fleeting status as well, no? I have the smartest one today, but probably not tomorrow.

Matthias Knab

In that new world, who do you think will be the sucker at the poker table?

Neal Berger: The suckers, I think, are the people who think that they can still can be great traders or think they can still be tape readers.

They watch the screen and say, "Oh the market looks strong. I'm going to buy it. The market looks weak and I'm going to sell it." I think that's the sucker at the poker table.

Many of those people are getting wiser and that's why they are moving toward passive index funds. That's the big move. They are saying, "Look, it's ridiculous. I'm trying to buy this stock or that stock. I'm investing in this mutual fund or that mutual fund. Meanwhile, none of them beat the S&P. Let me just go with the low fees and I'll just invest in the Vanguard S&P 500 Index Fund." So, people are getting smarter in that regard, which is reducing the edge for a lot of strategies that have historically been the beneficiary of the inefficiency that these active traders were creating.





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