LAUREN FOSTER: Hello and welcome to the *Take 15 Podcast* from CFA Institute. I'm Lauren Foster. And this is the show where we bring you an unbiased lens on investing and capital markets through short conversations with some of the world's most interesting and accomplished people. Today we're kicking off an exciting mini-series featuring authors of Research Foundation briefs. Over the next three weeks, you'll hear about cryptoassets, relationship alpha, and risk management from unconventional risk takers.

Now, in case you're not familiar with it, the CFA Institute Research Foundation publishes independent practitioner-focused research that is academically rigorous and easy to read. Its briefs are short papers intended to provide easy-to-consume content of global and regional niche interest. Content is free. And you'll find links in the show notes.

First up, cryptoassets with Matt Hougan, author of *Cryptoassets-- the Guide to Bitcoin, Blockchain, and Cryptocurrency for Investment Professionals.* This has been a very popular brief. It hit 20,000 page views in just five weeks. Matt is Chief Investment Officer for Bitwise Asset Management, which created the world's first cryptocurrency index fund and now has $1 billion in assets under management.

We talk about why Matt left ETFs for crypto, some of the risks and common misunderstandings about crypto, how to value cryptoassets, and what we should watch out for on the horizon. Whether this is your first foray into crypto or you're already an investor, I think you'll appreciate Matt's deep understanding of the space and his candid insights. Next week please join me for a conversation with Charlotte Beyer, author of the Research Foundation brief "Relationship Alpha, the Emerging Competitive Advantage in Wealth Management."

And now on with the show. I hope you enjoy today's conversation with Matt Hougan as much as I enjoyed having it.

Matt Hougan, welcome to the show.

MATT HOUGAN: Thank you for having me. Delighted to be here.

LAUREN FOSTER: It's really great to have you on today. And we're going to try something a little bit different. I've not done this before. But I thought it would be fun for the audience to go through like a numeric preamble that tells us a bit about you and your firm and your life. So here we go. Number one, that is the number of marathons that you've run, and it was the Marine Corps Marathon. Three, the number of kids that you have. Seven, the number of chickens. And I'm glad I checked that because the number of chickens has grown since I wrote that number down.

13, the number of inside ETF conferences that you've been involved in. 350, and that's actually a percentage. Around that number is the gain in Bitcoin since you submitted your draft of the Research Foundation brief. That note was in September. And as of today, that's up almost 350%, which is pretty staggering.

6,000 is the number of cryptoassets that are out there, which, again, is another staggering number. 50,000, now that's in dollars, and that's roughly where Bitcoin is trading today. I checked this morning. And today's March 5, and it's around $47,884. For anyone who wants to fact check the numbers, that's where we are today. And then the big number, a billion, and that is the assets under management for Bitwise. So some great context as we start our conversation.

MATT HOUGAN: I love it.

LAUREN FOSTER: So you have referred to crypto as complex, risky, but also exciting. And I'm hoping in our conversation today we'll sort of touch on each of those. But before we do, I love a great origin story, and especially one that has a kind of unconventional path. So how did a philosophy major end up becoming-- and this is a quote-- "the master of all things ETF" and now one of the world's leading experts on crypto? And you might have to take that in two parts, first, the leap from philosophy to ETFs and then the leap into Bitcoin.

MATT HOUGAN: That's an amazing question. Yeah, I did not follow a traditional career path after exiting Bowdoin College with a Philosophy major, I was a sea kayak guide. I traveled around the world. I sold shoes on the midnight shift at LL Bean. I served as a Minor League Baseball mascot. I had a lot of diverse jobs.

I ended up in the ETF industry really because I had moved back to Maine and was living in a cabin on the water in the winter. And there are really no jobs in Maine in the winter. There's summer tourist jobs. There's no other jobs. I had to earn money.

I got connected through an old colleague to a friend who was running a publication called indexuniverse.com because this was before ETFs were a thing. And it covered index funds, and it covered index strategies. We had a publication called the *Journal of Indexes,* sort of quasi academic. And I started writing for that just as a freelance writer. And we were two or three people at the time.

But of course, the ETF industry was a phenomenal beta to have in your career back in 2001, 2002. And so as the industry grew, we expanded, and we grew the business, started as a traditional media business. We started focusing on ETFs.

We bought the URL etf.com. We launched the Inside ETFs conference. We created the first ETF analytics and rating system in the world. And we grew that business eventually to about 60 or 70 people. And I went from being a freelance reporter to the CEO of the business and ultimately sold that in 2015 and 2016.

So there's an old saying about career paths, that the industry you choose is the most important piece. And your job or even the company you're at is less important. Certainly from my first article I ever wrote, which was about issues with how the CPI is calculated, to covering all things ETFs, as you mentioned, what was in the right place at the right time with some great colleagues.

And then how I got to crypto, there are a few reasons. After I sold my business and didn't earn out with the company that acquired our conference business, I was looking around for the next big area that reminded me of ETFs. And what did that mean? It meant an area that I thought was very interesting.

There was a core technological advance that I thought could make the world better but where the quality of information and the level of understanding was really low. And crypto was that. Crypto in 2016, 2017 was the land of hyperbole. Either it was the best thing since sliced bread, or it was worse than the tool bubble and destined to end terribly. And there was no happy middle that looked at this and said, hey, this is an interesting disruptive technology. It has big potential applications. But we need to understand both sides of it.

And I just had such a phenomenally good time doing that with ETFs. I wanted to do it all over again. And that's what I've been working on for the last three or four years at Bitwise.

LAUREN FOSTER: So what was the light-bulb moment? Did you see something, hear something? Was it a combination of things that sort of you're like, oh, this is the moment?

MATT HOUGAN: Yeah. Crypto is really interesting, in that I think for most people who come from traditional finance, there's is a moment where someone or something makes them stop and not reflexively dismiss it, which most of us do when we first hear about this magical internet currency that someone created out of thin air that's now worth a trillion dollars. For me, that moment was in 2013, while I was still heading up etf.com and Inside ETFs. We actually had Cameron and Tyler Winklevoss come down to speak at the conference, the former Facebook founders who are now very heavily involved in Bitcoin.

They had filed for a Bitcoin ETF. Now, if I'm being honest, the reason we had them come down was because they're big celebrities. They're in the Facebook movie. Everyone knew who they were. The were Olympic rowers. Isn't that exciting?

But Kathleen Moriarty, who is sometimes called the "Spyder" Woman because she was the lawyer on the first ETF ever in the US, S-P-Y stopped me. She's a good friend. She stopped me and said, Matt, you have to pay attention to this Bitcoin thing. It's actually very interesting. It's more interesting than what people think.

Now, I didn't pay enough attention to it to buy a lot of it in 2013. That would have been a good thing. But I did start tracking it and paying attention to it, which is why once I sold the business and started looking around, I didn't reflexively dismiss this thing, which, let's be honest, had lots of like signals of overhype-ness, had lots of bad actors in it, had some nefarious backgrounds.

I had that one person who made me stop and reconsider it. And then along the way, I met other people. There are actually a huge number of people who have moved from the ETF industry into the crypto industry I think because they see those analogies.

We remember when ETFs were called weapons of mass destruction. We remember when Noel Archer from iShares was dragged in front of Congress to talk about whether ETFs were destroying American entrepreneurialism. We remember when people called them EFTs.

And we've seen how something that's sort of renegade and interesting and disruptive can become mainstream. And a lot of us see that potential in crypto as well. So I think that that was the seminal moment for me, with Kathleen Moriarty and the Winklevoss twins.

LAUREN FOSTER: I'm so glad you brought up the early days of ETFs and crypto because I had scribbled down a note to myself. I've heard you say, or I'd read it somewhere that in the early days of ETFs no one believed in them, and no one trusted them, and no one understood them. And it seems like that cycle has gone through again with crypto.

MATT HOUGAN: It's so true. And if we're being honest, look, in the early days of ETFs, they weren't good at everything. Early ETFs were illiquid. They had wide spreads. They only covered certain markets. But they had a few technological breakthroughs that were really important.

They were inherently lower cost. They were inherently more tax efficient. And the way disruptive technologies gain hold is usually they're bad at most things, right? The early days of the internet was bad at most things. But it's really good at one or two things. And the same thing's true in crypto.

Is it a good way to buy coffee right now? Absolutely not. Is it going to be the way we conduct global trade? Absolutely not. Is there mainstream applications that my aunt and uncle are using today? No, there's not. But it's good at a few things, really good.

It can move money instantly around the world. It creates the possibility for digital property rights. And so even though all the criticisms are true, and even though it needs more regulation, it needs more seasoning, and it needs more development, and there's environmental concerns, and there's money laundering concerns, it has these few core breakthroughs which are really important technological breakthroughs. And so the question is, does that allow it to grow up and overcome these risks the way ETFs did? Or does It remain a sort of niche technological breakthrough? That's actually the interesting question in crypto.

LAUREN FOSTER: Let's also talk a bit about these breakthroughs that you alluded to. I think when you were talking off mic and you were saying when you left of the ETF business and you were looking around, you were looking for the next big disruptive area of finance. And you settled on crypto. Talk about that disruptive element and really what you were seeing that really fired your imagination, that you saw the potential for disruption. What exactly was being disrupted?

MATT HOUGAN: Yeah. There really three things. One way I look at technology is I think about things that seem like they're ridiculous in today's day and age. Here's an example of something that seems like it's ridiculous. If I were to wire money to London today through Bank of America, one of the largest banks in the world, it would get there on Monday. In a literal sense, the fastest way I could get $10,000 to London is to hop on a plane from here in San Francisco with a suitcase full of cash and fly there in hand.

That's ridiculous, right? We're having a live video discussion. It's being broadcast around the world at very low cost. I can read any book on my phone. So when you see things in the world that shouldn't continue to be, it's nice to look at new things.

The three big disruptions that anchored me on crypto and what it could be, one was that Bitcoin, as an example, an unmanaged network with no employees, no CEO, a few weeks ago someone moved a billion dollars. It settled in 10 minutes, and the fee was $0.57. That's pretty impressive for something with no technology department, no offices, no employees, no CEO, can move a billion dollars in 10 minutes. And it's considered slow in crypto land.

Another example-- people talk about Bitcoin as digital gold. And I think there's a lot of confusion about why people discuss that. The reason it's digital gold is it's the first time ever, you can own something in the digital world without someone else blessing you.

There's a lot of development right now around what's called NFTs, or non-fungible tokens. They're ridiculous things like little videos in the NBA or little drawings that seem ridiculous, crypto kitties, these imaginary kittens that you can buy online. But the underlying idea there is that blockchain and crypto allows for digital property rights. Digital property rights-- a big idea.

Once you have digital property rights, and you can move money instantly around the world, well, the whole world of how finance works opens up. So that's an example of the primitive breakthroughs that crypto brings. Again, just that visceral example of a billion dollars moving for less than $1 in fees is-- really just tells you that this technology does something that didn't happen before. And so that was sort of the thing that got me really excited, the opportunity to make finance more efficient, more productive, more fair, more open, more exciting, more automated, more software driven. All of those things are very exciting to me.

LAUREN FOSTER: So one of the numbers that I sat in our preamble was the 6,000 number of, I guess, cryptoassets, which is kind of mind boggling actually. Why is there more than one cryptoasset?

MATT HOUGAN: Mm. Well, I think there are two great questions there. Why is there more than one? And do we need 6,000? The why is there more than one is because, look, these are all based on software. And the software can be good at different things. Just like Microsoft and Salesforce, both great companies, both technology software companies, good at different things, Bitcoin and Ethereum, both software-based cryptocurrencies, the two largest, both good at different things.

Bitcoin software is optimized for security and decentralization. So as an example, it doesn't change much. It doesn't update with the time. It's like a pet rock. And so when people talk about Bitcoin as digital gold, part of the reason is the software of Bitcoin doesn't change much. So it's unlikely to get a bug. It's very secure. It's been up for 12 years with a trillion dollars in assets. No one's ever hacked it, very secure.

But it's not as innovative as Ethereum. Ethereum updates much more frequently. And you can do more with Ethereum. You can program it to do different things. You can build a new financial ecosystem on it. People have built decentralized exchanges, which is like the New York Stock Exchange except for with no people, just software. And it's all built on Ethereum. It's trading billions of dollars a day.

You can't do that on Bitcoin. So we need more than just Bitcoin, if it's going to make the potential impact. And as you go down the chain, different assets are faster, or different assets do different things. But when you get down below there, most of those long tail are worth nothing. Most of them are worth nothing.

The reason they're worth nothing is there aren't that many different ways to compete. And network effects is more important in crypto than it is in other assets because if you have a large asset, it's more secure, it's more liquid, they are more developers working on it. There's a high chance that 5,900 of those cryptocurrencies are literally worth zero. But that doesn't mean that there isn't a large potential market for the remaining, let's call it, 5, 10, 15, 20, 50 maybe, something like that.

I suspect over time you'll continue to see new cryptoassets develop because it's actually really easy. It's all open source software. You could launch a crypto coin tomorrow by copying and pasting bitcoin's code. Poof, new cryptocurrency. But it wouldn't have any value. So we need more than one because they're good at different things. We don't need more than the 6,000 because it's valuable to have concentration because it makes it more liquid, more secure, and more regulated.

LAUREN FOSTER: So one of the big questions on investors' minds is whether crypto belongs in their portfolio. And one of the questions you raising in the brief-- and just to remind the audience that there will be a link in the show notes to the brief, where they can download. It's free to access and read. So you ask, what role, if any, should cryptoassets have in a professionally managed portfolio? So I'd love your view on that but also the follow-up question, what role in the portfolios of individual investors, if any?

MATT HOUGAN: Mm. Great question. I think it can be appropriate for the right investor at the right size with the right management philosophy. So for the right investor, you need to have a long-term time horizon on crypto. It's extremely volatile. It goes through multiple years of significant downturns.

If you have liquidity constraints that you need a certain amount of money in the next six months, even the next year, maybe the next two years, crypto is not right for you. This is a disruptive new technology. It needs long holding periods, otherwise you don't need it. There are plenty of other assets in the world.

So it's not right for everybody, but it is right for someone. Portfolio size, this is really a behavioral question. Crypto has phenomenal portfolio characteristics historically. It's had high returns. It's had low correlations to other assets. It's liquid. It's very hard to combine those three in a traditional asset. Usually when you get high historical returns, low correlations, you're talking early stage venture capital, lockups.

Crypto has the unique fact that it has these. It's liquid, and you and I can access it. So what does that mean? It means if you beat it into a portfolio optimizer, it loves it. It wants more and more and more and more and more. The constraint on allocation sizing is behavioral. Again, it's very volatile.

Once you get above, like, a 5% allocation, you start having really significant increases in volatility in the portfolio because crypto's volatility overwhelms it. So we see most investors stay at the 0 to 5% range. And then the last piece, which gets overlooked by more investors than anything else, is you have to manage it as an asset.

Crypto is so-- the beta is so large. We just discussed. It's up 350% since when we started writing it. Guess what? If you had a 3% allocation and you bought it when we submitted our draft, it's now maybe a 10% or 11% allocation. It's time to re-balance. You can't just buy and hold it and expect it to have the kind of portfolio impact you want.

Now, some investors, if you're extremely risk tolerant, great, go for it. But for most investors it's like cayenne pepper. A little bit goes a long way. And you need to sort of manage and re-balance it, the way you would any other asset.

LAUREN FOSTER: So for individual investors it sounds like one of the greatest risks is the behavioral side of things. The flip side, let's talk a little bit about financial advisors, whose clients may be coming to them and saying, hey, I want to invest in crypto. What should financial advisors be thinking about? Should they be caring about crypto? If their clients are investing in crypto, what should they be doing about the clients in crypto?

MATT HOUGAN: Yeah. Well, first of all, they need to learn about it because there's a huge number of retail investors that have significant money in crypto. They're going to ask you questions. And if you don't have good answers-- and maybe you don't think it's appropriate and may think it is. But you need good answers. So do the education. That's one of the reasons we wrote this piece.

The second thing I would say is the honest truth is that many retail-based approaches to investing in crypto are based on apps on your phone. And that's fine if you're investing $500 or $1,000. But a lot of these people, maybe they invested $5,000 earlier. It's now $50,000 or $100,000. You shouldn't be carrying $100,000 on your phone.

You need to talk to your clients about the security risks of personal allocations and getting that out of a phone into a proper crypto custodian or crypto fund or something where there's security procedures around it. So ask your clients, are they allocated to crypto? And then walk through the security risks of how they're doing it because it is a new and emerging space. There are high-quality providers and low-quality providers. And an advisor can provide that advice.

And then finally, again, not to beat a dead horse, the re-balancing aspect is key. Again, a lot of people maybe, they bought in 2018. The price is up. Maybe they bought in March of 2020. The price is up 10x since the bottom of the pandemic on Bitcoin. Other assets are up 20x. Some of them are up more. It may be time to re-balance.

You need to have a hard conversation. Nothing goes up unidirectionally forever. Let's manage this professionally like an asset. So learn about it, counsel them on the security risk, and then manage it like an asset is what I would suggest.

LAUREN FOSTER: So when you came in there was a lot of hype, I think, about crypto, I think, on both sides. And even today there probably still is a lot of misunderstanding about what crypto is and what crypto isn't. So let's just try and clear the table here and say, what do you think is the biggest misunderstanding about crypto? And on the other side, what is actually the reality?

MATT HOUGAN: Yeah. A lot of people are anchored in what I call the ghosts of crypto past, this anarchic technological breakthrough that was primarily used by criminals and nefarious types and held at non-institutional custodians. The biggest change is that mainstream crypto is now a very regulated institutional market, right? The custodians are qualified custodians. They have insurance in place from Lloyd's. They're well regulated.

There's significant regulations over the entire space. The travel rule governing AML, KYC, applies to crypto. The largest crypto exchange in the US is the CME Futures Market for Bitcoin, right? This is a very institutional regulated space. And you know that because things like MassMutual are allocating. BlackRock is allocating. They wouldn't be allocating if it was still crypto 2013.

So if you're anchored on 2013, you need to update your views into the institutional market that we are today. So I think that's probably the biggest misunderstanding about the space. About the application, the other misunderstanding is this core idea that crypto has to be a replacement for the dollar to be important. It was dubbed-- that's sort of the original sin of crypto was it was called a cryptocurrency. And people thought of it as a replacement for the dollar. And because you and I don't buy our Starbucks coffee with Bitcoin, people think it can't have utility.

That's just far from the truth. It's a technological breakthrough. It moves money and property rights onto the internet for the first time. And that's a big deal. And it's going to impact society in a major way. And I really, really don't think it's just going to go away.

LAUREN FOSTER: So I know that you're a big believer. And I'm sure that no matter how many times you tell people about some of the great potential, the disruption, there are still people, the naysayers out there who just cannot get it. So I just want to ask you to respond to a couple of things that I've heard people say about the space. One is people who think, like even for us, like CFA Institute publishing content on crypto continues the history of misleading promotions of cryptocurrency as a true investment. So how do you respond to someone like that?

MATT HOUGAN: Yeah. Well, I love that there is a robust dialogue around this. And I think there's significant risks to it as well. There are regulatory risk. There are technology risk. There are adoption risks. Again, you need to be balanced on it.

There really are two classes of arguments there, one of which I think is wrong and one of which is interesting. The one that I think is wrong is this idea that this technology has no utility. I think that's been disproved already. It has utility as a non-sovereign store of value. It has utility as a money moving tool. It has utility with NFTs. It as utility in decentralized finance. I think that's just driven by ignorance.

There are also a group of people, however, who don't like assets that don't generate cash flow. And Bitcoin doesn't generate cash flow. Now, other crypto assets do, actually. This programmable money, programmable finance is generating millions, maybe even billions of dollars in real fees and cash flow.

But focusing on Bitcoin, it doesn't generate cash flow. It's like gold. And so if your view is that gold is not a real asset because it doesn't generate cash flow, well, then Bitcoin isn't either. And there's nothing I can do to counter that.

You can't model it on a DCF basis. It's more like a commodity than an equity. And there's some people who just don't like that. So the technology is real. Think of it as a commodity, at least for Bitcoin. But let's keep dialogue going. I think it's healthy.

LAUREN FOSTER: Well, speaking of keeping the dialogue, just one more, if I may, allegations that the benefits of blockchain are exaggerated. So for example, a person says or suggests, smart contracts require trusted parties to provide blockchain with real-world information. Automatic billing payment systems and trading systems already provide the useful features of smart contracts.

MATT HOUGAN: Yeah. Interesting question. The way I think of it is almost as a de-bundling. I'll make an analogy back to ETFs and mutual funds, right? ETFs are worse than mutual funds in certain ways. So when you trade an ETF, you take on the trading risk, the liquidity risk. You have to execute well.

The benefit you get from that is that it's lower cost than a mutual fund. Mutual fund wraps all that in, bundles it all in. Smart contracts and decentralized blockchain solutions allow you to de-bundles sort of the core simplistic aspects of trust from the wrappings that the financial system wraps around that, protection, fraud chargebacks, et cetera, all of which they layer on fees for. It's not that one is better than the other. One is just more efficient and stripped whilst another is a bundled service.

I think both will exist in the world. But look, the core thing I come back to is the financial system that exists today is so far behind the times in terms of automation and software. It's unbelievable to me that I pay my online bill pay, and it takes five days to hit my internet provider's account. It's unbelievable to me that stocks settle two days later. It's unbelievable to me that it takes multiple days to wire money abroad.

It's unbelievable to me that I have to hire an escrow agent and pay them thousands of dollars to do an if-then statement in the middle of a transaction. That just can't be the case in the future. And the only way you can solve that in a technology-focused way is through a blockchains solution. Because without that, you can't have money exist on the internet without a trust overlay extracting rent.

So will we get from 0 to 100 in terms of disruption? No, right? The traditional financial system is not going away. But right now we're at like one. And when we get from 1 to 10 or 1 to 20 or 1 to 50, I think the history of other disruptive technology suggests even though people are skeptical at the beginning, you often get to 30%, 40%, 50% disruption. And I think that's where finance is going. And I think blockchain is a big part of the solution.

LAUREN FOSTER: So we already touched on sort of the stratospheric rise in blockchain. And in the brief you talk about valuation. And, of course, this begs the question of valuation. And you say how to value crypto-assets is one of the most complex challenging and disagreed-upon aspects of the crypto market. So I guess I have a two-part question. We're at, what, about $48,000 now. So where to from here? And then if you could just distill for the audience, in the brief you lay out the five most widely used cryptoasset valuation techniques. Perhaps you could just run through those very, very briefly and then sort of tell us where do you come out on the valuation.

MATT HOUGAN: Sure. Yeah. Where to from here? My thought on the price of Bitcoin is that it's wrong. I don't know if it should be higher or lower. So there's a world where the skeptical people watching this are right. Bitcoin never emerges as a true store of value. It never gains traction as an international tool of trade. We never use it to buy and sell things. It doesn't catch on in emerging market economies.

In that case, it's like a digital play thing with interesting aspects. And the price should be much lower. There's a world in which it does achieve these things. I think it's on that path. And even if it's just a legitimate competitor to gold, the price is significantly higher, right?

If it had the same market cap as gold and no other utility, every Bitcoin would be worth about $500,000. So I think of the price today as wrong. And I don't know where it's going. That's why portfolio sizing is so important.

Other cryptoassets, again, I should say, much easier to model on a discounted cash flow, price-to-sales, price-to-revenue basis. There is real money there. So I don't want people to get over anchored on Bitcoin. In terms of the valuation metrics for Bitcoin, yeah, I just think they're disappointing.

I think it's a new market. It has real challenges. And I'm not satisfied with any of them. So an example of ones that are commonly referred to, there's a stock-to-flow model, which talks about how much new Bitcoin is being produced versus how much exists in the world. It's historically correlated well with the price of Bitcoin.

But guess what? Bitcoin's new issuance falls programmatically every four years. So guess what? The stock-to-flow ratio predicts that the price will go up forever into infinity. Now, it happens to be true that new stock has come down because it's programmed in. And it happens to be true that the price of Bitcoin has gone up. But there's no way, just because of some ratio like this has worked in the past, and we know the stock will go down over time, that the price will go up forever. It's just a silly argument.

There's another one that looks at the velocity of money versus transactions in the Bitcoin network. The issue there is that the terms in that calculation are very imprecise, subject to personal views. And you can make it generate a price that's anywhere from, like, $10,000 a coin to a couple hundred thousand dollars a coin. So is Bitcoin worth somewhere between $10,000 and $1 million? Yes. But that doesn't help you in terms of defining what it is today.

The one that has the most resonance to me is honestly the most back-of-the-envelope one, which is you look at the total addressable market that something like Bitcoin is going after. So let's define that addressable market very quickly. It could be going after the gold market, right?

In many ways, it's superior to gold. It's more divisible, more transportable. It's harder to falsify. It's easier to store. It's lower cost to store. You can spend it in more places. If it competes with gold, that's about a $10 trillion market.

Maybe it competes with other stores of value, like negative interest rate bonds, real estate, offshore wealth. That's maybe another $30 trillion. Maybe it becomes a tool for international commerce. I'm skeptical of that. I think it's like an out-of-the-money call option. That's maybe an $80 trillion market. Those are huge numbers.

But you can add up that, whatever you define the addressable market as, and then discount in your mind how likely it is for Bitcoin to achieve that. Again, it's not very satisfying to someone who's versed in discounted cash flow and saying Apple is worth $1,200 a share or $3,000 a share. It gives you these ranges.

But I go back to that idea that the price of Bitcoin is wrong. My view is that at a minimum, Bitcoin itself is likely to compete with gold on a sort of even basis for non-sovereign stores of value. And therefore I think the prices should be higher than it is today. And I consider everything else, global currency, paying for Starbucks, buying Teslas with it. I consider that out-of-the-money call options that you get for free for riding along this digital-store-of-value train.

Again, I think we'll see more advances in the next 10 years. It's a new asset class. CFAs haven't been focused on it, right? This is one of the first publications. Let's get smart people looking at this who understand both sides of the equation. Let's figure out better valuation metrics.

LAUREN FOSTER: So at the end of your brief you pose a couple of questions of looking forward. And I'd love to pose a couple of those questions back to you because they were rhetorical in the brief. And one of them was, what should we watch out for on the horizon?

MATT HOUGAN: Great question. Regulatory developments are a key thing. So Bitcoin, honestly, has mostly escaped existential regulatory risk. But the next layer of application, which is programmable money, using software to program other crypto assets, sits in a very vulnerable regulatory spot. It could either be squashed by overly aggressive regulation, allowed to grow nicely by progressive regulation, or allowed to grow in a ridiculous manner that leads to excess if it's allowed unfettered growth. And so you have to monitor regulatory developments to see how that progresses.

Other milestones that I think I would have pointed to in the brief were the adoption of crypto by increasing numbers of institutional investors. The thing about that is since we submitted that draft today, you're not seeing Bitcoin being owned by insurance companies, asset managers, or corporations. So we've checked a lot of those boxes. I do think increasing real-world penetration in terms of retail use or international money transfer use or trade use is something worth monitoring.

The last thing I would add, I spoke earlier about that regulatory risk for this programmable money space. We don't have time to get into it today. But people should dig into the term decentralized finance. There's some really interesting stuff happening in that space. And I would monitor that as sort of the next phase of growth of crypto to see whether it starts to sort of cross the blood-brain barrier into traditional finance or stays in its crypto-native setting.

LAUREN FOSTER: So in terms of institutional portfolios, I just want to let our listeners know, that you published a white paper, "The Case for Bitcoin in the Institutional Portfolio." I'm not sure when that was published. Was it fairly recently?

MATT HOUGAN: It's on our website at bitwiseinvestments.com in the Resources page.

LAUREN FOSTER: OK, great. And we'll make sure to link that in the show notes as well.

MATT HOUGAN: Great.

LAUREN FOSTER: So you to get this question all the time. What do you hold in your crypto portfolio?

MATT HOUGAN: Yeah. Great question. I hold our own funds is the answer. So 90% of my crypto portfolio is allocated to Bitwise's crypto large cap index fund, which holds the 10 largest assets weighted by market cap. 10% is focused in our DeFi index fund, which is just an exciting little fund. And I have some personal allocations that are maybe a percent or two of my crypto allocation.

The reason I take an index-based approach is, look, I live and breathe this 24/7, 365. I don't know exactly how it's going to play out. What I'm confident of, or what I'm personally confident in is this core idea of money and property rights existing on the internet is going to be big. And so I just want an allocation to that. And an index-based strategy is a nice way to do that.

LAUREN FOSTER: Great. So now we come to the fun part of the show-- or at least I think it's kind of fun because it tells me a bit about you-- is the closing questions. And I ask the guests the same three questions every week. So it's kind of interesting to see what kind of answers have been coming out. And the first one is what I call the ray-of-sunshine question. And regular listeners know this started during the pandemic. We were just trying to end on some sort of positive note. And so on that note, the first question is just, what is one long-term positive change that you hope to see as a result of the pandemic?

MATT HOUGAN: That's a great question. I'll talk from a personal perspective. I think I'm really enjoying spending a lot more time at home with my family, a lot less travel. I think this sort of video-based interaction has brought me closer to people around the world, without the burden of travel, than I ever have been before. I've done CFA discussions in Slovakia. I have one coming up in Jamaica.

So the advent of video communications, I think, is knitting us together in a really interesting way. And we're learning how to form bonds at a distance. And I'm excited about how that brings the world together.

LAUREN FOSTER: I'm curious. Earlier on, you mentioned that you were a kayaker I think when you lived up in Maine. Is that something you continue to do now that you've moved closer to the ocean in San Francisco? Or is that a past time?

MATT HOUGAN: Well, it's funny you ask. I don't kayak much here in San Francisco. The bay is big and scary. But I go back to Maine every year. And I kayak there. And I love it very much. I feel very at home in a sea kayak, particularly amongst the islands of Maine in summer. So it's something that I treasure.

LAUREN FOSTER: So we're going to take you from a kayak now into a flight module. And this is the NASA question. And this is if you're about to go on a long-duration space flight, and you're allowed to take with you one item, what is that item?

MATT HOUGAN: One item? Well, a book wouldn't last long enough for a long-duration space flight. I think I'd take a guitar. I've been learning the guitar recently. There's an infinite scale of potential improvements. So you wouldn't run out of time learning new things. You can also both mimic existing songs and create your own. So I think it's sort of an open source innovation platform. A guitar would be first.

I should have said a notebook and a pencil. That would have probably been first. But I'm going to assume that's on the flight. Those are on most things. So a guitar and the open-ended learning possibility would be what I would say.

LAUREN FOSTER: Great. And then the final question, and this is-- I've only been playing around with this one for maybe the last few episodes. And it came about because I listened to an old episode of *This American Life* that was focused on superpowers. And this particular episode, the host was going around asking people at parties, which would you rather have, the power of invisibility or the power of flight?

So that's what I've been asking my guests. You can choose either of those. And whichever one you choose, you're the only one in the world who has that super power. Which one do you choose and importantly, what do you do with it?

MATT HOUGAN: Oh, that's amazing. I'm going to go with the power of flight. So there's a negative-- I love these questions, I should say-- negative and positive aspect to it. I'm one of the least-sneaky persons in the world. So the whole invisibility thing makes me a little uncomfortable. What you see is what you get with me.

I also really love travel. Maybe I'm particularly missing it because of this moment. But the power of flight and the ability to go to different parts of the world and see different people I think would just be phenomenally fun and phenomenally interesting. I think it would be the superpower I choose, even if you gave me unlimited array. So I'm glad that was one of my options, the power of flight.

LAUREN FOSTER: Great. And on that note, we've come to an end. Matt, it's been a great pleasure talking to you today. Thank you so much for joining us.

MATT HOUGAN: Thanks for having me. This was a lot of fun.

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