Mike:	00:01:47	All right, welcome. That concludes the show with four-hour video prior to the podcast. Thanks for joining and have a great weekend, everybody. Got to poke ....
Rodrigo:	00:01:59	You know what I love about that video? That it came out in 2020, in like early 2020. How awesome is that? Just like prescient.
Mike:	00:02:08	Prescient, baby, prescient. Yeah. So, we got a great guest today. We got Stuie Stu, the Stu-man Barton, the man of the vol, the vol of the hour, the tower power. He's with us today. So, it's going to be a bit exciting and fun. And I want to warn everybody before we get started, this is for entertainment purposes and educational purposes. So, anything you hear on this is not advice. Don't take advice from YouTube shows at four o'clock in the afternoon on a Friday. It's just not good counsel. Anyway, with that said, Gentlemen, over to you. Let's fire this tanker up. Oh, I can't hear Adam.
Adam:	00:02:50	You guys muted me already? It usually takes at least 15-20 minutes for you guys to get sick of hearing me. I just wanted to say first of all, congrats to Stu on the launch of a couple of new products. And congrats to everybody on the end of the quarter. And it was quite a good quarter for a lot of CTA funds, trend funds, that kind of stuff. Macro trading funds. So, I think this regime is just getting started. So, I'm excited. So, all right, let's talk to Stuart about maybe your background, and then we can get into some of the fun stuff that you're currently working on.

Backgrounder

Stuart:	00:03:35	Sure, yeah. I've been a volatility trader of one flavor of another for probably more than 20 years now. Started my career in London with Barclays Capital, and moved to the US in the early 2000s to start their equity derivatives business in New York. Been around the world a bit since then. Spent some time in Hong Kong for HSBC, which was fun. Back to the US and more recently, I found the two businesses that I'm chief investment officer of, the first one that now must be in its sixth year. *Invest in Vol* is an RIA that manages volatility strategies for individuals and other advisors. And then more recently, in the last few years, *Volatility Shares*, which is the sponsor of the new ETFs that many people would have seen launching this week.
Adam:	00:04:35	Awesome, exciting. So, I actually, I'm not sure if we can say the names of those ETFs on this show. So, I won't say it, if we can.
Mike:	00:04:45	We can. Stuart may not be able to comment, but we can say what we would like to say. All with the caveat that none of it's advice. So, it's just four letters.
Adam:	00:04:57	That's true. Yeah, ...

Rodrigo:	00:04:57	Stuart, look away while we say it. Look away.
Adam:	00:05:00	Yeah, so ETFs are the, *Volatility Shares*, is it double-long, and then there's a single-short, right? So, there's SVIX and there's UVIX, and they just, I think, started trading this week. So, Stuart, congratulations on that. Maybe talk a little bit about the indices that are behind these ETFs? And how they're how he designed them. And then maybe let's talk about the history of volatility-based listed products. But first of all, yeah, what's going on in these indices?
Stuart:	00:05:41	Absolutely. I mean, first, I apologize for not being able to, like get into too much nitty gritty and talk about the stock. So, I think everyone's aware, and perhaps some people who are watching wouldn't know, but once you become an issuer of securities, there's a lot of rules and compliance that one has to follow. So, I have to be careful what I say. I would say if one is interested in any ETFs or stocks, for that matter, go read the prospectus. They're always available. You know, go find them and read that prospectus before you do anything with these sorts of products. So, yeah, we've been sort of looking into the launch of these ETFs, for about three years now. So, it's public and there's been many news stories about it. So, I think people will be able to find the information online. But ultimately, we know, over the last few years that there's been a few products disappear from the landscape. I won't mention their names, but products that were issued by big banks and ETNs, not ETFs, ETNs but ran into some trouble for various reasons, and left the market. So, we decided there was probably an opportunity to bring back those exposures in a different format. Now, personally, 10-15 years ago when I was at Barclays and we were launching the very first ETNs, it did seem like a very good wrapper for a lot of things. Neat thing about an ETN, it's a debt instrument issued by a big bank. You got the full weight of the bank's credit worthiness behind it. And you can effectively structure any payoff into that and stick them out there. And banks have been doing this for years, they were very popular in Europe and in US. But they have disadvantages. You're at the whim of the bank, the bank gets to choose how it's going to handle … going forward. It may choose to shrink it, it may choose to close it, you also have the credit risk on those products. I think there were times in 2000, and back in 2008, or whatever that these issued notes by banks that were near failure, the payoff would have looked nothing like what you would expect. You say oh, it's got to have this equity payoff, it's got to have this derivative times payoff, but the reality is, this thing could go to zero. So, anyway our view was there was a better way to bring the sort of exposure to the market and figured the ETF packaging was a better approach. So, we went down that route. We spent several years going through the long sort of legal process with regulators to eventually get to something that made sense clearly

to them, ultimately, but to us and to the markets, and all the participants and stakeholders. So, the indexes that the newer products track, we designed in a different way to previous fixed linked indexes. Many VIX linked indexes, or in fact, all of them until these recent ones that we've been involved in producing or helping produced go from, they effectively give the performance from settlements of the futures to settlements of the future. Simple as that.

And of course, if you develop products that track settlement to settlement, you've got to make sure you get settlement and you get settlement. Otherwise you've got tracking error. But even worse than tracking error is if you're an ETN issuer, you've told everyone they're getting settlement to settlement. So, you have to get or better settlement to settlement, at all costs. Because otherwise these products they're going to burn holes in the bank's pocket. So, that's sort of a fundamental flaw, I thought, in the way that the products that were out there operate and thought, well, there's got to be a better way to do it. So, what we thought was … start by producing some indexes that don't just look for settlement to settlement and what we came up with was using a TWAP process. So, well how about we say it goes from, it measures performance from the last 15 minutes TWAP to the next day's last 15 minutes TWAP, and say well, is that really important? It's going to be about the same movement every day as the settlement to settlement.

But there's one important difference. And that is, if you try and do a leveraged or inverse type of payoff, on an index that's settlement to settlement, you have to do your rebalance at settlement. Whereas if you do it at a TWAP to TWAP, you've got a whole TWAP period to match. So, you've got 15 minutes, 30 minutes, whatever the period might be, to get all your volume done. Now, that's pretty helpful. The VIX is a liquid space, but when you've got to do, these products have often, have in the past got quite big. And it can be advantageous to be able to spread that liquidity over a period.

Rodrigo: 00:11:02 Let's talk about that specifically in the context of *Volmageddon* of February 2018. So, this is clearly an important, I guess, development in this space. What happened then and you know, what's the risk of not being able to do what you just mentioned?

Stuart: 00:11:21 Yeah. And you make a good point by bringing that up. So, February 5th, 2018, as many will know, saw a tremendous spike in the VIX complex. We saw a relatively mild drawdown in the S&P, I think the S&P on that day was down about 4%. But we saw a tremendous, tremendous spike in the VIX products. Now, when we go back and look at what happened that day, it seems like the VIX was, or the VIX futures were sort of ticking along at sort of a plus 30% kind of move, which is what one might expect for a 4% down. It's like it's a big move down, but it's not like, we've seen these before, it's not the end of the world.

But then what was weird was in sort of the last five or 10 minutes of futures trading, that plus 30% went to almost a plus 100%, almost doubling. It was quite a sudden, it was quite -- the equity market hadn't really fallen any further, we just saw this, like tremendous drive up in the futures. And at the time, this had a devastating impact on some existing ETPs that are out there. And I'm sure many people know the big names. But it was suspicious how that happened. Now we can look back and sort of analyze it and understand what happened. But what's quite probable is that simply the amount of rebalance that needed to be done by those ETPs on that day, at settlement price, just right at settlement, right at the end of the day, was just more than the market could handle. And I think people went into that settlement market, found that liquidity was starting to wane, they were buying but they couldn't get enough, started to buy also in the cash market ahead of settlement. And that just pushed it right up.

And something that kind of adds some further weight to that argument is it didn't take long for the futures then to fall. And we saw them collapse the next day back to more reasonable levels. So, it definitely looked like you had this sort of instantaneous need for VIX futures that seem to disappear after the close. And that's one of the reasons that the new indexes spread that over 15 minutes rather than instantaneously.

Adam: 00:13:54 So, the risk of that type of vol explosion is substantially lower now with the current design, you figure?

Stuart: 00:14:04 You know, I can't say and I wouldn't want to say, but what I would say is spreading rebalance volume over a period of time, I think, is advantageous. You know, I'll let people judge whether they -- how advantageous that is. But I think most people would agree that trying to get an enormous amount of volume done at one moment in time, put you in this weird situation of if anything goes wrong, at that very moment in time, whether it's operational, whether it's connectivity. There's so many things in the financial markets that make it all work that could just go wrong very slightly. Having the opportunity to spread it over a period of time lessens the chances of it ending that way.

Mike: 00:14:51 It would certainly seem that it would increase capacity. Right? You have more time so I don't know how it would decrease.

Stuart: 00:14:59 Yeah, I mean that's right. I mean -- So, the way we've sort of phrased the -- or built the methodology of the index is to allow somebody who's using it to have access to both the settlement and to the 15 minutes at the end. So, it's sort of almost the best of both worlds. So, okay, there's lots of volume in the settlement, true. But there's also lots of volume in the last 15 minutes. It's surely better to be able to use both, do 50/50, do 50 in each. And with the same amount of volume I would expect, I think most people would expect there to be less marketing back, spreading it over that way.

Using VIX Products

Adam:	00:15:45	I wanted to also get into your sense of how investors use these products. We don't need to talk about any particular products. But how do investors use short VIX products or long VIX type products?
Mike:	00:15:58	Well, yeah. I mean, more like there's a couple of vol products and access points that Stuart has. So, it's really a question on how does one incorporate vol into a portfolio. And then with structuring, do you do it through an ETF of fund? Do you have a separately managed account? What are the differences, all of that?
Rodrigo:	00:16:17	It seems like one of those products that you're kind of baffled why the regulators would allow them to go live. But if you start peeling back what the utility of these things are, it actually becomes -- it can become a quite useful tool for private wealth, for institutions, for all types of players. So, Stuart, just enlighten us a little bit on what particularly is here for these products.
Stuart:	00:16:41	Yeah, absolutely. I mean, the VIX ETPs, and even the VIX futures themselves that underlie VIX ETPs are, they're for sophisticated users, institutional users and that's where the use case really stands. Now, the obvious one is you could be a fund manager with an equity portfolio that has a very strong conviction that the markets are going to change to be volatile or bearish, or whatever your view might be. And you might for various reasons not to be in a position to change the allocation to equity. It could be a tax realization, gain realization problem, or whatever. It might be that getting in and out of a big chunk of equity would just be difficult, because some of those equities aren't as liquid as you need them to be. There are many, many cases. The long products are fantastic in this regard in that you can say, well, okay, I'm going to go and buy some VIX futures, or I'm going to go and buy a VIX ETP, and I'm going to hold it for this very short period, where my conviction that we're going to go through volatility holds. There might be an hour or there might be a day or maybe longer. But that's sort of the key use of these products. And you'll see some of the popular products, their volume is absolutely unbelievable. Millions of shares trade a day, and it's not that they necessarily have a massive amount of AUM or open interest in the futures for example. But it's the people trading these in today. People are saying, okay, look, we're going into the Fed announcements, this is going to be terrible, I need to own some volatility, hold it for an hour, sell it and walk away again. You know, there's a lot of reasons for that. And I think we see a lot of writing about how tail hedging or hedging and the use of liquidity when you need it, and these products fall into the category. They're not investment products at all. These are tactically used trading vehicles that are used by people who understand them in conjunction with the products they already have, or the investments they already have.

Adam: 00:18:53

Now, what about the idea of just sort of strategically owning a short vol position to capture the roll down in the VIX? Do you have any thoughts on that?

Stuart: 00:19:07

Yeah, it's a trade that was popular for two or three years. So, sort of 2016 until 2018 this was a popular trend. So, what people had realized is it many qualities that have a non-flat, say a contango'd future structure is there's an effective, some people call it roll yield or some carry. But I mean, there's a sort of, you buy a future and then the next day it slipped down the curve and nothing has changed. It slipped down the curve a bit so it devalued.

So, this sort of carry trade in the futures world is relatively common. People realize that the contango in the VIX space can get quite steep, and that's typically in low volatility environments where the short end really drops, and we were numbers in 2016-17 right down a low teens. And this produced quite a lot of this contango. So, what people were doing was they were getting short the VIX space, sometimes the ETPs, but also through the futures. So, the most common one would be to sell a long ETP and carry that short. But then also there are short ETPs that exist, which allow people to buy them, and then you have the inverse exposure.

Now, that's one of those trades that kind of works and then it really doesn't work. People have talked about picking up pennies in front of a steamroller. And it's true, like that's not a trade that people should be doing. It's an effect that you can observe and there are, I would say, there are people that on a day to day basis, we monitor their trades, day to day, or hour by hour, can trade that and can make it profitable over the long term. So, there is an alpha there to try and extract. But it's not as simple as sort of, well, I'm going to sell some VIX curve, and life's going to be great, and it's going to make me money. So, and in fact, I'll mention the other business that we're involved in is managing strategies, volatility VIX linked strategies for individuals. And a lot of what we do, is that. There'll be times when there's a contango in the curve, and we will take a short position for clients.

Now, that's not because it's an easy trade. It's because we do it in a very, very small and measured amount, many, many, many, many times. And we play the probability of, will the probability say that your gains are high enough, of your potential losses. Putting a small trade on, taking a bit of pickup over and over and over again, is worthwhile. So, in some ways, we compare more with a CTA type of strategy. We'll both be long vol, short vol, long vol, short vol. It can change inter-day, it can change in an hour. But yeah, and we're not, I guess, we're a good example of what sophisticated asset managers are doing in the VIX space when they think about it as an alpha generator instead of over hedging.

Mike: 00:22:23

So, someone was mentioning to me and it might have been you Stuart, so you can confirm, you can fact check this for me. Someone mentioned that the actual money-weighted returns from the short VIX ETF or ETN, were the one that sort of blew up, were positive even after the blow up to zero. So, if people had been rebalancing them, or that was the rumor …

Adam:	00:22:46	That's Eric Balchunas, I think, who said that.
Mike:	00:22:49	Yeah, that was Eric. You're right. Yeah. So, we were talking to Eric Balchunas and he was mentioning even after going to zero, if you had done the rebalancing, which by the way, many investors had actually done, they'd actually taken that premium off the top all the way up. They were profitable on the trade, even when it went to zero. And it's a really tough thing to get your head around, but it's a pretty interesting, positive effect for investment.
Stuart:	00:23:13	Yeah. I mean, I think, Eric -- I mean, my gut says he's right, and I'm sure he is. But I think what he's saying, put simply is if the trade makes money on a lot of days, and can lose a lot of money very quickly. If you've keep rebalancing to the same $100 that you've got in there every month or whatever, it's like, yeah, at the end, you lose $100, but you've made many multiples of that over the period. And if that's his argument, I think he's right. Look, there are a lot of investors that do exactly that. And in many ways, what we do at *Invest in Vol* is that we encourage investors that only a very small allocation to what we do. It's a very risky strategy - can be high returning - it's very risky strategy. It's got to be the kind of thing you can accept a significant drawdown in, and as you put it rebalance say, okay, that was a bad month, let's go, do it again.
Mike:	00:24:17	Did you say, adding a tiny bit of a highly volatile non-correlated asset, reduces the portfolio's volatility and can potentially increase the return? I mean, that is the magic.
Adam:	00:24:30	That's how you generate the rebalancing premium, right? Oh, yeah. Yeah, sufficiently advanced diversification is indistinguishable from magic. Go ahead, Rod.
Rodrigo:	00:24:45	Yeah. No, sorry. Just the idea of telling people that when you talk about these products, and they ask you, so what do you think of it? I'm like, I think it's expected long term return of shorting volatility of negative 100%, maybe more if your downside isn't capped. Why would I invest in it? I'm like, why wouldn't you, right? You just walk them through it, right? And you go through 10 years of making positive returns, as long as you're scalping it long enough. When it goes to zero you rebuy, that's when you have a premium, … premium again. As long as you do that you're good. The problem is putting 100% of your retirement assets in a single short volatility fund. And thinking that that 60% annualized rate of return is going to continue. Yeah. Not advice, not advice.
Mike:	00:25:32	I can't tell you to do that and I can't tell you not to do that.

Rodrigo: 00:25:35 I'm not a vol doctor, nor do I play one on television.

Active Volatility Trading

Adam: 00:25:44 Exactly, yeah. So, Stuart, you've mentioned a few times that you run an active volatility trading business as well. So, maybe tell us a little bit more about that. Maybe go into that. When did you start that? Why did you start that? And then I actually would love to get into some of the mechanics.

Stuart: 00:26:03 Yeah, so I think that we started in 2016, so we've been running that for some time. That business started at a sort of a -- it was at that sort of run up in interest in the short vol trade. So, what I noticed was, there were a great number of sort of, like Twitter experts and whatever, who – a bit like the Wall Street memes stuff saying, oh, this is a goldmine, I found a way you can make money. There's loads of these pennies and the steamroller is not moving very fast. And it was quite obvious that there was an opportunity there to step in and say, well, hang on, guys, there is something there, very possibly, but it's quite likely that you don't understand what you're doing. So, go register as an investment advisor, formalize it, do it properly, give people professional advice. One, make sure they understand what's happening before we even get involved. And if that hasn't scared them off, make them understand that it's something that they might want to put a small fraction of their investments in, etc. And that's what the business grew out of.

So, *Invest in Vol* was a partnership between myself and my partner, Justin Young. Justin's background had been in the ETF business. He'd worked at Global X ETFs and before that he'd worked at the NYSE. And yeah, I think he saw the space as well as being interesting and growing, so we went down that route. You know, given his background, it didn't take long before we started thinking about the ETF space, as you might imagine, and my vol background in ETFs, and that's what led us to the later businesses. But *Invest in Vol* has grown over the years. Mainly our clients are high net worth individuals. If I gave you -- a typical client is 55 years old, he's got $15 million, and he gives us $500,000, or something as part of his investment strategy.

It's been a very interesting business. I would say 90% of our clients come to us already very well informed. So, the typical guy is, I've made a lot of money in the small space over the years, but I've lost a lot of money as well. I've decided I need to go back to my day job. I want somebody to follow a systematic strategy, because I believe that it's going to make me money. But I can't be sitting with my phone while I'm trying to be in meetings and stuff. So, people that have done it for a few years realized it's got to be active, you got to have a full-time portfolio management team on it, you've got to have a systematic approach and you've got to understand the products. And so yeah, that's normally where our clients come from.

Adam:	00:29:14	So, what instruments do you trade in that strategy? Is it just the futures? Are you also trading options? Are you trading some of the volatility products?
Stuart:	00:29:21	So, we actually decided to go along the route of the RIA rather than being CFTC registered and being a CTA. So, we actually trade the ETFs and ETNs instead of trading futures. So, there's a few reasons for that. One, I think people are generally -- people that come to us are generally very aware of and have traded the equity products. Very few will come to us and say I've been trading these futures. It's that they know the equity products and they're comfortable trading them. So, we started out just trading the popular ETNs that were available at the time. And then over the years, we've -- as these ETNs have either disappeared or changed or the ETFs have changed leverage, we've had to adjust. But in general, we trade all of them. We basically go for whatever is the most efficient way for the clients to get the exposure that we are trying to get for them. And unfortunately, the ETFs are typically very liquid. You'll see from the older ones, that millions of shares trading a day, and there got advantages over the futures in many ways. For intraday trading, the tick size is normally one cent, the future's five cents. So, there's the disadvantages, but we stick to the ETPs and we don't use VIX. We use options on the ETPs as part of a hedging process. And also, sometimes to get our delta exposure through the options. Sometimes borrowing becomes difficult or expensive and we may or may use options. But yeah, so we use a blend of ETPs and the ETP options.
Adam:	00:31:05	It's worth also mentioning, and maybe you can walk people through how this works. But the ETF indices or the vol indices that you just launched with, they roll on a daily basis to maintain a fixed maturity. Right? And so maybe just talk about how that works, what is that maturity, and why do you do that?
Stuart:	00:31:28	Yeah. So, I think one way to think about these VIX futures indexes, both the ones we use, and also previous, earlier ones, is that they try and maintain a roughly 30-day average maturity of futures. So, you start out with month one and month two, and every day, you're rolling your futures forward into the month two, until month two becomes month one, and you start out in month three, and then you've got one or two again, and off you go. I think that's advantageous. It sort of gives you an exposure, that's similar to having a blend of month one and month two. It gives you an exposure that is more consistent, in that if you just hold front month future it sort of acts differently, when it's first -- when it's 30 days to expiry than it would if there's one day to expiry. So, this way, you've never got a big exposure for the expiring future. And you're always rolling it forward. So, the index has defined that in a way that it's sort of one divided by the number of business days per month, you're rolling the notional forward. And the ETPs that track them do exactly that. So, they would just follow that index methodology exactly.

Adam:	00:32:48	Right. And so what some people may not understand about the VIX futures, is that as the futures get closer and closer to needing to roll or maturity of that futures contract, that it trades more and more like spot, right? So, if you're sort of -- if there's whatever, 20 days to maturity of that contract, then there's a lot of bases so the vol of the actual VIX index is moving a lot more than the actual vol futures is, right. But as you move closer and closer to expiry of that future, the future begins to trade more and more like vol and gets more -- and has more vol-of-vol, or more beta to the underlying VIX index, right? So, what you're trying to do is maintain that sort of linear exposure to, or mostly linear exposure to the underlying VIX. Keep that constant so people can -- it's easier to model and you don't get quite the same level of jump risk and stuff that you sometimes get as the index moves closer to maturity, right?
Mike:	00:34:06	Is there an average number of days that you're sort of sitting in most of the times?
Adam:	00:34:11	20's yeah.
Mike:	00:34:12	20. I'm sorry.
Stuart:	00:34:13	Well, no, it's about 30 days, you've got about, about 30 days between each future. Yeah, I mean, so the CBOE did some research on this some time ago and published it on their VIX site. And I think they talked about it in terms of beta, sort of like the VIX futures beta to the VIX. Now, so there's a -- some people perhaps forget, but the VIX is not an investable index. It's a calculated number. There are some very sophisticated ways to dynamically reproduce it, but not in a sustainable trackable way. So, the best you can kind of do is say, well, I'll trade a future that's going to settle to the VIX. But now as you point out, if the settlement's going to happen in one hour, then my future is going to move almost perfectly with the VIX. But when it's got a month out, the VIX could go up and the future could go down. The reality is, you could say, well, we're going through a very volatile period now because something's happening, but that happening is disappearing tomorrow. So, we expect in a month, it's not going to be as volatile. So, we do see that and we I think there are some, I think, discomfort or unhappiness from investors, when they will say, well, but I want the VIX. I saw the VIX was up 7% today, I want that. Well, that's unfortunate, you can't have. You can use the VIX as kind of an idea to tell you that implied volatility has gone up or down. But if you want something to trade, you really need to go primarily futures and then from futures into the ETPs and hold the futures. But you can't trade the VIX itself. And as you point out, the reason that these indexes have this rolling is for a couple of reasons. You wouldn't want your index to roll all its futures in one day, because that would be a nightmare, if you ever try to track it with the big fund. But also,

as you point out, it gives you this more stable beta to the VIX. It's not as exciting as having a one day future. But it's not as boring as having a three month future either.

Adam: 00:36:23 Well, yeah. I mean, so let's talk about that, how boring that three month future is, because we've chatted about this offline on several occasions, right. But it always seems so strange to me, why especially on the short side, why don't investors prefer rolling a 60 day index or a 90 day index? I mean, if you evaluate the long term performance on a risk-adjusted basis of those longer term indices, they're actually considerably better than they will in the front month. But you said that investors, they really just like juice, right. Anyways, say more about that. What's your experience with that?

Stuart: 00:37:06 Yeah. Interestingly, there have been, well, there still are products that track those middle months, three through five and beyond. And they've never been popular, you know? Yeah, there's a little bit of interest. To purists, we love them, it's quite a neat thing, you kind of get the sort of exposure that you get from the front months, so that that's great, but without the sort of *blows your pants off* kind of like moves that you get every -- it's sort of a more gentlemanly kind of approach. The reasons why people haven't adopted them as much, I think, must be around what you're saying, your point. And I think it's about capital efficiency. And we talked about having a very small exposure to this stuff. I think we're in a world where people are like, well I'm going to put 3%, 5% of mine in this. If I'm going to do it at all, I want to get enough of it, I want to get as much as I can for my 3%, so you kind of go in the shorter. I suspect that's what it is.

Rodrigo: 00:38:21 Yeah, it's kind of like the same observation on, when you think about risk parity and the idea of getting a levered bond exposure, you see a lot more like 30 year ETFs or 30 year futures contracts being used rather than levering up the very short term treasury, which gives you a higher Sharpe ratio, right? It's just capital efficiency, it's the idea, you have a cap of like high risk instruments in your portfolio that can't exceed more than 5%, so that real estate, that portfolio real estate could be really crucial, and more juice is better, especially in a non-levered portfolio, right.

Mike: 00:38:59 Well, I also wonder, Adam, when you looked at the research on those longer term, and Stuart, your experience with looking at that, do the returns occur at those moments of maximum equity pain? Or are they a little bit different? So, … structures -- right, the structures shift a little bit but …

Adam: 00:39:18 Right. They're not still good for tail-hedge approaches. They're more for if you just want to take advantage of roll down and have a much, much lower probability of total loss, right, than rolling the 60 day or the 90 day, is typically a much better risk/reward type of equation. But yeah, if you want just tail-hedge juice, and Stuart, again, I would defer to you on this, of course. But obviously, you want more beta to the VIX spot.

Stuart: 00:39:51 Yeah, that has been my experience that it comes down to… these are alternatives that people may add to a more traditional portfolio. I think it's difficult to get people to break out and allocate a big chunk because they have to allocate away from something else. So, bringing a high efficiency product seems to be more popular, and that, I think, would be a solid argument for why people do it. I mean, I think some of the question comes to why are the two times leverage VIX ETPs, why are they always been so popular? And the volume that trades in those things is tremendous, and the AUM has always been good. And I think it's the same reason it's like, well, I want to have some VIX exposure. How much do I want to de-allocate in order to get my VIX exposure? If you go for more leveraged products, you get that exposure more easily. I think that's the answer.

Adam: 00:40:53 Yeah, I mean, again, I get it. I especially get it on the long side, right, because the other advantage to ETPs is that you can't lose more than 100%. Right? So, the issue where I guess, backside or there are …

Rodrigo: 00:41:13 We'll talk more about that, Adam. Why is that the case? Why can you lose, if you go straight futures it's different than using any ETP?

Adam: 00:41:20 Well, I mean, Stuart, maybe you can say something about that.

Stuart: 00:41:24 Well, I mean, it's simply the neat thing about if you buy an equity product, you buy it, you can lose your money. If you bought 50 bucks and go to zero, so you've lost 50 bucks. The interesting or the concerning thing about people who then take short positions, and particularly short positions in commodity futures and fixed futures, how much can you lose? I think that's an absolute unknown. So, one of the strong arguments, I think, for inverse, why you have inverse products on the market, that seems like counter to the whole capital development, or whatever.

Well, interestingly, there are reasons and we've discussed some of them already, but there are reasons why someone may choose to take a short position. There are better ways to take short positions than say, I'm just going to short, a long ETP or short a future, which theoretically, could go to any number. And some of these ETPs, we've seen ETNs lose track and go to levels that nobody would have expected. You don't want to be short. And so you're right, yeah, being on the long side of an inverse product, it's like if everything went wrong, at least your broker is not phoning you saying you've got to make a deposit into your cash account. How did that happen?

Rodrigo: 00:42:36 Who's on the hook for that, though? I mean, with the asset manager who was dealing in these futures contracts, can lose more than what…

Adam: 00:42:48 Stuart's very uncomfortable talking about...

Stuart: 00:42:51 So, we play a conservative role in when we manage a short vol position. So, we'll take, as *Invest in Vol*, as an asset manager of other people's money, we'll take a position -- When we take a short vol position, we will do one of two things. Either we will buy an ETP that is inverse, knowing that, when the nuclear bomb goes off, it goes to zero, but that's it. Or if that's not possible, and there are times when that isn't possible, at the very least, if you're going to take a short position, take a short position with a call option cap, so that you're covered. I mean, I have heard some horror stories about people being short, making short vol. You see people on Twitter and elsewhere. You know, that's not a game we want to play.

You know, I have also heard stories about people that have had their accounts liquidated once they've gone negative, by the brokers. And I don't know the legal ramifications, but I suspect the next step is the broker says you owe this money. Then they point to page 73 of the agreement, which says you owe them the money, and then the lawyers blame you. So, yeah, it sounds pretty horrible to me.

Adam: 00:44:16 But I think where Rod's going though, is if you've got an inverse VIX product, then that inverse VIX product can go to zero on the event of a dramatic enough VIX spike. But that VIX spike could be so large that in fact, the loss is more than 100%, right. So, I guess in that case, who eats the rest of the loss, who eats the excess loss since the ETF holders don't?

Stuart: 00:44:46 Yeah. I mean, it's an interesting one. It's something that's managed behind the scenes in the way that the ETF has to be managed and risk managed, but ultimately that has to take place behind the scenes. Unfortunately, I can't give you the details about it. But yeah, I mean, at the end of the day, we have to make, as an issuer, have to make sure that the interests of the investor are taken care of. Behind that yes, there are institutions and professionals that may be taking risks in the background. I think there's a --

And you no doubt have seen, it's in the news, but you may have seen the recent story about Barclays and the problems they're having with their product. You know, if the news is, and I have obviously no inside information on this, I used to work there many years ago, but haven't for years. You know, if the news is to be believed, they've got a $600 million loss on a platform which has many products on it, but on a platform that I'd guess probably made a fraction of that over the years? So, yeah, I mean, behind the scenes, there's a lot going on.

Trading Vol

Adam: 00:46:05 Well, with the ETNs it's easy, right, the bank takes the loss. But with the ETFs, I guess it's a bit more of a mystery, which is fair. Okay. So, I actually really want to get into how exactly you are trading vol with your *Invest in Vol* business. So, for example, to whatever extent you're willing to sort of share some of the basic trading strategies that you employ. I think our viewers would be very interested in learning some more about that.

Stuart: 00:46:39 Yeah. So, we, I guess, at the very highest level, what we look to do is to extract any sort of risk premium that may be available in these VIX ETPs. And what we do or what we've done, is we've had a look at the historic data in VIX futures and VIX ETPs. And we've come up with a probability based model, which looks at a series of factors that says if this is the case, this is the probability that the product will increase or decrease in value the following day. We do this across approximately 30 factors. And then we weight these factors. And the way to think about it is, if you think you can identify something where it's likely, let's say even if a 52% chance of making you $1, and a 48% chance of losing you $1, if you can just play that game often enough for long enough, and just keep making those extra cents every single time. And that's what we try and do with probability.

So, our strategy has significant drawdowns. Our largest drawdown has been in the 30% range. And sometimes it takes place over several months. But for those that have been invested with us for a long time, they understand that this probability means yeah, you can win, win, win, lose, lose, lose, lose, win, win, lose. The game, though, is to just win on the probabilities over the long time. So, it's probability driven and we are very active. We trade, probably five times a day we are changing our position. Yeah, it's -- if I gave you some examples of some of the indicators we use, and some of them are quite common to even simple strategies, is the shape of the contango curve, for instance, I think people have realized when the curve is in one particular shape, the VIX futures are more or less likely go up or down in value. You know, that's one that it can nudge the probabilities in your favor slightly. Unfortunately, with that one, it's typically that you need to be short VIX futures, which means you have this chance that you get a win, win, win big loss, so you have to manage that.

The other one, which is a very strong indicator for us, is the rate at which the VIX futures move in relation to the index, the S&P 500 moving. So, many people will say, well, there's a -- almost a hard coded link between these two things. And what they're talking about is a kind of skew delta that exists. There's a the VIX is not a fixed strike it's a floating strike calculation. So, the … that it's using move as the S&P moves, and there's typically a skew in the S&P options market. Lower strike puts are typically marked on, or trade on a higher volatility than … volatility, than upside calls. So, as VIX goes -- as spot goes down in S&P, the VIX tends to go up, even if volatility actually hasn't changed, sort of like there's no new information, just S&P went down a percentage VIX went up? Did things get more volatile? Possibly not, but possibly we just tracked where options were already marked.

And we often see that. We will we see the situation where the VIX will be inversely correlated to the S&P most days. So, we sort of get used to that. And then of course, we get the days when it doesn't happen. Well, the VIX is broken because something different has happened. But really what's happened on those "something different has happened" days is, vol has actually moved. It's not just you've followed the skew curve, it's you follow the skew curve, but the skew curve moves. Vol actually went up or down. And that's the days when we get reach outs from people, clients that say, well, why doesn't the VIX work today or… so, the rate at which those two move with one another is quite important, and we monitor that. So, that's a strong indicator for us. You know, as you might imagine, if you see the VIX moving quite quickly, as you see the S&P coming off, it's typically an indicator that people are under- hedged, nervous, they're going in buying options, buying downside protection. That's normally a sign that we'll see a continuation in the VIX products picking up in price.

And I'll give you an interesting story. So, we've very recently had January/February, we had two drawdown months, and we haven't had a big drawdown for several years. But we did. And compliance were asking us why were we not longer volatility going into the sort of things that were going on in Ukraine and elsewhere. And what was interesting about that period, and as many people have commented on this already, is unlike the COVID period, or other periods where we've seen really stressed markets, volatility actually didn't pick up as much as one might have expected, for the drawdown we saw in equity markets.

So, what our models were saying was, yeah, okay, vol's going to go up a bit, but this isn't crisis levels. You know, and we had clients asking us every question, you know this feels like a crisis? Why are we not going long volatility? Why do you guys seem to be persistently, have a small short allocation? And we have to tell them, you know, crisis with VIX in the 50s, 60s, 70s, yes. VIX at 35, that's just -- long term average is 20, something like that. Just because you got used to VIX at 10, or 12 something, doesn't mean that 35 is crisis.

Adam: 00:52:42 Well, the other thing is too, that we started on much higher level, right? The VIX never came down to the levels that we saw sort of pre-COVID, right, it sort of always hovered in that 20 range. Yeah, so you just don't have that same potential pickup on long positions.

Stuart: 00:53:00 And it might be in a healthier space, right?

The History of the VIX

Rodrigo: 00:53:02 Yeah. Exactly. I was going to ask, and I know that the VIX product didn't launch till like 2004-2005. But I've always been curious to know what type of vol -- the VIX volatility would have existed during the 2000 and 2003, kind of traditional mostly growth equity bear market, right? What you're seeing, a rotation away from growth towards value. So, not every element of the asset class is going down. There weren't any really aggressive -- well, there were a few between 2000-2003 obviously. But there was like, I think I counted 11 *buy the dip* opportunities, but they never -- if you look at the chart, they don't seem -- the vast majority of them are just kind of blah, right? Probably just like a slightly highly elevated VIX if it had existed back then. Have you analyzed that period? And do you have any like any idea what …

Stuart: 00:53:58 There's a few. And in general, yes, I agree with you. We've looked at some synthetic data of our strategy, going back. Vance Harwood, if anybody knows him, we've done work with over the years is very good at sort of calculating things before they really existed by synthetically extracting the calculation. So, the few things that we're aware of that means it's tricky to put too much weight on these things. One is, the existence of an instrument often changes the way it may have traded. Now the arrival of VIX futures changed one's access to the volatility space and would have changed VIX. So, people say, oh, well, VIX moves VIX futures. VIX goes up and VIX futures track it. Well, okay. That's an analysis.

But what about the argument that says people are trading the VIX futures? They're going to print where people print them. And that flows through to hedges in the S&P 500 market, which people spread through time, which impacts where the VIX is calculated from. Now, of course, one is not right and neither is the other, but they have an impact on one another. And for that reason, it's very difficult to say, particularly during extremes when you get a move, what would have actually happened. Because the VIX futures are a kind of a unique product. They're out there, a way to buy implied volatility without having a gamma exposure. Now, there was something, well, there still is but there was a popular product that I used to make a lot of markets in back in the day that does that, the *variance swap.* But that was something that institutions were trading and that the people had availability to. The VIX future came in and it changed the way people had access to the market and to the markets in different way. You had to now buy implied without having the gamma. What have you actually created here? So, that's why it's difficult to make a solid judgment from …

Rodrigo: 00:56:13 Yeah, the reflexive nature of markets, period. And something as volatile as the VIX is probably going to have much more pronounced effects, right. So, whatever we do in the analysis in that period is probably moot, not necessarily indicative.

Stuart: 00:56:28 Yeah. I mean, it probably gives you some ideas. I mean, the other thing is obviously the creation of the VIX ETPs, which again, changed the way people interact, the fact that they roll so that they sort of bolting month one - month two futures together in a certain way that causes them to react in a certain way. Yeah, there's a lot to unpack in that data, if you have it.

Adam: 00:56:57 What about the relationship between spot and futures at different points along the curve? Have you noticed that there's any information?

Stuart: 00:57:10 You mean, sort of the changing in beta between different futures and spot VIX?

Adam: 00:57:15 I mean, I know S&P, for example, has some volatility indices, which is, you know, there's the VIX. And then there's the three month, right. So, those sort of spot VIX indices, versus -- So, the spot three month VIX versus the three month out VIX futures, right, those… do use the spot indices or information from the spot market, as well as information from the futures market to generate trading signals?

Stuart: 00:57:46 We look at it, it doesn't give us a very strong signal. The reason is, the longer dated measures are much more sort of measures of vagueness in the options market and are much more controlled by whatever the institutional flows are out there at the time. In terms of the movements of actual realized volatility in the short dates, I think the short-dated products tell us a lot more about that. So, with an option, a very short-dated option's got a lot of gamma and not much vega on it. So, it's very sensitive to movements up and down and spot. Longer-dated options are much more about just the implied volatility in vega, and very little about the realized vol. So, for that reason, it is certainly part of our library of things we look at. But a lot of what we look at is, are these short-dated things. I mean, there's some interesting new ones, which you may have seen, which we look at, again, it's not a very strong signal for us. Things like these gamma indexes that people have put together now. It's trying to guess how dealers are positioned. Are we in a pool where dealers are terribly short, and if they're terribly short gamma over this period, it's going to mean that they're going to be grasping and rebalancing their books making …

Adam: 00:59:19 Amplifying volatility in both directions. Yeah.

Stuart: 00:59:21 Yeah, yeah, amplifying. So, things like that might be interesting, I think, and we keep monitoring them. Our problem with some of those indexes is the way they calculate it is, there's often the weaknesses in the calculations without …

Adam: 00:59:35 And making guesses about who's on which side of the trade and …

Stuart: 00:59:38 Exactly. If you say well, it always trades on the side that the dealer side of the -- of course it doesn't. And you also have this problem with OTC positions that sit out there. Big banks have large positions that they have with clients. They then hedge them with OTC transactions with other banks and then this position gets moved around and you just don't know it's there. You know, the old Berkshire Hathaway trade that was put on years ago and that's nowhere near where we trade these days, but it's just a massive chunk, and something like a gamma index wouldn't have a clue that it's there until you ran into it. And then it…

Adam: 01:00:15 Exactly, yeah. What about the volatility risk premium or so-called where -- are you looking at the difference between, like, current historical vol of spot S&P, versus implied? And you know, that delta gives you some information about which side of the VIX contracts you're going to be on?

Stuart: 01:00:34 Absolutely, yeah. So, we look at things that will tell us the probability of it going in our direction, or which direction we think it may go in. And then we look at things which measure the potential size of the game. And on the game side, you've got two types of premium that I think about. One is volatility risk premium and one is futures risk premium. Volatility risk premium is what most people think about as implied versus realized. So, you often see implied trading above realized. Sometimes it can get quite extreme. We've had days when very low volatility, three or four vol. Realized/implied still sitting at 15. There's obviously this risk premium if you chose to be short options, short straddles, for instance, and you delta hedge them close to close in that situation, you would probably be making money. So, that's volatility risk premium.

And then on top of that, you've got this VIX futures premium, which exists, which is VIX futures often traded prices above VIX. You know that they're -- either VIX is going to the future, or future's coming to the VIX. But ultimately, there's convergence and there's a premium there. So, looking at those two premiums, helps us decide if it's sort of 80% chance of a move in a particular direction plus, those premiums are very large so the potential gain might be very large. You get to a point of saying well, then it's a trade, we want to be in 50% allocation or the allocation would go up, as the probability of gain sizes increases.

Adam: 01:02:07 Gotcha. And you're primarily trading the front month ETPs. Right?

Stuart: 01:02:14 Absolutely. Yeah, we only trade the front months.

Rodrigo: 01:02:20 Do you find any value in it -- one question about these big flows, these large mutual funds that have a hedging schedule on a quarterly basis, right? Things like JP Morgan's Equity Hedge. And I'm sure there are others that got way too big, way too quick. Is that an area that is very clear to arb out and participate and find opportunities? Or are they too -- are they smart enough to kind of obscure …

Stuart: 01:02:51 Well, I think the good -- I mean, obviously, a lot of this occurs today and has occurred over the years. So, there's a few things goes on. One, good execution means that it can get around a lot of that. There's big block trades you can give over to big execution desks that are willing to take it off your risk price, and all sorts of things that allow it to be dispersed into the market electronically over a period of time. But the other thing is that if you start with the most sophisticated into the market, but if that sophisticated into the market knows about it, there's sort of this like, well, they get ahead of it to try and arb it and then the next guy's getting ahead of it.

So, it's like, well, okay, we expect to rebalance on the close. Nothing happened. Damn. What happened? Oh, well, everybody front ran it this afternoon, and then actually somebody front ran it the day before. So, it actually went the other way. You know, it's like, we should have seen the big spike on the close, it went down. That's because everybody over front ran it. I think that there's an essence of that. So, when we get the ones that we see in the press, I think at that point, it's probably going to be an overdone situation. Right? Yeah.

Mike:	01:04:02	It's one big game of Michael Lewis' *Bullshit Poker*.
Stuart:	01:04:06	Yeah. I mean, it's one of the reasons that … keeping a little bit of ambiguity in the rebalance is absolutely key. If you make it -- if you tell somebody and rebalancing this -- everything is linked to this index is rebalancing there, it doesn't take a genius to say, oh, that fund is very big, that fund's got -- let me do a quick -- oh, yeah. Okay, let me see what can I do about this? Maybe I should maybe buy ahead of it. And it's very likely that on Feb 5th, we saw exactly that. And many people speculated, including myself that may have been the case. But you can avoid that by saying, yeah, we'll rebalance over a period. And if we think we're having a market impact, we may extend that period. Now anybody who wants to try and front run it is in the situation of going, have they extended? Well, if they're not extend -- Maybe they have -- sort of free money is not there.
Rodrigo:	01:05:08	Well, do you remember? Go on, Mike.
Mike:	01:05:12	I was just wondering, how was working through that with the regulators? Can you comment on any of that? Is that too sensitive? Or was it like -- Did they get it? Was it something that you had to really work diligently through? What was their uptake on that? Because it seems to help solve the problem.
Stuart:	01:05:29	I mean, it's obviously sort of confidential interactions that we have with regulators. But I can speak in general. I think the regulators are aware that there are issues with large funds and rebalances. They're aware that possibly some methodologies aren't as good as others, and I think we're going to need to rethink some of the methodologies. There's a lot of funds that -- some of these mutual funds designed such a long time ago, they're very simple methodologies, like you write up what you want them to do quickly, and then off you go. And then you think, oh, damn, when we said we were going to rebalance on the close, we didn't ever think we were going to earn X percent of the float of the stock. Damn, this is going to be tricky, or bringing a new stock into an index and ending up…. So, I think regulators are aware of that. Yeah, I mean …
Mike:	01:06:30	So, the flexibility is reflected and they're looking at approvals and the new approvals that are coming through whatever they be. I think there's a much more -- there's a larger bandwidth and tolerance for…

Stuart: 01:06:43

I mean, there's a million ways to skin the cat. But I think the thing is, we are always going to have to evolve. If we try and stick with what we were doing 10 years ago, we are going to run into trouble. It's a game of people looking, continually looking for ways to find a cheap profit out of something like that. So, I think keeping evolving, and I think what we've heard from regulators, so far, maybe -- we've heard criticisms about how slow they move, but I mean, they've got a lot of problems going on, or a lot of things that are concerning them trying to … My experience has been that they are good at allowing innovative players to propose solutions.

Like I must say, all my interactions over the 20 years that I've worked with regulators in different ways is, they're definitely not there to tell you what you should do and whether to approve or disapprove of any particular way of doing it. I think what they're there to do is make sure that the markets evolve in a sensible fashion, and that they are allowed to because everybody thinks -- we all think we're all so of clever, but there's always the next clever idea and I think they know that as well as anyone.

Rodrigo: 01:08:09

Yeah, and all these rules driven ETFs, or even rules driven SMAs that are very transparent and get too big for their own britches, they can get into a lot of trouble. I remember Good Harbor, Square, do remember those guys, rebalancing on a monthly basis, they got so big that they had to trade on a certain day, because those were the rules, and they just got front run to death. It was brutal to watch, right? So, you got to evolve the rules. I mean, it seems reasonable, right? Here are your rules, you wrote them down, follow them religiously. But … for the unit holders, if you do it that way.

Stuart: 01:08:45

There's been a lot of focus on tracking error. And now the thing is a lot of people tracking index and the index samples the price, or samples in a particular way. And it could put a fund manager, portfolio manager into an odd situation where even if it has market impact, at least they can claim it had zero -- they've had zero slippage. And that's a bit sad because -- well, I moved the market 10% but I nailed the index. You go yeah, because you push the index up 10%. It's going to be flipped around because, well that's not good for investors. Like, just printing it up there just because you matched your index isn't a great idea. So, yeah, absolutely. I think as we've seen some very large funds grow, I can only imagine that we're going to see more pressure on funds to have more innovative ways to do this. We have a different way. Hopefully that evolution is going to continue.

Other VIX Opportunities

Adam: 01:09:52

What are some of the other maybe VIX product opportunities out there, do you think? Stuart, is there anything on your radar that you might want to work on next?

Stuart:	01:10:03	Yeah. I mean, I think there are a few. I'm saying there's one that I like but I don't think it would be commercially worth building. And there's a midterm, short VIX midterm product that was managed by a large bank that was retired, which we were talking about that the potential returns from holding it, it's not particularly volatile. It does need to be managed and monitored, but it's quite an interesting product. I love it, I think it's a fantastic product. I'd have it in my own PA accounts kind of thing. It's a great product, but it just doesn't inspire enough people. So, you're stuck in this -- it's like well, we could create it, launch it and then lose money on it every year. But it's a great product. So …
Adam:	01:11:04	No hidden messages here with the ETF being referred to here. Yeah.
Stuart:	01:11:10	Yeah. So, yeah, I mean, I think there are spaces and I think, watch what we bring next. We've got about three more ETFs to bring to market this year. And they are innovative ways of doing stuff that I think the market wants. So, it should be a truly exciting year.
Rodrigo:	01:11:37	Awesome. I think it's going to be a volatile decade so it should be a fun ride.
Mike:	01:11:43	Inflation volatility, the inflation of volatility, volatility inflation, I don't know. It all gets so confusing. All right, well. Here we go. Let's get a VIX on the old Bitcoin cycle.
Stuart:	01:11:57	Yeah. And I think people have done -- have created the indexes and there's been work done out there. I think that one will be a challenge for the regulator. Can you imagine?
Mike:	01:12:07	I'm in line for that one. Give me, that's a humdinger. Give me the crypto index …
Stuart:	01:12:13	Two times Bitcoin vol.
Adam:	01:12:18	We need a Bitcoin Oklahoma hedge, right?
Mike:	01:12:20	All the legs are long. I love it. Well on that, guys it's been sort of an hour and a quarter. Shall we leave it there?
Adam:	01:12:36	Yeah, I think we covered a lot of ground.
Mike:	01:12:38	We sure did. Stuart's been -- thank you. You've been amazing, the insights …
Stuart:	01:12:42	Thank you for having me. I mean, you're talking about my favorite subject. I'm a pretty boring person. Let's talk about vol and ETNs.
Adam:	01:12:50	I have not found that, Stuart.

Rodrigo:	01:12:51	You know what? We actually have to get a studio on island so that we can do these in person rather than all be in our own separate bedrooms.
Stuart:	01:13:03	We could always hang out at one of the bars and set up a camera or something.
Rodrigo:	01:13:07	We'll do that next time.
Adam:	01:13:08	Instead of all being in separate bedrooms we can all be in one bedroom.
Mike:	01:13:13	Always thinking, always thinking. Queue the music Ani.
Adam:	01:13:19	Thank you.
Mike:	01:13:20	Oh. Wait, wait. Stuart, where can everybody find you?
Stuart:	01:13:23	Well, Invest In Vol, www.investinvol.com. But also Volatility Shares, www.volatilityshares.com.
Mike:	01:13:32	And any Twitter handles or stuff like that you've got as well that you post?
Stuart:	01:13:36	I'm VolatilityStu on Twitter. I must say though I'm not very active on Twitter, unfortunately, but maybe one day I'll become more.
Adam:	01:13:42	You're definitely a bit of a boring Twitter follower, I'll grant you that.
Stuart:	01:13:47	No, I used to tweet and then I realized the regulations and whatever around it were to -- I gave up.
Adam:	01:13:54	I hear you. Also, please Like and Share if you enjoyed this conversation. You know, the more you Like and Share, the easier it is for us to recruit great guests like Stuart. Speaking of great guests, next week we've got Rohan Grey on the show talking about Modern Monetary Theory. Rohan is in the halls of Washington shaping policy on the central bank digital currency proposals and has lots of say on Modern Monetary Theory and fiscal policy. Should be a great conversation as well. So, tune in next week at 04:00 PM Eastern.
Mike:	01:14:31	Beautiful. Now we can queue the music.