EconoFact Chats: Cryptocurrencies, and the Future of Money

Eswar Prasad, Cornell University

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Michael Klein:

I'm Michael Klein, executive editor of Econofact, a nonpartisan web based publication of the Fletcher School at Tufts University. At Econofact, We bring key facts and incisive analysis to the national debate on economic and social policies, publishing work from leading economists across the country. You can learn more about us and see our work www.econofact.org.

Michael Klein:

Satoshi Nakamoto might be the most famous person who either does or does not exist. In 2008, a cryptography mailing list included a post by a user with this name. The user wrote, "I've been working on a new electronic cash system that's fully peer to peer with no trusted third party," and thus, Eswar Prasad, my guest today wrote, "the revolution was born, not with a bang, but with a link to a nine page proposal that laid out the details on Bitcoin." Eswar has just published The Future of Money with Harvard University Press. We could easily spend an hour or more discussing all the topics he covers in this terrific and fascinating book. The role of money and financial systems, FinTech, digital currencies, and cryptocurrencies. Today, I would like to focus on central bank digital currencies and cryptocurrencies, since Eswar does such a good job in distinguishing between them, demystifying cryptocurrencies, and discussing whether or not eventually we'll all be using Bitcoin to buy our morning coffee. Eswar, congratulations on this book and welcome to Econofact Chats.

Eswar Prasad:

Thank you, Michael. It's wonderful to be on your podcast, which I know has had some very distinguished guests in the past and i've enjoyed hearing the previous episodes.

Michael Klein:

Well, we have another distinguished guest today. Let's start out with some clarification. How do central bank digital currencies differ from cryptocurrencies like Bitcoin, Ethereum, and Libra.

Eswar Prasad:

So Michael, I'll refer to central bank digital currencies as CBDCs for ease. And one can think about CBDCs as essentially digital replacement for the dollar bills or whatever currency notes we might have in our wallets. So a digital dollar, if it were to transpire one day, would essentially be a digital form of the US dollar. So the critical aspect of a CBDC, of course, is that it would still be issued by a central bank and it would be backed up by faith in the central bank and ultimately in a national government. A cryptocurrency on the other hand is essentially a piece of computer code. It is set up by, run, and managed by an algorithm and nothing more. And it is not issued by a governmental agency. So Bitcoin, for instance, was created through an algorithm, and the process of creating new Bitcoins or other such cryptocurrencies is all managed through algorithms. So such cryptocurrencies are not backed up by anything.

Michael Klein:

So I want to spend a lot of time talking about cryptocurrencies, but first to distinguish between them, to talk a little bit more about central bank digital currencies, they have been introduced in a number of countries, right? Like Sweden and China. And they're also related to mobile money with which people can make transactions using their cell phones. Things like Venmo. There's some real advantages of digital currencies beyond just the ease of transactions for people like you and me, correct?

Eswar Prasad:

That's correct. Sweden and China have started experimenting with CBDCs, and so has Japan. The first country to roll out a CBDC nationwide is The Bahamas, which introduced the Sand Dollar just a few months ago. So CBDCs have a number of advantages. They bring economic activity out of the shadows, into the tax net. They leave a digital trail, which makes it harder to use central bank money for illicit or nefarious purposes. And it provides a low cost digital payment system that is easily accessible by the masses. So in principal CBDCs have a lot going for them.

Michael Klein:

So the ability to track them is really important. Ken Rogoff was a guest on Econofact Chats earlier, and he talked about his desire to get rid of Benjamins, of $100 bills, because they're largely used for illegal or illicit purposes. And I guess this brings us to cryptocurrencies. You have in your book a really good and clear explanation of how cryptocurrencies work. I'm not going to ask you to go into detail, but could you explain some of the key aspects of cryptocurrencies please?

Eswar Prasad:

Starting with Bitcoin, the technology at some level really is a marvel, because what Bitcoin promised to do was to provide a medium of exchange that would allow two parties, it could be you and me, even if we didn't know each other, just using our digital identities, we could conduct financial transactions using Bitcoin without using either central bank money, that is, cash or using a trusted financial intermediary, such as a credit card company, or maybe PayPal, or maybe through bank accounts. And this is accomplished by Bitcoin essentially by providing a technology that allows people to use their digital identities and also to validate transactions and make settlement of payments in a very simple way.

Michael Klein:

So this is using what's called the distributed ledger technology, right?

Eswar Prasad:

That's correct. The distributed ledger is essentially a public ledger on which transactions and other information can be maintained, and by maintaining it on multiple computers, it provides not just transparency, but also resiliency.

Michael Klein:

And where does the 'crypto' part of cryptocurrency come in?

Eswar Prasad:

Now this is the interesting irony of Bitcoin. I mean, we think about cryptography being associated with secrecy, but in fact, the Bitcoin blockchain, which is the name of the public ledger that Bitcoin transactions are maintained on, is available for the entire world to see. So every detail of every transaction, including the transacting amounts, the digital identities of the transacting parties are visible.

But cryptography enters in terms of providing pseudonymity to people. That is to say, you can conduct transactions using just your digital identities rather than revealing your real identities.

Michael Klein:

So if I were to, say, pay you in Bitcoin, you wouldn't necessarily know that it came from me.

Eswar Prasad:

That's right. It would be a digital Michael and I might not know who that real Michael might be.

Michael Klein:

Well, I'm the real Michael and I'm not yet a digital Michael, but maybe I will be at some point. Now Eswar, money is one of the central topics in macroeconomics, and when I teach about money, I use a quote by the Nobel Laureate Paul Samuelson, who said money is a social contrivance. It's accepted because people think it will be accepted, so it operates through trust. And for conventional money, that trust is backed up by the government, like what you're saying with central bank digital currencies as well. And it used to be the case that the government would trade, say, a precious metal, gold for money, but now the government backs money by its willingness to accept it in payment, for example, payment of taxes. But you make this interesting point in The Future of Money that the transparency of the distributed ledger that you were talking about, that itself is a source of trust that makes cryptocurrencies able to operate.

Eswar Prasad:

So this is what Bitcoin tries to do. It tries to replace trust in a public institution, such as a central bank or a financial institution such as a commercial bank with trust that is created through what is called a public consensus mechanism. So the idea being that if the entire community of Bitcoin users can essentially agree that a transaction is valid, and if all those transactions are posted on public ledgers that are maintained on multiple computers, then it also becomes secure through that transparency. Because if anybody tries to fiddle with one of those transactions, it quickly becomes noticed by the community and any such invalid transactions would quickly be rejected. So it's really trust being delegated to the public square.

Michael Klein:

In the introduction I mentioned that this all began in 2008 with a post by perhaps someone named Satoshi Nakamoto, and you make the point in the future of money that it's not a coincidence that it really took off in the wake of the great financial crisis that began in the fall of 2008.

Eswar Prasad:

That's right. So the Bitcoin white paper actually was posted just a few weeks after the Lehman moment of September 15th, 2008, when the iconic bank Lehman crumbled and took almost the entire US financial system down with it. So when Bitcoin was first introduced, which actually happened in early 2009, trust in governments and central banks, and also in big banks was really at a very low ebb. So it was a very ripe time for one of these cryptocurrencies to emerge, which said that you could conduct transactions without relying on these institutions that many people had lost trust in.

Michael Klein:

Now, when you conduct transactions, another point I make in the classroom is that money is a medium of exchange and also a store of value. So I guess if cryptocurrencies were in fact the future of money, they would need to fill these two roles. And in your book, you write that along these dimensions, the

experience with Bitcoin, Ethereum, and Libra have been 'crummy,' which is an adjective you use because you're describing whether or not they'd be good for purchasing croissants when you're in Paris.

Eswar Prasad:

That's right, Michael. Bitcoin was set up as a medium of exchange. Whoever Satoshi Nakamoto was did not indicate in the white paper that he imagined it being a financial asset. Now Bitcoin has very volatile value, so one day you might be able to use Bitcoin to buy a bunch of croissants and maybe another day just half a baguette. So it's not a great medium of exchange. It's also very expensive and somewhat cumbersome to use. Transactions using Bitcoin are slow to be validated. But the irony is that although it's failed in its initial purpose, it has now become largely a speculative asset. So people hold onto Bitcoin because they think it's going to only increase in value, and that very faith of investors seems to be holding up its value. So it seems to be a rather shaky foundation of its value, given that it has no intrinsic use, but at least so far, the party has continued.

Michael Klein:

Well, it has increased in value quite a bit, and then it decreased in value quite a bit, then it increased in value quite a bit. So it's just been incredibly volatile, as you say. And even though it's not a very good medium of exchange, it does seem to be an important medium of exchange that is used for transactions for illegal or illicit transactions on what's called the dark web, like the so-called Silk Road website. So I referred before to how Ken Rogoff said that maybe we should get rid of $100 bills because they're mainly used for drug trade and other illegal activities. Does this mean we should also take a similar stance towards cryptocurrencies?

Eswar Prasad:

You know, in its early days, this seemed to be the primary purpose of Bitcoin, because anonymity was its real allure. The fact that you could conduct transactions without anybody knowing who you actually were. But over time, it's become clear that if you conduct a lot of transactions using Bitcoin, or use Bitcoin to buy real goods or services, ultimately your identity can be tracked. So the anonymity is not the big draw of Bitcoin anymore, and criminals have moved on to other types of cryptocurrencies. Some of them still use Bitcoin, but they have to run it through very sophisticated systems in order to truly conceal their identities. New cryptocurrencies are emerging that are promising much greater degrees of anonymity, but they're not very great to use still. So Bitcoin is no longer used that much for illicit activities. Like I said, it's really become mostly a speculative asset at this stage.

Michael Klein:

But this brings us to the point of the regulation of not just Bitcoin, but other cryptocurrencies as well. So we see a lot of regulation of financial markets because there can be these externalities, these spillover effects, these what are called systemic effects of financial failure. What's going on with the regulation of Bitcoin? Or what's proposed to be going on with the regulation of Bitcoin and other kinds of cryptocurrencies. And do you think these are good ideas or bad ideas? Are they easy to implement or will they be hard to implement and so on?

Eswar Prasad:

At one level, Michael, one might say if investors go into an asset like Bitcoin, which they know has no fundamental intrinsic value and essentially want to take a large bet, who's to stop them from doing so, so long as they do it with their eyes wide open? But I think regulators have some real concerns about market manipulation related to a lot of cryptocurrencies and the use of cryptocurrencies to manipulate other parts of the financial system. There are new cryptocurrencies coming up called 'stable coins'. Facebook, for instance, proposes to issue its own stable coin, which essentially would be backed up by stores of US

dollars. But there too, there are concerns about whether these would end up operating like unregulated money market mutual funds, which as we know, created a lot of problems during the financial crisis.

Eswar Prasad:

There are also concerns about whether cryptocurrencies such as Bitcoin or Facebook's Diem might be used for illicit cross-border transactions. So I think there is a variety of issues that regulators are having to contend with. Right now there is no clear evidence that spillover, that these effects might spill over more broadly into the financial system. But I think given how rapidly this market has expanded, it's good that regulators are trying to act proactively.

Michael Klein:

And there's some other funny features of these currencies as well. For example, Bitcoin has said that they're only going to mine 21 million Bitcoin. Is that correct?

Eswar Prasad:

That is set in the algorithm, that there is a hard cap of 21 million Bitcoins, and Bitcoin adherents seem to believe that that is the main value proposition of Bitcoin, that it is scarce, unlike Fiat money printed by central banks, which can of course be printed in essentially unlimited quantities. But again, scarcity by itself, as you and I know, Michael, can hardly be a durable source of value.

Michael Klein:

Well there's a question of whether or not they actually keep to it when they get to that point. And if they do keep to it, then there's going to be this scarcity of Bitcoin and the price would just go wild, and it would be a real problem with that.

Eswar Prasad:

Now it turns out it is hard coded into the algorithm, but everything can be changed if the entire Bitcoin community agrees to make changes to some of those parameters. But of course, people who hold Bitcoin might not be eager to have more Bitcoin created because that could reduce the value of their existing holdings. So you're right, Michael, the price of Bitcoin few years from now could be either zero or it could be some fantastic amount, so maybe it's not such a bad idea to get a couple of Bitcoins right now, just in case the price goes to the moon because who knows.

Michael Klein:

All right, so your listeners, you've heard that. We have advice from a very esteemed economist here. This also, Eswar, brings us to the issue of the mining of Bitcoin, which is kind of a very technical and unusual and interesting thing. But as it turns out, it also has these very adverse environmental aspects. Can you discuss the mining of Bitcoin a little bit, please?

Eswar Prasad:

So the mining of Bitcoin is this very abstruse concept through which Bitcoin transactions actually get validated. So essentially in order to get the privilege of validating a block of transactions using Bitcoin, people who have computing power have to go out and solve a complicated numerical puzzle that is generated automatically by the algorithm. And the only way to solve these puzzles it turns out is not through analytical power, but by brute computing power. So you need huge masses of computing power, which means you need energy to run the computers, you need energy to cool the computers. And right now a lot of this mining is done by very specialized mining rigs which wear out very quickly because they run at full capacity all the time. So Bitcoin really is an environmental disaster because it involves a huge amount of energy consumption, a lot of computer [detrisus] , All of which winds up in landfills, and

there are some estimates that Bitcoin may account for as much as 1% of world electricity consumption right now.

Michael Klein:

That's incredible. To think that so much energy is being used for this. And incentive, as you said, is if you solve the problem, which is requiring lots of computer power, then you get some Bitcoin, right?

Eswar Prasad:

That's correct. So that's the way Bitcoin is set up. As you and I know, Michael, if you want people to devote resources to anything, you need to provide an incentive, and that's a clever part of Bitcoin. The incentive that miners have to validate transactions is that they get rewarded with Bitcoin, and the higher the price of Bitcoin, the greater their desire to be the miners who are the first to solve the problem. And this is a critical element as well, why computing power is essential, because you have to be the first to solve the problem, and the only way to increase your chances of being able to do that are by having more computing power.

Michael Klein:

So it's not only the first person who's working on the problem, but all those who didn't achieve that. So that means that, as you said, it's a huge, huge amount of power. Is there any way that this might get resolved so it becomes a less dirty money?

Eswar Prasad:

There are new consensus mechanisms that are trying to convert cryptocurrencies into less dirty money. Consensus mechanisms are essentially the ways by which the network of computers agrees that certain transactions are valid. And the second most important cryptocurrency, Ethereum, will soon be moving to a different consensus protocol, which will be much more efficient. It'll allow transactions to be processed in greater quantities much more quickly, and without this environmental problem associated with it. There is a prospect of even Bitcoin moving to a new consensus mechanism, but it's not clear if and when that will happen.

Michael Klein:

I'll put you a little bit on the spot, Eswar. What do you think the future of money is? Will we see more central bank digital currencies, which seem to have a really important role. Do you think cryptocurrencies are something that will stay with us, or will people get tired of the wild swings? And I guess those Benjamins and those pictures of George Washington, will they still be around just so we can buy a cup of coffee?

Eswar Prasad:

One thing I can say with the reasonable degree of certainty, Michael, is that a few years from now, it's going to be very difficult for me to buy you a cup of coffee using dollar bills, because they just won't be that widely used anymore. I don't see cryptocurrencies in their present form being very viable mediums of exchange, but there are many technological improvements coming. And certainly both domestic and international payments are areas where there is a lot of demand for better, cheaper, and lower cost services. So those changes are coming. I think central bank digital currencies are going to become pervasive in the next few years, and they will provide a low cost digital payment system that is easily accessible to the masses without having a credit or debit card or a bank account.

Eswar Prasad:

Central banks that seem to be interested in issuing CBDCs, and that number grows by the day, don't want to push out cash. They talk about cash coexisting with CBDCs. But I think as we all get used to the convenience of digital payments, using it as some form of new cryptocurrencies or CBDCs, I think cash is organically going to wither away. So the one prediction I can make with a reasonable degree of certainty is that cash isn't going to be with us too much longer.

Michael Klein:

Well Eswar, I very much look forward to getting together with you and having you buying me a cup of coffee. And when we do that, I'm going to bring my copy of The Future of Money and ask you to sign it for me, because I think it's just a really terrific and wonderful and illuminating book. So thank you very much for speaking with me today.

Eswar Prasad:

I look forward to the day, Michael, when I can see you in person, and thank you very much for having me on your podcast. It's been a real pleasure.

Michael Klein:

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