



Opalesque Roundtable Series '18

CURRENCY TRADING

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Editor's Note

FX Trading, Cryptocurrencies and the End of Exchanges

The internationalization of investments has led to a significant increase in the foreign exchange (FX) business. Along with this major growth, the whole set up and market structure of currency trading, alpha generation in FX markets and the FX overlay industry have significantly changed.

*How are the markets working now? What are the best and most efficient set ups for currency trading? What happened to the alpha generation of FX managers? When it comes to technology and innovation, is FX trading leading crypto trading or is it the other way round - who sets the trend? (page 20) Why is **crypto a very easy market to trade** for professionals from the strategy perspective, but the trouble is rather on the legal and the regulatory side? And, **will Blockchain technology lead to a future without exchanges?***

These are just some of the themes and theses discussed in the new Currency Trading Roundtable, [sponsored by NEX Markets](#).

Liquidity myth and price generation mechanism in FX markets

The global FX markets are usually considered to be extremely liquid and based on an efficient price formation. However, practitioners, traders and market makers may find that **FX is not that liquid as people think**, because at certain relevant points in time auto liquidations can consume liquidity on an intraday high frequency and daily basis. Large market moves turn out to be unrelated to liquidity, but actually happen due to [auto liquidations](#) (page 16).

On this Roundtable panel,

1. Karsten Schroeder, [Chairman, Amplitude Capital](#)
2. Thomas Suter, [CEO, QCAM Currency Asset Management](#)
3. Giuseppe Rapallo, [Managing Director, Tiberius Asset Management](#)
4. Anton Golub, [Founder & CEO, flov technologies](#)
5. Thomas Kochanek, [Ph.D., Founder and CEO, 1512 SG Capital Management](#)
6. Richard Preschern, [Founder & CEO, RoboSig](#)
7. Alexis Atkinson, [Head of Order Driven Markets, NEX Markets](#)
8. Chris Codo, [Director Hedge Funds, NEX Markets](#)
9. Rene Chinni, [Senior Account Manager, NEX Markets](#)

are sharing the following insights:

- Why is currency trading for alpha generation very challenging? What structural issues are currency multi-manager programs facing? (page 8-9, 14-15, 17) Why is [systematic currency trading](#) extremely tricky (page 15)
- **What is the real intrinsic value of a traditional fiat currency?** (page 26)
- When does it make sense to use FX services from a prime broker? (page 9). The changed market structure in FX (page 19-20)
- Why should you know who is actually providing liquidity, and how to identify the type of liquidity provider (page 11-12)
- Do additional liquidity providers or **fragmentation** add value in FX trading? (page 9, 11, 14). How to know your market impact in FX trading (page 19-20)
- The use of **alternative data, Big Data and Deep Learning in currency trading** (page 13-15)
- What's the benefit of **high frequency trading?** (page 16)
- **Why do cryptocurrencies go up?** (page 17). What are the margin requirements of crypto futures telling you about the asset class? (page 18). What most people get wrong regarding crypto and tokens (page 18-19)

- **What are the two main issues the regulator has with crypto?** Why are the exchanges the predominant problem of cryptocurrencies? (page 20-22) Taxation in the crypto space (page 25)
- Why is the atomic swap that Blockchain provides so powerful? (page 22)
- **Gold, stable coins, and the biggest downside of Bitcoin. Centralized versus de-centralized Blockchains** (page 27-28, 31). Does the concept of broad-scale institutional custody actually contradict the intention and design of distributed cryptocurrencies? (page 28-29).
- **What will happen to Bitcoin in the next financial crisis? (Page 30) What could bring Bitcoin down?** (page 33)
- Over 2,000 crypto companies are active in the Greater Zurich area. What's the Swiss government's take on this? (page 34)

Enjoy!

Matthias Knab
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Participant Profiles



(LEFT TO RIGHT):

Matthias Knab, Chris Codo, Thomas Kochanek, Alexis Atkinson, Thomas Suter
Giuseppe Rapallo, Anton Golub, Karsten Schroeder, Richard Preschern

Introduction

Alexis Atkinson
NEX

My name is Alexis Atkinson and I am Head of Order Driven Markets at NEX Markets and run the product group for EBS Market, which is an inter-dealer central limit order book and the primary interbank market for EUR, JPY, CHF and CNH currency pairs as well as the leading platform for trading of Asian NDF pairs.

Thomas Kochanek
1512 St.Gallen Capital Management

My name is Thomas Kochanek. I am founder and CEO of 1512 St.Gallen Capital Management, which is an emerging Commodity Trading Advisor (CTA) based in Jona, Switzerland. At the same time, I am Research Professor for Financial Services at Hankou University, China.

I started my career in investment banking and alternative investments in 2007. I served high net worth individuals, professional investors and institutional clients with regards to portfolio optimization and developing investment strategies in various positions at investment banks and asset managers,

In 2012, I started a research collaboration with a German university with the intention to finish it with a PhD. The scope of the research project was to identify analogies among financial and economic crises. The result was basically my current St.Gallen I Counter-Trend Program, which allowed me to found my own company and finish my PhD in economics at the University of St.Gallen.

1512 St.Gallen Capital Management exclusively runs systematic counter-trend strategies. The philosophy of the trading models is to identify activities and position shifts of large hedgers (i.e. investors with no speculative interest in a market) to systematically anticipate short- to medium-term highs and lows in 130 different futures markets.

Thomas Suter
QCAM Currency Asset
Management

My name is Thomas Suter. I'm the CEO of QCAM Currency Asset Management, based in Zug. Until two-and-a-half years back we were known as Quaesta Capital, we changed the name and rebranded back then.

We are a dedicated currency manager focusing on currency overlay services, both on the passive and the dynamic side, FX best execution and FX Alpha programs. Our client base is mainly institutional – pension funds, family offices, investment funds, corporate and NGO's who have needs for currency management services.

I have been one of the founding partner of the company in 2005. Before that I have been working for a long time with UBS Investment Bank, with main stages in Zurich, Milan and London, and a focus on derivatives trading and risk management activities.

Chris Codo
NEX

I'm Chris Codo. I also work for NEX Markets and I run the European hedge fund team. Our aim is to work with hedge funds to provide them with access to primary venues and relationship trading platforms such as ours, which the banks have accessed for some time. I've been at NEX/EBS for four years. Prior to that, I was at Barclays Capital and Lehman Brothers on the equities and algorithmic trading side.

Rene Chinni
NEX

My name is Rene Chinni. I'm the account manager who looks after all the clients for NEX in Switzerland from Geneva down to Lugano and have been with the company for 10 years, and mainly until about a year-and-a-half ago was mainly banks and now we're going to asset managers and buy side. So working very closely with Chris and Alexis and hopefully roundtables like this will happen more often.

Giuseppe Rapallo
Tiberius Group

My name is Giuseppe. I studied mathematics and physics, and I started to work for the Tiberius Group 11 years ago where I still work today. The Tiberius Group is a fully integrated commodity player. We are an asset manager but we are also a miner, and we ship commodities around the world. About nine months ago, we entered the crypto commodity space. I say crypto commodity and not crypto currency because we were are tagging our coin to commodities.

It's been an interesting journey moving from university to the company. I first started as a dedicated quant, so I was doing statistical analysis. I then moved from the quant side to the portfolio management team, and since December 2017 I have also been running the Tiberius Coin. Currency markets are not our main focus but because we trade gold we have to keep an eye on it. Precious metals are obviously very dependent on what's going on in the currency market.

Anton Golub
flov technologies

My name is Anton Golub. My background is in the hedge fund industry – I used to be a high frequency trader in FX markets. I worked with Richard Olsen at Olsen Limited who quite a few of you may know as the pioneer in computerized trading. I did that for about two years, and then in 2013, Richard and I founded Lykke. Lykke is until today the largest Swiss crypto company. We started the company very humbly in 2013 – as you can imagine, things were a lot different from today, but our company continuously grew over time. In 2018 we had more than 200 people in offices around the globe, so Zurich, London, New York, and many different verticals within the company.

One vertical I was working on very hard for the last year is asset management which I have carved out at the beginning of 2018 into a separate company called Flov Technologies. Flov Technologies is a crypto asset manager focusing on trading exclusively digital assets mainly through providing liquidity.

Karsten Schroeder
Amplitude

I'm Karsten Schroeder. I set up Amplitude 2004 in London. Amplitude is a traditional CTA, however we focus on the shorter time frame. We have four programs out at the moment, three in the futures space and one in the quant equity space with total assets of about \$1.5 billion. The company is subsequently moved from London to Switzerland. We still have people in London and also Prague and Germany. Our client base is predominately institutional.

Richard Preschern
Robosig

My name is Richard Preschern. I'm the CEO and Founder of Robosig. We are based in Chicago, Illinois. Robosig is a systematic, automatic FX research engine that provides its signals to institutional demand globally.

I personally have been in the FX market for 20 years. I started off on the floors of the CME as a market maker in the option space and became one of the first private designated electronic market makers in 2008. I did this for several years after which I founded RoboSig and built a systematic, quantitative strategy in glass box format.

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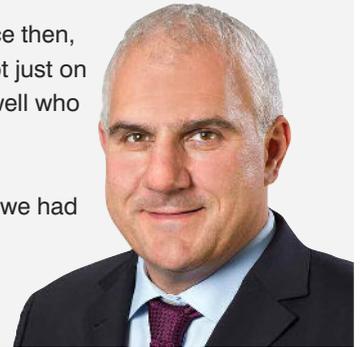
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Matthias Knab

Thomas Suter, QCAM is a pure play currency asset manager and have been active in this space since 2005. How have you seen currency trading and the overlay industry develop since then?

Thomas Suter: Correct, we have been active in currency management and currency overlay since then, so I am happy to give some thoughts on how the industry has developed in the last few years, not just on the active side but also on the passive side as well which may be interesting for some of you as well who are typically more active on the alpha side of asset and currency management.

When we started the company, we actually began with a currency multi-manager program which we had been managing for about 10 years.



Matthias Knab

Are you still managing that currency multi-manager program?

Thomas Suter: No, we had to close the program in 2014. **Currency trading is a very challenging area** because, at the end of the day, most managers mainly trade the G5 or G10 currencies – okay, there are some who focus on emerging market currencies, but the bulk of the managers trade the same few currencies. And then you can typically cluster these strategies in these who do well in a risk-on environment and those who perform well in the contrarian, the risk-off environment. Consequently, you typically have the challenge that when some do well, the others don't do well. This challenge is probably similar to some extent in any other multi manager set-up too, however in currencies the situation is probably even more concrete because there are not many alternatives to really diversify via strategies and currency pairs one can trade.

Of course, we also have had some good years. We particularly did very well in the very volatile 2008 which was obviously a great year for FX managers. We also did very well in 2010.

Another factor is that although many managers promote their strategies as unique and differentiated, at the end of the day I would say 80-90% of the managers do very well when there are very clear and lasting trends. Well, this is probably also similar in other asset classes that most managers typically do well in times of nice trends.

In 2007 we started to focus more on overlays from a risk management point of view, initially with passive overlays. I think back then, many players who needed FX management services were still in a situation where they traded with just one bank. They lacked knowledge about how the market works, so in that period banks had a great time earning nice margins out clients trading in FX. Transactions often were officially for free, the client did not have to pay a formal commission but obviously paid a hidden fee through an execution price which often deviated substantially from the market price.

Over the years, having realized a need there, we at QCAM have tried to find a good solution there for medium sized companies, let's say a medium sized pension funds who may not trade billions of FX trading volume per year but maybe just 500 million to one billion or similar.



The idea was to offer them a kind of FX prime broker setup where they have access to a number of banks for which they would typically be too small FX trading volume wise.

We actually found this good solution: We were able to do that in a cooperation with Zurich Cantonal Bank, a highly rated counterparty. Though having this attractive offering available, we have realized it's a difficult challenge to really bring clients away from their standard setup, with a custodian bank who does everything for them, making it easy, no collateralization, settlement issues, etcetera.

After the financial crisis the whole environment has seen some massive changes. While before, prime brokerage was for a long time what everybody wanted to offer and the banks were very aggressive in that business pricing wise, things have changed enormously. These days you need to pay typically a minimum service level fee of at least \$250'000 if not even higher if you want to get FX prime brokerage services offered from the large FX prime brokerage houses which means you will have to trade many billion US dollar trading volume per year, otherwise setting up an FX prime brokerage does not make sense. In such a case you would be better off being setting up your multi bank setup on your own and taking care for tasks like the ongoing margining, settlement and legal stuff on your own.

In the old days, a good client such as a pension fund often has received trading lines without having to put up collateral. Due to the regulatory changes this is hardly possible today.

So things have become more challenging, and at the same time the bank's offering has also changed: many banks these days have kind of best execution offerings in which you trade automatically with your custodian bank, but on the back they have a **panel of banks who quote anonymously** and you trade at the best price, plus pay a transparent fee to the custodian bank for offering this service.

If you are large enough as a client and you trade decent volumes, it is in practice still better to have your independent setup where the banks know that when they are quoting aggressively they also will be visible and this will be recognized. In the other set up as I just described, when for example Citi or Deutsche trade on behalf of the UBS best execution setup, they may not have the same interest to trade aggressively because the client would not even know which bank was the one who was quoting it.

Chris Codo: Do you think it's good to have additional liquidity providers in these set ups?

Thomas Suter: I think for the client it is definitely good. I mean they can still keep that one relationship but they also enjoy kind of an FX best execution set-up – I think there are ways to get that improved but at the same time they already achieved much more than in the old days when they had that one single relationship and maybe even for large tickets ended up paying five, six or even more basis points which of course resulted in significant amounts of money.

On the other hand, this development also creates a new challenge for independent currency managers like us, particularly on the passive side where for some time the execution was an attractive selling proposition. It has become much more of a challenge to win mandates on the passive overlay if you can no longer focus so much on the improvement of the execution.

However, also on the client side the focus is shifting and so we are seeing more and more interest in so-called **dynamic overlays** where the client has defined an FX benchmark hedge ratio but would



also give allowance to the overlay manager to deviate from that benchmark with the aim to achieve an additional return.

Rene Chinni: How big could the gap or differential be?

Thomas Suter: Well that depends on the risk budget the client provides. Let's say as an example, you are just willing to lose 2% compared to the performance of the 100% benchmark, then of course the allowance to deviate from the benchmark hedge ratio is much smaller compared to a client who may say "I do not have a problem if I lose 6%, 7%, compared to the performance with the 100% FX hedged benchmark.

Alexis Atkinson: You mentioned the idea of using UBS or Credit Suisse to access a variety of different banks. Are you referring to access to a number of banks through a prime brokerage arrangement, or something else? It sounded like you were talking about a riskless principle 'back to back' approach?

Thomas Suter: Correct, some of the major banks are offering these days this service to their clients to trade FX, with a panel of a certain number of banks who are quoting. Possibly even some of the regional banks in Switzerland may be part of panel, even though they may not be able to price very competitively.

So the lead banks offer that service, they grant the credit lines to the clients, but the clients has just got the counter party risk of its custodian bank and he does not know who on the back was trading because the lead bank was in middle, on one hand they bought and on the other they sold the respective currency pair. They then would add a certain commission which may be half a basis or one basis point for doing the activity and taking over the credit risk on this.

On the active currency overlay side, the changes are – as I mentioned – the growing interest from German pension funds for dynamic currency overlays which we have hardly seen in Switzerland, here there is so far a very limited appetite for such services.

But interestingly, demand is also coming from the US and Canada. My guess is that there is a trend towards more **internationalization of investments** also there and as such currency exposure becomes more of a topic than it may have been 10 or 20 years back. And therefore we also see more activities in the overlay space coming from North America.



Rene Chinni: The problem we have in Switzerland when I spoke to couple of pension funds seems to be that the limits on the risk side tend to be very tight, also in overlays.

Thomas Suter: You mean the risks that they are willing to take? I don't know. I mean they have always got to manage certain maximum currency risk limits that they are allowed to have. I believe this limit is in Switzerland at ~30%. If they have more currency exposure from investments then they would have to hedge automatically a certain part of the FX exposure.

But then a pension fund also has to consider its coverage ratio is, and depending on that, I think they would also be allowed to have a bit more remaining FX exposure. But let me add that I am just speculating here. What I do know and remember well is that when we started in 2005/2006, that was a period when many Swiss pension funds had significant allocations to currency managers, but overall the result was not so successful, and so for a long period the appetite for active currency managers was not really there. Back then some of the pension funds clustered the FX allocations for alpha aims as part of their liquidity bracket and not as part of their alternative investments bracket.

Things may change again, and what would help of course will more volatility in the FX space. Active FX managers went through a challenging time over the last two or three years, and if you think about it, the players who do dynamic overlay suffered from that fact as well. The two don't really work much differently, the dynamic overlay manager just combines the passive hedging activity with the active (alpha) part.



Richard Preschern:

I agree, some say the currency markets are difficult per se. I personally measure their validity in terms of liquidity and my understanding of dealing with the currency market is that you need to use or reap exactly that attribute, massive liquidity, which I believe is best assessed in a quantitative manner.

I happen to not have most of the execution issues because I have a world class partner in GTS in New York who takes care of that part. So, it was very interesting to hear that but I don't have much to add to that front.

Thomas Kochanek: I agree that markets are difficult and even become more complex with more participants and more liquidity coming to the market. However, with additional players, there is also more data to analyze and new opportunities to find. I would not agree that solely **quantitative analysis** is the best way to deal with the complexity of today's market. I believe that qualitative components should be added when analyzing market movements. Investment professionals can still apply a sort-of quantitative analysis by codifying fundamental information (such as COT data, term structures, investor behavior or sentiment) into comparable scores.



Still, **when looking at the liquidity of a market, you want to know who is providing liquidity at which levels.** Is it a trader speculating on a certain market movement or a commercial hedger, who might have a more profound insight into a market? Let me explain what I mean: A commercial trader – for example a wheat farmer – is usually interested in hedging her business risk and her decisions are based on her future crop. So, if she believes the price of wheat in the futures markets is too high, she will likely short a future to lock-in her profit. However, if she trades this futures contract too early (i.e. before knowing her exact crop for sure), she is taking on additional risk. Hence, she is not hedging but rather speculating on the price of wheat. That is, when she is shorting a futures contract, she agrees to deliver a certain amount of wheat at a pre-defined price in the future. In that example, if a sudden drought occurs after shorting a futures contract, her crop will be lost. Therefore, she will not be able to deliver her wheat at expiry of the futures contract. Even worse, if her crop gets lost due to a

drought, it is very likely that other farmers in that region lose their crop, too. This will then lead to the price of wheat increasing substantially going in synch with a severe loss on the farmer's short futures position.

When you combine fundamental data analysis with price action analysis, you can actually identify who is the driving factor of a market. Is it in the hands of speculators, which can imply that certain movements are not sustainable or is the commercial trader with real hedging intention the driving force?

This will then give you a completely different quality of your analysis...And this also works very well in the FX markets.

Chris Codo: How would you define liquidity, and how do you see things like market impact that can develop with a certain size?

Thomas Kochanek: In a sense, every market participant has an impact, because in well-functioning markets, there is a constant interaction among the price, potential buyers and potential sellers. Meaning my sell order can influence your behavior and vice versa. And that leads us to the actual function of a market: it is to determine the current fair price of an asset. And in this determination process, any investor action that can be identified and categorized is important to me.

Richard Preschern: While I traded futures for over a decade, the best FX market to be in is the spot market and here within the G7 currencies, clearly the best place to place liquidity 24/6. I think that is really what the edge of the FX market is compared to other capital markets, and in fact we at RoboSig look at patterns that we see within the liquidity.

Matthias Knab So your signals are mostly liquidity-based?

Richard Preschern: No, they are actually completely price-based, but as I mentioned it's a quantitative, pattern-based process that is indirectly dependent on liquidity because the patterns evolve based on the liquidity in the market which goes through certain cycles.

Chris Codo: Does **fragmentation** help you – the fragmentation of liquidity across the different trading venues? Is it good for you?

Richard Preschern: I don't use it because I really only issue the alpha or the pure signal. In addition, this isn't short-term alpha, so it is not high frequency trading. I'm also not a long-term directional bias trader, but I have concentrated on the space in between, which is about 10 trading days.

So I see certain patterns in there for which I require liquidity in order to get them done, but they are also not that price-sensitive as some others. And for all the issues with execution I partnered up with GTS in New York, who are really excellent at doing their part.

Thomas Kochanek:

I find this **10 trading day holding period** to be very interesting as well. The holding period of my trades actually varies between 1 and 30 days, but I believe short- to medium-term trend changes can best be captured around that 10 day period. It delivers many opportunities, in which trend-followers experience drawdowns without necessarily being stopped-out. I can therefore, not only generate alpha, but also serve as good complement to trend following systems by smoothing their performance curve.

Matthias Knab

What's the role of data and alternative data and then Big Data in currency trading?

Thomas Kochanek: Big data helps to basically analyze anything. And this also means that no individual investor will be able to have all price-determining information. However, the question is: **do I need to know everything?** Meaning, if I want to run around a lake as fast as possible, do I need to know, how many fishes swim in that lake?

Analyzing all sorts of data will also raise the question of correlation and causation. So, does my result actually capture a valuable insight or is it just a random relationship among datasets? Analyzing markets is not about knowing more, but rather about knowing the right things and in the complex market structures we are facing, it might be easier to focus on relatively few but important information.

When understanding that markets work as a conglomerate and constant interaction of supply and demand of real people living in the real world, it means if I am able to relate or assign market movements to different investor groups (commercials, speculators, retail), I will be able to derive who is the driving force within a market. And when I know that the market is in the hands of the commercial hedger, I consider current price information coming from the market experts, which will help me to anticipate short- to mid-term tops and bottoms with a high probability.

Thomas Suter also pointed to the fact that we haven't seen that many trends over the past years, which may be the reason for the choppy performance of the mentioned 80% to 90% of CTAs in recent years. However, when analyzing trends purely based on price data, trading programs may adjust too slowly to changes of market structures. Therefore, when combining fundamental data coming from market experts with technical analysis, it may be easier to identify trends again and also to discover that trends constantly change from being longer to becoming shorter and vice versa.

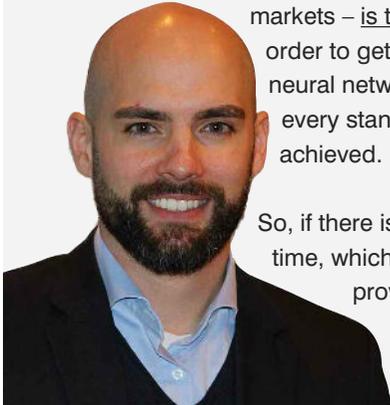


Matthias Knab

Is anyone of you using Big Data?

Giuseppe Rapallo: I think what's very important to keep in mind when doing quantitative investments and when dealing with time series is that this field is constantly changing, whether it's commodity markets, currencies, stocks or something else. For example, back in 2006 and 2007, trends in commodity were very important. That broke down in 2008/2009 and suddenly mean reversion approaches were way more interesting.

Big Data is interesting because **Big Data changed the way how we analyze time series.** When I started in quantitative finance, it was very important to analyze the general fundamental data. Then it was suddenly very interesting to analyze the figures that were released at 2:30 in the afternoon and to measure the impact of that. Like Thomas Kochanek, I aim to dig deep when analyzing time series – completely independent whether it's in the currency market or commodity markets – is there an effect, is there causality or only correlation? Obviously Big Data is very important in order to get to the root of this. But there was also a big breakthrough in computer science regarding neural networks six or seven years ago when it was possible to process a vast amount of data on nearly every standard machine. Suddenly everyone was focusing on that field and amazing results have been achieved.



So, if there is a constant in dealing with financial markets it is definitely the fact that's it's changing all the time, which is very, very unpleasant from a theoretical standpoint, however, at least that way it'll always provide work regarding the analysis of the market.

Karsten Schroeder: Christian had asked if fragmentation of liquidity is beneficial or not. I would say **fragmentation of any service, unless you have a conglomerate or price dictator, is never beneficial.** I'll give you the example of taxi services. When you show up in city that has a gazillion fragmented taxi services, typically the service is crap, the price is high – such a set up doesn't really give you any benefits, except for the individual operators. I would say that from a participant's point of view, the core function of a marketplace is to transact the security or the good in the most efficient manner. So, fragmenting the liquidity is only in the interest of service providers.

The same game also happens in the equity world. If there would be one central electronic exchange, things would come down to the pure alpha that you generate as a strategy. *But if instead many different trading venues and dark pools are involved, trading and you could say also investing comes down to a technology game or execution strategies.* But most importantly, this is now a set up that allows banks and other service providers to profit at the expense of the investor. Therefore, from the perspective of an investor or representing an agent for an investor, the fragmentation of financial markets is not beneficial whatsoever. Having one central pool of liquidity that in a fair manner can be accessed by all market participants is the ideal world. *I'm not saying fragmentation doesn't create business opportunities, but it's an inefficiency you create that then can be exploited.*

I can relate well to Giuseppe's earlier comments on the changes in the financial environment and now to work with data. I guess everybody – including us having started in 2004 – who looks at the sheer data would agree to the fact that **the nature of the data has changed** no matter how you look at it, from a microstructure or distribution point of view. We all know financial data is non-stationary anyway. But among the main influencing factor are certainly technology, the nature of investors and market participants in general, and the political and regulatory landscape.

We have seen in particular post 2008 an almost unprecedented way how **politics and regulators tried to manipulate markets** – I am saying it like this as I would not want to put a positive spin on it. The most directly affected markets are obviously the ones that you can drive with activities from central banks, so bonds and currencies.



And so, unsurprisingly, currencies as an asset class had been tremendously challenging to trade post 2009.

I mean in bonds the situation is also quite peculiar, because you just have to be long. *Developing a trading strategy on bonds is almost pointless because you can just collect the carry, and that's it. But as far as currencies go, it is not a reflection of the market, it's actually a reflection of the market and then managed by politics, so what they want with the interest rate; what they want with the currency.* **This makes any systematic attempt extremely tricky** because at the end of the day, no matter if you call a trend a mean reversion, both relates on a herd mentality and on an autocorrelation. If you have identified the reversal and you rely on the fact that that actually happens until it gets neutralized by another activity. And the more of these intervening factors we have, the more tricky it becomes for any form of systematic approaches.

My last comment is about data. I think there is a misconception around new data, people tend to get super excited when they have a new source of data, whatever that may be. I mean, it's very fancy to look at satellite images or what have you, but **in our business the only real advantage of data is when it has a forecasting power.** So, the more accessible the data is and actually the longer your signal or investment time horizon is, the less relevant this whole Big Data story is to you. Let's assume you only transact on daily data, I mean don't really worry too much about it, right? People use alternative forms of data to have an information advantage. But other people will be doing this data as well, and they will immediately transact on that. Waiting for a day or a week will not give you that advantage anymore. So, Big Data can be relevant on the shorter term if you can actually react on it, and then to me that's almost like an arbitrage opportunity.

Giuseppe Rapallo:

That is very interesting, do you think there's a race for a shorter time window. Say from a 10 days trading window to then five and then two?

Karsten Schroeder: Actually, I don't think so, because it depends what effects you would like to capture in the market. For example, when you are directional, you have directionality on multiple time levels. But, the shorter term ones have actually become so much more challenging. When it comes to the medium to longer term ones, you can basically still run your models from like 10 years ago. On the longer term, I would say that your evolution pressure there was pretty small. I mean, you can't just run long trends. Long trends have always been there and will always be there. Of course, it's not the greatest Sharpe, but at least it's a constant Sharpe and you don't deal with this degradation.



I think there's a **very high level of competition in the shorter end.** And if you operate more in the high frequency or in the arbitrage field, then it is definitely a race for technology and the race of data and being able to digest that data. **Deep learning technology** has opened up ways to normalize and structure data, so Big Data can then also be used in a say more traditional approach. This definitely has made Big Data a more valid consideration.

Anton Golub: I'd like to go back briefly to our discussion about liquidity in the FX markets, and I will refer here also to my experience doing high frequency trading, specifically market making in FX.

When I was working at Olsen Ltd., we had an understanding of what's happening at Oanda, the major market making platform which includes a range of investments strategies for retail, institutional, hedge funds and so on. For us at Olsen it was always very interesting to understand **why big market moves happen**. *We thought it could be somehow related to liquidity. In turns out, we consistently found that big price movements actually happen due to **auto liquidations**.*

Let us look at the most prominent recent example when the Swiss National Bank dropped the floor of 1.2 for EUR/CHF - the exchange rate moved more than 40% in a short time period. The FX market did not move because somebody was shorting Euro-Swiss. The phenomenon behind it was that clients were getting liquidated as the floor was dropped. Therefore, we thought the really interesting question is **what is the price generation mechanism in FX markets?** Looking at all time frames, short, mid and long term, we found that auto liquidations drive the pricing. Even though I come from the market-making world, it was quite shocking for me to discover that the things people perceive as fundamental moves actually happen due to large liquidations over time.

And again, when asking me if the FX market is really that liquid, my conclusion is that in fact **FX is not that liquid as people think**, because at certain relevant points in time these auto liquidations are the ones that consume liquidity on an intraday high frequency and daily basis.

This would be my first observation I thought to add to our discussion. My other thoughts are related to the question people would ask me many times, "**What's the benefit of high frequency trading**, what's the point?" We looked at the data, tick by tick and examined how does the price is behave. We found that taking any cross rate, it has around 25% annual volatility. You might wonder what happens looking at the coastline of this yearly price - if we look all the up and down moves of this yearly price and aggregate them, what do we get? It turns out these up and down movements sum up to 1,600%.

If someone trades on a yearly basis, he or she may collect 15% of profits if they are right. But moving to the high frequency space, all the sudden the range of opportunities sums up to 1,600%. Obviously nobody has that level of foresight and high frequency trading is not making that money. But that provides a good scientific argument about the value in the Big Data as well, because Karsten made a good point that it makes sense to analyze high frequency data. Maybe it does not always make sense to trade on it, but at least we found that this is a strong theoretical argument why high frequency trading can make sense.



Karsten Schroeder: If you really go ticket by ticket it can almost go infinite, like a coastline almost infinite when you just zoom in enough and go by atom by atom.

We also made exactly that analysis and found that two effects that go against you. Transaction cost, obviously, and also at a certain point auto correlation drops significantly so that things can also become very random, like throwing a dice, so dealing with this data then becomes much harder when you then actually want to deploy a trading strategy. So those two factors working against you, but I agree that potentially the opportunity set is huge, but you need to find the right balance in between those two things.

Anton Golub: You are, of course, right and coming back to the original question Thomas Suter brought up at the beginning, what is alpha in the FX world? Karsten made a very good point here, and I also tried to mention that in our experience the big movements come from auto liquidations. I also explained that the coastline length becomes a lot longer that when you go high frequency, and Karsten pointed transaction costs become an issue as they can kill many trading strategies. But as a market maker which collects the spread, it makes a lot of sense to trade on an ultra short time basis.

Let me make a strong statement, and Matthias invited all of us to be provocative, my argument is that **if you are not providing liquidity, there is no alpha actually in FX**. Traders are then just riding these auto liquidations in the FX world. To me, in FX markets alpha is liquidity provision, which makes sense because providing liquidity also improves market quality.



Thomas Suter: I agree that FX is always seen as the most liquid, most efficient market in the world and yet it is very challenging at the same time. I guess my question is really, shouldn't we have similar discussions when we talk about the nature of say equity futures, interest rate futures and possibly the whole securities industry? Is there really alpha according to the way we learned it in the old days with Markowitz and so on? I mean, there is probably **very little alpha left**, but as Karsten also said there are still trends, and I think if you are able to catch these trends as an investment manager, the client is happy.

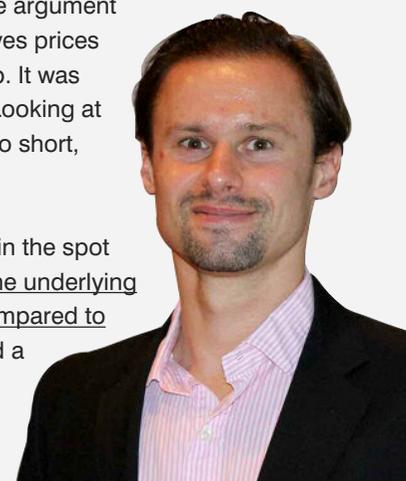
Whether that's been alpha or not has also become a very philosophical question – some call it alpha if you make money. So again, this is probably a question for the entire active asset management industry except maybe the really illiquid stuff, or possibly the fundamental stock pickers who try to figure out companies that are not so well-researched.



Anton Golub: I would like to move now into the theme of cryptocurrencies. For full disclaimer, even though I come from the crypto world, I am not saying that Bitcoin will go up or down, it may also may end up with a price of zero over the long term.

But I often get the question from people **“Why do cryptocurrencies go up?”**. Inherently, taking crypto-currencies at face value, they do not have any intrinsic value themselves. So why should they then go up? One argument some use is that cryptocurrencies have limited supply, hence greater demand over time drives prices up. But there are cryptocurrencies that do not have limited supply and the price still goes up. It was very interesting to look why is something so irrational happening in this new marketplace? Looking at the market structure of cryptocurrencies, the first thing to notice is that it is not possible to go short, and it is not possible to repo or to lend the underlying,

Nobody can go short and analyzing the price behavior, the order book and price dynamics in the spot market, we realize that the short side is not existent from a liquidity point of view. Because the underlying cannot be borrowed and shorted, cryptocurrencies do not behave in highly efficient way compared to stocks and bonds. Therefore, the argument for trends in cryptocurrencies is therefore based a lot on their market structure.



Thomas Kochanek:

As stated earlier, the role of a trader/ market participant is not only to deliver alpha or beta, but also to contribute to the discovery of the current fair price of an asset. And she is doing so by placing and executing her orders. Therefore, if a market structure does not allow shorting an asset, the market mechanism is disabled. Interestingly enough, the price of Bitcoin came down right after the CME and CBOE introduced futures on that crypto currency.

Karsten Schroeder: Right, you can go short the cryptocurrency future, but the **margin requirement** is really out of proportion – it's pretty much the notional value of the contract, and just this fact shows you a lot about the perception of this currency. If you compare Bitcoin to gold, and I think there are a lot of similarities because the inherent value is also rather insignificant because there is almost no consumption.

But, from a financial market perspective, the margin to be long or short gold is pretty identical whereas the margin requirements for cryptocurrency, absolutely asymmetric. Of course, when it comes to cryptocurrency derivatives, it's still very early days and we only got those one or two contracts in the US at the moment, but as that would develop further, also from a regulatory perspective and when you can collateralize it and so on and so forth, we will then see very different dynamics on these currencies versus what we have now.

And the other remark I want to make is that at least in this stage, investing in a cryptocurrency is a bit similar to that betting. I don't mean this in a derogative way, but the less educated professional market participants tend to get in the market the more crazy the moves are. On the other side there are obviously professional players like Anton and Giuseppe, but you also have a lot of retail that just think, "Oh my God, crypto is crazy, I read it in the newspaper, it's going to go to \$100,000 and I'm just going to buy it!"



Anton mentioned pointed to the market structure of cryptocurrencies, and I would clearly add as another example the host of rather uneducated market participants who contribute to price structures which may be set up very different to the efficient markets. We see the difference actually when you compare the deep, liquid, established financial futures markets versus the so-called **alternative market** – for example currencies from emerging markets or things like emission trading, power trading – where you just don't have the penetration of players with a sizable research budget and so on and so forth. This means that we are able to still get 30, 40 basis points more Sharpe on those markets compared to the very well-researched penetrated, deep liquid markets.

Alexis Atkinson: We talked a little bit about crypto in general and how it is valued, and it's interesting because now **all cryptocurrencies tend to be very correlated** in terms of the movements when in fact a lot of them are completely different tokens. For example, with Bitcoin there's a fixed issuance in terms of the rate in which it is issued, each blocked and with a cap on the top.

But if you have coins like Ethereum where the actual policy of issuance is still not yet finally determined, it's a group of developers coming together and deciding what it will be. There are also many utility tokens that allow you to do something on a platform which hasn't even been built yet. **Crypto is talked about as a single entity and a lot of them move together, but that shouldn't be the case given the different fundamentals of each of the coins.**



There are also utility tokens and security tokens, and I think that coins like Bitcoin fit quite well into the currency-style model. Of course, much will depend on how the regulators actually see these individual tokens, and so a lot of the market structure that will evolve around these crypto assets will depend on the respective regulator. Security tokens might be regulated by the SEC and then go down a certain pathway in terms of market structure, while Bitcoin may be regulated by the CFTC given futures are regulated there. Bitcoin could end up in a different market structure and it could look very much like precious metals or FX. This means there may be a certain fragmentation or divergence in terms of the tokens given how they will be regulated, which will then also impact how they are traded.

We also mentioned that so far there is no repo market and no ability to go short, so actually being able to borrow the asset itself will depend on somebody having a nice big pool of Bitcoin or other tokens, which won't happen until there are mature **custody solutions**. A lot of the market structure changes that are likely to happen in crypto will be driven by more widespread institutional custodial services becoming available, which is beginning to happen now. Once this is in place, the ability to separate out execution from custody will become important. Currently, you have to have your crypto-assets held with the venue, but you're running counter party risk against each of the venues and in most cases, the ownership structure and terms and conditions are unclear.

There is now no separation between execution services and custodial services, and there is likely to be a shift. Once you have that and change in custody, that brings in new models effectively well where you can borrow the asset more easily.

On the big data side, I just wanted to come back on the issue of market fragmentation where Karsten already commented on the inefficiency of having multiple places to trade and the benefit of a single, unified venue.

In FX, a significant amount of volume is transacted by banks on their own single bank APIs. In fact, much of the volume on secondary ECNs today is effectively aggregation of these single bank APIs. Naturally, as a kind of buy side customer – if you got those relationships in place, you actually have an incredible amount of ability to see pricing from the largest providers of liquidity that have unique pricing.

There's a need to do a reasonable amount of data analysis on that. *You're really talking about ingesting feeds from pretty much all the major sell side banks, understanding which ones are internalizing liquidity, and which ones have their own price formation.*

I think that that's key. It's quite hard to do this well from a buy side perspective. You have to understand the market structure, understand all the APIs and you have to understand the effects of the primary market on some of the banks pricing in the secondary market. You also have to understand the liquidity, the volume profile, and the requirements in terms of data, capture, storage, reply, and back testing.

But one of the things that is useful from a buy side perspective is to ensure you are executing efficiently and all the liquidity providers that are providing liquidity – is that working for me and is it also working for them? It has to be a decent and sustainable long-term relationship. What's really useful with big data there is being able to analyze that liquidity and look at what happened when you traded, be able to see what the mark out is after you traded at various intervals, see what the market impact was of that liquidity provider, and be able to leverage those insights to build those sustainable liquidity relationships so important in the long-term.

I think Big Data has really enabled the democratization of that information. One of the things we specifically tried to do on our platform is provide the ability to say, *"Okay, when you trade, what's your market impact or are you causing impact on your liquidity providers? For all your trades against a representative population of similar customers, how much market impact are you causing, but also regarding the liquidity providers -- which ones are actually internalizing, which ones are actually causing market impact themselves and may not be working in the way that you might want when you trade?"*. With that public data of your own activity versus everyone else on the platform, people can make the comparison before because the data is all private.

If you're dealing against a single bank API using their prices, that price stream is customized for you, and you don't know how they are pricing everyone else, and that is something that platform such as EBS are now making available in online analytics packages so you can make those decisions better. This is actually one of the few places where a platform can do a better job because it can actually give you composite statistics across similar customers, whereas otherwise you wouldn't have access to that sort of data.

This, in the end, is a side effect of the fragmentation we talked about earlier and providing tools to manage it. You can argue that it's not efficient and I sympathize with that and being someone who works on a CLOB (Central limit order book) platform I would tend to agree with my bias! But relationship trading has brought customized, tight pricing for customers also. *It's really a question of how best to cope with the existing market structure. Here I think having the ability to process the data and make the right choices on the execution side is very important and can be a significant source of alpha.*

A couple of things that people leave on the table which should be really obvious things to look at particularly in FX: *If you have a number of liquidity providers, what are your fill ratios? But not just general fill ratios – it should rather be in a specific currency pair. This can be really important when you know that someone may give you 100% in one pair but only 80% in the euro-dollar, as an example.*

So, what is that fill ratio, what is the last look time, what's the cost of the reject? What will it cost you if you are rejected? What does it cost you when you eventually manage to execute at a later point in time by which time you had some slippage? All these things may not be part of alpha generation, but they help with the execution side. I think that's where the data is really changing things both in TCA and execution.

Matthias Knab

We are talking today about FX trading and also cryptocurrencies, and I wonder, is FX trading leading crypto trading or is it the other way round? Where is innovation or the technological trend coming from at the moment?

Alexis Atkinson: I think there are **some parts where crypto trading is actually ahead of FX trading.** We talked about transparency of data. You can just look at coinmarketcap.com and the volumes of a lot of the current retail platforms. Whilst some of the data might be questionable in terms of double counted volume and potential wash trading, it is very accessible and easy to access this data whereas it is difficult to understand exactly how much volume is trading where in spot FX. Settlement is one thing that's completely different with Bitcoin, and the **settlement is part of the protocol.** With spot FX you are looking at T plus 2 to settle, but actually you can be pretty sure your payment on the Bitcoin blockchain is settled within an hour and less if you are prepared to take a little bit of risk after a couple of blocks are published.



The settlement portion is really quite interesting in that it is basically a scenario where the same thing gets done in a better way. Everyone sends messages over a text format today and that used to be over mobile phone providers' network infrastructure. Now it occurs over the internet using WhatsApp and so the internet has become the infrastructure for text messaging. In terms of things like settlement, you could argue that there is some potential for improving T plus 2 for spot settlement. The question is how long can that continue? We will probably not have the same situation in 20 years' time. This seems even more unlikely now that there are cryptocurrencies where settlement is happening within an hour. From that perspective, crypto leads FX. Where crypto can learn from FX is separation of execution

services from custody. You've got the prime broker setup today, which isn't perfect, and we have seen some contraction in terms of prime brokerage access, but you do have that separation of the position of credit and custody services from the trading.

Currently, crypto is a very much retail traded space which is actually really interesting for things like alpha generation. If you look at some of the retail platforms now, the trade size is in the order books and the volume amounts are non-standard. Whereas if you trade FX on EBS, you've got one million standardized amounts, so it's actually harder to see where the liquidity is because it is kind of obfuscated. But if you're looking at an order book in crypto, you can pretty easily see where the volume is and often determine where the manual liquidity and the real liquidity is.

I think it's quite an open book at the moment because you got open APIs, you've got market data that's actually quite freely and easily accessible, which is actually a bit different to FX where the data is generally private and often relationship based pricing. I think we're likely to see a kind of divergence between the retail platforms today and platforms that are designed to satisfy institutional traders' needs, so there may be more convergence between FX and crypto trading ahead. It's certainly a very interesting space!

Karsten Schroeder: When we look at the data in the crypto currency, we actually find it a very attractive market, and so we would deploy our strategies on crypto currencies whereas FX is very challenging. While crypto is a very easy market to trade from the strategy perspective, the trouble is rather the legal and the regulatory side.

We started to do due diligence on some of the exchanges and **compliance throws up outright flags left, right and center.** When you run managed accounts, also compliance of your clients will run over your trading set up, and *it's almost inconceivable at the moment to introduce crypto to large institutional clients on your account*, and that's a bit of issue.

But again, the opportunity set is great, but you have a really hard time to get to grips on counter party risk, and that's a bit of drama. Back to Alexis' point, if custody would be centralized, it would be massively helpful, but even apart from that, I would say **the regulator has two issues with crypto.**

First of all, cryptocurrencies represent currency vehicles which do not allow you to deploy monetary policy anymore. I mean, as a systematic manager I love it simply because the recent monetary policies have from a trading perspective killed a lot of opportunities in the last 10 years. But from a political perspective, that's clearly not good news. And secondly, you don't have the transparency on the transactions. So as far as any money laundering goes and certain criminal activities where you want to have transparency on, this is the second issue. In my view it's conceivable that if the regulatory body could have it the way they wish, it would just put like an end to the story. I am not saying that this is likely to happen but certainly this is a certain tail risk to the crypto world.



Alexis Atkinson:

You said that despite the opportunity as an institutional investment manager you cannot really trade cryptocurrencies at the moment. What specific steps need to be taken for you and other firms to get involved and trade?

Karsten Schroeder: Let me make clear that if you trade cryptocurrencies on your own account or if you trade the equity of your own firm and you are happy with the setup, I think that's perfectly fine. It's a challenge when you have client money, not necessarily from private individuals, but from institutions where their compliance department will then say it's a problem.



The problems come predominantly down to the exchanges. I remember we had calls with cryptocurrency exchanges asking them for example for an organizational chart, and they were like, "No." I mean, what's the problem with that? We just want to understand who works where. So then we suggested why don't we just fly over and see your offices?" And they were like, "No." And so, obviously, when you hear that on a DD call, that's it, the call is over. So, that's a show stopper. On the other hand, when the universe then narrows down to just one or two exchanges, then the game becomes less interesting. Therefore, if the exchanges would become more professional, that would open up the space tremendously.

Giuseppe Rapallo:

Adding to what Karsten said, the broader crypto universe is kind of the Wild West right now, it's incredible. An organizational chart, a fee structure, fundamental legal things are not available in this world, which also creates opportunities, and that's probably the reason why the space is prospering right now and why it attracts a lot of people, and why there are a lot a new companies and start-ups.

When we look instead at our asset management side where each due diligence questionnaire are 20, 30, 40 pages, this is also a kind of burden and can stifle innovation.

Anton Golub: Blockchain is just a highly efficient settlement infrastructure that provides direct ownership.

Blockchain is very good in doing something called atomic swap, which in plain language means that "you get my asset at the same time I get your asset", or coming from the traditional FX world it is called instantaneous delivery versus payment system. Therefore, blockchain is a platform for assets that allows you to exchange them very efficiently.

One of the main questions that we are trying to address here is, what is the market structure in the future? I will make a very strong statement now: **In the future, there will be no exchanges.** You may wonder, why do I as someone who has run a crypto exchange think like that? It is because blockchain as a global settlement infrastructure, that for the first time ever, allows anyone to exchange any asset with anyone else. This has never been possible in human history – peer-to-peer exchange of any asset in digital form.

Let me give an example. If today I have Google shares and I want to buy Swiss government bonds, I first need to sell my Google shares to get dollars – with a T+3 settlement – then, convert my dollars to Swiss francs – with T+2 settlement – and then buy Swiss government bonds – with T+2 settlement. In the blockchain world, we can exchange Google shares directly for Swiss government bonds.





Alexis Atkinson: I'll disagree on the point of no centralized exchanges. *I think distributed exchanges and the concept of atomic swaps on chain are unlikely to threaten CLOBs or other centralized trading venues here.*

I have yet to see good answers for how Distributed Exchanges compete on liquidity, price discovery, efficiency of price dissemination, latency, proximity, connectivity overhead, anonymity, etc. Atomic swaps to reduce settlement risk are a fine idea, but I think this is a post trade not pre-trade. You can probably transact like this on the blockchain, but where is your price formation?

Anton Golub: From liquidity providers - this is what we do at flov technologies.

Giuseppe Rapallo: Sorry to interrupt, but I just wanted to clarify that what you call now a liquidity provider is in fact in a sense a decentralized exchange.

Anton Golub: No, it's a peer-to-peer blockchain trading.

Giuseppe Rapallo: I mean, if I want to sell something and I cannot find someone on my own, I need to go to some platform that aggregates people's interests to get it done.

Karsten Schroeder: Let me ask one question on that. At the moment, these transactions are relatively simple because you have asset against reference currency, which creates a very limited amount of pairs. So, all stocks against dollar or euro, etc.

Now, if you remove the fiat currencies totally and you go asset to asset, it creates an almost infinite amount of combinations, and finding the price point also from your perspective as liquidity provider is going to become a little bit challenging when someone wants to exchange say a Japanese small cap stock against rubber or something like that.



Alexis Atkinson: We have a similar situation in FX today with the smaller currencies, and people then just go for the primary crosses.

Karsten Schroeder: Sure, at the moment you transact assets against a few reference currencies, but in Anton's scenario that will be gone because then you have an n-to-n connections because there you can trade say your apartment for some oil barrels.

Anton Golub: I will try to answer all of this.

Let me start asking you if you know which is the most traded cross in the crypto world? It is not Bitcoin against dollar - it is Bitcoin against ether. Therefore, asking what is the price reference and how can the markets work without so-called reference, I can claim it already works in the crypto world where the most liquid cross is not dollar against Bitcoin.

I agree that looking at the millions and billions of assets, we will have globally in the future, no matching engine on the planet can support trading all of these assets with each other. But in my view, liquidity providers will be the ones providing quotes to the global marketplace for any asset against any other asset.



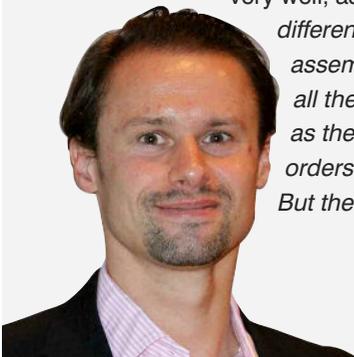
Karsten Schroeder: So, what you are saying is that you have to bring a crypto currency in? But I wonder, when you have the smart contract, you don't need the currency in the middle, right?

Anton Golub: Right, you do not actually.

Karsten Schroeder: And you also referenced to Bitcoin and ether as the most liquid cross at the moment, so the way I understand what you are trying to suggest is that I trade my assets against those references even though they are crypto currencies. But when we forget about the crypto currencies and go back to the blockchain, this will have the same effect?

Anton Golub: My argument is that **markets in the future will work without the so-called reference price.**

I think you are also asking how can this work when you do not have a centralized matching engine? I understand this question very well, as for a long time people did not understand how Lykke Exchange worked: *the quotes from different players were actually streamed to your own terminal, meaning that the order book was assembled on your own terminal. Indeed, there was no centralized matching engine that would collect all the limit orders, sort them out and then distribute to all the counter parties to trade on. Instead, you as the end user would receive orders directly onto your platform and your platform would sort out orders from where you can then select liquidity providers and trade using your own criteria and choice. But there was no centralized matching engine involved.*



Alexis Atkinson: What you are talking about is relationship-based streams going through to each individual.

Anton Golub: Exactly.

Giuseppe Rapallo: I mean, there is a cost in doing that, and probably a latency impact and reduced liquidity.

Anton Golub: My argument is that this has been done and working already at Lykke Exchange. It is data distribution in the end, and I will leave it at that... I know that having no exchanges in the future is a strong statement, and we will see if I am right or wrong.

Regarding the regulatory issues, which Karsten talked about this earlier, I think it is important to mention that the regulators today are finally grappling with the point that once an asset is on the blockchain, there is no US, there is no Switzerland, because blockchain is a global platform and local regulators have no claim on them.

I will give you an anecdote to illustrate that. At Lykke, as we had an entity in Singapore and an entity in Switzerland, the regulator once asked us, "If you have a client from Switzerland and a client for Singapore which transact with each other, where does the transaction happen?" And I answered, "Well, the transaction happens in the cloud", because this is the reality. Such transactions happen in the digital space where we do not have borders. In my view, any regulator who tries to put a firm grip on the digital assets or on the blockchain will just lose out because of not understanding that this is a global platform where you cannot place a local jurisdiction on top of it.



Karsten Schroeder: You are right, but don't you think that creates a massive problem as far as for example all the taxation goes?

Anton Golub: Yes, exactly.

Karsten Schroeder: When I now transfer personal assets into the crypto space, where do I get taxed? From my personal perspective, this is all great, but you can see why the governments will have a challenge here and also the regulatory – what regulatory framework do you actually deploy, because as you already said, it's not linked to a jurisdiction.

Giuseppe Rapallo: I think the problem is way more difficult – the problem of taxation and the borderless cloud are already on the tables of governments around the world. Where is Google making its profits? Where is Amazon's revenue coming from and why does Apple have a huge office in Ireland, what's the reason for that? I mean, these are all things and issues that come up as the world evolves into one global market.

Thomas Suter: This new paradigm keeps developing in an extremely fast way. I was recently attending a seminar of a very well-known professor from New York who said that most of the things that we talk and think about Blockchain these days would be already old data and that there would be so much more going on.



I understand that ICOs have become a kind of crowdsourcing where people can put their money in companies and projects such as IPOs in the traditional paradigm. But when it comes to cryptocurrencies, I am not even sure that they can be called currencies? With traditional currencies, we know there's a country or an economic block with its GDP behind it, but I don't get what the intrinsic value of a Bitcoin is. Is it at 10 cents or a gazillion dollars, nobody has a clue. There is obviously a lot of hype and fear of missing out going on, most just want to do some fast money. In the US now even endowments are investing in it, but I don't really get the valuation of cryptocurrencies.

Richard Preschern: A general observation from my end who is only in FX and I'm observing this space. It has been mentioned today that crypto is the Wild West currently, but I also think the merit of the technology were made clear.

My general concern is that wherever I go in the world, from a valuation perspective, I find hype for the space regardless of whether it is from sophisticated investors or retail people wanting to jump on the moving train. Therefore to me, there is a strong current emotional hype going on that is probably reflected in the price of the coins. However in the long term, I certainly see the potential of the associated technology.



Karsten Schroeder:

I have a provocative question for Thomas Suter. **Do you really know what the real intrinsic value of a traditional fiat currency is?** I don't think anyone does. So a central bank is issuing money, but has anybody gone through the balance sheet of the country?

Over the past years, the balance sheet of central banks has tripled or gone up five times. I did not see any value creation on the other side.

Thomas Suter:

That's true, QE is a big experiment and we are still in the middle of it. Now, we have the different story because all the major global central banks have done similar stuff whereas when in the past a country has been doing a very inflationary strategy, the currency would eventually also devalue.

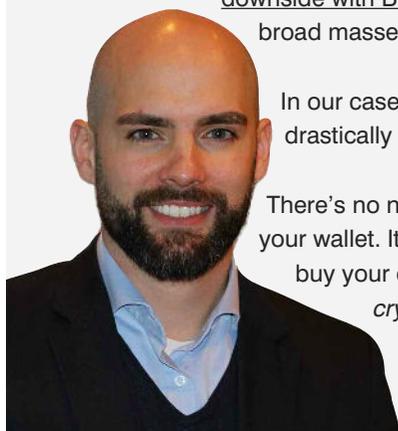
So at least from a historical perspective there was I think a link between economic activity and the valuation of currency which in this new world I struggle to understand.

Giuseppe Rapallo: I am with you here and behind every conventional currency there's a government and a central bank backing it, which is not the case in the crypto space.

What's more interesting in my view is actually what's going on with gold. Gold prices are not driven by money printing governments. It's way more interesting that we feel comfortable with gold because it has this long history and humanity was dealing with gold even before printed money was invented, and in a way it was so convenient. So the fact that it has been around for a long time gives us an impression that everything is regulated, and we even found a solution for taxation as well. We know exactly what happens when I stock my gold bars in a bonded warehouse at the airport here in Zurich, but with crypto it's a little bit different. The Crypto world right now is the Wild West; it's a new world. Everything new is exciting but unregulated. There are no clear guidelines or definition which makes it very challenging one side but also very attractive on the other side.

That's the reason why we're offering the Tiberius Coin – not only because we see potential in the coin, but also because this new market offers attractive opportunities!

We think that the pioneers that created Bitcoin had the right intention, however, were not consequent enough. Creating a technology which allows a safe and secure way to transfer value across digital networks was definitively revolutionary. And for obvious reasons it was a necessity to offer an alternative currency completely independent from governments or central banks. However, the fact that the supply is restricted leads directly into unbearable high volatility, which is the biggest downside with Bitcoin. An absolute no-go and the main reason why Bitcoin will never be adopted by the broad masses.



In our case we've attached an intrinsic value to the coin, with the sole purpose to lower the volatility drastically and to offer an attractive and well diversified investment opportunity

There's no need to carry that bar of aluminum around or that bar of gold. You have it on your phone, on your wallet. It's decentralized, you can exchange it in a second and it would be great to go to a Starbucks, buy your coffee, and pay with your copper. *That would fulfill that big vision that the pioneers of the crypto space had, like being really independent of central banks and governments.*

Alexis Atkinson: What I wanted to add regarding decentralization is that for most coins it's useless and just adds to the cost. Of course for something like Bitcoin, nobody can change the monetary policy or have control and no individual can pass around the decentralized control. It's based on the prescribed set of rules and nobody is going to be able to change them easily, I mean that's the main point. But when you have a coin that represents a physical asset, then **what's wrong with centralization** at that point if there is a trusted party saying that it represents these assets?

It's kind of going back to the old gold standard where a central bank was saying this paper money is good for this amount of gold. It's a similar thing, and to me, there's nothing wrong with centralization there. This also holds for some of the other tokens that are out there – a number of tasks can be done very well in a centralized way. Or just look at some of the tokens which are trying to compete with Amazon web services but in a decentralized way. I think it's just not efficient to do that, and so to me, *there has to be reason for decentralization. Otherwise, it's just a waste of time and is grossly inefficient.*



Karsten Schroeder: Regarding to your reference to the old gold standard where paper has been issued for gold – well that's all fine and agreed that's a certain similarity, but at the same time we know that this is not the reality anymore. You don't do paper for gold but because you trust in the balance sheet of a country.

Alexis Atkinson: True, but I also think it is important to set a historical context here where we have seen this before.



Karsten Schroeder: Sure, but at the same time everyone needs to understand that exactly that aspect or mechanism has fundamentally changed. With the cryptocurrencies, you know all details around the mining and the algorithm how the currency is created, and so if done in the right way you will not have to fear massive future devaluations because the market may get flooded with it at some point. I think this is a massive benefit.

And regarding gold, part of the reason why gold became so attractive in the last couple years, together with the whole asset price inflation, is because we really got worried about the money printing that was going on, and gold was one of the alternatives we had.

Matthias Knab

We discussed the of the intrinsic value of currencies. We discussed also the custody challenge which in every single discussion comes up as an impediment that needs to be overcome for the institutional, broader acceptance of cryptocurrencies.

But let me ask you one thing here. I am of course a layman looking at this question but I wonder, can custody of cryptocurrencies really be implemented on a large scale? Isn't it really a paradox that the owner of a cryptocurrency basically gives up the private key? And if you look at hot wallets where the keys are with the exchanges, aren't those exchanges the biggest risk because those tend to get hacked? If on the other side you keep your private key tied to yourself and don't lose it, you're pretty much on the safe side. So, **this whole broad-scale institutional custody question, I wonder if from a philosophical and technical dimension, will or can it ever happen?**

Anton Golub: *I think you gave the answer...The answer is no. If this highly efficient settlement infrastructure in fact provides direct ownership, how can you then have a third-party custodian for your own assets? That makes no sense whatsoever.*

This is the kind of clash that is created when trying to marry the old and the new worlds together.

The regulator and everyone coming from a traditional world will ask "But, who is your custodian?". And then you will find a couple of wildly ambitious, licensed custodians that will provide this service. But let me also make it clear that then you are demanding something that cannot be delivered within the context of the blockchain world.



To illustrate, direct ownership means when I have my Swiss francs, it is not some bank's Swiss francs that some banks have on their balance sheet, it is literally and physically my own Swiss francs. To give you an analogy, how would in the current set up direct ownership of Swiss francs mean? That would mean that I have a bank account with the central bank. But in this new blockchain world, there is no bank actually.

To wrap up, having a third-party custodian is trying to put yourself in the old set of rules that were set in place 30, 40 or 50 years ago. Then it makes sense to have a custodian, to have an auditor. But today, why do I need an auditor or a custodian, if the blockchain with direct ownership of assets has all the information? *What value is an auditor giving to me if all the data is on the blockchain?*

Alexis Atkinson: I think the two models don't need to be exclusive.

There is irony in the fact that centralized custody would probably help a decentralized currency to gain further acceptance and volume because more people will be able to participate and be comfortable with it.



From a pragmatic perspective, do you think that a buy side institution is likely to allow one guy having knowledge of the private keys so that he or she can transfer them anywhere? As Bitcoin is a bearer asset, that's a huge risk to run. But would an institution feel more comfortable investing in those assets if you have a trusted custody solution with insured funds? I would think the answer is probably going to be yes, and that would enable a wider number of institutions to be able to participate. That doesn't take away the use case. You and others might be sitting at home and very happy being the custodian for assets yourself, but history has shown that the majority of people actually prefer to put their money in the bank rather than keep it under their mattress at home.

Karsten Schroeder: It's interesting to observe sometimes how short-term the memory is in financial markets.

I remember how in 2009, so not even ten years back, we got a questionnaire from probably every single client with regard to every banking, trading and custody relationship, because nobody was comfortable with any counter party anymore.

I think that blockchain and crypto have a real strength and use case because they remove this counter party risk.

People tend to think, "Oh yeah, my funds get stolen." What people don't realize is that all or large parts of your money can disappear if the bank blows up, only because some government will or will not bail you out. So, going back to 2009, are people comfortable with the counter party risk of banks? Nope. They are not, but they have no alternative.



Rene Chinni:

If I may ask, what would have happened in a crypto world if 2009 would happen today? Or what would have happened in 2009 if Bitcoin would have been around as it is today?

Karsten Schroeder: Well, as we had said, *in the new world you own your asset, whereas the trouble you have with the bank – and that was the whole discussion back then – I and you had a balance with the bank and if it was not in a segregated account and the bank was over levered, your asset was at risk.*



Let's look at how another financial industry has addressed this issue. When you deposit your margin in the futures market, then that is also not on the balance sheet of the bank because that would screw the whole future market, because the integrity of the market obviously relies on you paying your margin. If the bank integrates your margin account within the balance sheet, then it's not guaranteed anymore. We all should remember here what happened with **Man Financial**. I mean it was a big hoo-ha when it turned out that the accounts were actually not segregated. So that's an issue you remove with the blockchain, how do I segregate my asset and how is it getting collateralized?

I think that's a massive advantage for cryptocurrencies and blockchain, which is currently played in the wrong way because people always tend to say, "Oh, I can lose it because my wallet or my key is stolen."

Matthias Knab

I started to publish daily in 2003, so I was at the pulse of the market since then, including the global financial crisis and every other crisis.

Karsten mentioned the government bail outs that may or may not happen. Just remember what happened 2013 in Cyprus where depositors lost 47.5% on bank deposits greater than 100,000 Euros. In my mind, if 2009 would repeat now or Bitcoin would have been around then, I think the prices of Bitcoin would have gone through the roof.

In 2009, everybody wanted to get out of the banks. All of the large asset owners were discussing which bank is still secure, where should they put their money?

Karsten Schroeder:

Correct, it was a total liquidity event, everything across the board got liquidated, every single asset class was dumped.

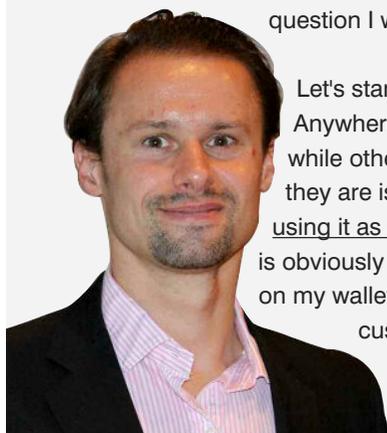
Giuseppe Rapallo: Obviously, people are looking at Bitcoin and thinking, “Shall I invest? Shall I not invest?”, and it seems that the majority of investors are rather risk averse right now. But in 2008, 2009, the risk was on. Everything was risky. During these times Bitcoin would have appeared less risky. Compared to the various options at that time a lot more people would have probably invested in Bitcoin.

I think the technology and some of the features are great but some other parts are concerning, for instance, the supply cap. The limited supply will always lead to the fact that you have unbearable volatility and unbearable volatility will lead to the fact that I will never put my savings into Bitcoin, obviously, because that kind of volatility is not sustainable. So there’s a need for a more stable solution. And that’s the reason why **stable coins** are coming up right now, and that’s the reason why we’re working on the Tiberius Coin.

But looking at the fact of how fast the global crypto space is moving, we might already have very convenient solutions in less than a year. Asset-backed coins for instance. In our case, we are linking a basket of metals to a token. By doing so we’re linking an attractive investment story, we call it stable alpha, to a well-diversified and low volatility token.



Anton Golub: I think this is a very interesting question: what would happen to cryptocurrencies in the context of a financial crisis? I will try to explain how I see **cryptocurrencies becoming digital gold**. Giuseppe mentioned supply shortage of Bitcoins, which like gold, are hard to mine. To me, volatility is foremost a result of market immaturity. The question I want to discuss is what prevents, for instance Bitcoin, from actually becoming a digital gold?



Let's start by taking a look what is gold in the financial system. Gold is in fact a **universal collateral**. Anywhere on planet, financial institutions are willing to provide a credit line with gold as a collateral while other financial assets, like government bonds, will be bounded as collateral to jurisdictions where they are issued. Hence, the last missing piece that can potentially make Bitcoin a form of digital gold, is using it as a universal collateral. Additionally, one great advantage that Bitcoin has over gold is that gold is obviously very heavy, and Bitcoin is not. I can have my smart phone and walk around with \$100 million on my wallet, but how can one walk around with \$100 million in gold? It has to be with a bank or custodian, and that comes with some other risks we touched upon already.

Giuseppe Rapallo: What about the volatility? You would agree that the volatility is one of the biggest issues that these currencies have?

Anton Golub: Liquidity providers will sort this out.

Giuseppe Rapallo: So volatility will come down as more liquidity providers step in?

Anton Golub: Yes.

Giuseppe Rapallo: So you don't think that the artificial supply shortage is the main reason for volatility?

Anton Golub: Not at all.

Thomas Kochanek: If you look at the Bitcoin chart for 2018, you can actually see that happening already. In a well-functioning market, where buying and short-selling is possible, the price will merge to the level where supply meets real demand. And as stated earlier, market participants help finding this “equilibrium” by placing their orders.

When a market functions properly, price determination can be compared to the concept of swarm intelligence. Swarm intelligence is a phenomenon used in nature – for instance by a swarm of birds navigating to warmer realms. Each individual of the swarm has information other swarm members don't have and that piece of information qualifies to steer the whole collective in some way or to influence its actions. Now, if one bird was to find its way to these warmer realms by itself, it would get lost. It would fly a random course (which can be compared to volatility) without ever getting to its destination and end up dying. By aggregating the individual knowledges of many birds, the swarm manages to navigate effectively. It may still not use the shortest way to its destination, but it will get there eventually.

The same happens in the marketplace: if I place a sell order above the current price, I am signaling to the market that I believe the current fair price of the asset being higher than today and that I might be willing to add to my position as long as the price is below that limit. When other investors get convinced about this idea, they will start buying and the price will move towards my sell limit. In return, if market participants notice an overreaction to the upside, they will come in as short-sellers and help the price to migrate back down to its real price.

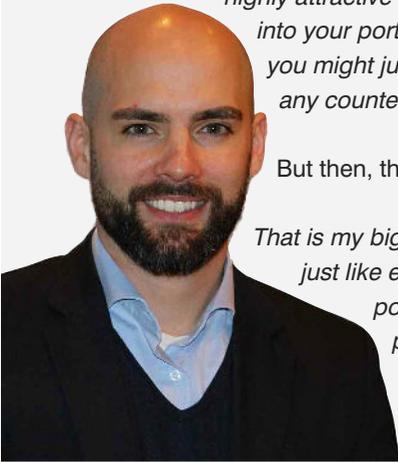
As a result, an increasing number of participants acting based on different insights in a sound market structure will decrease volatility in the crypto-space, too. And again, since it is possible to short the Bitcoin via futures, the price came down heavily and since then it trades in a relatively narrow range between roughly USD 6000 and USD 8000.



Alexis Atkinson: Just a question on the portfolio management perspective. What is attractive about crypto aside from volatility?

Karsten Schroeder: It's a Central Bank independent vehicle. It removes the political aspect, which from a trader's perspective is not helpful.

Giuseppe Rapallo: *I think from an asset management perspective and from a mathematical standpoint, cryptocurrencies are highly attractive because they are uncorrelated, and whenever something is uncorrelated, you want to add it into your portfolio. Now, if that asset has a volatility of 80%, you might not target an allocation of 40%, but you might just blend in 2-4%. Diversification is crucial, and as we said, the advantage is that I don't have any counterparty risk, so I can rely on the network.*



But then, the next question is: will the network be around when I want to liquidate it again?

That is my biggest fear with Bitcoin. The value of Bitcoin relies only on the perception of the crowd, and just like every year there's a new iPhone and new BMW, the technology battle will continue. At one point there will be coins based on superior technology, hence the crowd will move on at some point. And once the crowd starts moving, everyone will drop Bitcoin.

Alexis Atkinson: What is the challenge in participation in and further proliferation of crypto?

Giuseppe Rapallo: Regulation is definitely a main factor, and we need to keep in mind that regulation will not evolve at the same pace as developments in the crypto space where things are changing within weeks. We also mentioned that custody would be a catalyst. We discussed that.

I have another question for the group here. Bitcoin is a network, it's borderless, it's somewhere around the world. Obviously, the governments have difficulties in understanding and then trying to manage that kind of thing.

I think the next couple of months will be very telling how governments will relate to cryptocurrencies. Will they support it, will they attack it, how will they deal and manage it? So I was wondering, how big do you think is the leverage that governments around the world have to manage and to regulate crypto currencies? Of course they can regulate the crowd sourcing aspect, but the genie is out of the bottle.



Anton Golub: If in case you are not aware of this, in Zurich and the wider area around here, there are already more than 2,000 active crypto companies. Switzerland is the “crypto paradise”, and you may have heard slogans like crypto valley, Zurich crypto city and Switzerland a crypto nation.



Giuseppe asked how much power or leverage, regulators or the governments have with regards to that, and I will mention something that was told to me personally by a government official a year ago at an informal meeting. The person clearly said, **“We will not let this opportunity slip our hands.”** This was coming from a government official! Therefore, the question is, *are we smart enough to embrace this opportunity and create a crypto nation, or do we want highly regulated environment that just provide obstacles for any kind of evolution, any kind of growth, any kind of progress.*

It is just a tradeoff, which one of the two do we want? We are very lucky to be in a country who understands this is an amazing opportunity. Switzerland had a business model based on banking secrecy that ended with FATCA. Now there is a new opportunity, so why don't we grab it and provide environment for 2,000 companies in Switzerland to grow and prosper? *Therefore, I do not see it as leverage for governments to suppress, but leverage to actually use the technology.*

Giuseppe Rapallo:

But the question is, how can somebody have leverage on me when I store my Bitcoin on my computer? We are now talking about the internet of value – we can now transfer value on a blockchain because the network agrees on it and no one has a real leverage on that.

Karsten Schroeder:

I actually wanted to come back to that point and add a provocative question. When you think we can trade cow for sheep on the blockchain?

Anton Golub:

Yes, in digital form we will. In my mind, the sky is the limit.

In the '90s, it would be hard to imagine a global platform where people will post pictures and someone called Zuckerberg will be \$60bn rich because of such a platform. But this has become today's reality with Instagram or Facebook. With that in mind, if you ask me is it a realistic option to trade cow for sheep on the blockchain, I would say most likely not... But is it possible? I say, absolutely!

Giuseppe Rapallo: What was – until recently – the missing link in the internet? The missing link was the safe transfer of money, the 100% secure transfer of value. Until now, this is the insecure weak spot, and each time we had to go to through certain centralized agencies. Blockchain opened up a completely new field.

But that does not mean we should not take great care not to get fooled, **probably 99% of the products in the crypto space will disappear but the technology underneath will provide very exciting, very interesting things for the years to come** because suddenly I can transfer assets and value in a digital form and I don't even need trust you, but the network sees that assets were transferred to you, and then I'm fine. It's a quantum leap from the old internet.





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