

[SQUEAKING]

[RUSTLING]

[CLICKING]

GARY

GENSLER:

We're going to go through payment systems, what is a payment system, in fact, some trends around the payment system, which is a little bit of a statistical review, and then critically think about the pain points, a list that I've been keeping as I teach FinTech and also as I think about cryptocurrencies and how they might insert themselves in this space. Some trends around the globe with nations trying to move forward with real-time gross settlement, the idea that you could settle payment transactions instantaneously, 24 hours a day, 7 days a week, which many nations don't do yet. Some do. We'll get into that.

And then the landscape itself. What are the companies doing and so forth? Harkening back to last discussion, what are we seeing in the crypto projects and tokenization? And then close out on Facebook Libra and China's Digital Currency Electronic Payment project. So a lot to cover.

But please, as I had said, video's on. So we can keep this sense of community and audio off. But anytime you have a question, raise the blue hand in the participant area. Engage in the chat room amongst yourselves, or Romain would be good enough just to interrupt me when he sees something interesting in the chat. Or for that matter, even if you're a student and you see something interesting in the chat that Romain's not raising, you can raise your hand and say, I see three things in the chat room, and I want to capture that for the class and so forth.

So the readings today, I thought it was interesting to take a speech by Lael Brainard. Lael is on the US Federal Reserve Board. And as they do in many commissions and boards of central banks around the globe, they allocate different projects.

Now, Lael is part of the Federal Open Market Committee and helps set interest rates, but she also is that key player on the Reserve Board around payments. So she gave a speech about the updating and where we stand, and I hope you found that

helpful.

Along with Neha Narula, we did a cryptocurrency online course last summer. And the payment system space was something we wrote just as a background, as a primer in this area, and then some payment innovations in the FinTech space, and a little map about nine payment track. So I hope that was helpful.

If you haven't dug into it, I do think that Lael's speech is a good update as to where we are and particularly as the US Federal Reserve is thinking about things like Facebook's Libra, thinking about going to real-time gross settlement in something called FedNow that won't be rolled out now for three or four years. But I think Lael gives a good sense of where things are.

So just if we can have a little bit of conversation here, and Romain will help facilitate. But what are the key challenges and opportunities in the current system, just from your own perspective? In essence, what do you think I will later have on that list of pain points, if you've not yet downloaded the slides? But Romain.

ROMAIN: Let's see who will be the first volunteer for today.

GARY Just to get it a little bit interesting.

GENSLER:

ROMAIN: Still waiting for a blue hand. Hassan.

GARY [INAUDIBLE] page. You might have to get one. What did you have, Romain?

GENSLER:

ROMAIN: Hassan, the floor is yours.

AUDIENCE: Thank you. Yeah, about the payment system, I've noticed that there is kind of a monopoly, especially here in the Middle East. All the payments are, or I would say almost all payments are through Visa, and Mastercard, and AMEX. And if you can see that, these companies take a percentage of the merchants.

And I don't if you guys have this in the States, but sometimes, for instance, in my country in Bahrain, if I would go and buy something, if I know the owner person, he would say, hey, listen, if you would pay me in cash, I could give you a discount. So I

think that there are many opportunities for companies that could maybe take less money and exploit this opportunity.

GARY

So this captured two themes that you picked up there, and there were many others.

GENSLER:

And I see Andrea's hand up. So we'll have some other good discussions. Cost, you're saying that the current payment rails-- my word-- that the current payment rails have a significant cost. And you also mentioned the concentration.

You said monopoly. Some might say oligopolies, but there's a concentration usually in the payment systems. And this comes by and large not only because of the history of payments but also the significant network effects, that if you have one central payment mechanism, whether it's a clearing house in days of old or, in the last 40 years, the credit card companies became very significant in the payment space.

They had network effects, scale, bringing merchants on the one side, the store owners on the one side, and the consumers on the other side together. And the platform economics create a significant network effect. So there's a lot of concentration. But Andrea or others?

ROMAIN:

Andrea?

AUDIENCE:

Yeah. So I'm not fully sure if this is related or if you count it also as payment. But I think one of the biggest opportunities and also challenges is still to resolve the international payments, so basically how you send the money across the borders.

There are many startups, like everyone knows TransferWise who are doing a great job. But when you think about it, it's still-- the way their business model or how it works, it's still not basically instant sending of money, and there are a couple of limitations. For example, you also need to do it-- you also need to or you're allowed to send the money internationally if you have a bank account.

But I, for example, know I was working in the Middle East where, for example, there is a lot of people, a lot of international people coming and working there. And they are sending a lot of money back to their families home. And, for example, a lot of them don't have a banking account. So they're using services such as Western Union.

GARY So let's--

GENSLER:

AUDIENCE: And [INAUDIBLE].

GARY I think Andrea was good. She raised three points in there. I see Ivy's hand, and then
GENSLER: we'll close. But the three points I heard, cross-border, sending payments from one nation to another. Now that could be because it's moving from one currency to another, or even if it's in the same currency, if you're using US dollars and sending it cross-border or using Euro or yen and sending it cross-border, you're jumping between two different payment systems, two different banking systems.

And so cross-border same currency or cross-border cross currency, there's a significant amount of cost embedded in that. There is time delays that Andrea mentioned until you can have settled money. Final settled money means that you can actually use it in your commercial daily lives. And then thirdly, I think Andrea raised inclusion, whether everybody has access to that system. So I thank you. And then Ivy, and then we'll move on.

AUDIENCE: Sorry. I actually had some earlier points. But I think just building up off of that, things like Plaid, I think, are quite interesting because you really need this-- I guess I think about it as the plumbing of the payment system, if you will, because they really need to plug into so many different types, the payment systems, all these different financial institutions.

And just even thinking about inclusion and consumer-- customer behavior and consumer credit behavior or cross-countries, it's entirely different. Like people in the UK don't, or in Europe in general, I don't think, use credit cards as much as Americans do. People in Asia are really used to using Alipay, WeChat. QR codes have become a big thing. And in Canada, people pay down their debt much faster than we do. So just trying to think about how all these different players, both on the consumer side as well as on the supply side, if you will, will fit into the entire system in the future.

GARY So Ivy's mentioned a bunch of cultural and geographic differences. Country by
GENSLER: country, we have differences in our payment systems. We have different cultural

behaviors about paying down our debt and so forth. And you mentioned one company, Plaid, that helps the plumbing. And what's interesting is that the word "plumbing" in banking or plumbing and payment is an age old thought.

Actually, when Alexander Hamilton, our nation's first Secretary of the Treasury, helped found one of the first banks in the nation, the Bank of New York-- it still is part of the Bank of New York Mellon-- this was in the 1780s, they took as their logo-- logo is a modern word. But they took as their symbol something that looked like plumbing, literally that they thought of banking as like waterworks or a central utility, sending money around rather than sending water around. So I thank you for that. But yes, Plaid is part of that plumbing.

And as Andrea said, TransferWise is trying to find a gap in the cross-border. They're not alone. There's Remitly and WorldRemit, and many other companies also. And so this is a long question. But just anybody want to say, what lessons can you take from Big Tech in this space, Alipay, WeChat Pay, M-Pesa, et cetera, just Big Tech?

And secondly, any lessons from all the startups. So it's two buckets, but it's what can you take from the competitive landscape, either Big Tech or the disruptors?

ROMAIN: Anyone?

GARY
GENSLER: I'm sure that some of you use these companies, whether you're from Asia, and you use many of the Big Tech ones, or even in the US if you do, or you're bound to use Venmo, which is owned by PayPal, or something.

ROMAIN: So we have Luke and then Yi.

AUDIENCE: So one of the--

GARY
GENSLER: Which side are you [INAUDIBLE], Big Tech or disruptors?

GENSLER:

AUDIENCE: I'm sorry. Say that again. Say that again now.

GARY
GENSLER: Are you addressing Big Tech or the disruptors?

GENSLER:

AUDIENCE: So let's go with Big Tech, but I guess it's not too easy when I talk about, for example,

KakaoPay, which is the payment platform made by Kakao Group, which is the largest-- the tech company in Korea. And basically, it's WhatsApp of Korea. So whether it be KakaoPay, or WeChat Pay, Alipay, Apple Pay, the key thing is it's very, very easy compared to the bank.

Now, the banks are trying to catch up with the API Open Banking system and all that. But basically, the UI user interface is pretty easy to use. And if you have a problem, if you contact customer service, they'll contact you right away, versus banks make you wait 20 minutes, blah, blah, blah. Sad to say it as a banker, but it is what it is.

GARY

GENSLER:

So I think that the key lesson you're saying is it's easier, it's got a user interface that's quite convenient. And while you didn't use the word, it's also ubiquitous. And so KakaoPay in Korea, LINE Pay in Japan and Taiwan, WeChat Pay, Alipay, M-Pesa really leapfrog the banking system. But there is a very established banking system in Korea. And yet still, KakaoPay leaped over.

Not as much so in the US. I mean, yes, Google Wallet is there. Yes, Apple Pay is there, and they're significant. Less so for Facebook actually.

AUDIENCE:

I think that's because of the--

GARY

GENSLER:

[INAUDIBLE] we're weaker, in a sense, adoption, Google, Apple, Facebook in the US, than we find in Korea or China.

AUDIENCE:

But I think that's more because of-- not because of overbanking or the power of bank. It's more because of the telecom services, how reachable, approachable you are with the LTE speed or 3G speed you have here in big land of America.

GARY

GENSLER:

So what Luke's raising is there's also facts on the ground about how developed the technology is, whether it was already at 3G or 4G or how developed the technology was on the ground. So it's not just about how developed the banking system is but also technology. Romain, we had somebody else that might take the disrupter side. Thank you, Luke.

ROMAIN:

Yes.

GARY

GENSLER:

Good.

ROMAIN: Yi, go ahead.

AUDIENCE: Yeah. I just want to raise a trend, the loss of the payments this time.

GARY And then, Yi, do we have a video? Do we have your face?

GENSLER:

AUDIENCE: Yeah. I'm just very ugly this morning, but--

GARY Oh, I'm sure you look fine. You look great.

GENSLER:

AUDIENCE: Yeah. So I just feel like there's a key trend between the-- even including the Big Tech payment firms as well as like the FinTech firm is social media. People want to pay via the social media. This happened between the Alipay, WeChat Pay, the KakaoPay, and also the Venmo.

You can connect with friends. You can send stickers. You can send-- express your emotions. You can make your transactions available to your social network.

And I think there's also similar to M-Pesa in Kenya. So I feel like this is a huge trend that people don't want to only make the transaction with banks, which is very separate and individual. They want to make transactions with their social network.

GARY Yeah. I think that's right. I think that's probably a larger factor with regard to the Big
GENSLER: Tech companies, but it is also true that it's a factor with the startups.

And then lastly, a question is, do you think stable value coins, tokenized assets, even the initiative of Libra-- what will that do on this payment space? In essence, are they hype or a passing fad, or are they going to do something here? Romain?

ROMAIN: Any opinions on this? I'm still waiting.

GARY We're going to help out. We're going to help out. We have a poll. This is exactly
GENSLER: when we can ask a poll to tease this out. You've done terrific, but no one answer, because now, Romain's going to pull up a poll. And this is more broadly-- this is about blockchain technology, but curious what everyone thinks here.

ROMAIN: So you should now see a poll with three different questions on your screen.

GARY This is a little bit more broadly as to whether financial firms will incorporate
GENSLER: blockchain technology into their business models. As they've already incorporated AI and machine learning, as they've been incorporating open API, will this be a fundamental feature in the next 2, 5, or 10 years, or not at all?

ROMAIN: 20% of the class voted so far. Please check the window and vote.

GARY Romain, I like your ability to pull in the votes. You might have a job to do come
GENSLER: November in our next general election here.

ROMAIN: Are you confident it's going to take place?

GARY Yes. I am confident under our constitutional system that we will have an election.
GENSLER:

ROMAIN: Excellent. OK. We have 70% of the class that has voted. I'm going to let 5 more seconds--

GARY [INAUDIBLE] 10 seconds.
GENSLER:

ROMAIN: Yeah. And we reached 80%. Thank you, everyone, for sharing your thoughts. I'm sharing the results with you. You should now be able to see them.

GARY So let's see, that the class tends to be optimistic that blockchain technology will be
GENSLER: incorporated in, even though it might take 5 to 10 years. It looks like the mode is 5 years or 5 or 10 years. In terms of, what will it have will be-- beyond speculative digital store valuable Bitcoin become the currency of choice in some part of the economy, that generally 60-some% say no.

And then, who is Satoshi Nakamoto? Well, that was just my one little question because, of course, we don't know who Satoshi Nakamoto is, this woman or man who wrote the eight-page white paper and put it out on the internet 12 years ago. But it looks like a third of you said maybe it was a foreign state actor, or 20% said US intelligence.

OK. So let's get back to payments, I like this thought there. If you want to take that window, you have to, I think, get rid of the poll individually, which I'm about to do

now--

ROMAIN: Yes, thank you.

GARY --as well. So what is a payment system? Let's just dive in and talk about what it is.

GENSLER: And it's been around a century. So it's not a new thing. But in a digital world, in a ledger-based world, it's a method to change a ledger.

Now, this isn't an accounting class. I'm not going to bore you with accounting. But basically, if I'm moving money to you, somebody has to lower my account, credit my account. Remember assets or debits.

So credit means it's going down, a little bit of accounting here. And then somebody else's account has to be debited. So one debit, one credit. One account goes down, one account goes up. It's also about authorizing those movements and then what's called clearing and final settlement. And earlier we discussed that-- and sometimes final settlement doesn't happen for a couple of days.

And a long time ago, if you wrote a physical check, you might not have it settled, meaning having money in your account for five days or longer even. Now it's closer to two days. But it's basically amending and recording those ledgers. That's what it is in an accounting system.

And so how did we do this? This is just some fun background, but Thomas Jefferson, the writer of the Declaration of Independence, actually you can find online a check he wrote to himself. I'm not quite sure why he did. This would have been the year after he was president, but he wrote a check to himself.

So physical personal checks have been around a long time, but they are basically an instruction called negotiable orders of withdrawal, but an instruction to a bank to amend the ledger. Lower my ledger, and give me maybe paper cash, or lower my ledger, raise somebody else's.

All of the sudden, the telegraph comes along. And a company, Western Union, which still exists-- Western Union comes along, and it's a telegram company. But they figure out how to send money by telegraph, the FinTech of its time.

And yes, there were machines that looked like this, telex machines. These were

ubiquitous across financial firms in the 1950s to the 1970s. I will admit I saw one or two of these when I was on Wall Street still in the 1980s. But a telex machine existed basically to send instructions on payments around to another bank.

But what's it look like today? Well, first, the important thing is central banks sit in the middle of payment systems. This was not as true in terms of the-- I'm just trying to move a window out of the way. This was not as true in the physical coin and currency world.

But here, this little chart puts the central bank at the top. And we have central banks around the globe, 180 different Fiat currencies. The central banks are central to commercial banks. And what's important to remember is our money system has moved on from being paper money to basically digital money.

And so today in the US, if you think about the total stock of currency, the total stock of paper currency prior to this coronavirus crisis was about \$1.8 trillion. It's actually gone up in the last month. It seems that there are people that want to take cash out of the bank, out of the ATM as a store of value around the globe.

We're not using it. It's a disease vector, but it seems that the growth-- and it might be now \$1.9 trillion. So it's gone up \$100 billion or approximately.

But the digital money, all the people's bank accounts, bank deposits, money market funds is multiples of that, \$15 or so trillion. So about 90% of the money in the US, depending upon your definition of money, is digital. And most of that digital money is commercial bank money.

You and I, when we go into Starbucks, we're basically spending Bank America dollars, or Citibank dollars, or Wells Fargo dollars, or SunTrust dollars, or Community Bank dollar. That's what we're spending when we walk into Starbucks. It might have some implicit or explicit guarantee of a government here in the US, deposit insurance and the like. But we're in essence saying to Bank of America, please change my ledger balance and move something to somebody else's ledger balance, maybe a Community Bank for that local Starbucks.

So in between has to be some electronic means, some payments system, a deferred net settlement system. And this chart lists the number of them. These payment

systems are the domain of central banks.

Some central banks actually run them, like the US Federal Reserve runs something called the Fedwire. But some are run by a consortium of the commercial banks. Some are private. And in some countries, they can even be for-profit.

But all of them have some regulation from the central bank. So either the central bank owns them or the central bank oversees them. And usually then the commercial banks might run these single purpose payment systems around the globe.

Some countries have multiple systems. The US, we have the Fed system, and we also have something called the automated clearing house. The clearing house was founded in the 1850s to give you a sense of its history, a long history. Questions, Romain, any?

ROMAIN: None so far, Gary.

GARY
GENSLER: All right. So you'll see how this fits together. But let me say what the modern payment system looks like when I think of it in terms of you go into Starbucks, and you want to make a payment.

You're the consumer. We're going to go across. You have an issuing bank. Let's use Bank of America just to say. And you're giving that bank, Bank of America, a payment instruction.

Now, in an earlier day, you could write a physical check, like Thomas Jefferson's check. You could use a credit card, a debit card, some prepaid card. But you have to give some payment instruction. Even that QR code that you pass-- and we'll get to Alipay and WeChat Pay in a moment-- there is a payment instruction somewhere, digital payment instruction.

And then at the heart in the middle is a network. Now, these payment service providers, PSPs, in the middle or networks could be associated with a credit card company, the Visa credit card network founded in the late 1950s by Bank of America, a California bank at the time. And it became ubiquitous by the late 1960s. Visa, Mastercard, UnionPay in China can both be credit cards and networks, or there could be a network that services the credit cards.

But you need something in the middle because on the other side, there's tens of thousands of merchants or millions of merchants if you go to China. And on their side, they have another bank. But they need some way to access this network, a point of sale-- POS is point of sale-- or by phone or by some modern mechanism to access that network. And then the merchant on the other side. So you have consumer all the way to merchant.

You have banks, the issuing bank. The issuing bank is that party that says, all right, I'm going to take a payment instruction. And you have the merchant bank on the other side or acquire a bank, sometimes it's called. But in the middle, there's some network. And it leads to a lot of concentration because there's such significant economic and network effects in a modern digital payment system. Questions.

ROMAIN: Yes. We have questions from Carlos and then Jose.

GARY Please.

GENSLER:

AUDIENCE: Hi. So I wanted to ask, I know in a lot of developing markets now making the-- since you mentioned the ACH, making it real-time is a big focus and using different technologies, right? So could you explain, I guess, the magnitude of difference that having a real-time ACH system versus not makes?

GARY We're going to dive into this in about a half an hour, but let me try it very quickly,
GENSLER: Carlos. And then remind me as we get back to it. As a merchant, there's a value to getting final settlement when you sell your coffee or sell your produce or a big machine, whatever you're selling. And there's the value because there's certainty, and there's also timing. So if you can get your cash on Monday rather than Wednesday, there's a value to it.

Payment systems around the globe historically could give you final settlement if you used physical cash. And physical cash under the laws of the developed world became final settlement from the earliest days. There's a famous lawsuit from the *Crawford* case, if you ever want to look it up, about final settlement using physical cash. It's from the days of King George II, I think. But digitally, it was harder to get final settlement, and we still have delays.

So what's happened in the last 25 years is many nations have said, can we get to real-time settlement rather than delayed settlement of one day, two days, or, in the old days, five days? And trying to get to that real-time settlement has been a challenge. And we'll go through different countries in about a half an hour. Let me hold that. But a lot of countries, central banks around the globe are trying to get to real-time settlement. But the value is to the merchant that they have finality, that they can then use those funds in some way.

And I can tell you, even when I was the chief financial officer of the Hillary Clinton campaign in 2016, we had to deal with it. We were the merchant on the right-hand side. We might get a donation. But until that donation actually settled, sometimes several days later, sometimes a day later-- it was different settlement cycles-- but until that settled, we couldn't actually use it to buy advertisements on, let's say, Facebook or Google Ads. So we needed-- even in that instance, particularly when you get down to the last six or 10 days before election time, those days matter. So I lived this as a-- other questions?

ROMAIN: Yes, Jose?

AUDIENCE: Yeah. So I'm not sure if this is a bit out of the scope of the class, but I've always been very curious on, why are checks so prevalent in the US? So, for example, in Spain, I've never used a check in my life. And I think it doesn't seem to be a very efficient way of transferring money versus, for example, a wire transfer. But in the US, it seems like banks sometimes charge more for wire transfers, and they require more security, passwords and things for a wire transfer than for checks.

GARY So it's--

GENSLER:

AUDIENCE: And I don't really understand why.

GARY --very much part-- it's part of the pain points, and each country has a little bit
GENSLER: different heritage. Of course, through the 1960s, physical checks were very a important dominant part of many payment systems. It was only in the 1990s that the US government said by an Act of Congress that the US government should move to electronic payment of social security and other important parts that

government pays money. But even then, the adoption was supposed to be by the late 1990s, and there was various exemptions and so forth installed.

And so we even see now, in the middle of the corona crisis, that you can read in today's newspapers that the \$1,200 that's moving out of our tax authority, the IRS, to individuals, while the bulk of that's electronic-- 80 or 90 million of those will be electronic-- it's estimated that there's still millions of people that will get physical checks in the US. So we still have this legacy that's probably a little bit more dominant. I'm going to show some statistics on check uses in a moment.

Some of it's cultural. Some of it's actually commercial. At the middle of all this are banks. And in the middle is these networks in the middle.

So it's not only cultural, but it's also sometimes hard for a merchant to say, I want to pay-- the merchant, remember, has to pay the 2 and 1/2% cost if you're going to be accepting Visa. So the cost of interchange fees, the cost the credit card companies are taking here in the US average around 2 and 3/4%, 2.75%. So a lot of merchants still would prefer to take a check than that 2.75.

You go over to China, and you say, well, within the Alipay, WeChat Pay systems, the costs are significantly lower. In fact, if you're all within service, within system, it's 0%. In India, I think it's around 10 basis points. So there's a lot of reasons a merchant might say, all right, I might prefer if you can give me an ACH or a check. So gives you a little background.

But layered on top of this system is all these digital wallets, an invention really just of the last 20 years. And whether it's here in the US or overseas, a lot of these are related to Big Tech, not only, but a lot are related to Big Tech. And then the question is, will cryptocurrency play some role? Can crypto skip some of these inefficiencies and play a role?

And so with that, some of the trends, just a quick look. And this goes to the-- this is from a report. Worldpay, which is a big payment company, puts out an annual report each year. And this is their most recent report that came out in February of 2020. But around the globe, mobile wallets are estimated to already be 42% of global e-commerce.

Now, this is important. This is e-commerce. If you go off to the big wholesale payments or large value payments, different story. But this is electronic payments in the e-commerce space and then point of sale payments.

Cash is still a pretty big piece of the worldwide global environment for point of sale, whereas e-commerce, basically online using your mobile phone or your laptop-- can't really use cash much-- cash on delivery is still 4 and 1/2%, though, interestingly. That's Worldpay's overall view, but they say credit card will decline, debit cards decline, bank transfers about even.

And so what's increasing? Digital mobile wallets. And then, of course, at point of sale, cash declining. And there you will see increases in their estimation.

But the US is a little different. The US or North America, which is the best statistics I can grab off the Worldpay, we still have a significant amount of credit card. Look at that. Credit card's still a third. Digital mobile wallet's 23%. And from a merchant's point of view, they would prefer actually to have something that takes the less bite out of it.

Here in the US, debit cards by an Act of Congress after the 2008 crisis-- Carl Levin, a Senator from Illinois, said, we should make sure that debit cards do not-- and banks issuing debit cards can't charge more than the cost of actually issuing that debit card. And after a series of rule makings by the central bank, the Federal Reserve, that settled out. But debit cards are a little less costly than credit cards for the banks.

And in terms of trends just in the US specifically, this is from the Federal Reserve in December of this past year. But this just gives you a sense, 20 year history. And this is overall payment trends. This is not just e-commerce.

Checks were 45% 20 years ago. And you can see that line just decline, decline, decline. So to Jose's point, we're not quite there yet. Spain might be down to 5% on checks or something, but you can see where we are.

And this is the number of payment instructions. This is dollar amounts. So in terms of dollars, checks only went-- lost this parade eight years ago.

So one is volume of payments. One is the actual checks and so forth. And large

value payments are included here. The other charts did not.

And just one last thing in terms of the e-commerce side of it and card payments, this just gives you a sense of remote and in-person, that I like this right-hand chart. But the trillions of dollars we move, we are moving on our physical cards more remote than we are in person. This gives an opportunity to startups.

Startups can say, wait, Visa, Mastercard in many countries has this 2 and 3/4%. Maybe we can get inside that pricing. Maybe we can get inside especially as we move from in-person to remote payments as an opportunity.

So that brings us to a list of pain points. What point are--

ROMAIN: Gary?

GARY --these pain points?

GENSLER:

ROMAIN: Perhaps--

GARY Please, Romain.

GENSLER:

ROMAIN: Actually, before we move there, I think Hassan had a question.

GARY Please, Hassan. Hassan, you might need to take your mute off.

GENSLER:

AUDIENCE: Yeah. About payments, so, for instance, you could see we have the bank transfers and e-wallets. So my question is, for instance, I was trying to pay my landlord while I was in Bahrain, because I still have my apartment in Cambridge.

And if the amount exceeds a certain number, they have to send me a message, which can be annoying because if my mobile isn't working, they would not send me an email. So is it like the system, the whole system, the whole payment system supports bank transfers when it comes to big payments and small transfers when it comes to e-wallets and mobile payments?

GARY Well, I'm not sure of your question. It is true that ultimately sitting in the midst of

GENSLER: this, with the risk of going back a bunch of slides, there has to be something-- well, I'll just stay here. There has to be an instruction that moves it from an issuing bank to an acquiring bank.

So your landlord would be the merchant here. Your landlord's bank has to get an instruction somehow. So even if it's in this orange box, the digital wallets at the top, you have to send an instruction somewhere that takes funds from your bank, which is called an issuing bank, and somehow moves those funds to the landlord's bank.

And what you're finding is that your merchant bank, the acquiring bank on behalf of your landlord, is saying, listen, if it's greater than a certain dollar amount, we need a second security check. And the mobile wallet companies basically inserted that check, I think is what you're telling me.

You could have that same similar thing. Venmo has a limit. I don't think you could move \$1 million on Venmo, for instance. Venmo is a PayPal subsidiary, and Venmo is actually-- avoids those credit card fees. Venmo is a form of account to account transfer, your account at your bank to somebody else's account.

And account to account transfers are a very important feature of the competition. But still, Venmo is not going to move \$1 million without having additional security checks. So that's probably what's happening here, I fear to say.

AUDIENCE: Yeah. I, mean my point is it's a bit annoying because I would-- for instance, because my mobile is a prepaid mobile. So I could not receive a message from my bank.

GARY Oh, well, I can't solve that for you here, but I think that's part of what you're saying.

GENSLER: That's part of these pain points is that fraud. Basically, when you think of all the pain points, you and I, as users, we want something that's easy to use, nearly costless. We're willing to spend something, but we'd prefer not to spend 2% to 3% of our purchases on the payment system.

And we want it not to have complexity, the cross-border payments that we talked about earlier. We kind of know that they're tracking us, they're getting our data, but we're a little concerned about data privacy. And so you're capturing one of the pain points around fraud. And that's from the merchant side.

The merchant doesn't want the fraud, but also you don't want it. You don't want

somebody to be able to tap into your account and move your money out. And the pain point sounds like the fraud detection system that your bank is using is requiring your mobile phone in a way that's friction. It's frankly friction.

It's similar to a pain point-- it used to be until very recently, if you traveled overseas, you were better to tell your bank that you were going to be using your credit card in Spain, or France, or Asia, or Bahrain. But now no longer because now they have-- they use our mobile phones to say-- they track us. They know that we're in Spain, or France, or Asia, or Bahrain. That's part of the reason we don't need to call any longer, but that's part of their fraud detection programs.

Let me keep moving on if I can. So there's a series of pain points. And I don't necessarily have all of them, but these are also-- you can think of them as opportunities.

These are opportunities for disruptors to say, maybe we can provide a better service. Maybe we can provide something at a lower cost and more inclusive. These are the possibilities for any startup in a sense.

So I talked a little about the cost. This is a couple of years ago, but this *Bloomberg* article broke down the cost, and I find it very helpful. Often in the US and in Europe, we think, all right, I pay \$100 for something. You think you paid \$100 for it. Well, actually you paid \$97 roughly for it, and \$2.75 went to the payment system.

And that \$2.75 that went to the payment system, most of it goes to what's called the issuing bank. And again, the issuing bank is the purchaser. The acquiring bank is the merchant. So that merchant bank is only getting \$0.19 on average two years ago, the acquiring bank, Bank of America, or whomever issued the credit card. So the dominant part of the economics here is on the credit card side.

There's seven big companies in America being the big four banks of Bank of America, and Wells Fargo, and Citi, and Chase. But then Cap One is a very big credit card bank. And then, of course, American Express and Discover and the like. Those seven big banks are the big issuing banks. But community banks, even smaller banks across the land, will issue credit cards, and they get that roughly \$2 out of \$100 purchase.

Now, what do they do with it? Part of it is the rewards program. And wrapped up inside of all this is an incentive system that issuing banks are using part of that \$2.20 on average, on average about \$1-- I think the national average recently was \$1.06. If you take all the different rewards programs, they come back.

So you buy something for \$100. \$2.20 goes to your issuing bank. \$1 might come back to you as a reward. And it makes behavioral sciences important and makes this stuff sticky. It makes us loyal to our cards in a way that pure economics, you would think, that it would be easier to disrupt this space.

So I wouldn't put aside some of these reward programs when you're thinking about, all right, I'm going to be a disrupter. I'm going to break into the payment space. The credit card companies, they have a point of view on this, too. And they're going to want to protect their market share.

Questions, Romain? Anything there?

ROMAIN: Let's give it a few seconds just in case someone wants to raise their hand. Yeah.

GARY I'm going to--

GENSLER:

ROMAIN: We have Luno. Luno has a question.

GARY Sure. And then I'm going to do an overview of the cost. Luno?

GENSLER:

AUDIENCE: It's actually not a question. It's just in Europe, it's a bit different. The interchange fee is actually capped to 0.3% if it's a credit card and 0.2% if it's a debit card. I'm not sure about the numbers.

And so I think this has interesting spillovers in terms of rewards programs in Europe are definitely not as good as in the US. And then you can also see that the credit card usage is much smaller. And that might be one of the reasons why.

GARY No. It's a very good point because around the globe, the official sector inserts them self from time to time. And because of the natural network effects-- remember that chart-- right in the middle, there's powerful, powerful economics around network

effects. Think of plumbing again. We only have one-- we usually only have one electric company, one waterworks company per city because of that incredible network effect of the plumbing. Similar here.

And so what some official sectors have said is, so now we have to put a limit on what can be charged. In the US we did do that. Senator-- did I say Levin? It was Senator Durbin actually of Illinois. I'm sorry. But Senator Durbin, the Durbin Amendment, we did that in debit cards. But credit cards, not the case.

And then in other countries, like in Asia, which really Alipay and WeChat Pay and others leapfrogged. And then the official sector is involved in a different way. So you're absolutely right. So rewards programs would be lower. Credit card users might be lower. If you're going to be starting something, you have to think of those separate dynamics country by country, very much so.

The worldwide-- an interesting report, and this is from a McKinsey report from September of last year. McKinsey puts out an annual report of payments. If you're interested in the area, I didn't assign it as a reading. It's a remarkable report once a year. But this is one chart that I pulled from this McKinsey report. The worldwide revenues in the payment system add up to about \$1.8 trillion, \$1.9 trillion.

Now, I should caution, McKinsey includes what they call account-related liquidity. And this quote, "account-related liquidity," is earning interest for the banks on your credit card balances. Earlier World Bank statistics would say the payment system around the globe takes about a 1/2 a percent to 1% of the economy.

The worldwide economy before the corona crisis was hovering just short of \$100 trillion, the US economy about \$22 trillion, the world economy about \$95 trillion. But of that \$95 trillion, we've probably been spending, McKinsey would say, nearly 2% on our payment system. World Bank would say this-- the figure is more like a quarter to a half of that because McKinsey includes all the interest that we're paying on our balances.

So this is the opportunity. This is the opportunity. If you're saying, aha, what did Stripe, what did TransferWise, what did Plaid see? This is anywhere from a half a trillion dollars at the low end to \$2 trillion at the high end. 1/2% to 2% of the world economy relates to just moving these digital payments back and forth plus the

account-related activity liquidity, the starting, the lending balances on top of that.

Romain, I see the chat room seems to be lighting up quite a bit. Are there questions there, or do I keep going?

ROMAIN: You can keep going. It's mainly students sharing additional resources.

**GARY
GENSLER:** All right, great. So I was asked earlier-- I'm sorry, I can't remember now who asked it. Was it Carlos? But I apologize-- about real-time gross settlements.

Real-time gross settlements is this conceptual framework that we are all familiar with in one way or the other. Can I move a digital instruction to move money and to have the settlement be relatively fast, real-time gross settlement? What's the word "gross" mean? It means that we're not net settling.

If you run a settlement system with millions of checks coming into a warehouse-- and that's literally how the system of check clearing used to work in New York and elsewhere in this country-- you can actually net settle. You can say, well, there's these checks coming in from Bank of America to Wells Fargo and these checks from Wells Fargo to Bank of America. Let's net these settlements off against each other.

But if you do something in real-time, if you do it almost instantaneous, it has to be gross. You can't net the payment instructions between the various banks. Real-time gross settlement is used for large value payments and has been used for large value payments for quite some time. In fact, the early large value model is the Fedwire, 1970. That's 50 years of technology that we've had the Fedwire, meaning I can do what's called a wire instruction.

But in the United Kingdom, we had CHAPS. And in China-- I'm going to mispronounce it, but C-N-A-P-S high-value payment system, the Eurozone TARGET. 2002 is actually when the Eurozone was created. So we've had large value models. Coupled with that is something called SWIFT. SWIFT is just a messaging company. SWIFT, the Society for Worldwide Interbank Financial Telecommunications, I think, it's basically to send messages to facilitate these interbank.

The question in the last 10 to 15 years is, can we move from large value to just you and me, in essence, what we think we're doing with Venmo? Can I move you money

rapidly instantaneously? And some countries have actually moved forward. It's called real-time retail. And the important thing is it's retail instant payments.

Now, a lot of people don't call it real-time retail instant. A lot of people would just call it 24 hours a day, 7 days a week, or some people might call it RTGS. But fundamentally, the question is, can we do what the Fed the Reserve of the US did 50 years ago and the United Kingdom did nearly 40 years ago? Can we do that for the retail public, and can we do it 24 hours a day, 7 days a week, every day of the year? And the answer is yes, the technology exists.

I'm listing here seven or eight countries that either have instantaneous payment systems or near instantaneous. Some of these are not literally instantaneous. A couple of them are three cycles a day where they do this three times a day. And I can't remember each country, but you can see it's relatively recent.

And then the US. With the US projects, we have this split system. The clearing house is owned by 24 major banks in the US, and it's been around since the 1850s. The clearing house by 2017 said, we want to provide a real-time payment network. But it's really buying amongst these 24 major banks, all the big banks in the US.

The Federal Reserve at first seemed comfortable with that. And then frankly, the rest of the banking community, the banks that weren't the top 24 said, no, not really. And they went to Congress.

They went to the US Congress, and many members of Congress got involved on behalf of community banks. There's 5,000 or 6,000 banks that are not direct members of the clearinghouse. And so now the Federal Reserve is standing up FedNow service. And you can see this in Lael Brainard's speech.

Now, FedNow service is also meant to be like a public utility rather than controlled by these 24 banks. And so there's some interesting dynamics back and forth in the competition. The clearinghouse real-time payment network probably will up its game, and FedNow will come along as well. Some said that the announcement last year by the Federal Reserve was in reaction to Facebook Libra, and maybe that spurred this a little bit, that the official sector was then competing with Facebook because the announcement came just weeks after.

Now, I would imagine the Federal Reserve was working on it a long time beforehand. And we'll close out this lecture today on when China's digital currency electronic payments program. China and the Federal Reserve in the US both had major announcements right after Facebook Libra. This project, FedNow, and China's, both had been-- work had been done, but it feels like the announcements were accelerated and in reaction a bit. We don't know for sure, of course. Questions, Romain?

ROMAIN: None so far, Gary.

GARY
GENSLER: All right. So what's the payment landscape? Who are the companies? Well, we've talked about Big Tech. And I'm glad, Luke, I think I have KakaoPay on there thankfully. I should have had LINE Pay as well. But Big Tech, OK, we've chatted a little bit about that.

And then there's, of course, a bunch of unicorn startups. I could have put another half dozen to a dozen, unicorn being \$1 billion of value or more. But each of these startups have a little bit different way that they've broken into this space.

Plaid, which we've chatted a little bit about, Plaid is in this space because they came in through open APIs and facilitating the software in the system. Ripple is a cryptocurrency type company. One97 is in India. It's really-- I could even have put that in the Big Tech because they started, I think, Paytm.

NewBank addressed it a little bit from being a challenger bank, and we're going to be talking about that in a couple of lectures. Toast picks a sector, and they really dominate the restaurant sector. But they initially were getting into payments because they were into tablets.

So each has a bit of a different story. Brex was about startups and facilitating credit for startups. TransferWise was cross-border, as we talked about earlier. So they each found a strategy to build themselves into this place.

But let's just talk about Alipay and WeChat Pay for a moment. This is even dated because this is nearly a year old, but this is their user base in the last seven years, this remarkable growth of usage between Alipay and WeChat Pay in China, both with approximately a billion users. It's thought that WeChat Pay and Alipay now have

92% of the retail payment space in China.

And one of their strategic approaches is that if you have a store of value on an Alipay wallet and you move it to somebody else within the Alipay system, as I understand it, it's still 0 cost. If you jump out of service, out of system, 10 basis points. But this conceptual framework-- and their pricing model could change at any time, but their pricing model has been historically, if you stay within the Alipay wallet system, heck of a benefit in cost.

So merchants then start to want to pay their vendors. And merchants and customers want to stay within those wallet systems to keep those costs down, significant network effects. Romain?

ROMAIN: Sijin has her hand up.

GARY Please.

GENSLER:

AUDIENCE: Yeah. Hi. Just want to add one point. I think the social platform base is really important, but another thing that Alipay is so successful because it's working closely with the government.

For example, right now in China, we can use a QR code in Alipay when we try to get on the shuttle bus or we want to get a phone. We can use the Alipay to pay that bill. So actually, the government is encouraging all of the citizens to use this Alipay and WeChat Pay.

GARY Yeah. So there's incredible collaboration, what you're talking about, between
GENSLER: government and these payments systems. And we've seen this in India as well. India really encouraged the uptake.

And I could have put various statistics in for India. They're a couple or few years behind. They're not as robust and developed in India. But this encouragement by the official sector or the banking sector-- sometimes in other countries, it can be by the banking sector.

But what's interesting in China, and we'll close out on this, is now the Chinese government is offering what one might say is a complement or a competitor to

WeChat and Alipay through the Chinese digital currency electronic payment project or DCEP. And so they've facilitated the ramp up of Alipay and WeChat Pay, but now they're going to have an alternative as well. So it's very interesting.

And I think in part, this is to facilitate the commercial banks were losing a significant market share to Alipay and WeChat Pay, that the Chinese government may well have been encouraged to build their own-- they call it the central bank digital currency-- but their own wallet system, digital wallet, digital yuan that will look a lot like Alipay and WeChat wallets. And in fact, this is all being rolled out in 2020. But in fact, the initial pronouncements say that it must be accepted, so just as we have had multiple centuries of laws that are called legal tender laws.

And the legal tender laws go all the way back to Genghis Khan in China, where under the coercive power of the state, you must accept in those days the paper bark currency of Genghis Khan, or in the US, you must accept the US dollar for all debts public and private. Those are called legal tender laws. Something similar is happening right now in China that this DCEP will have to be accepted, at first in certain cities. They're going to start, I think, in two cities, and then they're going to roll it out over time in other places.

So now let's look here in the US. And I picked Facebook because they haven't been as successful. This remarkable platform, Facebook is so ubiquitous, over 2 billion members around the globe. They've tried multiple times to get into payments starting 11 years ago. Virtual currency in 15 currencies terminated in four years, Facebook credit. They came about in 2015 Facebook Messenger. They started in the US, UK, and France. By 2019, they rolled out of France and the UK.

They, in India, had a pilot that for the longest time was in pilot purgatory, in a sense. Facebook could not get the approval of the Indian government to go beyond one million accounts. They only recently in the early spring of 2020, late winter, got approval that they could move up to 10 million and so forth. But it's pending further data standardization, and it's conditional on data standardization.

And then last November, they announced Facebook Pay. Now, that puts aside Facebook Libra. I'm just saying their efforts to do Facebook Pay, bringing together Facebook Messenger, Instagram, WhatsApp is their new effort. You can decide

whether you think they'll be successful. But it's interesting that in some circumstances, Facebook has been very successful, but not so much in the payment space.

And even Google Wallet and Google Pay has more adoption, and Apple Pay has more adoption than we've seen in Facebook, as I understand it. It's hard to get all the statistics. So it gives you a little bit of a sense of these challenges.

What's the landscape? Going to do it a little quickly, but this is to give you that landscape. First, commercial banks and the bank-owned networks.

I put here thousands of banks. They've been around since 1784. I like taking 1784 because that's the Bank of New York here in the US, Alexander Hamilton's bank.

But the clearinghouse literally has been around since the 1850s. It was a place where people took physical checks, negotiable orders of withdraw, and had to take them into a warehouse and clear them. But even UnionPay in China, which was formed amongst 85 banks initially-- and some say maybe the People's Bank of China owns something of it, too-- but UnionPay, these bank consortium.

Next in this architecture of the payment landscape, the card companies. I would note that Visa was a consortium. Bank of America was a California bank. It was not a national bank at the time. And Bank of America wanted to offer its California credit card across the country and formed a consortium.

It later became an independent company. It later went public. And it's got a \$373 billion market value as of last Friday.

Now, we sometimes talk about the Big Tech firms, the big four, Microsoft, and Google, and Amazon, and Apple. They all have market values above this. But Visa is one of the 10 highest market cap companies in the country, maybe in the world. And then, of course, Mastercard and so forth, Discover and the Dow.

So that's the base layer, but then there's something that you and I don't think a lot about, is payments service providers. And these companies have gone through a significant wave of consolidation. These were data companies basically, expounded around 20 years ago. Fiserv is an agglomeration of three or four different companies that have come together over the last few years. But these dominant

companies here in the US are the backbones of the payment network right in the middle of that earlier chart that we talked about, \$45 billion to \$80 billion market value each.

And now we get to the startups starting with PayPal at \$124 billion of value, and Square, and then some companies you might not be as familiar with. But each one of these companies founded usually in the 20-year timeframe-- I'll put Western Union to the side. Western Union was that company that started in the 1850s.

These are publicly traded companies. You can look at their financials. If you were actually going to go and compete in this space, I'd largely recommend you've got to pull these financials, read their public statements, see how they make their money.

But then there's the private companies. And all I could do to value these companies that go to Forbes and Crunchbase and some other sources to say, what was their last funding round? Stripe has not gone public yet. Paytm in India has not gone public yet, but these are their last funding rounds.

Plaid was purchased for \$5.3 billion by Visa. But it gives you that sense, putting aside whether these values will persist or not. And there's hundreds, thousands of other companies in this space competing.

As I said, there's a lot of consolidation. And one of the consolidations is around payment service providers. Just in the last 18 months, four big mergers, one in Europe, three in the US, basically consolidation in the middle of this technology. First Data, which was one of the biggest companies, that basically was on the merchant side, helping merchants with their point of sale, Worldpay that does this annual report that I talked about, and Total Systems Services all bought in the last 15 months. And then in Europe, Worldline bought Ingenico, which was like a cross-Europe merger.

But we're seeing a lot of mergers also in the data aggregator side. Visa bought Plaid, as we talked about. And SoFi recently announced for over \$1 billion buying Galileo. Galileo is a smaller competitor of Plaid that is in this API data aggregators space, a really important space in payments.

SoFi, which we'll talk about in our next couple of classes, started as a credit

provider, not in the payment side. But here it's interesting that SoFi is going back and saying, we want to get to that payment side. We want to acquire Galileo and the API side.

And so a little talk, and we've only got a few minutes left. We already talked about crypto projects, but the crypto land is here. And they're saying maybe a digital token backed by US dollars or backed by Euro or yen would be the way to address these pain points. Some are retail projects. Mostly tether and others on the retail side are about cryptocurrency exchanges.

But the wholesale projects are interesting. 14 large banks have come together and formed this thing called Finality without an I. It's F-nality. JP Morgan has said JP Morgan Coin. These are trying to use digital tokens representing Fiat money to smooth out pain points. And then the messaging companies, Telegram, the world's largest secure or encrypted messaging company with 400 million members or customers, they're trying to have a token called GRAM, even though it's held up in the securities law case that they have with the Securities and Exchange Commission here in the US.

And that sets the stage-- I'm going to skip over-- that Bitcoin and all of these payment tokens are out there and talk about the goals they're trying to do. The goals they are trying to do are the same things-- addressing pain points, extending settlement to 24 hours a day, 7 days a week, and lowering costs. That's why JP Morgan has JP Morgan Coin. It might be a little bit of hype, but there's some reality, too, that they think that between their project and this competitive project Finality at the wholesale payment space, they can lower cost in the cross-border space.

So Facebook comes along, and Facebook says, well, maybe we can do it. Maybe we can do it with a worldwide currency. They announced it was-- it didn't lack ambition. Mark Zuckerberg and Facebook announced a new global currency to meet the needs of billions of people.

They talked about financial inclusion. They talked about cross-border pain points. And they said, this is the wave of the future.

It's run into a lot of central bank concerns around the globe. It's run into significant public sector concerns around the globe. It's still uncertain whether it will take off,

but it's a significant feature of this payment space that one needs to understand, even if it's just a catalyst for change. Both China and the US reacted quickly with the FedNow project here in the US and the central bank digital currency project in China.

So I'm going to close on just a little chart that shows Libra versus central bank digital currency and just say something about China's project. China's project, not yet lived, digital currency electronic payment program, the issuer is the People's Bank of China. And this is a really important question that is on a lot of people's mind. If a central bank issues a digital representation of money directly, what's the role of the commercial banks?

Commercial banks in most countries are the issuer of digital money. I know we think about central banks in the 180 countries that have money, and they're really important. But it's commercial banks that keep those ledgers. The commercial banks with some backing of their governments, either implicit or explicit with deposit insurance, you and I have a liability to our banks, to Bank America, to Barclays, to some bank in Asia.

The People's Bank of China is saying, no, we will issue this directly, but we'll have the commercial banks involved. And the commercial banks, you'll get your digital wallet from the commercial banks. There were announcements as of early April 2020 that update us, but we don't yet have the full picture. It looks like it's basically a centralized private network run by the PBOC.

It does look like Alipay and WeChat Pay will have to use this system. So some question is, how different will it really be? It looks like by government Fiat rolled out by city and region that merchants will have to accept DCEP. So the QR system on those buses will have to have DCEP, Alipay, and WeChat Pay. Alipay has taken out a bunch of patents already on how to interface with DCEP.

So it's a work in progress, but it's an important feature of this. And if you're thinking about payments, this is really important. And what's fascinating is central banks around the globe are then looking to see what China's done.

Sweden was already looking at an electronic digital central bank currency, the E-

krona. And they were at the forefront. But now you can go central bank around central bank.

France has made announcements. The United Kingdom has made announcements in 2020, all in this milieu of, how do we address pain points? Do we as a central bank have a responsibility to our citizens to continue to offer a digital currency when the paper currency is going away? And important public policy questions of, what does this do? Does it destabilize commercial banks? So I think that's a bit of a wrap.