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HR: Welcome to Consensus Money a podcast series with Horizon Kinetics about cryptocurrencies. I'm Hugh Ross, COO of Horizon Kinetics, and today I'm joined by Steven Bregman, President and Co-Founder of Horizon Kinetics. In today's episode, Steve is going to be addressing more real questions from real people regarding investing in bitcoin.

HR: Back in December 2017, you corresponded with a gentleman who is not a client but rather just was seeking out answers to questions he had about bitcoin and you were kind enough to engage with him and provide some feedback. He asked you: Regarding the forks of bitcoin, aren't the forks a form of debasement, in that, instead of having 21Mn coins as the max supply, won't we have 21Mn x number of forks? What if the number of forks increases constantly? Maybe every year there are a couple of new forks?

SB: The bitcoin forks are not dilutive, and that is because they were issued to the existing bitcoin owners. You can liken this to the difference between a conventional corporate stock offering and a corporate spin-off. In the former case, an existing publicly traded company, let's say a pharmaceutical company, issues more shares, which it sells to the public, perhaps to help pay for additional biotech research. That does dilute the existing shareholders, because new shareholders now own additional shares; the total number of shares has expanded. In the case of a spin-off, the pharmaceutical company instead spins off, or distributes to existing shareholders shares of its biotech research division. Now the existing shareholders own both the original parent company shares as well as shares of the new spin-off company. As to Bitcoin Cash, Bitcoin Gold and the impact of other forks, you're in the same position. You held Bitcoin and now you hold those also.

HR: In our next question, a client asked you in December 2017: "What do you say about Warren Buffet calling Bitcoin an illusion and to stay away from it?"

SB: You should know that I'm changing the tenor of the conversation I'm having with clients about cryptocurrencies. Some of them are feeling quite pleased that they own some and can brag a bit at parties. But there's a lot more to it than that, and I want to keep them sober. We should consider what happens after the possible accession of bitcoin to the status of a parallel global currency -- that is, after

the thrill of wild success for early owners, the subsequent and perhaps dismaying implications for those who don't own.

I think it also relates to a misunderstanding of the bitcoin volatility. Missing from their understanding, in algebraic fashion, would be the relative weight to apply to each side of the equation. Picture a water tower of the type that can be seen on the tops of many New York City buildings, hooked up with a garden hose to a partially filled ten gallon pail, such as the blue recycling pails now found in many offices. These water towers typically hold 10,000 gallons, so the volume differential is 1,000:1. Open the spigot a touch, for just a fraction of a second, and look how the water level in the pail surges violently. It is beneath the threshold of our physical sensory capabilities, though, to determine whether the water in the tank declined. It might well be beneath the calibration sensitivity of the water meter on the tank, if the tank had such a meter. That would be a better way to understand the volatility of bitcoin relative to the ocean of conventional money and money-like assets in the world

So one can more readily see how a seemingly infinitesimal draining of fiat cash into bitcoin, not measurable in the messy real world in the instant or the short term, can eventually become quite measurable, even obvious, by which time, the representational bitcoin pail will have long overflowed and would have to be replaced by hundreds of representational pails. We even made up a set of charts to illustrate this.

The further implication, though, relates to the relative strength of the two currencies. Americans are not accustomed to thinking about exchange rates or their relevance to their daily lives. The privilege of a reserve currency. It's one thing to observe and perhaps wonder at the plight – if there is a minute devoted to it on the evening news – of the populace in Argentina or Brazil when their currency collapses versus the dollar. We don't understand the mechanism by which their supermarket shelves are empty, middle class professionals can't afford their rent, etc.

But what if, some unknown number of years in the future, the bitcoin millionaires are the ones who can pay ever so much more for a house or a car than all the historical dollar holders. What if the exchange rate of the dollar against whatever fixed-supply cryptocurrencies represent the strong currencies – the new reserve currencies – collapses? Even if it's a slow, multi-decade collapse? What happens to retirement planning; will retirees be living on dog food?

Viewed in this light, we believe one should consider having some cryptocurrency exposure, keeping in mind the appropriate monetary policy, not as a 'play', not to make a bundle, but as a basic form of insurance.

HR: *In another correspondence you had with an inquisitive non-client in December 2017, you were asked: "Can you respond to the remarks in a recent WSJ article where, in essence, the article stated that since central banks can't print bitcoin, if the world switches away from fiat currencies, they would be unable to create new money to alleviate a crisis."*

SB: Bitcoin will not supplant existing currencies. Rather, it can function as a parallel currency. The law of no arbitrage, though, should endow it with a magnitude of value that rivals fiat currencies. There are plenty of examples of parallel markets and currencies. In the U.S., there was a time when silver and gold coinage and metal-backed paper, were accepted and used on a pari passu basis. One does not obviate

the other. And there are many parties who will have no intention of using bitcoin as a currency; for them it will be a store of value that they might periodically convert to cash for specific purposes. And there are populations who have no savings at all, such as the unbanked or underbanked, who might rely upon it (or a different cryptocurrency) for daily transactions because it is more affordable and accessible than a bank account or credit card.

HR: *Back in December 2017, a sophisticated investor who founded an investment publication for the 'road less traveled' asked you: Isn't it true that the higher the price, the harder it is for bitcoin to be a medium of exchange, i.e., how can one spend an \$8,000, a \$12,000 or a 15,000 coin?*

SB: That's not an uncommon question, and it's easy to misunderstand when so much of the daily news headlines are about the price of the coin. In fact, I've heard well-known investors, when interviewed on the topic, say the same thing, questioning how bitcoin can become a successful transactional currency, because after all how many things can you buy with a \$10,000 coin? But that's not how bitcoin actually works. Bitcoin was originally designed and coded so that each coin would be divisible into 100 million units, known as satoshis, after the nom de plume of the creator, Satoshi Nakamoto. Therefore, each satoshi would be each be worth about 1/10,000th of a penny. So not only is bitcoin divisible, it is breathtakingly more divisible than a single U.S. dollar.

In practical terms, you could buy one Peanut M&M, out of a bag of M&M'S. Just to show you how we do research, and I have the citation from the manufacturer's website, there are approximately 210 M&M candies in a 7 oz bag. Now, I'm accustomed to the standard retail 3.1 oz bag, so by extension there should be 93 pieces in the bag that I buy. As to the cost, the in-store price of such a bag, according to Wal-Mart, is \$0.98. In principle, one could buy 1 M&M, although you couldn't in practice - at least I couldn't, short of some virtuosic negotiating skills that are far and away above my capabilities. That 1 M&M would cost me 1.0538 pennies. If I wanted to pay with U.S. currency, either the store would have to take a 5.38% hit by charging me only 1 penny, or I would have to pay a 90% premium by paying 2 pennies for something that only costs 1.0538 pennies. But with bitcoin, everybody could be satisfied. (Except, perhaps, the store, because a favorite retail tactic is to wildly overcharge for sub-standard quantities, like with travel-size toothpaste.)

HR: *For our last question of today's podcast, another one of your non-client correspondents, asked you in January 2018 to respond to a series of comments made by Professor William Buiter, who, until very recently was the Chief Economist of CitiGroup. Professor Buiter stated that:*

"Bitcoin and other digital currencies based on code, will not survive.

"Bitcoin is an asset favored by terrorist and criminal groups. It serves no social purpose. The Energy used to create it is a waist.

"Bitcoin lovers say that it helps citizens who have a fear of government. This is nonsense. In a democracy such as ours the government isn't the citizen's enemy. Rather it protects them, therefore democratic governments can't allow the existence of bitcoin and they will crash them."

SB: As a point of interest, you should know that this questioner is not a native English speaker. He is a journalist with an Israeli financial newspaper – I believe it's Globes – and he was translating an interview

originally conducted in English, translated into Hebrew for publication, and which he here retranslates into English. There is a big difference between statements made by someone as a basic position or ideology or bias, but with no factual or analytical support -- such as a political party typically does -- and an assessment based on information and analysis. I covered pretty much all of these objections in recent quarterly reviews. Nevertheless, let's take these statements one at a time.

"Bitcoin...will not survive"

Why not? On what basis is this statement made? Not a single one of the thousands of currencies that have existed in the world, historically, have survived; it has been a 100% failure rate. Seen any Sestertius Roman Imperial Coins lately, or perhaps gold florins, which were the reserve currency of Europe in the 13th and 14th centuries? On the other hand, almost anything that enough people agree can be money has been. There was such a shortage of coins in the American colonies in the early 1600's, because coins were made in England, not in the Americas, that business could not be conducted. So in some colonies, such as Virginia, tobacco leaves were used as money for about 20-30 years, including to pay taxes or exchange for gold. U.S. cigarette packs were used as money throughout Europe in World War II, and even in prison can buy almost anything. Bitcoin, is superior to both tobacco leaves (it can't be diluted by growing more or by mixing in poor quality leaves) and cigarette packs (at least outside of prison). And coins that the U.S. Mint stopped making 60, and 70 and 100 years ago have appreciated by 10% or more per year, even as the U.S. dollar lost 95% and more of its purchasing power.

As an aside, there is the possibility that large deposit banks such as Citi Bank might not survive in their current form, the technological disruption of the blockchain and alternate currencies. In principle, a blockchain/coin technology can function as one's own bank (for safekeeping and record keeping purposes), for transactions (like wire transfer) and for purchases (side-stepping the credit card/bank oligopoly). One can see why a bank would not want to support the decentralized network capabilities that blockchain represents.

Bitcoin is used by criminals.

Every once in awhile, on the evening TV news, the police show a table loaded with weapons and drugs and bundles of cash. No one ever says, "Mein gott in himmel, we have to stop using dollars (or shekels), because criminals use them!" Secondly, bitcoin is not a good cryptocurrency for criminals, because every single transaction can be viewed and tracked both forward and backward in time. I'm told that criminals prefer Monero, which is more anonymous.

Bitcoin serves no social purpose.

It serves perhaps the greatest economic social purpose in the history of mankind, which has always been subject to governments or rulers debasing or otherwise confiscating their money. As an aside, does Professor Buiter suggest that American football will not survive because it serves no social purpose (at least I don't think it does, though most Americans disagree). But here, you see, just like bitcoin, if enough people agree that it has social value, it is supported, and that support gives it tremendous economic value. Google tells me that a U.S. football team can be worth as much as \$5 billion -- does that make sense on a social purpose basis? The same can be said for alcohol, which if it were introduced for the first time today

as a new beverage could not possibly be approved by the Food and Drug Administration due to its clear, known and substantial health risks.

The Energy used to create bitcoin is a waste.

This is an interesting statement, because it doesn't address the relative value -- in terms of wasted electricity -- of something that can act as a store of value and save money relative to bank account and credit card fees, versus some other activity, like all the people playing online video games at this very moment, or watching salacious online video. Data centers face the same problem and are enormous users of electricity. Is one usage better or worse?

Secondly, the solution to this problem is to use less power, not to stop using cryptocurrency. And that gets solved by technological improvements. Consider the IBM 370 mainframe, introduced to much fanfare on September 30, 1970. It represented the leap into the modern computing age, because that system was the first to use semiconductor chips, the prior 360 series being the magnetic tape technology. How much power was needed to run and cool those? If you look at the photos released at the time, this computer was actually a roomful of refrigerator-sized modules, an entire room that needed to be cooled for just one computer. Yet, we wouldn't have said no to computers.

The answer was technical improvement and the constructive side of economic self-interest. There's no incentive to solve the cost/pollution problem at low levels of activity. Look at the computational power of an ordinary smart phone compared to that global state-of-the-art object of global envy mainframe of that era. The IBM 370 originally has 87 million characters of memory, expandable to 233 million. Compared with the iPhone 6's 62.5 GB – or 62.5 billion characters – of usable memory, the 370 had only 3.7% of the iPhone's memory.

The IBM 370 could process 869.6 million instructions per second; that is only 2.59% of the 3.36 billion instructions per second the iPhone 6 can execute.

The IBM 370 price ranged from about \$705,775 to \$1,783,000. A mid-level (65 GB) iPhone 6 without a phone company subsidy costs \$750. That is 0.06% of the \$1.24 million mid-point price of the IBM 370.

On a price/performance basis, if we multiply 2.59% of the processing speed x 0.06% of the cost to own the IBM 370 versus the iPhone 6, that is 0.00155% or 15 thousandths of 1% of the price performance; the inverse of that means that the iPhone 6 is 64,350 times better than the IBM 370. And in terms of energy consumption, the iPhone can run all day on one battery charge.

Just to understand that innovation on this continuum hasn't stopped, there is a Japanese company that is both licensed to operate one of the 12 authorized Japan cryptocurrency exchanges and to engage in mining as a service. This company is partnering with a major semiconductor fabricator to produce a 7 nanometer chip. The current standard is 16 nm. Many observers are skeptical, since this is a dramatic level of advancement that seems to be skipping a couple of steps on the improvement curve. Nevertheless, the company indicates that the power consumption will be about 50% lower per hash. As well, because the chip is so much smaller, they expect that their datacenter will take up about 1/6th the space of the current standard for the same computing power. Though I'm not qualified to judge, this will presumably confer further cooling power savings.

In a democracy such as ours (USA) the government isn't the citizen's enemy. Rather it protects them.

As reviewed in our year-end webinar, GDP in the U.S. expanded by 4% per year in the past 39 years, but the monetary base increased at a 9.25% rate. Which means that 5% more dollars were required every year to buy the same goods. That means that the purchasing power of dollars was eroded by over 85%. Does someone wish to argue that to a person on a fixed income or pension or with liquid savings that they might not feel that the government has protected them, since it was government policy that might have reduced them to poverty?

Democratic governments can't allow the existence of bitcoins and they will crash them.

That's a very, very intriguing question. One might wonder, then, about the first government to approve bitcoin as a legal method of payment. And one might then ask why that government thereafter encouraged its use by removing an 8% surcharge on goods and services purchased with bitcoin, and after that established licensed cryptocurrency exchanges. All of this happened last year. That government would be Japan, and the question is, why would they do that?

Japan has more than twice the debt: GDP level of the U.S.; in fact, it's the highest in the world. They've tried for decades to encourage spending by their citizens, but the citizens don't trust the government's monetary policy. Maybe, by inducing the population to use bitcoin, some Yen will come out from under the collective mattress, so to speak, and more of it will get spent.

Also consider what happens following a long enough period in which the government has artificially lowered interest rates, made money too cheap. Two important things happen. First, too many entities borrow money that they otherwise wouldn't have been qualified to get; too many over-indebted companies can stay in business by refinancing at successively lower rates. That's happening in the U.S., too. So one effect is to reward debtors, including irresponsible debtors.

At the same time, savers, those who are behaving constructively within the economy and who invest their savings in corporate bonds, are getting hardly any or even no return on their capital. After inflation, they're even experiencing a negative return. Their savings are being eroded even as the debtors are being rewarded.

This state of affairs is not stable on a long-term basis. It's dangerous. Now you have a governmental motive for bitcoin to exist. If I own a bond portfolio as a creditor, and I have a very, very small investment in bitcoin, and if over a period of many years, even decades, it eventually trades as parallel currency, then it could appreciate by hundreds of times. A 0.2% position, \$200 in a \$100,000 account, that over 10 years appreciates 300x, would add 4.8% a year to that portfolio.

On the other side of the coin, so to speak, a debtor that holds a small investment in bitcoin could use it to defray some maturing obligations over time.

Think of it, from the government's point of view – though I can't imagine it would ever be voiced – as an external policy tool that relies upon the populace to employ when the government has run out of the ability to transmit policy through the money supply.

Then there is the question of counterfeiting and the fact that the North Koreans have for some time now been able to produce what the U.S. government calls "super dollars" because they are indistinguishable from true dollars, except under laboratory examination. That is a threat. There might come a day when the U.S. Treasury itself shifts to a cryptocurrency to protect against debasement by counterfeiting.

All in all, the government might have valuable uses for cryptocurrency.

So, that is what Prof Willem Buiter Chief economist of City Group, had to say about Bitcoin Well, here is what Professor Nassim Taleb had to say in a forward to a book on bitcoin by Saifedean Ammous, which he posted on Twitter recently. He wrote that bitcoin's "mere existence is an insurance policy that will remind governments that the last object establishment could control, namely, the currency, is no longer their monopoly. This gives us, the crowd, an insurance policy against an Orwellian future." I don't know which professor is more qualified to speak on the matter, but being a professor does not, apparently, make your opinion the only one.

HR: Thanks for responding to all of those questions Steve. And thank you to our listeners. Please keep those question coming by emailing us at info@horizonkinetics.com and please stay tuned for additional episodes of Consensus Money.