

THE BROOKINGS INSTITUTION

WEBINAR

THE FUTURE OF BLOCKCHAIN AND DIGITAL MARKETS:
A PERSPECTIVE FROM THE WORLD ECONOMIC FORUM

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P R O C E E D I N G S

MR. PATNAIK: Hello and welcome to this fireside chat of the Center on Regulation and Markets at the Brookings Institution. My name is Sanjay Patnaik and I'm the director of the Center. In our series of fireside chats we explore important topics related to modern day markets and regulations through one on one conversations with regulators, business executives, and academics.

Today it is a real pleasure to welcome Sheila Warren, who is the head of data blockchain and digital assets and a member of the executive committee at the World Economic Forum. Her pioneering policy work is helping shape the data and technology spaces to become more inclusive, ethical, and equitable.

Sheila began her career as a Wall Street attorney before turning to philanthropy and civil tech over a decade ago. She also serves on the board of the ACLU of Northern California, the Equal Justice Society, and TechSoup, and has advised the World Bank, the OECD, and the California government. She is an honored graduate of Harvard College and Harvard Law School.

Thank you so much for being here today, Sheila.

MS. WARREN: Thank you so much for having me, Sanjay. It's a pleasure.

MR. PATNAIK: And especially in this time where it's very busy I would imagine. The topics we're talking about are pretty trending, especially this week.

MS. WARREN: To say the least. (Laughter) Every day is a new adventure.

MR. PATNAIK: Exactly. I can imagine. I mean we have received a ton of audience questions, which is not surprising given the recent news stories. And so I thought what we can do is maybe to start off the topic for those audience members who are not as familiar with the technologies, if you can just very briefly explain what is blockchain and how does it work.

MS. WARREN: Sure. Well, the very briefly is the challenging part there, right?

So, first I'll reframe the question a bit and say it's not so much how does it work, it's what does it do. Because how it works is it can get quite technical very quickly. So I would encourage people interested in that to read the bitcoin white paper. You can't get through it the first time probably, but it will

make sense if you keep going over it.

So what is a blockchain and why is it interesting? So, let me give you an example. So right now, Sanjay, if you and I were — if I were to buy you a cup of coffee let's say, we went out for a coffee, socially distanced of course, we might take our mobile devices, as people really do these days, and we would select our payment app of choice, Venmo, Square, Cash, whatever it was, and we would basically push a couple of buttons and what would happen is my bank would basically tell your bank, through the intermediary of the payment app, that we should debit from me and we should credit to you, like if I'm paying you back for a cup of coffee, right.

MR. PATNAIK: Yeah.

MS. WARREN: So there are three institutions involved there, there's my bank, there's your bank, and there's this intermediary payment center base, okay. Now, what a blockchain can do is it removes all three of those middle parties so we can pay each other directly without the need for anyone to track what else is going on, right. And how does that work? Well, what's to stop you from basically coming back and being like, oh, you never paid me back, right? What's the record?

So what's happening is that we're substituting the trust that we have in the institutions, in these cases the banks and the interface, we're substitute in that for a distributed network. And in this case, it's a network of end computers that are all going to simultaneously take a note, Sheila's account goes down by X and Sanjay's account goes up by X, right. And so imagine if everyone watching this right now watched me hand you, you know, the money and they all wrote down Sheila hands Sanjay \$5 or whatever the going rate of a cup of coffee is — \$8 or whatever, depending on where we are right.

Now, for us — for me to come back to you — you to come back to me and say you never paid me, you would have to convince 51% of those recorders that it never happened, okay. And because all of these computers are anonymous, you know, tied into each other, the idea is that it's very, very, very challenging for this to ever be overridden. So you're substituting the trust that you have in a centralized institution, like a bank, you're substituting this network, this distributed network, which holds a distributed ledger — it's ledge technology — for that as a record.

So that's really the fundamental behind a blockchain and why it's interesting because you can see that the disintermediation decentralization opens up a lot of possibilities.

MR. PATNAIK: Yeah, definitely. Especially I'm thinking about kind of like cutting out some of these middle men, right, and making transactions more efficient, not only between different market participants, but even across borders I would imagine.

MS. WARREN: That's right. And the other thing that's interesting is that the record is public, right. So if you need to have — let's say you have parties that don't really trust each other, well you want to have the ability for everyone to know that what they're seeing is essentially the same record. And using this kind of system you don't have to rely on a centralized authority to kind of show things to people, right, to be the proof point. You can actually view the ledger yourself at the same time, simultaneously, or however you set it up.

So there's another element there where with parties that don't really trust each other, haven't built up that kind of a relationship, they have an accurate source of truth — or state, as we call it, as to what is real. And that can be quite valuable as well.

MR. PATNAIK: Yeah, I would imagine, especially in those countries maybe where institutions are weak and where there are high levels of corruption —

MS. WARREN: Exactly.

MR. PATNAIK: — where you could kind of improve that trust because you don't need it anymore for these institutions, right?

MS. WARREN: That's right. That's exactly right.

MR. PATNAIK: Very interesting. And so let me also move a little bit to the topic that has been trending, especially this week, which is digital currencies like bitcoin, right. And so they relied on technology, related to blockchain. So I'm just curious, can you explain very briefly how do these currencies work? What do they do?

MS. WARREN: Yeah. Why don't we stick with bitcoin, because that's the one that's getting the most popular attention, but note that there are many other forms of digital currencies.

So bitcoin is a digital currency. It's a decentralized system which records transactions on a blockchain, okay. And so the way this works — I think what's interesting about bitcoin right now is of course there's this interesting question, is it a store of value, is it a currency, is it — can it be used for payments? And so right now what you're seeing, the whole big trend here, is bitcoin kind of is an investment, right. So people kind of — institutional money coming in, people buying in and seeing that price really skyrocket based on the back of all of these different announcements that are coming through, seemingly on a daily basis.

So bitcoin has been used more as a store of value, which is not to say that it is not also used as a form of currency. You can pay for things in bitcoin. In fact, there's this kind of running meme joke right now, like, you know, is it worth it to pay for your Tesla in bitcoin, right. And you can do that. And more and more merchants are accepting bitcoin and other digital currencies as a form of payment as well. But that is a little newer frankly, it's a little bit more — it's getting easier, but it's a little more — it's been a little more complicated historically.

So that's really what it is. It's important I think to separate the protocol, the blockchain that underlies this, from the network itself, which is basically what bitcoin is, and then from the coin as well. There's kind of three different layers.

MR. PATNAIK: So that's interesting. So it looks like people are thinking of it more like an alternative to gold or something to put value in as an asset class.

MS. WARREN: You know, the debate rages around this, right. I mean the debate rages I think less so than it did maybe four or five years ago, but it's still an interesting conversation to have. And different people — there are very strong views on this, on what is it now, what could it be used for, what's its potential. You know, all of this is why you're seeing I think so much activity in this space from different players.

MR. PATNAIK: Mm-hmm. And so related to this, we have seen this week two very important announcements. One is that Tesla just announced that they invested \$1.5 billion in bitcoin and that MasterCard will accept cryptocurrencies as payment.

So I would be curious to hear from you what do you think are the implications of these major announcements for digital currencies going forward. And especially if you look at other major developments that you see related to blockchain and/or bitcoin as it relates to your work at the World Economic Forum.

MS. WARREN: Oh, my, where do I begin. Okay, well, let's —

MR. PATNAIK: Probably a very broad topic.

MS. WARREN: Yeah, let's start with Elon Musk and MasterCard.

Well, first of all, I think it's going to be really interesting to see what the SEC has to say about this whole situation. And I am not a securities lawyer, so I'll leave it at that, but let's just say I'm certainly paying a lot of attention to what happens there — yeah. What does that mean? And, you know, it's not that surprising to me. I mean there are a lot of players that have come out and been more open about the fact that they've been holding bitcoin specifically for quite some time, but also Ethereum and some of the other coins as well, some of the so called alt coins. There are university endowments that have, you know, some money in bitcoin, there are private wealth managers who for going on five years now have been telling people to keep a percentage of their investments in cryptocurrencies, specifically bitcoin and Ethereum, but also other coins as well. There are crypto index funds that have existed for a while now.

So this is obviously a big move from a very powerful player and it's a lot of money. And so the scale and scope of it is at a new order of magnitude. The fact that a lot of very wealthy people are invested in bitcoin should not be surprising at this point, the way maybe it would have been, you know, again, four or five years ago. A lot of people have been riding out the bear market on traditional currencies, on bitcoin specifically and are not willing to be more open about that.

MasterCard. I think is indicative of what I was saying earlier, which is this movement into looking at additional currencies and bitcoin as a form of payment. So there's a ways to go, you know, I think in the user interface around that, but the great news is that I think a lot of companies that have UX pretty resolve, like they have a pretty simple payments process, are now looking at connecting on the

back end in digital wallets. And that I think is the interesting thing. It's not so much that you can now pay for things in bitcoin or whatever, it's that all kinds of digital currencies eventually are going to become available on these payment networks. And that integration is really interesting, right. Because part of what it is, is it's putting a centralized layer on top of a decentralized currency, which is interesting in and of itself. So to what extent are you reaping the benefit of decentralization in the first place.

The other is it's just representing kind of an institutional openness, not just to holding it as an investment, but to using it. And that is a very significant I signal I think to the market in terms of what the future is going to hold for digital currencies as the general matter.

MR. PATNAIK: Mm-hmm. That's actually interesting. That brings me to my next question, which is if you look at this — I mean the implications for the existing banking system and existing currencies might be huge, right, because if people starting paying in cryptocurrencies, why do you need like national currencies, for instance, right. Or why do you need these intermediaries?

So I'm curious, what are your thoughts in terms of the future developments that you see in the space and how will it affect existing players, central banks, the banking system, and national currencies?

MS. WARREN: So let me break down three different kinds of digital currencies, okay. So there's something called a central bank digital currency, that is fiat money, issued buy a central bank, all on its books. It's the equivalent of cash. You need to think of it exactly — it's just digital cash.

MR. PATNAIK: Okay.

MS. WARREN: Then there is something called a stablecoin, which is a cryptocurrency that is fiat backed. Some examples of this are tether or USDC. Okay, so that is — there's reserves held on that. Tether's reserves are an interesting question. It's again the subject of some debate. USDC is dollar to dollar backed. And so but it is a purely digital form of currency that is not issued by a central bank.

Then there's the next level of abstraction, which is pure cryptocurrency, like bitcoin, which has its own intrinsic value. It's not pegged to anything. Okay. So CBDC, stablecoins — stable — they're

pegged to an asset that could eventually — it could be something like commodities pricing, Agri futures, whatever. It could be anything, but it's an extrinsic asset and that's where it derives its value or it's price.

And then you've got — yeah, it's value, exactly. And then you've got the intrinsically valued cryptocurrencies, which are a different class. And the most famous of those of course is bitcoin.

And so my view has always been that there is room for all of these things in the ecosystem. And there is this growing I think idea that one of these things is going to take over all the other ones and, you know, CBDC is really hit. Like if the digital yuan comes forward and really moves forward, then nobody will use bitcoin or whatever. That has never really made any sense to me, you know. I think that the case for a CBDC, it's not an easy case to make. I mean you really have to have a particular use you're going for and a particular need to have that kind of an option available if you're going to have it be central bank issued.

The case for stablecoin to me is just ease of payment. You know, it's programmable money. So the other thing I didn't mention is that you can program digital currencies in a way that you can't program, obviously, regular fiat, right.

MR. PATNAIK: Mm-hmm. Yeah.

MS. WARREN: So let me digress a bit and tell you what that means.

So you can imagine, you know, an insurance contract, okay. So when X thing externally happens then, you know, there's a trigger and so and so gets paid an amount of money. So if there's a weather situation then insurance kicks in and a payment gets issued. You can actually program all of that into code. I mean that's not something we could do five years ago. Like it's not more than that. What's interesting is that the digital currency trigger, it can be coded into the currency. So you actually know that this money is held in some sort of escrow, let's say, and it's going to be released when X thing happens. And that all happens automatically.

MR. PATNAIK: Okay.

MS. WARREN: So the speed of this is really interesting. Now, we're just starting to unlock the programmability of money, and that in my mind is really the primary use case for a lot of digital

currencies, particularly those that might be issued by a central bank or those that are stablecoin.

But, yeah, the universe, these are different things, they fit different purposes, there's different reasons behind them. And ultimately you have to go back to asking the question, what is the problem you're trying to solve. That is where you being, right. You don't issue any of these things because it's fun. Like you have a particular problem you're trying to solve. In bitcoin's case it was this problem called double spend. You know, in a central bank digital currency's case, it might be that you want to have particular kinds of control of the money. Whatever it might be. There's different reasons that you're going to do these things. And I don't think that we're going to see a world in which any of them become totally obsolete because the other one becomes — you know, gets so much traction.

MR. PATNAIK: That's actually very interesting too. So you see an ecosystem where you have parallel currencies —

MS. WARREN: I do.

MR. PATNAIK: — basically and maybe serving different needs, different parts.

MS. WARREN: And the other reality, right, as we talk a lot in this space about financial inclusion, but at the end of the day the easiest thing to use is cash, you know. And so the idea that cash is going to become readily obsolete I think ignores the realities of many people's lives, you know. And when you talk about financial inclusion via a stablecoin or any kind of digital currency, you have to take into account, you know, infrastructure questions, you know, connectivity issues. Like there's threshold onboarding questions that have nothing to do with the financial system that are really about technology and its availability in different parts of the world.

So interesting enough, we are seeing that cryptocurrencies have high use in hyper inflationary economies because they're much more stable, right, than the hyper inflationary —

MR. PATNAIK: (Inaudible).

MS. WARREN: Right. Yeah, but for people that have access to something like a digital wallet. And so that is an interesting I think user question that a lot of people are working on very hard. There's been a lot of progress made, but we're still not in a world where we could just eliminate cash

completely and not leave out or, you know, create hardship for part of the population.

MR. PATNAIK: And I think that's a bit reflected with the divide that we have seen during Covid, right, where some part of the population can do everything remotely, work from home, including us, for instance, right.

MS. WARREN: Exactly.

MR. PATNAIK: And then some part of the population cannot and they — often times that overlaps with a very cash based economy, right.

MS. WARREN: That's right.

MR. PATNAIK: Usually in poorer countries. And even — I mean it's interesting, even some richer countries, if you look at use of cash in Germany, for instance, it's much higher than credit card use because I think of cultural preferences. So that's an interesting aspect to keep in mind for the future probably.

MS. WARREN: Yeah, that's right. We tend to think of economies as monolithic in their use — or preferences. And that's just not at all the case. I mean there are very strong cultural preferences around certain kinds of financial services, for that matter, but also certain kinds of financial payments. Like how payments really work. There are some countries that have already gotten pretty digital, like everything is pretty much e-money at this point, and other that are not there, they're not there yet.

So we'll see. Yeah, we'll see what happens. (Laughter)

MR. PATNAIK: That's actually a great point related to my next question, which is when you look at blockchain as the underlying technology and then the bitcoin draw on these technologies, what do you think of the implications of those for equity, and how inclusive do you think the technology is? Is there a way that that can help it include more people in the economy? Maybe reduce some of the inequality we see?

MS. WARREN: Yeah. I mean that is something I'm very passionate about and very — I'm optimistic about it, but I'm also cautiously optimistic about it. Like I think that we kind of went through

in the last three years a tremendous sort of quiet in the bear market, a very significant build phase. And so I think a lot of activity that was focused on banking systems and the unbanked and integrations and on ramps and off ramps to fiat and all of that. There was a lot of activity happening quietly sort of behind the scenes — 2018 through 2020.

So I feel pretty positively about the direction of travel with this. Like I said, I do think these are systemic problems. And so when you think about financial inclusion — and again, you have to kind of explore, like what are the reasons a particular population is not able to access a banking system. In some cases it's just that because of de-risking or other reasons the banks just aren't available. They're literally not there, right. So in that case, okay, you've got one set of problems.

Another case it's because there's resistance. There's resistance on the part of, like you said, cultural resistance because the economy works in a much more informal kind of way and that's actually preferable for a variety of reasons.

So we have to think about what would it mean to formalize some of these things in a way and what might we lose. And this is kind of a very classic development aid problem. Like we go in, we kind of top down a solution, and then we're surprised when we've broken other things that we didn't realize were part of that system.

So I think this is something that there's a number of groups that are doing a lot of exploration around this, some development agencies, but also some of the big NGOs, international NGOs that are looking at this and how these kinds of technologies and opportunities can truly solve problems and create, you know, (inaudible) standard of living as opposed to being again kind of a novelty system that isn't necessarily solving an actual real need.

You know, all that being said, this — again, and as I've been pointing out for years — a lot of the activity is happening in emerging economies. So when you look at the real in depth experiments with central bank digital currencies, it's not the Fed and the Bank of England, although there was some experiment with the Bank of Canada or Japan — there was experimentation there for sure, but the real deep level experimentation was Sand Dollar, the Bahamas, Cambodia, Eastern Caribbean Central Bank.

Like a lot of these places that were really looking at this can help our population right now. Really innovative regulation out of Bermuda. You know, these are the economies that I think A, they can take a little bit more of a gamble because they're propelling themselves kind of onto the world stage in terms of being very innovative and forward thinking, right. So that's good for their citizens as a general matter. But also there was a need that was more obvious in some of those economies. When you ask most people in western developed society — take the United States, you know, it's not a huge pinpoint for a lot of people, right.

MR. PATNAIK: Yeah. Because we have that institutional framework at the top, right.

MS. WARREN: That's right. Which is not to say that it's not a problem for — I mean there are people in San Francisco, you know, a block away from house, that certainly this is a huge issue, cash and all those kind of things. It's a gigantic issue. But it has not risen to the level, I would say — at least not in the last four years — of a political issue that would get this kind of attention, the way that is the case in some other jurisdictions and geographies.

MR. PATNAIK: And I think that's something that I think where this new technology could really play an important role by helping those countries like overcome the institutional voids that would take a very long time to fill with regular traditional methods. A bit similar to when you look at energy, right. Like instead of building a coal fired power plants, a lot of these countries are trying to switch to solar direct and leapfrog ahead, which I think makes sense because they can harness the potential.

MS. WARREN: That's right. And so I do think that we're undergoing a gradual transformation towards digital money, financial systems. Like that's been happening for a while. Like even just some of these payment apps, it would have been a thing you never would have trusted something like that a decade ago, right.

MR. PATNAIK: Definitely not.

MS. WARREN: And now everybody — you just don't even think about it. So I do think we're moving in that direction. But, you know, there's this kind of like belief — it's really kind of like a passionately held belief in some of the hard core crypto community that banks are going to be eradicated

in the next five years. And when I hear that I kind of have to roll my eyes a bit because they're certainly – we're going to be growing a generation of crypto natives, the way that we have a generation of digital natives. Crypto, using crypto, it will be very natural in a way that is unfathomable to I think us and most people probably listening to this talk today. You know, the way that digital nativity, when I view it among my own children, it's shocking the things that they are able to do and think about that are natural to them at the age of 2 or whatever that I didn't even experience until I was 17 to 18 years old.

So I think that is a thing that's going to happen. But let's not forget that it's still the case that the people really moving around money a lot are not crypto native by any stretch of the imagination. They don't necessarily see a problem with the way that they, you know, get their paycheck or pay their bills or whatever. I mean they have other problems, but the problem is not the ease of use of doing some of that stuff. So while we all acknowledge that there can be massive improvements, I think it's unlikely that we're going to see people suddenly just leaving their banks out of it all together.

And the example I often use here is ATMs. So when I think about my own parents, right. Like the ATM was right there but they were like well we're just going to go to the bank, you know, what's the big deal. And it took some time for them to realize like, oh, that's just — it is easier and it is faster. I think the learning curves on these things, they're a lot faster, adoption curves are faster, but they're just missing a part of the population we should not be forgetting about when we talk about this radical transformation of the way that we engage with crypto. It's just something —

MR. PATNAIK: And it's probably going to take a generation or so to really take hold.

MS. WARREN: Yeah, but things move really fast, right. I mean like email took hold a lot faster than previous innovations. And now that we have the ability for people to kind of teach themselves — you know, we have our lovely search engines and other courses and things like that. So I do think it's not going to take the time that other kinds of adoption curves took. But nevertheless, when it comes to people's money, change takes time, comfort levels take time. It isn't the same thing as getting in a car with a person you don't know to get a ride somewhere, right. It's a different thing, it's a different thing.

MR. PATNAIK: That's very interesting.

I think another aspect that I'd love to hear about is when we look at blockchain that technology can be used in many different settings, right. I mean bitcoin is hogging a lot of the attention obviously, but I would love to hear what other potentials do you see for blockchain. I think you've mentioned a few as work, especially supply chains, which I think is especially important nowadays in a globalist economy with things like the pandemic happening that has impacted supply chains around the world.

So I'm curious what other applications you see for blockchain and where you maybe see the biggest potential that this technology can really change existing ways of doing things.

MS. WARREN: Yeah, so I think one thing to note is that a lot of times when people think they need a blockchain, you really have to step back and be like do I really just need a centralized data base. So I've always been a bit of a pragmatic optimist on the use of blockchain. And, in fact, the first thing that we did when I started at the Forum was we issued a paper called "Blockchain Beyond the Hype." And that was — this was during the craze of like Long Island blockchain iced tea or whatever, right. Like when everybody was kind of putting blockchain in the name of their thing and you could use blockchain for absolutely everything in the world. And so I never believed that that was true. It didn't make sense. As the technology gets faster and cheaper it will start to make more sense, but there are some cases where really a centralized data base is a perfectly fine alternative and you don't really need to be using a blockchain. Just, again, the novelty is a novelty toy.

That being said, I think that — this goes back to what I was talking about in terms of an alternative source of trust — and so what we did see was a tremendous amount of exploration around supply chains. And you had Maersk and IBM launching TradeLens, you had a lot of just different — Wal-Mart doing a big exploration here, you know, we had lots of shipping companies, LogisticsX looking at this. And that — you know, it's quieter now, to be honest. We issued a big supply chain tool kit in the spring of 2020 that really talked about how you build coalitions around blockchain. One thing I say is that blockchain is a team sport. Like there's no point in launching a blockchain for yourself, right, or parties that you know really, really well. It really only makes sense when you've got a coalition of organizations

across a border, for example, but not necessarily, that really need to have access to some information.

So I do think we're going to see blockchain being used as a way to assist in things like audits where you could actually give an external auditor kind of real time access to some of your information that might make things a little more seamless. There are business reasons you wouldn't want to do that, obviously, but I do think you could see a little bit of pressure on systems like that, right, where the auditor needs to know that you're not like cooking your books when they're coming through and they could have that kind of access. That's something I think that we're seeing.

Payment of taxes is something else. You know using again these smart contracts. I was mentioning this automatic kind of payment that happens. And supply chains as well. I mean we are seeing it more along the lines of provenance and traceability. So one thing that came up a lot — actually, coincidentally we had launched our tool kit right — our supply chain tool kit right when the pandemic was sort of becoming very, very concerning, you know, sort of in the April kind of time frame. And so one question was like, wow, if only we could have actually tracked PPE from origin to destination, it would have made it impossible, or at least very, very nearly transparent that divergence were happening, where they were happening, right. And we could actually match need more effectively and efficiently in a system that would be fully transparent to everyone. It could actually almost automate allocations depending on where cases were rising, and things like this.

So there are situations like that where it's understood what could have been the case had we had such a system. But, again, the incentive to actually put one in, it's not easy. This is kind of like if your legacy system is working, I think again this is more of a longer-term consideration for when you're ready to kind of retire your old system. A lot of people I think are going to be moving to blockchain as part of the tech stack.

MR. PATNAIK: And I think that is also probably the resistance of the current (inaudible) rules out the middle man, right?

MS. WARREN: Exactly.

MR. PATNAIK: But I agree. I mean I think the pandemic is a great example. But even to

try to trace the origin of masks, right, like if they are genuine masks or not.

MS. WARREN: That's right.

MR. PATNAIK: Because there are a lot of masks that have been seized that are fake masks.

MS. WARREN: Yeah.

MR. PATNAIK: And not as protective as they should be. And even I think I mean my own work as climate change, I could imagine using blockchain, for instance, to look at emissions offset credits.

MS. WARREN: That's right. We have a project —

MR. PATNAIK: Where they could identify those. That's (inaudible).

MS. WARREN: Yeah, we have a project looking at that. Yeah. A number of mining and metals companies came together and they're actually using this to help move towards net zero. So they're kind of tracking essentially emissions. And, again, it's a situation where you know that what is going into that system is something that everyone has access to. So there's like a different level of accountability.

Now, I think it's important to note one thing we talked about with blockchains a lot is that they make information more transparent, okay. And I think it's important to take a step back and say well, transparency isn't necessarily the end goal. You know, I've been a lawyer and there's something called the data dump, right, where you're transparent but you're just flooding a system with a ton of information and only some of it is really relevant.

So there's a lot of design that has to go into this and I think we have to be mindful of like what is the policy, what is the governance around that transparency that makes it really useful. And, again, it comes down every time to what is the problem you're trying to solve. Who needs to see what and when and does it need to be multiple people at the same time. All of these kinds of things really do matter when it comes to the decision of whether or not to include a blockchain in your tech stack.

Now, that being said, I'll go a little bit deeper on that. Blockchain is part of a tech stack.

So I think there's this public kind of mythology that like you put everything on a blockchain and that's kind of like the end game of a blockchain, right. That's not — it's a code base fundamentally. And so what you're doing is you're basically layering that into a bigger technological system that's got a cybersecurity layer, or whatever other kinds of layers, and you're deciding whether to do that based on the characteristics that we've been talking about and others that are relevant to your particular context.

MR. PATNAIK: Mm-hmm. I think you bring up a very good point, which is kind of we have talked a lot about the technology and the market side, but there's another side to it, which is the regulatory side, right. And I mean this is one of the prime examples where we see a technology coming up that is completely new, that is very rapidly moving, and I think the regulators are grappling with how to find ways to regulate it.

So in your work have you seen kind of like any regulations already being put in place for blockchain technology or digital currencies? And if yes, what kind of regulatory failures or successes have you seen in that space? Even the U.S. or EU or abroad.

MS. WARREN: Yeah. Well, those are very different things. So I think regulating a blockchain is talking about regulating technology, right. And so I tend to be very hesitant about any regulation of a technology in its pure form, right. I tend to be — I think we should move extremely cautiously before we do something like that.

And so I haven't seen a lot of movement towards regulating blockchain the way that no one is really regulating TCP/IP or protocols, right, like code essentially. However, because bitcoin and blockchain were so synonymous for so long, regulation of banning of bitcoin for a little while actually meant you were kind of banning the bitcoin blockchain, which was one example of — there are other blockchains as well, right. So it got really confusing for a time in there, right.

Now I think there's a lot more understanding at the regulatory level. This is I like pretty true pretty worldwide, that they're different things. And so the coin is one thing, the currency that there has been all this. Is it a commodity, is it a security, is it a — what is it, right. And that the answers have varied depending on what the thing is. Bitcoin and Ethereum in the United States are not considered a

security. Other alt coins considered a security. Lots of people and lots of trouble at the moment, or potentially in trouble around this distinction. More I'm sure to come. We'll just see. But the digital currency itself, there has been a tremendous amount of desire to regulate that, okay.

Now, where it also gets really interesting is the mechanisms of how you transfer and trade the thing. So there was this big kerfuffle at the end of last year — which continues a little bit to this year — with a FinCEN notice that came down that was talking about self-hosted wallets. And so the idea there is, as I mentioned, one of the beautiful things about a blockchain is you can engage in a fully peer to peer transaction, right. So we can do things without an — and so if you don't have an intermediary, well, like then who was on the hook or accountable or for all kinds of things that kind of apply, all kinds of rules, the Bank Secrecy Act Rule, KYC and anti-money laundering things that apply to these transactions, particularly if they cross a certain threshold.

So FinCEN wanted to come down and basically say no — I mean really paraphrasing — no self-hosted wallets. Like you can't use them. You have to kind of custody your wallet with another party, like an exchange. So the most famous exchange right now is coin based. You have to have kind of a central party that is hosting your wallet, you can't host your wallet yourself, which means you can't really access the bitcoin network yourself in exchanging a transaction or a trade.

There was a tremendous amount of push back from the industry.

MR. PATNAIK: I would imagine.

MS. WARREN: Yeah, tremendous. I mean I think there were like 7,000, going up to like almost 8,000 comments that flooded in from all across the industry just saying that this was deeply problematic for a variety of reasons. There were procedural issues raised. We actually submitted a comment that was about financial inclusion issues, you know, and how this would actually stem a lot of innovation around financial inclusion, which I firmly believe. And that's now — we'll see what happens with that notice, right.

MR. PATNAIK: Mm-hmm, sure.

MS. WARREN: So I think with the new administration in the United States that has come

in, I think there is certainly a lot more openness to this conversation. In some cases there's pretty deep knowledge about the technology and about the additional currencies themselves. So it will be very interesting to see. And again, I'm not going to predict here, but it will be very interesting — it's going to be very interesting. It's going to be a very interesting year to see how do these things play out and do those notices actually become codified. Like what is going to happen here.

Now, in other jurisdictions, I mean you've certainly seen China go very, very, very big on digital currencies, right. They have a program called DCEP, which has really been experimenting with pilots around the digital yuan. And those have been done in a variety of jurisdictions and they're poised to just explode and be very, very, very huge. And if successful, there is talk that China will move almost completely to digital yuan kind of payments.

MR. PATNAIK: Wow, that's interesting.

MS. WARREN: India has also made some big moves here. So they are looking — you know, the banning of bitcoin was a big conversation there, leading the way potentially to India rolling something out tied to Aadhaar, which is the identity system that's already been rolled out, that would connect payment to your Aadhaar identity card and use that and move to a digital coin situation.

So we're seeing these massively massive populations and massive government engaging in what can only be viewed as a very serious experimentation that I think is really important to track and look beyond the United States and Europe for these things.

But at the same time you've got jurisdictions that are deeply skeptical about these currencies as well. So it's just — part of I think what I see as my role is just trying to educate everybody, trying to make it very clear that digital currency is not going away. We're not going to unwind this. This is — there's no putting the toothpaste back in the tube here. All we can kind of do is try to make the trajectory rational and progress at a pace that's going to bring along, you know, as many people as we possibly can and be very mindful of who we're leaving behind. And we have an obligation to ensure that this inevitable roll out of digital currencies does not further the digital divide that's already being experienced, both in American society but all over the world.

MR. PATNAIK: So I mean you guys at the World Economic Forum work on this obviously, but who do you think should be — kind of like which body might be best suited on an international scale to work out some of these kinks? Maybe like come up with common standards, come up with common regulatory frameworks? Because, as you said, I think we see a lot of divergence across countries and, at least from my perspective, I see both blockchain and digital currency the big strength at the international level, at the global level, right, to overcome some of the limitations of natural borders, of national assistance. And so the question is, is there any push or movement to look at it from a global perspective? And if yes, who is doing that?

MS. WARREN: Yeah. Well digital currencies are borderless. So that is a really important point for land, right.

MR. PATNAIK: Yeah, exactly.

MS. WARREN: They are by definition borderless. And in fact the original use cases were around cross border settlement payments. So you had banks that were — central banks that were pairing up to kind of explore how could they engage in faster settlement times and the efficiency case that you said, which was kind was the immediate thinking most people jump to as an obvious advantage here, or a potentially obvious advantage.

You know, we certainly do a lot of this work, so we certainly do a lot of convening in true form and fashion of a group of stakeholders that span private sector, public sector, regulators, you know, civil society organization, trying to come up with that foundational sort of the interstitial tissue work that no one really wants to do, right, the unsexy kind of stuff, right. So we rolled out something called the Presidio Principles. It was kind of like an ethical values framework for how you ensure that the applications built on top of a decentralized protocol actually retain the decentralized components that make them compelling. Because if you're just building a super centralized thing on top of decentralized protocol, that isn't necessarily bad, but we should be very mindful of what we're doing. And everyone — you know, the impulse — there's kind of a running joke that if you get a developer in room they're going to just centralize everything right away because it's easier, it's faster, it's cleaner to have that kind of control.

And the whole point of these protocols is to not have that.

So you raise a very interesting question, Sanjay, which is like, okay, so if it is borderless then who on earth can regulate it effectively. And what we've seen over the past few years is tremendous diversity of regulation. I mean I would say it's potentially almost worse than what's happening in the data space. So I also run data here at the Forum and the way that we're seeing some of this regulation roll out is not only — it's almost impossible to effect compliance across the jurisdictions and have a global business. It's just getting really, really hard to do that, right. And so I agree with you. And I think that you've got — you do have bodies looking at this, and every sort of major international organization is really looking at this in some fashion. The World Bank looks at it, you know, the Inter-American Development Bank looks at it, the IMF looks at it, the BIS looks at it. But we don't really have a standard body like an IEEE that's kind of like looking at the technology.

Now, what's interesting is that for the code, like for the protocol, so Ethereum, there's the Ethereum Foundation which is really responsible for changes to the Ethereum code base. Again, kind of oversimplifying here. And they are rolling out — they're in the process of rolling out the next version of Ethereum, Ethereum 2.0. And that is — the governance around this is — I mean I'm obsessed with governance, so it's fascinating, right, because the entire point here is that no one controls Ethereum or bitcoin. There's no CEO of bitcoin, there's no like — there isn't a person there. There's like people that are bigger or celebrities or whatever in the space, but there's no one who controls it by definition. So the idea that anybody could come in and control these protocols, it doesn't — that would never make sense, okay.

On the currency point of view, I agree with you. We need to have some more frameworks around how to engage with — I would even say regulate — how to engage with digital currencies responsibly, how to mitigate the risks and accelerate benefits. And that is really a lot of the work of what my team, the team at the Forum, is trying to do. We have a body called the Digital Currency Governance Consortium, it's comprised of 85 different institutions from all around the world. As I mentioned, all these different kinds of participants and stakeholders. We have a steering committee, it's

got the CEOs of the major payments companies, it's got minister, all these different people on it from all around the world. Again, we're trying to land on basically a framework to think about this, like think about it in the financial inclusion context, think about it from interoperability perspective, think about it from a regulatory perspective. Like all these different avenues and angles that intersect to create what the experience and what the path is going to be forward for digital currencies.

We released a concept note a few weeks ago during the Davos Agenda, the Davos that just concluded, and the rest of that work will be coming out around the time of our Singapore meeting in August.

MR. PATNAIK: Oh, great.

MS. WARREN: Yeah. So we are an example of such a body. (Laughing)

MR. PATNAIK: And I think it's important. I mean — and that brings me a bit to my next question, which is whenever you have technology like this there is a downside, right. And so I think I'd love to hear what your concerns are with blockchain technology and then digital currencies regarding users and consumer protection, regarding financial stability, and also regarding financial crimes and things like terrorism, money laundering, things like that, right, where there has been a lot of stories have written on digital currencies being used by criminal networks to hide money, to launder money.

So I'm curious what are your thoughts on this.

MS. WARREN: Well, let's start with that last question, first. You know, I think it's an open secret that most technology started and took off through illicit activity — exploration by illicit activity. It's just a fact, right. The internet exists because of illicit activity and pornography, and that was what blew it up. Bitcoin really took off because it was in fact being used by nefarious actors to exchange value that they were using to pay for like terrible, terrible things. I mean this is just — this is true.

That is not a reason to throw the baby out with the bath water, right. Like just because something can be or has been used for nefarious ends — and we should just be very open about that — I think that any denial about that is just ridiculous, it's very known, you know — doesn't mean that that is the path forward and it doesn't mean that is not a — it doesn't mean that that is going to stop completely

or can ever be fully stopped. It also doesn't mean that there isn't a way of making that a very small portion of a much bigger opportunity, right.

So every time someone tells me, oh, we can't have bitcoin because it's used by horrible people, I'm like, well a lot of things are used by horrible people. I mean like most things are in fact used by horrible people, right. Like some things more than others, but almost everything so — you look deep enough. I would also argue that there's a difference between — we classify crime differently. White collar crime happens all the time in open view in the current financial system, so let's just be honest about that too, right. So I just kind of dismiss that entirely to be honest.

Now, that being said, nobody wants to, you know — wants their protocol or the thing they're putting their livelihood in to be used to fund terrorism. And there's a reason that we have — you know, there are customer kinds of rules in our society. There's a reason that we provide certain kinds of checks, because we want to make sure that we are not fueling that engagement. We're not making it easy to do that. We're at least putting a lot of blockers or barriers in the path. And this is where I think the whole concern arose around — or at least the story about the self-hosted wallet concern arose, because it was to stop terrorist A from funding terrorist B and then no one is in the middle to kind of like look out for it. Now —

MR. PATNAIK: (Inaudible).

MS. WARREN: Yeah. Number one, you know, my friend Katie Han — there's people in this space that have actually found the — like they busted up Silk Road. Like that's a thing that happened. And Silk Road, for those who don't know, is this online marketplace, it was a terrible, terrible, terrible place selling terrible, terrible, terrible, things by terrible, terrible, terrible people using bitcoin and other digital currencies. And actually it's the bitcoin that — eventually that's what got them caught, right.

So it is actually not anonymous, it is pseudonymous. And this is a very common mythology about cryptocurrency and bitcoin specifically. It is pseudonymous. You can actually back out where transactions happened. There's a lot of context that happens here when people are in fact findable.

So, again, you know, do we want to have to spend the resources to do that? Of course we don't, we want criminals to wear a brand that says I am a bad guy and then we can just like arrest them and of course it's all you want, right.

MR. PATNAIK: (Inaudible).

MS. WARREN: Yeah. So, yeah, anyway, I'm going on too long on this. But let's land that there.

But how you kind of create a system that is safe for the average person, leaving the nefarious intentional criminals aside. There is a concern that I think is fair around investment in the space. Now, I think it's important to distinguish this from bitcoin itself, right, and distinguish the kind of activity where you get people putting into something that is — they're putting their life savings into something and that thing vanishes. And certainly I was very disgusted, frankly, during the ICO, initial coin offering phase of 2017-18 where this happened to a lot of people. There was a lot of ridiculous nonsense happening in the space, things were never built, lots of money collected. And this happened to the tune of — you know, it's a lot of money. A lot of money that was lost. That is something we should be concerned about as a society, it's something that we should have a problem with, right.

And as we open up this kind of opportunity more and more, there's something called decentralized finance. It's the idea that you can actually take financial services and decentralize them, so remove the need for a mortgage broker or lender, you can have an automatic market maker that kind of connects people, right, and there's lots of this happening in this space that's kind of the hot new area in cryptocurrency. But there's a certain level of protection that some of these processes, centralized processes provide.

MR. PATNAIK: That's good for people that aren't as savvy with the technology, right?

MS. WARREN: But you have to balance, right? You have to balance. Because on the one hand, you know, we know about red lining, right. We know that certain kinds of people, who often look like you and me, could not get mortgages in certain jurisdictions or certain cities or whatever, from certain banks, because they weren't considered trustworthy, right. Or people that weren't able to show a

certain kind of credit that was gotten in a certain way didn't have access, right. So the system was already failing a lot of people. So we want to provide — and DeFi could actually help — decentralized finance could help with that problem. But then you have to balance like, okay, how do you make sure that people have access but it's not just access that winds up with them getting into this horrible situation where they lose all their money, right.

So that's where I think the regulation can come into play. But I think that what Wall Street bets and (inaudible) have shown us is that we have to really fundamentally rethink what we mean by consumer protection laws and regulations. Who is the consumer?

MR. PATNAIK: Mm-hmm. How so?

MS. WARREN: Who are we protecting, right? And what should that protection look like. What is the role of the government in protecting consumers. Is it that we create a system where every institution has to do a risk analysis and thereby like just axes out a portion of the population? Is it that we provide some kind of backing, like — I mean I don't — there's so many answers and possibilities here, but I think we have to be more open about how we're talking about this and recognize that there is potential for this to happen, but also we shouldn't again throw the baby out with the bath water and make it impossible for this kind of thing to move forward and innovate.

MR. PATNAIK: Probably like to follow really a measured approach, to see that we don't reinforce existing biases, but not like go overboard to maybe we create new ones.

MS. WARREN: Yeah. You know, and it's so funny because you really hear such dramatic — it's very dramatic in this space. This is obvious from the news. You've got people who are just like ah, banks, terrible, awful, blah, blah, blah, and you've got people over here who are like, ah, everyone in crypto is a criminal and they don't know what they're doing, and whatever. And the truth is, of course as it always is, it's in the middle. And so what we try to so is really provide this — I call myself a pragmatic optimist. You know, I believe very firmly in the technology and the potential digital currencies, but I also think that we have to be practical about some of these things. We do have to make sure that we're being thoughtful and we are not inadvertently just accelerating a lot of the risk without thinking

through the consequences.

MR. PATNAIK: Yeah, I think that's a good point.

And actually I have a couple of really interesting audience questions related to that. You mentioned real estate, right, and so I think if you look at how blockchain could maybe make some of those transactions more efficient, I'm curious to hear how do you see blockchains rolling, reducing costs in financial services, for instance, for record keeping or loan servicing, or even like typing for deeds and for transfer of properties in the real estate market.

I'd love to hear your thoughts on what you think blockchain could do in that space.

MS. WARREN: Yeah, so land titling is something that was a kind of early use case. And so you had Estonia, for example, but other jurisdictions that kind of looked at moving all of their title or all of their recorder's office, you know, assessor, recorder, kind of documents onto a blockchain. And so that would really — could in theory eliminate something like title insurance, because it would be very, very clear, right, like who held title and the chain of custody of the title would be something held on a blockchain. It would be immutable, it would be basically impossible for someone to kind of like pretend that they held title if they didn't. All the things that title insurance is designed to protect, right.

So I think that when I think about what these systems are going to kind of attack and what the certainty of the record could provide and the transparency of the record could provide, I do think about the insurance markets. I also think that a lot of what insurance — a lot of the red tape around getting an insurance payment, for example, you know is because you have to kind of verify the event happened and all this kind of thing. So, again, using this technology called smart contract, if you could — if you had — you know, again, the easiest example here is like travel, okay. So travel insurance, they tell me oh, if the weather delays you by 12 hours or whatever, then you get automatically rebooked and then you get a voucher for whatever, right or you get — whatever it is. And so you could make all that run automatically. So instead of my having to go stand at the airport and be like, hi, I'm here, you know, please, please, please like let me —

MR. PATNAIK: (Inaudible).

MS. WARREN: Please help me with my three little children — you know, the whole thing, right. Instead of that whole thing, it just would happen automatically because there would be an external source, national weather service or whatever, that was tracking that. And everyone would agree like it's independent, it's not like we had — you know what I'm saying?

So some of these things I think could streamline some of these systems in ways that can be quite significant. Now, again, is the investment really worth it. That's kind of a big decision. We actually published a paper on how do you assess the ROI of deploying a blockchain. And that's a question every industry has to answer, right. And some are further along than others and some have decided it just doesn't really make sense at the moment or maybe it will in the future.

So that's one thing I think is the case.

The other thing I haven't mentioned that I'm really excited about is so the Forum is really big on ESG metrics and stakeholder capital, and this idea that we should create a more equitable allocation of financial return across a broader group of stakeholders. So less the shareholder extractive model, which obviously benefits a certain class or kind of person or institution more than others, but really this more equitable allocation. And so we talk about this a lot in agriculture, so the idea that whether it's crop insurance or anything like that, you could actually have the individual farmer have more power in the system because by putting their information into this system it was kind of tracked that that information came from them and you could then see how that could lead to real time adjustment of the price index or whatever it might be, right, that would help that individual almost be a collective in a way that might not be reasonable or very easy to do in certain parts of the world, including, I would argue, in the United States.

So there's things like this I think are very powerful and exciting. But, yeah, land titling, something that a lot of people looked at, spent a lot of time thinking through. There's an interesting project that was happening in Latin America that was looking at disputed lands and how do you provide just a source of truth and kind of end the debate once and for all, which can be very powerful as a form of reconciliation.

MR. PATNAIK: Mm-hmm. That's actually quite fascinating.

Another question we got is going a little bit to the earlier point you made that we will see many different cryptocurrencies probably in a parallel. And so how do you think they will relate to each other? And do you think there's kind of like — how would that happen? How would that develop? Do you think there will be a dominating one that might emerge after. You said before that you don't think this is the case. And what do you think the governments — what kind of role they might play in like shaping that landscape of parallel currencies that are floating up?

MS. WARREN: Yeah. So to clarify, it's not that I don't think there will be a dominant one. I mean there probably will be. I just don't think there's going to be only one. I think there will always be a multitude, right, the way there's a multitude of everything. I just don't see this as a space that's going to suddenly — there's going to be no competition in it. And that's not the case now. There are different ones of these, some more successful than others, you know, by price index.

I just think that they're for different uses. So I think — yeah, you know, it's kind of like if I — perennial question, right, where to place your bets. I think that there's always going to be a use case for pure crypto. And I think that — being clear that speculation is not a use case in my opinion, okay. Like that's certainly very active use case. But I think there's always going to be a use case for pure crypto, because there's always going to be situations where you need that engagement. And we're only starting to think about some of the opportunities that crypto provides, like being outside of the formal banking system, what that provides. Like we're just — we not even creative enough about that yet. There's so much that can be done there. I won't go down a whole rabbit hole on tokenization and models like that, but I mean we're just starting. There's a whole thing we can talk about around digital collectibles, non-fungible tokens, you know more on DeFi. There's just a huge industry that is just starting right now. And that's all built on the back of essentially what are cryptocurrencies, on the back of Ethereum, some more on — potentially on the back of bitcoin, when a new layer called lightning comes out.

So there's a lot there. And the idea that that is — there's only one thing you can do with it and that's paying something with it, is just very shortsighted in my mind, okay.

Similarly, stablecoins are the idea that there'd be this security of having in some cases that reserve backed, or ideally I would say a reserve backed digital currency that was pegged as something external, so you weren't as worried about kind of this sort of volatility. That could be phenomenally useful for trading pairs.

So there's a company my friend Elizabeth Rosiello started, it used to be called BitPesa, now its AZA financial, and that was creating currency trading pairs among African currencies using bitcoin because bitcoin was actually more stable and it traded faster than some of the currencies that it was really hard to make pairs around.

MR. PATNAIK: Yeah, (inaudible).

MS. WARREN: So you could very quickly like trade through bitcoin and you could actually establish this capital market. It was a capital market creation.

MR. PATNAIK: Oh, wow.

MS. WARREN: Super creative, really interesting, right. There's a lot more we can do of experiments like that that could use something like a stable point, specifically as kind of an agent of exchange, kind of like transfer from one to the next. So there's that.

And then central bank digital currencies. Now, every central bank and government will have to assess for itself does it make sense to roll one of these out, does it not. There's a variety of decisions. Some are political, some are not, some are about monetary, you know. We laid a lot of those out in a tool kit — a CBDC policy makers tool kit that we issued in Davos in January 2020, so last year — those considerations. You know, I think that we're going to see more — we're already seeing China's, so we're going to see more of those. You know, I think we're going to see India do something in the space.

Is everyone going to have a CBDC? I don't know, maybe in the next 10 years it will be an offering. I have no idea. You know, I couldn't possibly say because so much of that decision is going to depend on who's in power in the country, like who's the chair of the fed, like all — it's impossible to predict, right, unless you can have a crystal ball into the political situation in every single country around the world and how independent their central bank really is and all these kinds of questions, right.

So that's why I say, you know, all these things have different purposes, they provide different kinds of value, and they solve different kinds of problems, right. And some of them are solving problems that, by the way, we don't even know that we have. We didn't know we needed email until we had email. And now we're like, how did we live without email. We didn't know we needed smart phones until we had smart phones. No one could argue we don't need these things. They're terrible for us, you know, attention — all of those things are also true, but it's not like we don't use them very happily every single day, right. So there are things that are going to emerge in this ecosystem, the crypto ecosystem, that we can't even conceive of yet. We just can't even conceive of them. And once we have them we're not going to know how we lived without them.

So that's what I'm most excited about, is the imaginations of some brilliant people working in this space and where they're going to take this entire industry.

MR. PATNAIK: I think that's the fascinating part because it can create completely new markets in the future.

MS. WARREN: That's right.

MR. PATNAIK: As you said, markets, products, maybe even — or needs among the population that we don't even know we needed, right. It's very similar to artificial intelligence I think in that regard.

MS. WARREN: I think that's right.

MR. PATNAIK: It's very hard for the public, for consumers, and also for regulators to even anticipate what is coming out in the next two years, right.

MS. WARREN: That's why regulation lags innovation, right. Because the time you understand the technology, you figure out that it's really real and kind of baked, and then you can kind of get through your political process to establish something. You're regulating something that's already a year, two years, three years old.

MR. PATNAIK: Yeah.

MS. WARREN: So it's very touch. And that's part of why the Forum opened our office in

San Francisco, was focusing specifically on this question of tech governance and how do we kind of create more agile methods of governance of technologies that could be more real time. That could kind of make sure that we're not suddenly killing an industry that's really doing well with some regulation that nobody could foresee that has bigger consequences than it was meant to have. But at the same time being safe, trying to ensure that there is safety built into the process.

MR. PATNAIK: Yeah, we're doing a lot of that in our center as well because we want to –

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MS. WARREN: Yeah.

MR. PATNAIK: How can improve regulations, to make them more dynamically adaptable, more flexible.

MS. WARREN: That's right.

MR. PATNAIK: Yeah. Well, this is has been really fascinating. It's an exciting space you work in. You must have a very —

MS. WARREN: (Laughing) I do love it.

MR. PATNAIK: — full inbox every morning with very interesting and new topics.

MS. WARREN: Oh my goodness, I mean every morning, right, I wake up and I'm like, oh, who did what today, you know. Especially recently. So, yeah, if we were talking next week we probably would have had an entirely different set of things to chat about.

MR. PATNAIK: I would imagine. But this was great. Thank you so much for your time. We know that you're really, really busy. And so we appreciate you coming onto the Brookings event. Thank you.

MS. WARREN: yeah, such a pleasure. Thanks for having me.

MR. PATNAIK: Thank you.

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