Mike: **00:01:01** All right. Well, welcome everybody.

Adam: **00:01:02** Okay, welcome.

Mike: **00:01:04** I see Rods got his frappuccino cappuccino ready to go. I've got my...

Rodrigo: **00:01:08** This is because we're supposed to be drinking no?

Mike: **00:01:11** I've got a Johnny Carson coffee. You'll notice that there is no steam coming out of that coffee cup.

Rob: **00:01:24** Look, I'm in a very strange in joke here. So maybe you can explain it to me afterwards.

Mike: **00:01:28** You didn't know Johnny Carson, his coffee cup. You always had a coffee cup. That thing was filled with whiskey every night. That's why there was never any steam out of the old coffee cup in the Johnny Carson Show.

Rob: **00:01:39** Oh, you learn something new every day.

Mike: **00:01:41** There you go.

Adam: **00:01:42** Okay, let's introduce our guest. Rob Carver welcome to ReSolve Riffs. Thanks so much for coming on. I note that you are broadcasting from your man shed. You had a great series where you showed pictures in stages as you as you went along. You built that on your own or at least had something meaningful to do with the construction of that, right?

Rob: **00:02:11** Yeah, so I built the base myself and the thing comes essentially as a load of pieces of wood that you have to hammer together. So I did all that and then I had to do all the finishing and the painting and all that stuff. So yeah, but probably two solid weeks of work I'd say. For someone who was competent it would have been a week, but for me it was two weeks. Also doing everything by yourself, it's recommends two people.

Rodrigo: **00:02:39** Is it like an IKEA shed where you get the parts and the assembly instructions.

Rob: **00:02:46** It's similar-ish, except it's not from IKEA and you don't end up with like 78 little screws left at the end and you've no idea where the hell they go. Fortunately, I didn't have it in that situation.

Adam: **00:02:58** But it's great at night, you showed the view and you look out and onto this garden, this bucolic scene which I'm sure is inspirational and calming as you're sitting coding and riding your makeshift Peloton in the background.

Rob: **00:03:15** Yeah, it's quite nice. The only downside is we have a lot of squirrels in our garden. And I'm deep into a function trying to debug it and like really

concentrating hard and then this little rascal will run across my roof and it sounds like someone playing the drums. So that's the only distraction. I realized this is like a real first world problem now, because a lot of people over the last year or so obviously working from home brings massive distractions, but I'm fortunate that I built this in the summer of 2019. So when it came to last year and I found suddenly that my children were home the entire time. There's a good 150 feet between me and them at all times. So now they're back at school it's less of a problem. But it's only last year that having this little refuge was very nice for me.

Adam: **00:04:06** Life saving.

Rob: **00:04:06** Probably life saving for them as well, to be honest.

Mike: **00:04:10** Yes, agreed.

Mike: **00:04:14** So, before we start, like, just everybody realizes is for entertainment purposes. So take neither any construction advice, nor any investment advice from any scallywags on this call. And just leave it at that. But go ahead.

Adam: **00:04:33** Yeah, I just wanted to introduce Rob, or maybe Rob you can give us a little bit of your backstory. I always find it funny bringing guests onto this show who are much better known than we are and then assuming that people don't know the guests and someone else, but I do think it's useful for you to give us a little bit of your backstory and then I want to talk about your books, specifically *Smart Portfolios* and *Systematic Trading*. We may get into *Leveraged Trading* a little later on, but yeah, maybe just your career trajectory to get us started.

Backgrounder

Rob: **00:05:07** I'm not sure I'm better known than you guys. If I am that's a serious crime because your output's extremely good and I think it's generally accepted that most people who are trying to sell a fund and also putting out research, that the quality of the research is not very good at all, because it's often purely a sales exercise, and I'm not gonna name names. But it's fair to say that that you guys are in a very small group of people who are trying to sell the product but also putting out research, however that's extremely high quality. But anyway, enough mutual appreciation, I'm sure people didn't sign up for that.

Adam: **00:05:45** Did you say mutual information? Well, we're really getting into it.

Rob: **00:05:50** Okay, where was I? Oh, yeah, so me. Okay, I've been trading probably over 20 years now. Professionally, I started trading on the sell side for an investment bank in 2002. I did a couple of years with them trading exotic

interest rate derivatives and then I spent a couple of years in economic research, and then I got a job with AHL, which is a large, systematic quantum CTA based in London. I did a couple of things for them. I started off with a new product which was basically a systematic global tactical asset allocation type product, which is very different from what they are known for, which is trend following mainly. So did that for a few years and then there was a business restructuring and I was promoted I guess, a bit up and a bit sideways, so diagonally to be head of fixed income. So that was running all the fixed income risk, bond futures, interest rate futures, interest rate swaps, credit default swaps, mortgage bonds, you name it, all that stuff.

I did that till 2013 and then decided I had enough of working for other people and I was in a fortunate position where I didn't have to anymore, so I left them and the last few years I've done various things. So as you've said, I've written a few books, three books. Two basically on trading, one on investing, although there is a bit of investing stuff in the trading books as well. All about doing things systematically. So using systems, using methodologies. So, none of this looking at charts or looking for inverted Vipers or any of this stuff or any of this stuff, purely rules based…

Adam: **00:07:40** Following camels.

Rob: **00:07:41** Following camels of course, yeah. So none of that stuff, but stuff that the way I like to describe it, it can be coded up and doesn't necessarily have to be coded up. And in fact, my long only portfolio is run using rules, but not without any automation. I just do the trading manually myself, and it's quite low frequency so that's, that's fine. I probably trade that once a month. And then I've got a systematic futures portfolio, that's a pure fully automated kind of, that trades just futures. I obviously do my own trading although mostly I'm not trading, mostly I'm writing code or doing research and all this stuff that leads to ultimately the computer doing the trading for me, mostly apart from this, and I want them once a month rebalancing exercise. I do a bit of teaching at University, as we were talking about, I did a lecture this morning which is why I'm dressed relatively smartly for me. My normal pandemic work wear is obviously a lot more casual like most people. So that's what I've been doing for the last few years.

Adam: **00:08:53** That's fantastic. Actually, if you'll indulge me, I'd love to get a sense for when you arrived at the conclusion that systematic thinking was the right approach to markets. Because I think I certainly came to markets with very much a discretionary view and I tried to be figuring out the macro dynamics and trading off those themes. And it took a couple of frying pans to the face before I realized that systematic thinking was really the only coherent approach to complex systems. But how did you walk that journey?

Rob: **00:09:37** Yeah, it's a weird one because my first exposure to the industry was when I was still at university, and in my penultimate year of summer I did an internship actually at AHL, although I didn't subsequently go on working for them after I graduated, which is another story entirely. So that was my first exposure to the systematic industry. That was actually my first job effectively in finance, completely in finance although I had done a bit of PA trading before that, with a very small amount of capital that I had as a poor university student. So that was my first exposure too, and that that seemed like a very logical way of doing things, and at the same time I read a book by a guy called Thomas Bass called *The Predictors*, I don't know if you've come across it. I've mentioned it a couple of times in interviews before and I'm surprised by how few people have come across this book, but it's probably, it's a nonfiction book and it's a book about a hedge fund called *The Prediction Company* which was subsequently bought by O'Connor and then by UBS, run by Doyne Farmer and some other people, he's most famous, he's one of the leaders into the chaos theory and he is now teaching at Oxford actually. But I read that book and it was a very well written book and very interesting and it made it sound like a kind of, I don't know, it's something about when you're trying systematically, it's more structured and rigorous, but it's somehow cooler to someone like me anyway and more fun, because the kind of thinking that you're doing is completely different from the thinking you're doing when you're making trading decisions.

So when I was working in a bank I did not enjoy that at all. I was working actually in a relatively difficult part of the bank in terms of the fact that we were just buying and selling say Spot FX, we were pricing complex derivatives. So it's quite a mentally challenging job, but it was an intellectually stimulating job. So it was like, the best description I've given is that imagine that you've been told to solve Sudoku puzzles while 12 fat guys are yelling at you. To me, that's what working on a trading floor was like. And some of them weren't fat actually, but physically intimidating people. So I had this brief exposure to this really nice interesting fun industry courses when in trading, and I had two years of hell in an investment bank doing the discretionary trading. And then a couple years later, I got back into systematic trading and it was just at this point, I was, I guess, how I was, I was probably like 30 years old or something like that. 32, I think I was 32 years old and it was just like, I felt like fire coming home. It's like this is the industry, is all what I want to do, this suits my skill set. I can not understand why most people choose to trade within a discretionary fashion. Because it's something that's superficially appealing and interesting and cooler.

And let's face it, no one's going to make any films about people working, doing our job. You can't really see you're like, I don't know, Tom Cruise,

like leaning over a computer and going in that Tom Cruise voice like *guys, I think the algo is broken.* There's no drama there, there really isn't? It's not sexy, it's not cool, it's not interesting. But to me, it's actually, it is cool, it is interesting, and it's sexy. It's intellectually interesting. So for me, it wasn't one of the, you sometimes hear of people who start trading in a discretionary fashion and gradually come to realize that systematic is better. And I guess Adam that's maybe your story. You hear that a lot. But for me, it was more a case of actually, it was just a blinding on the obvious, this is the way you should do it. Now, the more interesting thing actually is, while I was working at AHL, if you look at my personal account trading which obviously was limited by compliance restrictions and that stuff, it was extraordinarily unsystematic. My individual personal portfolio was a complete mess. And that's because I had two problems. Firstly, I didn't really have time to think about that, I was worried about my day job which was obviously more important. But also I was exposed to this constant flow of market news and ideas and I'd be like, oh, well, this stuff on the street about this stock, or buy some of that, or some of this or some of that.

So I actually probably ended up massively over trading my own personal portfolio, and it wasn't until I actually retired I sat down, looked at the spreadsheet with something like 120 tickers on it and actually then began to piece together a way of trading this systematically, using ironically all the skills and knowledge I already had from my day job.

Rodrigo: **00:14:42** So that's an interesting backstory. When you talked about the 25 traders yelling at you while trying to do the Sudoku method, you mentioned that you didn't quite like that even though it is, I would imagine it's more like the mathematical problem is a solvable problem but you have a lot of emotions involved in the trading of that to the market. Is that what you disliked about it? The fact that it was emotional?

Rob: **00:15:09** There wasn't really time to think. It was the ironic, you had to think a certain way and do a certain thing which is better to think very quickly under pressure to solve problems that were sometimes quite complex. Often, the thing I actually found fun was the fact that you got 10 minutes to price this trade, there's no way, it's a new trade, we never priced it before, there is no way you can get a quant to go in a room for six months and come out and then with a French accent because all the quants we employed with French, say well this is the most elegant perfect optimal solution with all the factors considered, you had 10 minutes or more you could really generally do was glue together two different spreadsheets and price something that was probably 99% correct. And behind the hope that you hadn't missed something that would end up blowing up the bank because of some unforeseen risks.

So actually, I found that quite fun. But it wasn't really giving you time to actually think deeply about, I didn't feel I was actually developing any

trading skills really to be honest with you. Because there wasn't the time to actually think about the markets. Think at a more strategic level. It just wasn't there at all. So yeah, this is the thing, everyone, the ironic thing is a lot of people want to work on trading floors and investment banks. I mean, maybe not so much now, it's not such an attractive job but certainly 20 years ago it was a job that 30% of my graduating class wanted to do. And I was the guy doing it and I actually hated it.

Rodrigo: **00:16:41** And now that you're trading your PA account and systematize it, is all the emotion gone? Or are you still doing it? Are you still feeling the feeling?

Mike: **00:16:49** Okay, that comment deserves sharing. Keanu Reeves isn't going to star in *The Covariance Matrix*?

Adam: **00:17:04** Ani, you're not gonna show that comment, come on.

Mike: **00:17:06** I'm sorry to interrupt the flow.

Rob: **00:17:10** No, that's fine. Actually, if only Hollywood producers are watching this YouTube channel, I'm sure there are probably a couple. There is a very good book by called *The Fear Index*, which is actually about a guy who works in a systematic fund unbelievably, and it actually is a very good book, it's a real thriller, exciting thriller. And so there is a film there potentially in that book if someone wants to make that and I am available as a script consultant. At my normal rates, of course.

Adam: **00:17:40** I do, but you as the leading man?

Emotion and Trading

Rob: **00:17:45** Yeah, perhaps no, I don't think it'll be as marketable. I still think maybe Tom Cruise or Keanu Reeves would do better. Back to your question which I haven't forgotten. Emotion and trading, it's still true actually. Even yesterday, I was rebalancing my portfolio and I actually made a mistake. So a couple of days ago I bought too much of a particular fund and I was still, because it's just after the end of the UK tax year, so I have to do a bit more rebalancing than normal. And I went and looked at our books. What's this, I really ought to sell this down and then put it into the fund that we're supposed to go in to begin with, and I've got some other stuff to do as well. So it wasn't like correcting one mistake. And I looked at that and the price of the of the ETF had dropped by like two cents, as a percentage of my net worth is insignificant. Could I pull the trigger? Could I take that few 100 pounds which also actually in a way is a good thing, because it's a taxable account. So it's a tax loss. So actually, it wasn't that bad. And I was actually like, it was about half an hour and me sitting there going, I feel it'll go up. Maybe it'll just go up a little bit and I'll be able to close it and after half an hour. I got a coffee one of my own books, I beat myself over the head with

it until I saw sensible, pull the trigger, close the trade, took a tiny loss, did the rebalance correctly. But even I after all these years, still the emotion's still there.

Adam: **00:19:20** I thought your thread looked a little flatter today.

Mike: **00:19:26** Yeah, it's a common thread. Go ahead.

Rodrigo: **00:19:27** Pulling on that thread just one more time. I know there's a chapter in your book where you talk about having thought systematically about purchasing stocks when you're in a panic, and you talk specifically about OAO, I would love to hear that story again and share it with the audience and then the follow up to that is how'd you do in the COVID crisis?

Rob: **00:19:50** So the story is basically that it was actually Q109, and it felt to me like we were at the bottom. And I thought, well, where is the best place to put my money in the UK banking shares, because they've been just massively beaten down, as you would expect in a debt and leverage crisis, of course. And also, I like understand banks as a business, and I can read their balance sheets and stuff whereas if you were to ask me to do that with an insurance company I would struggle. So I thought, I'll buy shares in a few banks, the biggest share would have been in Barclays because I felt that was in the best position, and as it turned out they raised money privately rather from the government so that subsequently was obviously the case.

So the point that was made here is, it was a discretionary trading decision but actually, it was a good one. The problem is that when it actually came to pulling the trigger, I panicked. And my timing was perfect, I probably was within like 3% of the bottom, something like that. I bought that the moment some really bad GDP numbers have come out in the UK, just astonishingly bad GDP numbers, and the market tanked as a whole, the banking shift sold off. I thought, well, this is not new news, this doesn't change my thesis, I'm going to actually go ahead and buy these things I just could not force myself to buy in the size of trade that I'd originally intended to trade, I just cut everything by 90%. And I bought 1/10 of the position I intended to take. And yeah, those shares probably went up by some like 350% in six months.

So the reason I include that in my book is to show that even if you make good trading decisions, and I'm not by any means am I someone who makes those kinds of decisions all the time, absolutely not. You still need some system in place to manage your risk, manage your position size. Doesn't matter if you're some genius trader, I still believe that that is where you should use systems. But most people probably should use systems for everything including deciding when to buy and sell but if you do, if you do think you can make those discretionary calls, you should still use it, have a system in place to size them.

Mike: **00:22:10**

So that's a really good point and a point that I think is something that we could talk about a bit more, Jason … has a wonderful framework, a four legged chair, if you will where you're harnessing beta and then you've got some prediction that you might want to do some tilts. And you've got a bit of a protection side if you want to do some tail hedging and then lastly, there's opportunistic. And this weird opportunistic bucket is really quite hard because opportunistic can be as you encountered a particular situation where you had a fairly high degree of confidence that in fact, there's a number of things that the models are actually not aware of. Your models only, no inputs to the models are and you as a PM are overseeing your own portfolio do have a wider, more pervasive view of the horizon. So I mean, can we delve into how you do that either with a particular sector that looks particularly good. I mean, this was a banking sector in the middle of a crisis, great, you could look at tobacco stocks in 1999, you could look at uranium stocks today after a decade of just being absolutely obliterated. Like, how do you work that in?

Rob: **00:23:34**

There's different ways of doing it and actually. I think another paradigm that's quite nice and is often people say, with your financial advisors say, you should reserve 5% of your money for just gambling. So for me, I think it's okay to say right, most of my money is going to be run in this very structured and rigorous way. For most people, that probably means a diversified portfolio of passive ETFs. And if you've got enough money, maybe some stocks and maybe you want to go beyond them that in into tactical asset allocation and momentum stuff, that'll be fine. But the point is our human instinct. Firstly, for two things. Firstly, it's a human instinct to have a bit of fun and to be interested in things. And I said earlier, when I was working in the industry, there's this constant stream of ideas and stuff coming in. So effectively, my entire portfolio consisted of this discretionary fund interesting stuff. I wouldn't even go as far as to call opportunistic, that's dignifying it with a name it does not deserve. That implies a level of skill and rigor that was not there with the possible exception of the trade we just talked about.

So I think that it makes a lot of sense to say actually, most of the time I'm going to run my money in this particular way but I'm going to reserve a certain proportion of my risk capital for things that just come up, and they may be things that are outright gambles in which case, you should probably be quite a small amount of money, maybe 5%, maybe 1%, whatever your risk capital is, whatever you can afford to lose, it should be money you can afford to lose and there's a link here between that and the Nassim Taleb *barbell idea* isn't there, where you preserve a proportion of your money for out of the money options you think cheap effectively. And then it could also be opportunities, things that could come up. And that depends very much firstly on how much interest and time you're willing to spend on that as a bucket.

So it might be that you just keep 5% of your risk capital aside and every year or so something comes up. Or it might be that you're spending more time on this, and actually, it's a quarter of your risk capital, that's fine. But the main point is, firstly, it should be a strict per portion of risk capital, you shouldn't just suddenly sell everything and go and buy GameStop because, that's the fun idea that's crossed your desk today. And the second thing is that even within that special bucket you should still be applying some system in terms of risk management, position management.

Mike: **00:26:13** So, allocate a particular portion, step one, you've got an opportunistic bucket, you're stating that explicitly, you put a percentage aside that you're comfortable with, I suppose you'd also be able to rebalance that so you're balanced between opportunistic and the other systematic buckets that you might have.

Rob: **00:26:34** Yeah, I mean, it might not be a fixed percentage. So actually, let me go back to the unanswered question about COVID. Because actually, that's a really good example. Because with COVID, it wasn't so much the case that I had all, that I've got 10% my capital here, I'm going to pull down to a COVID specific trade. What it was, was actually I have my normal portfolio rebalancing process. But I wanted on top of that, pulling the lever mainly between equities and bonds, although also in between individually within asset classes as well, I wanted to override that to some extent to reflect the fact that I had basically had an opinion on the likely shape of market movements. So my main input into my long only asset allocation bonds equities is a 12 month momentum signal. I knew that would be way too slow to reflect what I could actually see happening, coming in at me 100 miles an hour. So the way I described my discretionary trading ability is, every 10 years, and this has happened twice. So it's probably not statistically significant. But maybe every 10 years if there's something really big happening, I seem to have twice now been able to catch the top and the bottom of that. Actually, three times if you count the tech boom in 2000, although actually I had no money then to trade with so. I couldn't commit to that decision.

So what I did last year was in February, I started pulling the handle on basically reducing my risk, reallocating from risky assets, like equities towards US Treasuries. And doing that in advance of my tactical asset allocation model. So let's say, my tactical assest allocation model was going from an 80-20 portfolio, and was gradually moving down, I was accelerating that, but within limits, so I wasn't just, oh my god, the world is going to end, and I'm going to sell all my stocks now, I didn't do that. I set myself a limit. So it wasn't a proportion of my capital, that was my opportunistic bucket. It was a proportion of my risk allocation decision. And then on March the 23rd, I had this really strong feeling that we were going to go back up again, that we were at the bottom, I think I was one day out. So again, I then switched the risk back into equities. And again,

this was going against what my model would have wanted to do because my model was using 12 month momentum that was still showing a completely different signal. But again, I didn't pull the handle and go from zero to 100 in one day. It was a gradual relocation, but it was just it was just speeding up what the model would have done anyway.

So it was it was essentially taking some of my system, taking that away from the system, allocating that discretionary risk management decision, but basically otherwise following all the rules on my system. And the difference between that and '09 was, I felt very confident in what I was doing, because I was doing it in a size that I knew that the worst case scenario is was if I complete make completely the wrong decision was it wasn't going to be the end of the world. I'd underperform what my system would have done anyway if I'd made the wrong decision, but it wouldn't have been dramatic. Conversely, of course, I didn't end up making a lot extra so I probably made an extra 2% last year from that little discretion allocation based on my whole portfolio size, which is better than a kick in the teeth. But it could have been a 2% loss, which I would have been okay with.

Mike: **00:30:20** Right. And it reflects the humility of you're making decisions overlaying your model that are probabilistic, not deterministic, where the world's going to end or the world's going to be okay. So I'm switching 100% back and forth but it's a bit of a dimmer switch, maybe overlay where you're saying I'm going to impart some of my experience expertise and judgment, through the execution of my models, probably would make sense to have a bit of a checklist, I'll bet you that that checklist for you it's in your bones because you have so much experience with respect to some expertise in judgment and having done these calculations so many times, you're very aware of where your models will have some blind spots. Is there any obvious check list points that you go through mentally in your head when you see these opportunities that allow you to come to these conclusions? Or is that?

Rob: **00:31:15** Again, I feel like I'm dressing up two lucky strikes as a...

Mike: **00:31:24** Of course, it's going to go wrong at some point. But if you … more than three times.

Rob: **00:31:30** Yeah, this is something that's so rare for me that I don't fully feel like I can tell you yes, these are the factors I looked at when making this decision, I mean, my reputation is ruined after this podcast.

Mike: **0:31:44** All intuition.

Intuition and Systems

Rob: **00:31:45**

Yeah, this particular decision was literally intuition, I could tell you the things I was looking at, but it was the same thing everybody else looking at? What made me decide that the price was going to go from on the 23rd of March whenever it was, and you can check Twitter, I did tweet and say, *this is the bottom in my opinion.* What specific thing was that I was looking at and I even think this is the bottom like I couldn't tell you, honestly couldn't tell you. And I think the main lesson from this story isn't that Rob is some genius picker of market tops and bottoms and this is the secret checklist that he uses to pick them, it's actually sometimes your intuition can be a powerful thing, but you've got to use it within the confines of a system. And if you do that, that means that you can make a decision knowing that your downside is limited to a degree you're comfortable with if you're wrong. And that is the main difference for me between '09 and 2020.

Mike: **00:32:40**

Just to save your reputation a little bit like you've put in huge guardrails around your intuition. So I think that that's well said. A lot of people should take away from that much more systematic and very small intuition with a very high confidence in your intuition which leads to a very small adjustment in the systematic portfolio. So I think that's a great point. Sorry, Adam. Over to you.

Adam: **00:33:10**

No, all good. I just was wondering if Rob, because you did work in the OPM industry for many years. And so I'm just wondering if you could comment on the intuitive or opportunistic decision making process through the prism of institutional fund management. Like, if you're in let's not use AHL because you worked there, but if you're a large systematic institution and having worked at those institutions, what did you observe in terms of that type of decision making and what is your general thinking on the responsibility of the portfolio manager to be able to observe that there are things happening that the systems aren't aware of, but also operate within the limits of the offering memorandum and those types of things? Any thoughts there?

Rob: **00:34:06**

Yeah, it's a good point. Because what I just did, if I'd done that I would have been fired. The discretionary levers that you would be pulling would be more things like how much should we allocate to this model? Should we turn this model on or off? Should we trade this market, in what size? A lot of those decisions will have quantitative underpinnings, but at the end of the day, it's often a human decision to actually call the final numbers and I think, actually, this is where potentially it's more difficult in the institutional environment because there's a whole different set of pressures with other people's money that you don't have with your own. And things like for example, year ends take on an importance that they don't really have for me. So wanting to get a good calendar year performance. Certainly, and this is, well, not giving any secrets. When I was working in an investment bank, if we were working on calendar years, and

if it got to November and you'd had a good year, you took no risk. I mean, you basically like hedged everything, like just completely hedged everything and if a client came along, you try to win no client business at all, that would result in you taking any risk, because you've made your budget plus 5%, that you're going to get paid. There's only downside from there, you just you just sit on that.

And even in a systematic business, there is potentially the pressure there because your obviously year end numbers are in the report and there are things like awards which rightly or wrongly have some currency as well and they are often based on calendar year performance. So, that would potentially be the temptation to reduce risk towards year end, potentially. And there are ways you can do that without actually, you can do it by... you could do that potentially and you're in that big grey area between fully sourced for systematic and never touching anything and fully discretionary. And there is a big grey area there. And I think it's misleading to pretend that PMs don't have a degree of discretionary control, they can't control the position size, they can't do what I just did with my own money, but they can control a lot of levers, that result, can result in things happening that wouldn't have otherwise been the case.

So I will tell you a story about somebody I know. And they were working in a fund and I won't reveal the fund or the person's name, or the name of the person they were speaking to, but basically they had a position on and someone came over and them having conversation about this position. And this person said, I think you should cut the risk on that position and the guy said well, that's reasonable to what level? And the guy said, until it's a short. Now to me, that's crossing the line, it's one thing to say, this model doesn't know about a particular risk, therefore this position is too big, we should reduce the size of this position. The moment you're changing the sign of the position you've moved from risk management to basically discretionary trading it through the back door. So there's a clear line for me, but before that there's probably a big grey area.

Now, the other thing is that it's very difficult if, let's say something's coming and everyone knows it's, let's take an example, let's take the US election last year, or Brexit. So there's some big event in the calendar that's coming. Now, if you take no action, you don't make any overrides to your system at all, you just let the system do its thing, which is the pure thing you should do, and you'll then lose money. Your clients are going to come back to you and say you had a fiduciary duty to look after my money, it was clear as this was going to happen. You shouldn't have let this happen. Now, for me, that's like, well hang on a second, you're basically paying us to put money into a system. That means we shouldn't be doing this. Now, of course, if our fund made money through Brexit, no one would have been complaining, everyone would have been happy and we'd be patted on the back and we get we get awards and stuff. So there's that level of pressure

as well. And even if clients don't say that to you, I think there's always that feeling in the back of your head. And perhaps this should be fitting in the back of your head, that this is somebody else's money and you're going to be more risk averse potentially. And I don't mean just in terms of purely like economic utility of like choosing where your risk tolerance should be. I mean, your behavior will be more risk averse than if it was your potential your own money and you didn't have that extra set of pressures.

Mike: **00:38:46** Explaining to somebody else is always a challenging dimension.

Adam: **00:38:52** And I think also the fund management industry positions your role as, you write an offering memorandum. And your responsibility is to execute on what you set out in the offering memorandum. But from the investors' perspective, while they technically bought a strategy that is described in the offering memorandum, the implicit purchase is I want you to make me money. So it's not, I want you to run this strategy. It's, I want you to use your expertise to my benefit. So there's an implicit conflict, an agency conflict that is actually explicitly set out in the regulations of the investment business that I think is not widely recognized or discussed.

Rob: **00:39:45** And it's different from say the relationship saying a bank working on a trading desk because if you're working on a trading desk in a bank, and you say make unexpected profits, you're going to be called up, like they're going to be saying, what the hell are you doing? You've exceeded your risk limits. Then they've begun that's because there's a much more, well firstly, the contractual relationship is stronger obviously because they're paying you and so on. They have a lot of control or visibility over what you're doing but also because there is that mutual understanding of why you're there, and it's a very clear relationship. I agree. I think with the fund management thing, it's much more difficult. It's like, do this but don't lose money. Okay, well, what if those things are in conflict? And they sometimes are. What do I do? I can't predict the future. I don't know whether, where's the right, which option I should choose. And I'm always going to be taking a risk that I will lose you money if I do exactly what I should be doing. So yeah, I'm in complete agreement with that.

Mike: **00:40:44** That reminds me of Ted's comment of be the same but different. Ted Seides was on last week *at Capital Allocators* and one of the quotes from one of the portfolio managers is *clients want us to be the same but different.*

Rob: **00:40:58** Yeah. Don't drift out of your style bucket, but make more money than the other guys.

Rodrigo: **00:41:03** Yeah. So Rob, there was one thing you mentioned on the discretionary side for systematic managers and that was that a lot of the decisions are made on whether a system should be turned on or off, or a market should be

taken off the roster or on the roster. I'm curious to know what that means from a discretionary perspective. Do they use data on it or do they? Is it more like gut based from an investment community perspective? Because I've seen it in BlackRock, I've seen it at AHL, at least I've heard stories about all that. Curious to know what you've experienced.

Rob: **00:41:34** I mean, my opinion is, if you're working in a systematic business and you're making a decision and you're having to make qualitative judgments, you need to systematize that. You should not be making so in a good in a good shop, and I'm probably allowed to say this, AHL I think is one of the better shops in this respect. The first time you make a decision, it might be very qualitative. But if that's the decision you're going to have to make again, you should probably systematize it. And I'll give you an example. We were very worried in 2011 about interest rates getting very low. How naïve we were? We were particularly worried about this weird phenomenon in kind of obscure parts of Europe like Switzerland where interest rates actually were getting very close to zero and possibly even negative. And we thought, well, how this this clearly is negative interest rates. What is this magical mystery where this makes no sense. Again, how naive we were.

But the first, we had to make a judgment about whether to stop trading. I think it was the Euro/Swiss LIBOR Future, which was approaching a price of 100, which meant the rate was about to go below zero. So we were like, we had this kind of long discussions and in the end actually, I built a model basically which automatically reduced our position as interest rates approached zero in a particular market. And we had long debates about whether where that threshold should be, whether it should be different for each market, because obviously in Japan they've had very low interest rates for much longer periods than inside the US. I decided that it should be kind of fixed for all countries which is simpler as well as avoiding overfitting and actually in retrospect, was the right decision because we've seen interest rates come down in the US as well to historically low levels.

But then that was, the important point here is that was now a system. It wasn't necessarily a piece of code, we didn't have to systematize it in that way, but it meant that if anyone had any discussion about whether we should turn a market off or reduce a position because of interest rate, with interest rates being very low, then we would say, well, we have this procedure in place. So if a client asked about it, we say we have this procedure in place, we have a system in place. So it's no longer, you'd know and we've got a load of guys sitting around a table trying to make a discretionary decision which could be subject to biases and so on and so forth. So you try and systematize it. So, I can think of many other examples of for example, markets where volatility got very low, which has a couple of effects firstly means your leverage increases because we're volatility sizing our positions. Secondly, means generally trading costs increase because the market's getting less volatile but the tick size is not getting any

smaller so you're still paying the same spread, risk adjusted that spread is now much bigger, so it's a more costly market to trade. So you'd want to get out of those markets.

Again, the first time we had big kind of decisions about it, then we put in place a system saying the moment the volatility drops below this point, then we start cutting our position and we wait for it to go up to this level before we put it back in again. So that's how you can do it. I mean, obviously, they're always going to be decisions coming up that are non-systematic and they often relate to things that are not necessarily very market specific. Things like credit risk, maybe there's a market you can only trade with one …, we have this issue. There was a market we could only trade through MF Global. There were rumours on the street that MF Global we're in trouble. Mr. Corzine was getting a bit handy with the gambling chips on the casino table. So we had to stop trading that market. And that was that was another quantitative decision that was purely like, this is a very specific business risk, because these guys are going down.

Rodrigo: **00:45:19** That's a great answer. Thank you.

Mike: **00:45:22** Amazing, really. Lots of fantastic insights there.

Adam: **00:45:27** Totally. I was wondering how much of the thinking that informs your strategies today was pulled very directly from the general framework that you were using at AHL. Sort of, if that's a harder question to answer for disclosure reasons, then maybe how has your thinking evolved since leaving AHL? And what sort of thinking are you applying today that maybe you weren't applying back then and do you have a framework for how to think about how your thinking should evolve over time in a way that reduces the amount of bias that you're bringing to the table?

Reducing Bias and Forecasts

Rob: **00:46:24** Yeah, in terms of my actual pure trading system, my futures trading system is not dissimilar from what I AHL we're running certainly when I left. The main differences are, there's no kind of proprietary signals or stuff that is very well known on the street, pretty much. The long only stuff is obviously quite different in one respect, and obviously it's long only so you're just a different kind of setup. The commonalities are obviously around the idea for making forecasts. I think one thing that is in my system that a lot of people really find surprising is this idea of forecasts, a risk adjusted forecast of return future returns, which is something that's very much straight out of the AHL system and embrace similar CTAs. So the idea is that you don't just take binary long short positions, you're continuously adjusting your positions depending on how strong a trend or a carry signal is.

And the advantage of doing it that way is it means you can use the same kind of thinking in a long only system as well. So that's how I do my asset allocation example long short, we were talking about earlier, when I'm not ignoring it of course, because of COVID. So the kind of basic kind of theoretical building blocks are things that I guess you could say I learned that AHL rather than, say they're direct copies. I think the main differences that I've tried to become much more rigorous in thinking about things like I guess uncertainty, in terms of back tests and so on and so forth. So interestingly when I decided to leave AHL the kind of conversation was well, can you hang around for a bit as a bit of a handover, but on the other hand there's not really anything for you to do. So obviously, there's a handover that takes time, you want clients to be handed over and make sure the clients are happy and make it clear this is a sort of very planned and gradual transition and make sure it's all nice and smooth. But actually, in terms of what you're actually going to do, what do you want to do?

So I came up with this project that was basically about doing conditional fitting. So normally, when we fit our models, we look at all of history and trade it all equally. But one big question that was still around in 2013 was actually how will CTAs do when interest rates rise? Because a lot of the historic CTA performance has been in bonds, and actually just being long bond futures, long interest rate futures was a one way back. And a lot of the kind of raw Sharpe ratio was basically coming from the fact that there was an asset that was going up, we were long it and that that was that was all there was to it. What happens when that asset starts going down? Can you or should you fit your systems differently? And I think, Adam actually last time we spoke, I did a blog article that basically did a similar kind of piece of research and we talked about that a bit. So I won't go into too much detail about it.

But the key point about this project was it really brought home to me how when people made very confident statements like, obviously if interest rates are going to rise, then trading fixed income with momentum is going to do badly. You should be doing something else instead. If you actually look to the data, it was so much uncertainty around say, let's fit a model that works when interest rates are falling. Let's invent another model when interest rates are rising. Yeah, there was a difference between them and there were the patterns you would expect, but they weren't that different. And they weren't that different, because there was still so much uncertainty there, that these very confident predictions people were making were wrong. So what's always amused me is that people in the systematic industry, including myself, many times, spend most of their lives working with statistics and data and having a much better understanding of statistical uncertainty than the average person, will then very seldom effectively make a point forecast and say, I'm 100% confident that you should turn off this model, because interest rates are going to rise, for example.

So I think the main difference in my thinking, and I think this has been helped a lot by the fact that I dare to say, I don't have to speak to clients anymore. And I don't have to deal with that pressure, the OPM pressure that we've been talking about, it's allowed me to think much more clearly and honestly about how little I know, and to build everything around my systems to reflect that. So, simple example is that if you're using something like say 12 month momentum to allocate between equities and bonds, to tilt your allocation away from strategic allocation of say 60-40, and there are people out there who've written books saying you should go zero to 100 and back again, not naming any names. But if you actually look at the amount of confidence and uncertainty that that momentum signal gives you, it's nowhere near enough that you should be going from zero to 100. You might be going at a push to be going from 60-40 to going to 40-60 or 80-20 but no further. And that's a really simple example of how you should bring that uncertainty of, I call it the uncertainty of the past, everyone worries about the uncertainty in the future but actually, there's a lot of uncertainty in the past, because we measure things and we measure parameters and we test things.

But actually, you do simple exercises, like Monte Carlo's and more sophisticated things. And you can see there's actually a huge amount of uncertainty in terms of what happened in the past. And you should use that otherwise, why are we here as systematic investors and systematic traders, of course you should use that information. But you've got to understand the limits of it and how far you can actually push yourself towards doing something very dramatic, bearing like turning off a model or like pushing your equity allocation to 100%. Bearing in mind that not the future is uncertain with that's a given. But the past is also uncertain as well. And the COVID trade is a perfect example of that because I made 2% ,on what was basically absolutely perfect, almost perfect market call, I think I was two weeks late on the sale and I was one day early on the buy. And it made a difference to 2% of my portfolio because the amount of things I changed, reflected the fact that I really had a lot of uncertainty about what's going to happen in the future, but I had a lot of uncertainty also about how confident I could be about the predictions I was making.

Adam: **00:53:22**

That resonates really deeply with the learning trajectory that we've all experienced, and if you want to get a sense of what this looks like at home, and you've got even some simple trading systems, and we've run some simple examples and I know you have to Rob, just try to for example, take five trend following systems. And every year based on the historical performance of the entire trading history up to that point, try to use any sort of statistical tools to determine which ones you should emphasize or deemphasize going forward. And you'll just see that it is almost impossible, right? There's at the at the extreme limits, very short term or very long term, you might be able to sort of identify where some of the soft boundaries might be on those, but you give up so much in diversification

by trying to concentrate in the right one and the information you have to make those decisions is just so weak, that the realization totally dominates the precision.

And I know you brought that to bear in your handcrafting process which we really like but I want to also dig into something because you kind of glossed over this in your last comments which were great, but this whole idea of fitting a model. Like say more about that because there's so much that goes into that, that actually has a lot of discretion in how you think about fitting models. So how do you think about? So let's say you've got, that you mentioned a 12 month momentum model or something or pick one doesn't really matter, but some sort of signal? How do you think about the model fitting process there?

Model Fitting

Rob: **00:55:22**

I mean, one thing that is interesting is that I think people have the impression that model fitting is something that should be automated. The whole kind of machine learning sort of drivers is that really you should just be able to press a button and the parameters come out of the bottom, and it's all good. And I'm very much against that. So one thing, the first thing to say I guess, is ideally, you should keep your model away from the data for as long as possible. So the moment you actually...there's the most tempting thing in the world is to, I've got a new idea, I've got some data, I'm going to test it and see if I've made money or not. That is literally the last thing you should do. Because the moment you've done that, you're going to be opening yourself up to what I call implicit fitting, which is basically where you've gone the count curve, it doesn't look good. You say, I won't do that?

Well, you basically made a fitting decision, but you're not made a fitting decision in a controlled way. You've done it in an uncontrolled way and it's an effectively an in sample thing. So you want to push that decision off as far into the future as possible. So the first thing I do actually is focus more on the behavior of the model rather than on the profitability. So I'll be looking at things like does this model capture the effect I want it to capture? Are the trading costs reasonable? Does the holding period reflect the sort of effect that I'm trying to capture? So for example, if I've got a model that's trading every day, but it's looking for six months trends, well, that suggests that some kind of smoothing would be in order before continuing. And what I will do is one of two things, what I can either if appropriate, I'll use data that's completely random to make those kinds of decisions and it may be not completely random but for example, I might actually create data that has trends in it, but six month trends up and down, plus some noise and it's completely unrealistic. But it can allow me to answer the question, well, does this capture six month trends? Because look, here's a six month trend. Is it capturing that trend? Yes or no?

So that's the basic thing, because it's very easy to construct something that doesn't do what you expect it to do. The other thing, if I can't do that, it's not always possible, I will use real data, but I will limit myself to a single market and I won't be looking at profitability, I will be looking at, I might take a five year snapshot of the single market and I'll just look at the buying and selling behavior, the holding period, and sort of make sure that that's doing what I expect it to do. Now then what I want to do is, once I'm happy with the models behavior, I then want to see whether it's any good or not, but I won't test the thing independently. I'll just drop it into basically a massive portfolio optimization with all the other signals I've got. And what that will do is it will then effectively allocate some risk capital to that model. And obviously, if it's a good model, then the risk capital will be high at the end of the back tested period. And if it's low, then obviously, it's a poor model. And if it's below a certain threshold there's not really any point implementing it. Because I'm in here, if you've got say, 50 models and average of 2% risk capital, well, if one of them ends up with point .01 percent because it's so shockingly poor, then there's no there's no point in implementing it and you're not going to be achieving anything, you just be writing code for the sake of it.

Now, the important thing is that that decision as to how much risk capital put into something, is not based on me looking at an account curve, it's based on a fitting process which is controlled and that means I can do two things. Firstly, I can make sure that it's robust and it's allowing for the amount of uncertainty in the data which, as I've talked about, that's much bigger than you think it is. And secondly, it can be a purely backward looking thing with no in sample information polluting it. Now, the reason I can do this is because my models are all structured effectively as linear weighted combinations. So, I've got lots of Lego building blocks, I combine them in linear weights using a robust portfolio optimization process and that means that the actual resulting behavior can actually be quite complicated and complex. But it's made up of things that are individually quite simple. So none of my individual models are complicated. They're all pretty simple. And actually, if you follow my blog, there's a lot of things where I'm posting something saying, look, this is interesting.

But it's going to make my model too complicated. So I'm not going to bother doing, so it's like I spent a lot of my research time looking at things and deciding that this is not actually, it makes a small but insignificant difference to my performance that's not worth the complexity that it adds. So that's kind of the way I'm thinking. I will only add something if it adds something to my performance, if there's a good thesis behind it. So just a pure data mining exercise, it's pulled something out, that seems to work and I no idea why. I believe that can work, but you need to be much better at machine learning than I am. And it also needs to be something that I can implement in a relatively simple way without making my system for

example, horrifically nonlinear.

Adam: **01:00:52** So, walk me through the optimization a little bit, because I think I know a little bit about what goes on. I think you've got a regularization step where you are sort of taking each year independently, and then what you want to do is maximize the average performance relative to the dispersion of the performance from year from like calendar year to calendar year, I think was one of the techniques that you were applying or did I miss...

Rob: **01:01:29** The expression on my face thing is you got me mixed up with somebody else.

Adam: **01:01:34** No, it's funny because I've got this second hand because we one of our internal quants was using a strategy that was informed by your systematic investing book when he first joined us. And so he sort of walked us through the handcrafting that he had been doing and that's what I took from that.

Handcrafting Portfolios

Rob: **01:02:00** So, this handcrafting is...what I noticed when I actually watched how people actually fitted portfolios, this was a kind of an anthropological observation. Everyone said that they fitted portfolios using some kind of fancy optimization process. And I remember very clearly, the first time I watched somebody actually do this. There is a guy called Simon. Simon, if you're listening and watching, Hi, Simon. I hope you won't mind me using your name in this story, but Simon who was much more experienced researcher than me, we implemented a new model, but Simon was the guy on the team that was responsible for allocating the portfolio weights to different instruments within our model. So that was his job. So he sat down and around this optimization, of course, it came out with like 20 instruments and two had a weight of 10% the rest were zero, as you might expect. I sort of looked surprised and Simon said, *it's okay Rob, optimization is an art, not science,* go and get yourself a cup of coffee and when you come back all will be well. I came back, and there were this beautiful set of weights. And what Simon had done was basically added constraints to the portfolio until the weights looked like he thought what they should look like. And there's no disrespect to Simon specifically because I know loads of people who do doing exactly the same thing and probably still do it now. And I've done it myself.

Now, I thought, well, this is crazy. Why don't we just if we're going to just put information in portfolio weights that we think look right, well, let's just do that. But let's try and do that in a robust way. So if you actually have intuition about how portfolios should be optimized, well, the first thing you do generally as a human being is you put things into groups. So you say, well, I'm going to put all my bonds over here and all my equities over here

and I'm going to decide my top down risk allocation. That's the first decision I have to make. And the nice thing about that is from a mathematical point of view, by separating that into effectively three problems. I kind of how much in A, how much in B, and then how much within a within A and within B, those problems individually are much easier than the problem of doing A and B jointly. So effectively, you end up with a hierarchical approach and this is quite commonly used. So this the HRP, *hierarchal risk parity* which is the kind of the more high end version of what I do, I guess you could say, coming from more a mathematical background rather than me with my anthropological kind of observation.

So the first thing you do is cluster, and then within each of those clusters obviously, you work down until you're at the point where you have a cluster small enough that you can allocate within that cluster in a robust way. And actually, I used to use clusters of three, and now I'm down to clusters of two. And basically you allocate in, within a cluster, you get 50% risk weights for each asset, because that's the optimal portfolio weight. If volatilities are the same and Sharpe ratios are the same. Everything should get 50-50. The next step then is to say, well actually, if you do that, unless you're very lucky, you're going to have bits of your portfolio where you don't have equal risk weights when you should recall risk weights. So for example, suppose you've got the same number of bonds and equities, but your equity markets are much more diversified than your bond markets, then you'll have less risk effectively than you should do between those two asset classes. So there's a correction idea which is called the diversification multiplier and is just the inverse of the way this sort of outer product to the portfolio weights.

And basically, if you've got two assets that are uncorrelated, then their diversification multiplier is going to be 1.4 which is square root of two. If you've got two assets that are perfectly correlated, diversification multiply will be one. So you multiply all the weights by these numbers and that effectively then gives you equal risk allocations, all things being equal. And then you can then apply a couple of overlays and one is basically Sharpe ratios to say, well, actually, I've got information about Sharpe ratio, so I'm going to use that to tilt the weights. And it is tilting, it's not like we've said, it's not going zero to 100, it's tilting. And basically to do that, I use a little bit of maths which relates to the sampling uncertainty of the Sharpe ratio, this paper by Andrew Lowe, about 25 years ago that introduced this quite simple formula. And I use that to reflect both, if two assets have different Sharpe ratios but say, I've only got a year of data, those weights are not going to move at all. But if those two assets have got very different big difference in the Sharpe ratios, and also if they're uncorrelated, which means that difference is more significant theoretically and I've got 50 years of data, well it's quite plausible that can make quite big difference in the weights.

And this is all now being, this is all being done in a kind of assumption that all assets have equal volatility which is my futures world this is correct. But in my long only world is not correct because I don't use leverage, so then I apply a fairly simple stage which maps from risk weights to cash weights. So that's where, and it's evolved over the last few years, actually the methodology. I made it more robust. I've changed a few things like just making it to assets, made a few simplifications. And it's not that dissimilar from the HRP but there's a few twists in there.

Adam: **01:07:29** Yeah, it's sort of like robust risk parity times the probabilistic Sharpe ratio.

Rob: **01:07:38** Yeah, exactly. In a theory, so one lesson I like to talk a lot about is about uncertainty because people have different views on uncertainty in markets, I was having a debate on Twitter with some trend followers because I'm kind of at this, we're in this weird position where I'm not on the edge of the trend following community, and they invite me to talk on their podcasts and stuff, but we disagree on a lot of things. And they made this statement. Well, that because of that, trend following is not making predictions, which I disagree with, but that's another discussion. And this Jerry Parker who's this kind of big CTA guy came on to say, Well, Rob won't try and do his accent. The reason why we don't make predictions on what you do. The reason why we don't make predictions is because markets are very uncertain. I mean, yes, they are uncertain but importantly, there are different degrees of uncertainty. And if you think about the three statistics you need when doing portfolio optimization, which is Mean, Standard Deviation and Correlation. Actually, let's change that and say Sharpe ratio, Standard Deviation and Correlation. Standard deviations are very predictable relatively speaking. If you regress say, next month's standard deviation on last month's, you get an R squared of about .25 which in finances and amazing R squared for regression, anyone who's listening knows about R squares and regressions.

That means that's very predictable indeed. So that means you should buy things, like risk parity are a good idea is because actually volatility is quite predictable. And that's even without doing fancy like using an implied option vol of the VIX as a secondary indicator or using a fancy … or anything like that. Correlations are a little bit less predictable and that's why using this hierarchical structure is a good idea. Because that brings in robustness and means you don't do things like if you have two assets, say that a very highly correlated normally, portfolio optimization will do crazy things with those normally, because it's not accounting for the fact that those correlations aren't always going to be that level and when they break down that's when you end up often with people losing a lot of money.

And the thing that's least predictable of all these is Sharpe ratio, which kind of makes sense. Because if you can predict Sharpe ratio you'll be extremely wealthy. Predicting standard deviation just means you're less likely to go

bust, won't make you rich sadly. Predicting Sharpe ratio is very hard and that means any predictions you have like Sharpe ratio should not be affecting your portfolio as much. You shouldn't be putting as much into them which is why I have this probabilistic layer in there as you say. So basically what my thing does is assume I can predict standard deviations perfectly because I do risk. A straight mapping from cash weights to risk weights. Sorry, the other way around. Assuming I can predict them perfectly, it assumes there is some difficulty putting correlation. So I've got a robust structure in there to deal with that and then I assume that predicting Sharpe ratios is really hard. So I have a full kind of layer of probabilistic uncertainty in there to reflect that.

So it's reflecting those three degrees of uncertainty. Whereas, if you just take a naive Markowitz out of the box portfolio optimization, it doesn't know anything about uncertainty, it takes all the forecasts, point forecasts, assume there's no uncertainty in them at all. So it's a more nuanced approach.

Adam: **01:10:55**

Well, we're obviously huge supporters of that type of probabilistic based optimization and robust optimization. I was curious whether you've run any... I suspect you have. What do you observe when you run your optimization on? So this is at the at the total portfolio level that includes your probabilistic Sharpe estimates? Have you walked that process forward and observed how the relationship between your estimated probabilistic Sharpe ratio weights and the realized probabilistic Sharpe ratio weights and do you observe that those relationships are meaningfully persistent over time?

Sharpe ratio Weights

Rob: **01:11:45**

I haven't exactly done that. One thing I have done with all three of these kinds of statistics, I've done things like saying, well, how does the R squared change with how much time you've got and things like that? What I have done for example, is say, let's take momentum, I've said well, as a way of illustrating actually the uncertainty. So no information about anything, you'd basically just use unconditional estimates and in fact you probably can for Sharpe ratios, you wouldn't even bother using them. But you basically if you get some kind of unconditional distribution for Sharpe ratios, it has a certain shape. If you've got a really good indicator, let's say that splits into I think high or low states for momentum, so something like that, you still end up with distributions and they overlap a little bit. And that overlap's telling you actually you don't pull the handle completely. This is about tilting your portfolio depending on the Sharpe ratio. But there is some information there, because obviously there's information that the two conditional distributions are so on top of each other, and you won't be able to see any difference between them. So I've done that.

The difficulty with doing what you describe is there is so much noise that if you're doing really well, you can make the predictability and Sharpe ratios goes from an R squared of like, .03 which is just noise to like .07.It's still a very... you're still not doing a great job of predicting Sharpe ratios, but you only have to do a little bit better than the unconditional noise to have quite a decent portfolio return. So no, I haven't done that. It would be an interesting thing to do that. But I suspect it would be quite hard to see much there. I mean, the statistics would be meaningful but I'm not sure that there would be enough of a pattern there to make it a compelling pitch to look at.

Adam: **01:13:50** Well, yeah. I think we've sort of concluded that that actually is the hardest and most rewarding effort in finance.

Rob: **01:13:59** These two things go together. Right?

Adam: **01:14:01** Yeah, right. Absolutely. I mean, it's, it is just shockingly hard. We don't really use the linear models so much anymore but even just using, really constraining the degrees of freedom in your models and having a small number of models for each sort of call, it feature family, so you've got a few carry models and you get a few seasonality models and you get a few trend/momentum models. And you're going to use 90% of the data and derive a probabilistically weighted expectation of future Sharpe ratio for the remaining 10% and use a variety of different objectives or target metrics to determine your optimal weights. And even using 90% of your data and some of those futures data is obviously, goes back to the sort of mid 70s to make those predictions. The R squared are just vanishingly small delta between .5 and the realization. And so it ends up you've got to sort of drill deeper into for example, stuff like the stability of the models through time. And then you got to have like nested versions of these validation procedures in order to figure out the right balance between trying to be precise versus trying to be robust.

This is an almost endless rabbit hole. So I think the lesson is, unless you want to spend all your time on this problem, which again, admittedly, is the most rewarding problem in finance, being extremely humble about your ability to make strong tilts in that dimension is probably your best course of action.

Rob: **01:16:02** I mean, this is what I find interesting, because I think a lot of people pay attention to things. They ignore things that are easy, like it's easy to predict standard deviations, which means for example, that risk parity talked about this before, risk parity should kind of be your starting point. And people dismiss that because they say things like, we shouldn't invest in risk parity because that means you'll be putting too much of your portfolio in bonds and everyone knows bonds are going to do badly, which is basically making a point forecast with no knowledge or understanding of

probabilistic lessoning. It's also that they're saying you should ignore this very predictable thing which is standard deviation, while simultaneously saying that there is a very large predictability in Sharpe ratios, because everybody knows that this is what's going to happen to bond and equity prices. I mean, bonds look expensive now but they've looked expensive eight years ago, but risk parity has done okay. So, I'm not saying that risk parity is necessarily a great buy right now but the point is that the structure of thinking that I like to use, based on evidence around predictability leads you to really question a lot of the things that people say about these things.

Rodrigo: **01:17:15** It's like the Dunning-Kruger Effect in full flight. Like the Dunning-Kruger Effect is one where somebody comes into the market, they see a nice little trigger and they're like I'm going to do 100% of that. So I'm either 100% in equities as you said earlier, or 100% in bonds, or 100% in commodities.

Rob: **01:17:29** Or 100% in GameStop.

Rodrigo: **01:17:33** 100% in GameStop and as you dig deeper you're like, oh, I didn't know that, that's not going to work out for me every time, maybe I shouldn't do 100%. And you go from 100 trying to predict the future prices or Sharpe ratios to saying, well hold on a second, what's easy, you go down to correlations and you go down to volatility and then you realize, okay, we should actually start with risk parity. Start with that base case, because that's the one we have most confidence in. And then slowly build until after that. So it just takes a decade, a lifetime and professional lifetime to go from being 100% certain to not being certain about anything at all and use probabilistic method.

Rob: **01:18:12** I mean, the other thing that's kind of related, not exactly the same in terms of things that are easy is risk premia. Like, doesn't require any skill to collect risk premia. Maybe requires a certain amount of operational things you've got to do to understand and you've got to maybe do things like short stocks which you can't do very easily. While these things you do through ETFs anyway, but just collecting risk premium up, people say to me, what's your skill? My skill, I'm not sure I've got any skill. I collect a bunch of risk premia, I try and do it in such a way, that in a robust way which means I'm not making silly mistakes like paying too much for execution or overfitting my models. But, a large percentage of my returns is just collecting risk premia. There may be a tiny amount of something special in there, but it's a much smaller proportion than most

Mike: **01:19:03** I think the other thing that's missed is the idea or the understanding that when you've taken those lower building blocks that you have higher confidence in, and you built a maximally diversified portfolio. When you tilt the portfolio, you are likely increasing the standard deviation of the portfolio and you have to be more right. Because you've imparted this tilt and that tilt takes away from the diversification. So the least likely thing

that you believe you can predict ie: Sharpe ratio, you have to have a really high confidence in that because you're giving up the other two layers. And I think that's just absolutely lost. People don't understand, this is kind of the core idea of *you start with risk parity.* And once you understand this maximally diversified portfolio and you lever it up to whatever risk that you can tolerate. When you step away from that, you are embedding a prediction of a Sharpe ratio which you have a much lower confidence in than the other components of inputs for the portfolio and it's a higher hurdle than people think.

Rodrigo: **01:20:15**

That's right. I think people think they're layering returns. Okay, I start with my basic here and then I'm going to layer this return. But what's actually happening is you're taking away the rebounds premium will be all talk a lot. And so you're adding …yeah, the diversity which leads to the rebalance, you're taking away from this and what you're adding needs to be, the hurdle is what you're taking away. So you're not layering anything, you're losing something and you'd better be gaining something really big to do better than the base.

Rob: **01:20:48**

Yes. I mean, it goes back to the very first discussion where I say, well, you take some of your portfolio and you use that for opportunistic stuff what have you. Well, the kind of hurdle rate on that it's not zero, it's what you would have made, is what you expect from what you've already got. So you need to be very convinced as you say, you need to be very convinced that this is absolutely the right thing to do, and that's why, and that knowledge that this is quite different, what I'm about to do is going to be quite hard to get right, is what should make you say, well, I'm not going to get 100% of my portfolio into this crazy thing. I'm going to put this much in because I know I'm pretty confident this is a good idea, I'm confident enough I'm going to do some of this, but I'm no arrogant enough to think that I can I can take 100% of my portfolio, I'm going to limit it to 5% or 10%, or whatever. There's a lot of jargon in the investment industry that kind of is confusing, misleading and you guys are old enough to remember this idea of core and satellite which kind of gone out of fashion now. But there was some kind of that actually, I found quite a helpful way of thinking about the world. Like basically, you start with this, and what we can have, and you'd obviously with what we start with have a big debate about, and then you do a bit of this on top. And again, we can have a bit of a debate about that. But it's a different approach from as you say that the idea of layering things.

I remember a discussion I had with somebody during the last market crash and the guy said, well, I've no idea what's going to happen so I've gone 100% into cash. I'm like, well, that's a huge decision you're making, you're actually…Yeah, you've actually made a much bigger decision, a much bigger statement about what you think is going to happen than I have

going from going through, I think I went going to say 50% cash, or whatever at the time.

Rodrigo: **01:22:44** And then you said instead of cash you buy 100% Bitcoin, right?

Mike: **01:22:50** Well, this is the point I was trying to make earlier on when you were talking about those subtle changes you had made in the portfolio in March 2020. They were subtle. And they absolutely understood the trade-offs that we're talking about now. And they understood that you understood the humility with which you need to think about those outside tilts. And that, that point can't be emphasized enough, I think.

Rob: **01:23:20** Yeah. So, I guess you've got the systems trading that embodies the idea of uncertainty in this way we've described. And then the kind of, as I said, the main evolution in my thinking has been the fact that I now apply the same level of understanding of uncertainty the, to the kind of meta part, which is actually in terms of how I design the system and how I back test it. So it's not just that I have a system that embodies the fact that the world is uncertainty, there's different levels of uncertainty and you go with the things you can predict the most, but I also similarly try and more so than when I was working for AHL actually, if I've had any evolution, it's that I apply that scepticism and uncertainty to the actual process of constructing these things as well, in a much greater way I'd say, hopefully.

Mike: **01:24:14** You went over sort of asset class inclusion. And we didn't dig into that too deeply. But I wouldn't mind doing that now in the context of Rodrigo mentioned them the evil word Bitcoin, but it's a trillion dollar asset class now, but maybe that's a good example, or a bad example, but how long or how do you think about asset class inclusion at the you know, sort of the first level and when it comes to new assets that might impart some different exposure to some other risks that you would be hedging by buying that particular asset? How do you think about inclusion? When does something qualify? How long does it take because you talked about having something only as a year history, well how you know anything about that asset class. So you can talk a little bit about the asset classes inclusion side and what are the sort of hurdles that have to be overcome for inclusion?

Asset Class Inclusion

Rob: **01:25:07** I mean, it's a difficult one because actually my portfolio is relatively simple in that it effectively only has three asset classes in it, it's got bonds, equities, and then it's got this futures trend following account, which I kind of treat as an asset. Because that account has within it say, commodities.

It's kind of picking up things that other people might want to get through, for example buying commodity ETFs, which is the fashion 10 years ago, less so now, perhaps. So there are things that aren't in my portfolio, like, for example, like to start things like private equity on in my portfolio, things like...generally speaking, there are quite a few asset classes that I would not mind accessing, but the sort of costs of doing so which could be something as simple as doing it through a closed end fund, they tend to have quite high charges.

So one of the things I talk about a lot in my *Smart Portfolios* book was this very difficult thing where there are quite a few things that look good, but actually to retail investor unless you've got a lot of money and you're able to do things like directly invest in say, 10 private equity funds, to get diversification because just putting your money into one private equity fund for me would be just too risky. So you need quite large amounts of money to be at the stage where you can write 10 checks to private equity funds. So then okay, what do I do? I'll go buy the ETF route. Well, it's great, the ETF route's available now. But then I look, you look at the annual DARs on these things, and the kind of 10s or even over 100 basis points and you think well is am I really going to generate enough marginal improvement to my portfolio to justify that.

And the other thing is that I, I think that there is a case to be made that if you do have some, let's say you knew nothing about private equity or nothing about anything at all, well, then you can afford to then you absolutely have as many in theory, I mean, we can get into details about things like Bitcoin, in theory have all these things in your portfolio, have a bit of commercial property, have a bit of private equity, have a bit of this have a bit of that by all means that is theoretically the best thing to do. But I'm in a slightly different position in that I know quite a lot about this weird asset class called futures trading and I can invest in that without paying any fees, I'd have to pay some guy 2 and 20, to invest in that. I can get it, I can get it for the marginal cost of my time which works out to less than 2 and 20. And especially when the system's running and just running by itself. And I probably...If I look at my performance over, say seven years, which isn't really long enough to be statistically significant but long enough to kind of start making a judgement. I'm kind of ahead of the benchmarks. But a bit behind the top part, I'm sort of the bottom edge of the top quartile say, so it makes more sense for me to on a marginal basis put my kind of alternative asset allocation, if you like into that, rather than to put $10,000 in private equity ETF, for example. Now, if I had a lot more money than I do, then maybe I would consider investing directly private equity. But it doesn't make any sense to me at the moment.

In terms of history, I think that's not important because, okay, the nice thing about the process I've just identified to you is, volatility. So I need a month's worth of data since we've been trading it for a month, that's

enough for me to predict its volatility. So I'm happy, even then, you could probably, if you said to me, what's the volatility of this Turkish equity ETF? I'm going to guess about 30% because it's an emerging market ETF, equity ETF, and I may be wrong, I'm not going to be wrong by a factor of two though. I might be wrong by, it may be between 20 and 40. Maybe it's a bit higher, because Turkey is quite interesting in the moment, but I'm not going to be wrong enough that the position is going to be way out of line. And because of diversification, because that Turkish ETF is going to be ultimately a small part of my portfolio, there's less kind of idiosyncratic risk in making the decision and putting it in with only and potentially getting that wrong. So actually, that doesn't bother me. And the nice thing about the sort of probabilistic Sharpe ratio idea is actually it accounts for the fact there's not much data automatically. It says you only got a month of data roll, that the fact that this this thing may have done amazingly well in that month is kind of nice, but actually, it's only going to tilt the allocation by a fraction of a basis point because it's statistically meaningless. And then for correlation, I tend to find that about...correlation predictability peaks at around six months–ish a bit shorter, not much different.

But again, you can probably guess roughly what the correlation of that thing's going to be with everything else as well. I mean, it's could be quite correlated with other emerging market equities, maybe a bit correlated with Turkish bonds. So, you don't need very precise, this is one of the kind of things that it's a bit weird, you don't really need very precise estimates of these things because your portfolio process should be robust enough that actually it's not sensitive. I'll be worried, I'll be really worried actually if I had my Turkish ETF, with one month of data, the allocation was here, if after two months, the allocation was here, but I will, there's something wrong with your system, there's something wrong with the way you're allocating risk.

Adam: **01:30:52** Rob, I'd love to get because we're closing in on an hour and a half, I'd love to leave listeners with something, there's lots of practical stuff here but something really concrete. And I'm just curious, if you were not, I mean, you obviously have the ability to trade your own accounts and you have been doing so for many years, and you've been using strategies that you fundamentally believe in. If you did not have the ability to trade your own accounts, how would you think about setting criteria for decision making for allocating to other investors or firms or funds or whatever that would raise the probability of success for you?

Allocation Decision Making

Rob: **01:31:43** Yeah, so in this hypothetical world, do I still have all the knowledge, skills and experience I've currently got?

Adam: **01:31:49** Let's assume you do, but you just don't know for some reason you don't want to run your own account?

Rob: **01:31:53** Yeah. I probably I'd only go with... I mean, this is the interesting thing because actually, my decision making process would probably be quite qualitative. Because of my limit. For example, if you show me a manager with a great track record over say, five years, well, the statistical part of my brains going, yeah, that's good, but it's probably not statistically significant. Okay. I would potentially, if you showed me a manager who was supposed to be doing something, and actually his correlation the benchmark was 0.2, I'd be that's a bit suspicious, there's a lot of style drift there in this thing a bit strange going on here. If you showed me a manager who Sharpe ratio was exceptional, I wouldn't even consider him because most likely the probability is this is the next, Bernie Madoff, may he rest in peace, wherever he's going to up or down. So there will be a limited amount of kind of quantitative information that would be in that decision, but actually less than you might think. It would be much more, if I would probably only invest in funds whose business model I understood and where I had a high degree of empathy with what they were doing. And that potentially would actually mean a less diversified portfolio, than maybe you would expect, because actually I probably still have quite a big allocation to CTAs even though because I understand that business, and I can read a prospectus and talk to people and get that qualitative information. And I don't see the point of not using the skills or knowledge and understanding I have of that say.

I would be less likely to invest in a discretionary long only equity manager because, A, it's not a space I understand and B I'm more sceptical about whether they're really adding value beyond their fees that I couldn't just pick up through buying into a risk premium value premium, things like that. So yeah, it's not a very kind of these are the equations of calculation.

Rodrigo: **01:34:01** I actually think it aligns with what I believe investors do anyway, which is you align with managers that align with your values. And I think the reason that works is because if you understand if you have similar values and you understand that process better, that you're more likely to stick to those managers through the thick and thin because there is a shared belief system there. And so yeah, it totally makes sense to me that you would be more geared towards CTAs and tactical asset allocation or core and explore. And then from there, it's just the pedigree and the reputation of the managers that you end up interviewing, and value investors do the same thing and momentum investors do the same thing. And they call each other out and say value investing's garbage, at the end of the day I think the majority of single investor alpha is their stick-to-itiveness. And that's really most of it.

Rob: **01:35:02** But don't take this, because a lot I think a lot of the problem with people is that they are. And that's naturally like a sales thing. Like if you work in the CTA industry, of course, you're going to say to people you should have a higher allocation to CTAs. And trend following is the best strategy and all this kind of stuff. But you should have a diversified portfolio of risk premia. And that means you should still have allocations to equities and bonds, you should have allocation to value, should still have allocation to momentum yes, but also to things like carry, and some negative skew stuff that that's going to be a nice kind of counterbalance to the positive skew of momentum. And I think that the main difference between me now and me in this imaginary world where maybe I've retired and I can't be bothered to run the futures portfolio anymore is that the asset allocation is probably going to not look that different but it may be actually more diversified because I may be a bit more adventurous and have a few different types of funds to replace that kind of allocation to futures now, which obviously wouldn't exist in the future. So, I wouldn't just do a straight swap and sell, sorry to my former employers, but I wouldn't just get rid of that buy AHL. I think it would be an opportunity to diversify that a bit more definitely.

Adam: **01:36:28** Nice, thank you.

Rodrigo: **01:36:28** Excellent.

Adam: **01:36:29** All right. Well, we're over an hour and a half in and Rob it's getting late. What is it like? You're sneaking up on five there now on a Friday afternoon?

Rob: **01:36:37** Yeah, it's getting up to beer o'clock definitely. Sorry to you guys who are like a bit earlier in the working day still, but yeah.

Adam: **01:36:47** Well, we do that to people on the west coast too, right? So we often have guests on the web. So we're drinking and it's still close to noon their time and they're envious. So it's the same. Anyway, that this has been absolutely magnificent, really grateful for your time and your usual candor and humility. And I'm sure everybody learned a lot and hopefully we can do this again sometime.

Rob: **01:37:13** Definitely. It's been a lot fun, thank you very much.

Mike: **01:37:16** Thanks Rob, been a delight.

Rodrigo: **01:37:18** Thank you Rob.

Adam: **01:37:17** Thanks, guys. See yah.