

## TRANSCRIPT

# Understanding Bitcoin's impact on your portfolio

*Presenters: Jim Armstrong & Jurrien Timmer*

**Jim Armstrong:** Welcome, and thanks for being here today. I'm Jim Armstrong with Fidelity. So now, to our first webinar of the day for this conversation on Bitcoin, which we are all thoroughly excited about.

We are thrilled to have Fidelity's Jurrien Timmer with us. Jurrien is our director of global macro. He is constantly studying and analyzing the markets and our economy as a whole, looking at historical trends, taking a look at what's happening today, and coming up with ideas about what's to come. And recently, to our great pleasure, Jurrien's been particularly interested in Bitcoin, and crypto at large. So our goal today is kind of to pick his brain a little bit, figure out what he's been thinking, and maybe learn a bit ourselves. Jurrien, thank you for making the time to be with us today.

**Jurrien Timmer:** It's great to be here, Jim. Thank you.

**Jim Armstrong:** Yeah, for sure. Before we get going, just a couple of notes for our viewers. First, the size of today's audience really surpassed even our

estimates, so we're not able to take individual questions live, but we've got plenty of questions for Jurrien nevertheless.

I do have to mention that today's webinar is for educational purposes only. It's not a recommendation to buy, sell, hold, or interact with Bitcoin or any cryptocurrency in any way. Cryptocurrency such as Bitcoin can be considered an alternative investment, which are investment products other than the traditional investments of stocks, bonds, mutual funds, ETFs, and ETPs. Cryptocurrency is an example of an alternative investment that may carry additional risks and liabilities that are not associated with traditional investments. Some of those risks include the following. Alternative investments may be relatively illiquid. It might be difficult to determine the current market value of the asset. There may be limited historical risk and return data. A high degree of investment analysis may be required before buying. The costs of purchase and sale may be relatively high.

Okay, all of that out of the way, it is time to get down to it, thank you all for your patience, including you, Jurrien. You know, I wanted to start with this idea of how you came to learn about Bitcoin, because each of us is in sort of a different place. At some point, the switch gets flipped, right? You go from thinking about Bitcoin or cryptocurrency as something you've heard about

elsewhere, to something you're interested in, to something you're really interested in, and for you that, that switch kind of got flipped pretty recently. So I was hoping you could just explain how that happened for you personally.

**Jurrien Timmer:** Sure. I mean this happened last December actually, about eight, nine months ago. And you know, Bitcoin, it's interesting because the learning curve is very steep, right? So it's not like, you know, I see a recipe, I'm a cook, and I see a recipe I'm like oh yeah, I'm going to figure out how to make that dish. It's not that simple. You have to spend hours and hours, and tens of hours, even hundreds of hours, to really get a sense of what's going on. So it's one of those things where you're kind of an observer, you know, it's sort of like a sideshow, until everyone starts talking about.

And then certainly from my perch as a global macro person at Fidelity, you know, I get to the point where like, I really need to have an opinion on this, because people keep asking me, whether it's clients or you know, on TV. And so I need to onboard myself on this, and you know, as we like to say, I kind of fell down the rabbit hole, and so last December, for about two weeks, I did not come up for air. I was just 24/7 just diving into this, and you know, Fidelity Digital Assets, which is our unit that explores this whole world, they were very helpful in helping me understand okay, you know, there's the supply

argument, there's the demand argument, the network effects, and so here, you can kind of go here and learn more about that. And of course, I learned a lot about this on Twitter, but with the caveat is that you get a lot of very strong opinions, and you don't really know which ones to believe.

So last December, I went down the rabbit hole, and I came out with a sense of okay, you know, this is really, really interesting, it's probably the most unique asset class, or aspiring asset class, I should call it, that I've ever seen. And we'll go into that in a little bit. And then I wrote a paper, so like internally as you know, I write, every Sunday I write a report that goes internally to our colleagues at Fidelity, and that was really well received. And then we wrote an external version of that, and that came out maybe two months later, because it always takes a little time to get that done. And for a day or two, we actually broke the internet with that piece, I think we got, on Twitter we got two and a half million impressions on just that one report. And I think that kind of put me, I guess, on the map as someone who is interested and who has, I hope at least, an informed opinion. But even then, you know, that was eight months ago, and it still seems like I'm scratching the surface, right? Because quickly the conversation has evolved from just Bitcoin to now, you know, the larger crypto space, and Ethereum, and NFTs, and DeFi, and so it really is almost, it's like drinking from the firehose. And so, I think probably a lot of people on the

call feel the same way. So, this is not a study that is a one and done. This is an ongoing thing that I'm trying to learn about, and there'll be a lot more work that we will do in the future on this.

**Jim Armstrong:** That's great, that's -- and I will say the same wave that sort of caught you up at the end of 2020 is the wave that brought me in too, from going to something that I was sort of interested in, to something that I also fell down the rabbit hole a little bit about. So without further ado, let's get into some of the charts that you've built specifically about Bitcoin, and help us understand sort of why the buzz now? What's going on now, do you think, that's driven the current interest in Bitcoin? Setting the price aside, I think.

**Jurrien Timmer:** Yeah, so I think there's three kind of ways to think about this. One is why should we care? Like what's the buzz all about, as you just said. And then the second one is like, why now, right? Why not five years ago, or five years from now? And then the third one is, well what does it mean for me as an investor? So let me give you kind of the value proposition, at least, well from my eyes personally but also through the eyes of, I think, what -- from the eyes of the Bitcoin community. And the reason I mentioned earlier that Bitcoin is so unique is because it has very unique supply characteristics, and very unique demand characteristics. And by the way, I should mention from your earlier

question, one of the really cool things from my perspective as a history nerd, when I did this deep dive down the rabbit hole, was that you know, I was expecting to be looking at the shiny new parts of this new asset class, which I did of course, but in doing so, I went back into history for over 1,000 years to understand the role of money and gold as a store of value, and what Bitcoin's role may or may not be. So that was one of the really cool things that as I'm looking forward, I ended up looking back as well. So you'll see some of these charts here.

But let me start with the unique characteristics of Bitcoin. So, as we probably all know on this call, Bitcoin has built-in scarcity, right? So the founder, you know, no one knows exactly who he is, but he created Bitcoin in 2008, and really kind of, you know, initiated it in 2009. It was built in with a built-in scarcity, meaning that only 21 million coins can ever be mined, and every four years, what the Bitcoiners call the rate of inflation gets cut in half. So the growth rate gets cut in half every four years, or every 210,000 blocks, it's just the way the incentive system is built in for the miners who create the Bitcoin. And you can see that in this chart. So the chart shows that the price of Bitcoin, and then on the reverse scale, the growth rate of supply. And obviously, this chart goes well into the future, so it's a combination of what the growth rate has been, so this halving every four years cuts the growth rate in half, and then

we know from the way the incentive structure is built into the code that roughly every four years from now, with the last one being, the last halving being in 2020, and going forward, that this growth rate will get cut in half again, and again, and again, until there barely is a growth rate, and then in a couple of decades from now, actually a century from now, all 21 million coins will be mined.

And so, you know, it doesn't take much of a probing eye to look at this chart and see how the price kind of looks like what the growth rate has looked like so far on the reverse scale. And you know, there's a fellow, I believe he's in Holland, his handle is 100trillionUSD, he's also known as Plan B. So he has papers out there, you know, on the internet, and so as part of my due diligence and onboarding on Bitcoin, I kind of looked at that, and I sort of looked at his models, he's very transparent in how he does his math, and I kind of did my own version of it, and you can do a regression of the dotted blue line and the price, and come up with a sense of where the price may go. So that's the supply side.

Now from my perspective, this is not enough, right? So the supply argument is fine, but you need to have a value for the supply, you know, scarcity to matter. And so, I got quickly kind of unsatisfied with this being the only value

proposition and so then I started looking at the demand side. So if we go to the next slide, you know, Bitcoin is network, right? The blockchain is a network, and Bitcoin is the asset that sits on that network, as well as other assets.

And I've looked at these things in the past, you know, I'm a student of history, I've looked at kind of Metcalf's Law, historical -- what we call S curves, so exponential growth curves. And so one of the value propositions of Bitcoin is this network effect that, you know, Bitcoin is really the first mover on the blockchain, and so it has a very powerful network, and so that made me think about this in terms of historical parallels. And in this chart, you can see historically, some important S curves. So you have broadband subscriptions way back a few decades ago, internet users, mobile phone subscribers, those are the three lines on the left. And then on a separate scale, I show Bitcoin active addresses, and active addresses are addresses with a balance of greater than zero. And it's a little apples and oranges, they're different scales, but I think the premise is, generally speaking, that the growth of Bitcoin, in terms of its network, is following this same kind of historical S curve.

And you know, in my model, which I'll show you actually on the next slide, I picked mobile phone subscribers, not because I think the mobile phone is

analogous to Bitcoin, and plenty of people on Twitter have commented like, why are you looking at mobile phones? This is nothing like the mobile phone! And the point is, not that this is like the mobile phone, but that the mobile phone curve, as well as internet adoption, a bunch of other technological innovations, all followed this exponential curve.

**Jim Armstrong:** Sure.

**Jurrien Timmer:** So it doesn't really matter which one you use, because it's all the same curve. So on the next slide, what I've done, what I did next, was I took -- okay, I took mobile phones for the, you know, for no particular reason, and I regressed that against Bitcoin's actual address count so far. So the pink line is the mobile phone curve, the orange line is the address count. And then it's really just a simple regression, just in Excel, because you're just essentially curve fitting the demand curve, the network effect so far, against historical S curves, regardless of what they may be, and then from there, you can kind of make some assumptions of okay, if for the last 10, 11 years, Bitcoin's curve has been like this, that would be the first 10 years or 11 years of other technological S curves, and so therefore we can kind of make some assumptions of what Bitcoin's network effect might look like in the future. And as I said, you know, it's not just a technological thing, or mobile phones, or

internet, you can apply -- this S curve notion can be applied to almost anything. It's basically just the network effect. So think about the highway system in the 1950s, that was a network effect, because it opened up all kinds of other avenues, and one actually very simple one is in the next slide, is just the global economy and its history.

So in this chart, this is one of my favorite all-time charts, I made this chart 20 years ago, and it's funny that we're bringing it out now when we talk about Bitcoin. But this is the S curve for kind of the global economic development. And so on the horizontal axis, I show the number of years it took for a country to become industrialized, and then on the vertical axis, I show the per capita GDP. And so, you can see, you know, the Netherlands and the UK, and then the U.S., the old kind of reserve currency leaders are all the way on the right, China and India are kind of towards the left, and coming up rapidly, and so even there you can see an S curve.

And there is another reason why I'm showing this chart, because one of the implementations of the blockchain on which, of course, Bitcoin sits, is what we call defi, or decentralized finance. And the notion there is that there are many, many people around the world who are unbanked, who don't have a banking relationship, and by my calculation, if I look at data from the World Bank and

the IMF that if I look at the population 15 and older, or over 15 globally, about 1.5 billion people are unbanked. And so you look at the size of those dots, which are generally less developed nations coming up very sharply, or very rapidly, there's a whole other angle to this, because those, there's a lot of unbanked people in those, and that's part of what gets folks in the crypto space very, very excited.

So let me show you one more chart, the next one, and that's just kind of bringing this together. And so, we have the blue line, which is the built-in scarcity, also known as the stock to flow model. And essentially, that measures how many years it will take to replace the existing stock. And so, that's one dimension of this, very unique for Bitcoin. Bitcoin is actually even scarcer than gold.

So on a log scale, the new supply of gold, gold is, of course, very scarce, and there's a lot of parallels between gold and Bitcoin that we're going to talk about today, but the rate of growth in the supply of gold is relatively constant, whereas the rate of growth in the supply of Bitcoin becomes asymptote, right? You see that curve kind of starts to flatten out. And then the pink line is the demand curve, and again I've regressed the address counts that I showed two slides ago against the price, to get some sense of where things might go. And

so, you look at this chart, and this goes out several more decades, and it's not a leap to see why the Bitcoin community is so excited about Bitcoin, because you look at where those lines go, and they are pretty, pretty high. This --

**Jim Armstrong:** I was going to say, all eyes shift to your price axis there, for sure.

**Jurrien Timmer:** Yeah. But you know, it always comes with a few caveats of course, right? So the part to the left, where we already have the existing price history, you can see that the two lines explain very accurately what price has done. I mean price still kind of goes up above and below it, because it -- this is a new asset, it's in price discovery, I liken it to like a teenager, you know, it's like it's all over the place, but heading in the right direction hopefully. But part of that is just the consequence of curve fitting to lines, right? So, regression analysis, this is always a cautionary tale, they're always going to look great in sample, because you are literally curve fitting to make sense of it, and then as you go into the kind of out of sample, it doesn't always work as well. And what's interesting here is that the pink line, the demand side, is -- it becomes much more conservative than the blue line, although you know, it still points to much, much higher, higher prices, or at least it implies that.

My sense is that I'm more inclined to go with the demand model than the supply model, because I think that the Metcalf's Law, the network effect, to me that's a more robust way of looking at it. The supply side is important. But you need the demand side for there to be intrinsic value, and then the supply side is kind of icing on the cake. But again, Bitcoin is very unique, and I -- it's the most unique asset class, or aspiring asset class, that I've ever seen, because it has these very unique dimensions that I don't know any other asset class really has. So very, you know, built-in scarcity with an exponentially growing network effect.

**Jim Armstrong:** I want to continue, if we could, talking about sort of history as perhaps instructive to where Bitcoin is going. And you mentioned Bitcoin's birth right after the global financial crisis of '08, '09. You know, no small percentage of folks who got into Bitcoin really early did so as a reaction to that, right? A mistrust of banks, and of banking. A mistrust of the Fed's role, of the government's role, in money. Looking for a way to buy and to have transactions outside of that system. What parallels, if any, would you say you see to today's financial circumstances, just I think of the overabundance of fiat money that seems like there's a limitless supply being printed, it would seem to me that that would drive some of the same interest in Bitcoin that we're seeing today.

**Jurrien Timmer:** Absolutely. And it is no coincidence that Bitcoin was born, you know, around the time of the financial crisis, and has really taken off over the last year and a half during the COVID period. And what those two periods have in common was, what I would call monetary inflation. So, you know, the Bitcoiners have very strong opinions about the world of fiat money, right? So we used to be on a gold standard, then we had the Bretton Woods system, which replaced -- it was still the gold standard, but all the other currencies in the world got pegged to the dollar, which got pegged to gold. So it was still a form of gold standard. And then in 1971, very famously, President Nixon abandoned the convertibility window of gold, and that was the start of the fiat era. So fiat money meaning money created at will, basically, by the central banks. I think that, it's certainly true that we have been in the fiat money era, and that monetary inflation certainly is rampant right now. But I'll show later that I think the Bitcoiners can be a little guilty of overstating, or over (laughs) -- you know, creating a little bit too much of a dramatic narrative around it. But we'll talk about that in a moment.

But clearly, you can see in this chart that we're (inaudible) so the top panel shows the U.S. monetary base, the gray line is nominal GDP, this goes back to 1790, like I said I'm a history nerd. The orange line is the monetary base as a

percentage of GDP, and the blue line is the Fed's balance sheet as a percentage of GDP. Remember, the Fed was created in 1913, so there was only a limited history there. And what you can see is that periods of monetary inflation, when a lot of money is created, usually during war, and then the Fed is tasked with monetizing that war debt, that actually used to be one of the charters of the Fed. You can see that during wartime, so you got the Civil War there on the left, World War II in the middle, you know, the percentage of the monetary base to GDP goes way, way up, and during the '40s, it was really a very analogous time to today, because during World War II, obviously the U.S., you know, joined or entered World War II after the bombing of Pearl Harbor, the debt to GDP tripled, quadrupled to 116 percent of GDP, and the Fed which was not yet independent at the time, was tasked with monetizing that. And so, the Fed's balance sheet went up tenfold, it kept rates well below the inflation rate, and that's where you see that spike there in the blue line. But what we're seeing right now, you know, blows that all away, right? So we have kind of the one-two punch of the financial crisis, that's that first rise there, and then it came back down, and now we have COVID, so now the Fed's balance sheet is 35 percent of GDP, the monetary base is 24 percent of GDP, this is as of the end of last year. And so that is monetary inflation, and that's very much part of the narrative that Bitcoin is a hard money store of value. I mean it's a number of things, right? There's the network technological aspect, but there's

also that stable, or I shouldn't say stable, because it's very volatile right now, but it's also that store of value, because of its built-in scarcity.

So that's kind of where we are, and it's interesting, if we go to the next slide, that, you know, the dollar inevitably becomes part of this conversation. And you know, the fiat era, since 1971, so 50 years exactly now, and that, you know, with the dollar being the world's reserve currency, 60 percent of worldwide currency reserves are in dollars, that that, you know, there's a narrative among the Bitcoiners, at least the hardcore believers, that that era is coming to an end, that the fiat system has failed us, there's too much debt, the central banks, whether it's the U.S., or Japan, or Europe, are kind of printing money to absorb that debt, and that this can only end in tears, and you know, maybe it will, I'm not saying that that will not happen.

But one caveat to the story is that, you know, the U.S.'s predicament, in terms of fiscal and monetary policy, is not unique, right? So in this chart, I show debt to GDP, so that includes government debt, corporate debt, individual, you know, household debt, and for the U.S. that number is at 300 percent of GDP, all-time high, off the charts. I mean you look at the U.S. and he's like oh my God, how can the dollar possibly survive this? I better have some Bitcoin to kind of offset that. But one caveat is that as you see in this chart, the U.S. is far

from alone in this, right? So Japan is at over 400 percent, Europe, many, many other countries are in exactly the same predicament, so you get into the kind of cleanest dirty shirt business of okay, this is not so much about the dollar versus Bitcoin, but about all fiat currencies versus Bitcoin.

**Jim Armstrong:** So let's, I want to dive a little bit deeper on what you mentioned in your response to that question, this idea of Bitcoin as a store of value. Because I think that starts to trigger conversations and thoughts about Bitcoin's comparison to gold. So what have you, what has your thinking revealed about that topic?

**Jurrien Timmer:** Yeah, and that was a really, as I said before, that was a really cool dimension to this deep dive that I did when I kind of got myself onboarded, because you can't -- you know, if you look at Bitcoin purely as a technological innovation, and you're looking at the blockchain, and what that means for decentralized finance, you know, NFTs, you know, the way business is being done in a decentralized way, that is one particular angle. But to really study Bitcoin as a store of value, I don't think you can do that without first looking at gold, and what gold's role has been historically as money, and then in my view, it went from money to an asset class, right?

**Jim Armstrong:** Yeah. Yeah, yeah.

**Jurrien Timmer:** So before 1971, it was just money. And it would go up with the inflation rate, I view -- and actually we'll show this chart later, but if you look at money going back several hundred years, until 1971, gold did exactly the same as the CPI. Like it was no more, no less, it was just money store of value, inflation at 5 percent, gold goes up 5 percent, basically. Then in 1971, gold became convertible, and to me, gold in the '70s is Bitcoin now, over the last 10 years. It was the price discovery phase for gold as an asset class, rather than just as currency and money.

**Jim Armstrong:** As a means of transacting, yeah.

**Jurrien Timmer:** And -- yeah. And so, when we look at the history, as kind of a follow-up to the chart from two slides ago, you can see how gold's role changes when there's monetary inflation. So in this chart, I show the U.S. money supply, that's the gray line, and then I show in the blue line the market value of all the aboveground gold that has ever been mined. So that's around 10, 11 trillion right now. And you can see these spirals of monetary inflation, World War I, World War II, the financial crisis, during those periods, the value, the market share, if maybe that's an odd way of thinking it, but the market --

gold would take market share away from the money supply. So it would outperform the money supply, because too much money was being printed. So you can see kind of, if you squint hard enough, that gray line, the dotted gray line is the historical trend going back to the 1800s, and when you see the money supply go, grow in excess of that line, those are periods when gold goes up a lot in value, relative to the money supply. So World War II, the 1970s, the financial crisis, and so you tend to see this kind of range between, you know, 20 percent and about 90 percent. I originally saw this chart about a year ago in a post that Paul Tudor Jones actually did, and it was really like, an aha moment for me.

And so, the relationship of gold as a hedge against monetary inflation, or price inflation too, but for me, my focus is mostly on monetary inflation, tells me that gold is an absolute, you know, viable store of value hedge, and my sense is then that Bitcoin, not the blockchain side, but the supply scarcity side, could be viewed as an extension of that, as a digital gold, if you will. And in my view, kind of I see gold, and silver, and Bitcoin, as all different players on the same team, on the monetary inflation hedge team.

And actually if we go to the next slide, I think that's a good way of illustrating this, this may be a little, a little bit, a little bit psychedelic, but --

**Jim Armstrong:** But modern art, yeah, right.

**Jurrien Timmer:** You know, (laughs) charts are my creative expression, what can I say? But in this chart, I go back to 1700, and I showed the monthly, or the 12-month volatility of monthly returns in the horizontal axis, so this is a scatterplot. And in the vertical axis, I show the monthly return. And the blue dots are gold, the orange dots are silver, and the gray or silver dots is Bitcoin. And the size of the dot is what we call excess money. So monetary inflation. So excess money is defined as the growth rate in the money supply, minus the growth rate in GDP. And so, when there's a lot of monetary inflation, gold, and silver, and Bitcoin should do better than when we have the opposite. And you can see kind of in this chart that that's true. But what's interesting is that the left-hand side of the chart, the dots are all on zero, right? Because that's when gold was money, and not an asset class. So it didn't know how to move, and sometimes it was moved, for instance, in 1933, when FDR changed the gold standard, so you would have a large bump there. But generally, in the money days, when gold was just money, there was no movement on this chart, and then after 1971, you see that cone kind of widen.

But it's interesting, to me this kind of illustrates that they're all different players on the same team, but when you look at Bitcoin, most of the dots are above zero when monetary inflation is high, and it tells you, it tells me, at least, that Bitcoin is kind of the shinier, you know, version of gold that -- because it has more convexity, it has even more scarcity than gold does, and certainly more than silver. But you can kind of think of Bitcoin as high octane silver, which is high octane gold. I mean that's kind of one way of thinking about this.

**Jim Armstrong:** So that's fantastic context, thanks for that. I want to maybe shift a little bit now to where, frankly where the rubber meets the road. I think a question on the minds of many, if not 100 percent of people watching right now, is whether and to what extent I need to have Bitcoin. Does it belong in my portfolio? If it belongs in my portfolio, to what extent should it be in there? And listen, fully recognizing that for every single person watching right now, there's a different, you know, everybody's got individual, unique circumstances, but I think again that question is probably pretty common among us. So should we have it? Should we be holding it? And to what percentage should we?

**Jurrien Timmer:** Yeah, I mean that's always a hard question to answer. I mean people used to ask me that about gold, right? They'd say well should I have 5

percent, 10 percent? And I'm like, I can't answer that question, because everyone's different. I don't know how many other real assets you have. Maybe you have tons and tons of real estate, and therefore you don't really need gold, because real estate's a real asset as well.

So it's -- you know, we're not going to have an answer to that question, and even if we had a sense of what everyone's personal financial situation was like, this is an emerging asset class, right? In price discovery, it's highly volatile, like I said, I think in my view, it's like gold in the 1970s, it was like a teenager coming of age, teenagers have lots of potential, but they can also crash your car, right? So it's kind of like, you -- so you have to take that into account, and one way of illustrating this, I think, is in this chart, where on the left-hand I show drawdowns from previous highs in the S&P 500, and on the right I show the same for Bitcoin.

And you know, for the first -- for the stock market, we kind of know the value proposition, right? Stock market goes up 60 percent of the time, you know, half the time it's in a correction of 10 percent or so, but -- and a quarter of the time, it's in a bear market of 20 percent or so, but if you wait long enough, and you're patient, and you don't sell when it goes against you, over the long run,

you'll -- you know, the S&P has returned about 10, 11 percent. So that's the value proposition, hold on long enough, ride out the volatility.

And the same has been true for Bitcoin so far, but it's kind of -- but, you know, but amplified by orders of magnitude, right? So you look at the chart on the left versus the chart on the right, on the left you can see that, you know, a 25 percent decline has happened 20 percent of the time. And a 20 percent decline has happened 28 percent of the time. Go to the right and you see that a 20 percent decline in Bitcoin has happened 72 percent of the time.

**Jim Armstrong:** Yeah.

**Jurrien Timmer:** All right? So, it's interesting because Bitcoin, so in our world, in the traditional finance or investment world, we look a lot at Sharpe ratios, right? So it's not enough just to say the upside potential is X, you have to look at the volatility as the denominator in the Sharpe ratio. And so, it's interesting that the Sharpe ratio for Bitcoin over the past 10 years is about one and a quarter, which ironically is about the same as the Sharpe ratio for a 60/40 stocks to bond portfolio. Which you would think makes no sense, but that's because the denominator and the numerator are so amplified, right, that over the last

10, 11 years, Bitcoin is up 265 percent per year, but the volatility is about 205 percent per year.

**Jim Armstrong:** Got it.

**Jurrien Timmer:** And so that's why it can go up a lot, and still be in drawdown. And that's just one way of saying, you know, if you're going to invest in Bitcoin, you really should know what you're getting into. Like you should go down that rabbit hole and do the deep dive, don't just buy it because it's going up, and you don't understand what, you know, why it's doing what it's doing.

So, it's a cautionary tale, but the good news, and if we go to the next slide, with Bitcoin, is that a little goes a long way, right? And again I want to emphasize that, you know, if we -- in our world, we kind of live in a 60/40 world, right? Sixty percent stocks, 40 percent bonds, and that's a diversified portfolio. It doesn't have to be 60/40, it can be 70/30, or what have you. But the idea is you have growth assets on one side, and then you have something on the other side, so that when you have bear markets, something else is going up, so that not your entire portfolio is going down at the same time.

And in the old days, you know, the 40 was great! Because you would get maybe 5 or 7 percent income, and you would have a negative correlation against the 60, and so it was a win/win. But now, we're in a world where interest rates, you know, the Fed's policy rate is at zero, inflation's at 5, even the 10-year Treasury's at 1.35, well below the inflation rate. And even if we think, if we assume that the CPI, you know, the 5.4 percent print in the CPI is transitory, even if we just look at the TIPS break even spread, which is about 2.2, that is almost 100 basis points above the 10-year Treasury yield.

So the problem with the 40 part of the 60, right now, is that the 40 is not maintaining your purchasing power, because real rates are negative. And so, I did a simple experiment, and you see that in this chart, so I took a 60/40, which is the blue line, and then I took 2 percentage points out of the 40, and put it in Bitcoin. And the reason I took it out of the 40 is because if we are assuming that Bitcoin is a store of value, like gold, then it's meant to protect our purchasing power, so it really should be on the 40 side. Like the 60 side, like equities, the stock market is pretty good at protecting your purchasing power. It goes up 10, 11 percent per year over the very long run, inflation over the very long run is around 3 percent, so the real return is still 7, 8 percent, which is pretty good.

And again, I should just back up one second here, that again, if we look at the crypto space entirely, there's Bitcoin as the digital gold, in my opinion, and then we have all the other stuff, right? Defi, Ethereum, NFTs, whatever you want, all the companies that are exploring, that are mining, to me that whole bucket belongs on the farthest side of the 60, as almost like venture capital, you know, high risk, high return.

**Jim Armstrong:** Yeah.

**Jurrien Timmer:** But Bitcoin is separate from that, and that I think goes on the other side. And so what's interesting is that if you look at this chart, the orange bars is the additional volatility that that 2 percentage points of Bitcoin would have added to a 60/40 portfolio. So over the years, it's been about an extra hundred basis points, not really that high, and if you look at the drawdowns at the bottom, the gray bars is for 60/40, so these are the worst declines from a preceding 12 month high. And then the purple bars is the 60/38/2, you'll notice that there's very little difference between the two, and that speaks to one attribute of Bitcoin, which is that it's pretty uncorrelated to everything else. The correlation to stocks is maybe 0.1 or 0.2, correlations to bond is basically zero, to cash is zero. And so, you know, it's a diversifier, and just that 2 percent, and again this is not meant as a recommendation that you have 2

percent, but I'm just kind of testing this historically. And of course the last 10 years are very unlikely to be repeated over the next 10 years as Bitcoin matures and becomes less volatile, but also has less upside.

And so the bottom line is that that, just that 2 percent would have added enough return to take you from a negative real return on the 40 side to a positive real return. So, the message is a little bit goes a long way.

**Jim Armstrong:** Got it. And did you have another slide in response to -- I think you had something

**Jurrien Timmer:** Why don't we, in the interest of time, let's skip over the next one, and then we'll go to your next question.

**Jim Armstrong:** Awesome, which is talking more about sort of Bitcoin as an asset class, but also sort of looking at it through sort of the dichotomy between assets that compound and assets that don't. I know that's an important point that you thought was worth bringing up.

**Jurrien Timmer:** Yeah. Yeah, this is a very important point. So this chart goes back to 1700, and it says here what's \$1 worth today, and I plead guilty to that,

because there were no dollars in the 1700s, so this is meant to say what was one unit of fiat money worth today, and what you can see is what we talked about earlier, that that yellow line in the bottom is gold, and the orange line is inflation. So these are various indices put together. So gold, one unit of gold, or one fiat unit of gold, in 1700, would be worth 60-- or 94 today. But look at the blue line to the top. And this is a very important consideration, in my view. You know, one of the definitions of an asset class is that it should compound a cashflow. It should have a cashflow, and it should compound.

And the cashflow argument, which Warren Buffett, you know, was very famous on, about you know, in terms of dismissing gold as an asset class, that used to be true, but now in a world of zero rates or negative rates, or negative real rates, that argument can no longer be made. So an asset class like gold or Bitcoin that doesn't produce a cashflow can still be competitive in a world where real yields are negative. But still, the compounding part is so important, look at what one unit of fiat in stocks would be worth today, \$4 billion. And so, it crushes, you know, anything that doesn't compound over the long horizon. And even if you look at the gray line, that's one unit just earning the overnight interest rate, that's worth, you know, multiple times that gold would be worth today, so and this is an important kind of sanity check that you know, yes, it's a great asset, it's a shiny new asset, but it does not have that compounding

ability, so from my perspective, that makes it not an all weather asset. All right? So gold you own not all the time, because when you don't have periods of monetary inflation, it's just sitting there, collecting dust, literally.

**Jim Armstrong:** Yeah.

**Jurrien Timmer:** Whereas stocks and bonds are compounding at either 6 percent or 11 percent during normal times. And even overnight cash is compounding, and I think that's one important consideration to think about if you're thinking about placing gold or Bitcoin in a portfolio, it's, you know, how much and how -- and when. To me, this is not an always asset, but it's an asset as a high-powered hedge against periods of monetary inflation.

**Jim Armstrong:** Love referring to it as a sanity check. I think there's certainly no small number of people who have FOMOed into Bitcoin. In our remaining time, there's 100 different directions we could go in, but I love the historical context you've given us so far. So take us sort of what you see happening next in terms of potentially the entire situation.

**Jurrien Timmer:** Yeah, and I'll go very quickly, just because we're running out of time, but you know, so Bitcoin has had a pretty good test here, right? It peaked in I think it was April, it went down 55 percent to about 3,000 at its

weakest, it was 28 something thousand. And it held support, it held there really well, and now it's back at 50,000 today, so 48,000 or so. And so I think that was a very important test for Bitcoin, because other drawdowns in the past were much more severe, they would be, you know, 90 percent down. And so, I think kind of the beast is being tamed a little bit, in terms of this asset class is maturing, the adoption of institutional investors, other investors, is being felt. And so what used to be a 90 percent decline is now a 50 percent decline, which is still a lot, right?

**Jim Armstrong:** Yes. Yes.

**Jurrien Timmer:** So it's another reason why you don't want to have half your portfolio in this. But it's interesting that that 30,000, that floor where we spent a number of weeks trading and now building off of that, is exactly where the updated or the close-up version of both the stock to flow model and the demand model intersect. So it's at 30,000, and from here the demand model goes up slowly, the supply model goes up quickly, the next time that the two models intersect, and the last time that they will intersect before they part ways for good, is in around 2024, at around 100,000. And so, that's not a prediction, I want to make sure that that's clear. But that's what these models would suggest, and so that 30,000 level was kind of an important floor, I think,

or level where if someone is looking at this fundamentally, and looking at okay, what is this thing worth, that would be an accurate number, at least on the basis of my work.

And so, you know, so it's been an important test, we had everything that could go wrong went wrong, you know, we had kind of the whole, you know, ESG element, the dirty energy, the miners in China using coal fire plants, you know, that's kind of behind us, I think the energy use argument is kind of slowly going to dissipate. And you know, short-term holders, we won't go through the charges, because we're running low. But you know, the percentage of holders, of people owning Bitcoin for less than three months, that was very high at the top, which makes sense because this -- you know, Bitcoin has kind of boom/bust characteristics, because it's such a new asset. That number is down to 17 percent. And Hodlers, the really long-term holders, they're called Hodlers, that just keeps climbing. So the true believers, not only are they not apparently selling, but they buy more whenever they can. Yeah. So that, we can close on this chart.

And so, it's a testament to the belief that is out there among, you know, the OGs, as we call them, in Bitcoin, in terms of its viability, and you know, that, that is to be respected. I mean I wouldn't say you see that happen as much in

other asset classes. Maybe in gold, you do. So anyway, that, that -- yeah, go ahead.

**Jim Armstrong:** I was going to ask, so that -- right, I mean it's -- have you ever seen anybody walk into a coffee shop and attempt to pay for a cup of joe with a gold -- with a Krugerrand? No. So, but I'm curious to get your opinion of maybe Bitcoin's -- there was a time, let me go back 15 or so years, where -- well not quite that long, but people were thinking about Bitcoin as something you could use for transactions on a daily basis. Get your pizza, go to the dry cleaners, pay for a movie, that seems to have pulled back, and so everyone's Hodling now. How does that impact, do you think, Bitcoin's growth, if it's not used as a means of currency, the way I think those early adopters in '08 or '09 thought it would be, or could be?

**Jurrien Timmer:** Yeah, and it was developed, you know, by Satoshi as a medium of exchange, and clearly that's not what Bitcoin is. Maybe it will be someday, but -- and in a way, it's kind of obvious why it wouldn't be, because it's just too scarce. Like why would you sell -- why would you use your Bitcoin to buy a cup of coffee? I mean someone famously in 2010 bought two pizzas with Bitcoin, and that was like, the \$40,000, I think. So I, you know, in the same way that you wouldn't use gold as a medium of exchange, because you -- the whole

reason you have it is to have it, you know, protect your assets. And so, Bitcoin I think has clearly gone the way of a store of value, rather than a medium of exchange. But you know, there's the Lightning Network, there's these kind of secondary layers, where maybe that's where Bitcoin will become used as a medium of exchange. But perhaps it just won't. Perhaps it just won't, it will be the store of value, and people will just use other forms of money.

And this kind of comes back to the slide that we skipped earlier, but that's okay, is that I think that the narrative that, you know, the dollar, that the U.S. is going to default, and the dollar is going to be worthless, and we're going to have hyperinflation, I think that is a grossly overstated narrative. The dollar, you know, has been, you know, the fiat era has been there for 50 years now, and during that 50 years, the real effective value of the U.S. dollar has gone down by half of one percent per year. Yes, that's a devaluation, right, and it masks periods of appreciation and depreciation, but my sense is, especially where the dollar as a reserve currency is the cleanest dirty shirt around, that the dollar is not going to go anywhere.

And I heard one person really interestingly describe the opposite narrative, that in a way, Bitcoin will actually cement the dollar's value, or position it as the global reserve currency even more, because through the blockchain, and

Bitcoin, and Ethereum, and decentralized finance, people in Africa, for instance, that would never have had access to dollars actually will now have access to dollars via Bitcoin, and then the stable coins, and then the U.S. dollar. So there are many ways to think about this, so I'm not even going to bother trying to weigh on the dollar's reserves status. So I don't think we need to be buying our pizzas with Bitcoin any time soon, but the Bitcoin value proposition lives regardless of whether that narrative plays out or not.

**Jim Armstrong:** A remarkable evolution and Jurrien, thank you again for taking the time to be with us to explain your take on it. We are really grateful that you were able to spend this hour with us, so thank you again for being here today.

**Jurrien Timmer:** Yeah, great to be here. Thanks Jim.

END OF AUDIO FILE

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