Episode Book

EPISODE #6015

How Banks Move a Million vs a Billion Dollars

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SYNOPSIS

What actually happens when someone wires you a million dollars? The answer splits in two: the number is trivial, but the plumbing is a whole industry. This episode walks through three transfers — a hundred dollars, a million, and a billion — and shows where the paths diverge. Along the way: why money never physically moves, how CHIPS netting meant one large payment never had to move as a large payment, why the Fed's instant rails now reach ten million dollars, and what really stops a ten billion dollar transfer (hint: it isn't the message format).

TRANSCRIPT



Corn

Here's the question I keep turning over. If I owe you a hundred dollars, and I owe you a billion dollars, is the second one a different kind of thing, or is it the same thing with more zeros?



Herman

That's the whole episode, right there.



Corn

That's what Daniel wants to know. He's got this hypothetical benefactor, a generous one, and he wants to know what actually happens if somebody wires him a million. And he was very clear about what he doesn't want, Herman. No KYC, no anti-money-laundering, no tax paperwork. He said it twice.



Herman

He's not asking what forms get filed.



Corn

He wants the machinery. How the amount is stored, which networks handle it, what changes in the ledger when a million moves between two banks, where the thresholds are, and what the actual ceiling is on a single transaction. Whether a bank could push ten billion dollars with one instruction.



Herman

And the honest version of that question is beautiful, because the answer splits in half. The number is the same number at every scale. The plumbing is not.



Corn

Then let's run the three transfers. A hundred, a million, a billion. See where the paths diverge.



Herman

Start with the distinction that makes everything else make sense. Every payment between banks has two halves, and people collapse them into one. Clearing is the transfer and confirmation of information. Settlement is the actual transfer of funds that discharges the obligation.



Corn

Information first, money after.



Herman

Always. The banks exchange instructions, confirm what's owed, and then settle. And settlement does not involve money moving anywhere. It involves balances in accounts held at the central bank being adjusted. That's the whole trick.



Corn

Say the sentence that sounds wrong but isn't.



Herman

Money never moves.



Corn

Good.



Herman

The Richmond Fed is blunt about it. Banks exchange instructions and settle obligations by adjusting balances in accounts held at the central bank. There's no vault, no truck, no packet. When you hear settlement, picture a number being edited in two places.



Corn

And when people talk about their money being in transit, they mean the information is in transit.



Herman

Exactly that. The funds are sitting still the entire time. What's in flight is a message telling two institutions to edit their books.



Corn

So the ledger question. Daniel asked what actually changes. If I pay you a hundred dollars and we both bank at the same institution, what does the bank do?



Herman

Two entries. Debit one deposit account, credit the other. The bank's total liability to its customers is identical before and after. It hasn't lost a cent, it hasn't gained a cent. It just re-labelled who owns what slice of the money it already owes.



Corn

That's a little deflating.



Herman

It should be. Now put us at different banks. That's when the reserve accounts come in. The payer bank's account at the central bank gets debited, the payee bank's gets credited, and alongside that, the customer deposit accounts get their entries. Four lines of bookkeeping.



Corn

Four lines. That's a million dollars.



Herman

That's a billion dollars too. Same four lines. Which gets to Daniel's first question, and the answer is clean. The representation of the amount is not a hard problem at all. It's a number. Typically an integer in minor units, or a decimal with fixed precision, sitting in a ledger database somewhere.



Corn

Integer in minor units meaning cents.



Herman

Cents, or agorot, whatever the minor unit is. You store it as a whole number so you never do floating point arithmetic on money.



Corn

Which is the correct engineering decision and also the least romantic fact in finance.



Herman

Moving a million is computationally identical to moving a hundred. Same message, same fields, same processing logic. There's no branch in the code for large numbers. There's no special flag. CHIPS migrated to the ISO 20022 format in April 2024, and on day one it settled five hundred and fifty-five thousand payments worth one point eight one trillion dollars, and the amount field carried every one of them the same way.



Corn

Same field, same width.



Herman

Same field. So when Daniel asks whether a million is computationally different, no. The computer does not care. The computer would move a trillion without blinking.



Corn

Then the interesting question is what does care.



Herman

Liquidity cares.



Corn

There it is.



Herman

That's the real answer, and it's the sentence the whole episode hangs on. The computation is trivial. The liquidity is everything. A sending bank moving a billion dollars has to have a billion dollars in reserves at the central bank, or borrow it intraday, at the moment that payment goes out.



Corn

Not eventually. At the moment.



Herman

Fedwire is real time gross settlement. Each payment order is processed individually as it arrives. The Fed debits the sender's master account and credits the receiver's, in central bank money, and that credit is final and irrevocable. There's no waiting for the end of the day, no netting it against something else. It's gone the instant it lands.



Corn

So the bank that's short can't just send it and figure it out later.



Herman

It can, actually, sort of, and that's the machinery. The Fed extends intraday credit, what they call daylight overdrafts. But it's not a blank cheque. There are debit caps, collateral requirements, and the Fed watches those positions minute by minute through the day.



Corn

So the message format doesn't stop a ten billion dollar transfer. The balance sheet does.



Herman

And the balance sheet is a much harder thing to move than a number in a field. That's why I said the plumbing differs. The number is trivial. Making the number true is the entire industry.



Corn

Give me the hundred dollar case first, because I want to see how far down the ladder it stops.



Herman

A hundred dollars from you to me is a retail payment and it never goes near Fedwire or CHIPS. If it's instant, it runs on FedNow or on RTP. If it's not urgent, it's batched up with ten thousand other payments and goes out through the ACH system at the end of the day.



Corn

And FedNow's ceiling?



Herman

Ten million dollars, effective November 2025. They raised it from one million, and the stated reason was to unlock higher-value use cases. Corporate treasury, real estate escrow. RTP's limit is still one million.



Corn

Ten million is a strange ceiling for something called instant retail.



Herman

It is, and it tells you the retail rails are creeping upward into territory that used to belong to the wholesale systems. Which is going to matter when we get to Daniel's question about thresholds.



Corn

So a hundred dollars sits comfortably at the bottom. Does it ever touch Fedwire?



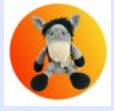
Herman

Not in your life. It rides the small rails and settles in a batch.



Corn

A million dollars. This is the case I actually want to sit with, because it's the one where the path branches.



Herman

It's the most interesting of the three, no question. A million dollars could go through FedNow, now that the limit is ten million. It could go through RTP. Or it could go through Fedwire or CHIPS, depending on the institution and what the payment is for.



Corn

Same amount, different rail, depending on who's sending it.



Herman

Depends on the bank. Some institutions wired a million dollars through Fedwire for thirty years and they're not going to change the workflow because FedNow got its limit raised. Others will happily push it down the instant rail to save the fee.



Corn

And the fee's not nothing. What does Fedwire cost the bank?



Herman

Ninety-seven cents a transfer at the Fed's Tier One rate for this year. But that's the bank's cost. What the bank charges you is twenty-five to fifty dollars a wire.



Corn

Ninety-seven cents to twenty-five dollars. That's a healthy margin on a bookkeeping entry.



Herman

That's the retail wire business, yes.



Corn

So the million. If it goes through Fedwire, it's processed individually, right there, final and irrevocable, and the sending bank needed a million dollars in reserves available at that moment.



Herman

It didn't necessarily need to own it. It needed to have it or be able to borrow it intraday against collateral. Either way, the constraint was real money sitting somewhere, not a limit on the message.



Corn

And if it goes through CHIPS instead?



Herman

Then something strange happens, and this is the part that answers Daniel's question better than anything else I've got. CHIPS is a multilateral netting system. It matches payments against each other and offsets them. Which means a large payment entering CHIPS might never actually move as a large payment.



Corn

Explain that, because it sounds like magic.



Herman

The Richmond Fed has a worked example and it's the cleanest one. Suppose Bank A owes Bank B five hundred million dollars in the morning. But Bank A expects four hundred million dollars to come in from Bank C that afternoon. Under Fedwire, Bank A needs five hundred million available when it sends. Under CHIPS, the system nets it. Bank A ends the day owing a hundred million, because the five hundred out and the four hundred in cancel.



Corn

So four hundred million dollars of that transfer never existed.



Herman

Never moved as a gross amount. It was offset against an incoming payment, and only the net hundred million actually had to be funded.



Corn

And the system does that across every participant simultaneously.



Herman

Constantly, all day. The Clearing House puts the headline number at roughly twenty-six to one. One dollar of funding supports about twenty-six dollars of settled payment value.



Corn

So the billion dollar transfer is the same message as the hundred dollar transfer, and then it may not even move as a billion.



Herman

It depends entirely on what else is crossing the system at the same moment. Same payment, different funding requirement, based on the traffic around it.



Corn

That feels like a loophole and also like the most sensible engineering in the whole system.



Herman

It's not a loophole, it's the design. CHIPS has run this way since 2001. It's a hybrid, real-time final settlement plus a liquidity-saving algorithm with netting and intelligent queuing. The whole point is to reduce how much actual money has to be parked to make the payments go.



Corn

How much money does that save?



Herman

The Clearing House calculates about five and a half billion dollars a year in economic value from the liquidity savings. Call it fifteen million dollars a day that doesn't have to be sitting in accounts doing nothing.



Corn

I have to ask, Herman. Why does the sending bank agree to this? Netting means their payment doesn't go out clean, it goes out as an obligation to be settled later.



Herman

Because the alternative is worse. Every bank in the system parking gross amounts all day means enormous idle balances. Netting lets them all hold less, and the less they hold, the more capital is free to do something else. Nobody's being charitable. They're all better off.



Corn

Now, before we go on, I want to nail down SWIFT, because it's the one I hear wrong constantly.



Herman

It's the most misunderstood piece of the whole stack. SWIFT is not a settlement system. It settles nothing. It's a Belgium-based cooperative messaging network that delivers payment instructions between banks.



Corn

It's the envelope, not the money.



Herman

It's not even the letter. It's the courier that carries the instruction. The actual settlement happens afterwards, in Fedwire, in CHIPS, in Europe's TARGET2, wherever the currency lives. The Richmond Fed is explicit that SWIFT is a message system and settlement happens subsequently elsewhere.



Corn

So when people say a payment went through SWIFT, they mean the instruction went through SWIFT and then it settled somewhere else.



Herman

SWIFT carries the instruction to the bank that's going to settle it. Which is why cutting a country off from SWIFT hurts so much. You haven't taken their money. You've taken their ability to tell another bank what to do with it, and the money just sits there.



Corn

How big is the network?



Herman

Over ten thousand member banks. Compare that to Russia's SPFS at around three hundred and forty, or China's CIPS with seventy-five direct participants. SWIFT is the network, and the alternative networks are thin.



Corn

So if you're outside SWIFT, you can still settle, you just can't speak to most of the room.



Herman

You have to go through intermediaries and letter of credit arrangements and it gets slow and expensive. That's the whole game.



Corn

Okay, back to the billions. There's a hierarchy here, isn't there. SWIFT carries the message, CHIPS nets the obligations, and Fedwire provides the final settlement.



Herman

That's the shape of it, and Fedwire is the floor. It's the irreducible core. At the end of the day, CHIPS's net positions get funded through Fedwire transfers into a prefunded account at the New York Fed. So even the netting system settles through Fedwire in the end.



Corn

Because Fedwire settles in central bank money.



Herman

Central bank money is the only thing that's truly final in dollars. That's the Fed's own language. The credit to the receiving master account is final and irrevocable. Everything else is a promise that eventually gets converted into that.



Corn

So there's a chain, and it terminates in one place.



Herman

And that place runs twenty-two hours a day. Nine in the evening Eastern to seven the following evening. Every business day.



Corn

Twenty-two hours is oddly specific.



Herman

It's two hours of maintenance and the exact length of the days when banks in Europe and Asia are both open. Fedwire's hours are designed around the fact that dollars are being settled in Frankfurt in the morning and Tokyo in the evening, and that settlement has to happen in central bank money on the same day from everyone's perspective.



Corn

What does Fedwire actually move?



Herman

Last year, two hundred and seventeen million transfers. About one point one five quadrillion dollars total. Roughly four point six trillion dollars a day.



Corn

Which is, for the people listening, more than the annual output of most countries, three times over, in an afternoon.



Herman

Every day. The NBER paper made the point with 2020 figures that Fedwire was moving the annual GDP of the United States every seven business days. Four point six trillion dollars a day is roughly twice that pace.



Corn

And CHIPS?



Herman

Average daily value of two trillion dollars last year, up nine percent year over year. Volume up twelve percent. Forty-three direct participants. Ninety-five percent of payments settle with finality in seconds.



Corn

Seconds.



Herman

Seconds. Which matters, because the netting scenario I described sounds like it should take forever. It doesn't. The algorithm runs continuously and matches in real time.



Corn

What's the record? Somebody always has a record.



Herman

Last November twenty-eighth they set one. One point two one million payments in a single day, two point nine seven trillion dollars gross. Beat the previous record from 2008 by about twelve percent.



Corn

Two point nine seven trillion gross. And after netting, what was the actual funding requirement?



Herman

A tiny fraction of that. That's the entire point of the system, and that's the number I'd want people to take away over the gross figure.



Corn

Say the efficiency line again, because I think it's the best answer to Daniel's question in the whole episode.



Herman

One dollar of funding turns into twenty-six dollars of settled payment value.



Corn

So the billion dollar transfer is a big number on a screen and a small number on the balance sheet, if the timing's kind.



Herman

Same message as the hundred dollars. Wildly different demand on the sending bank's balance sheet, and even that demand depends on what else is moving around it.



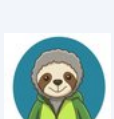
Corn

And that gets us to the limits. Daniel asked what the largest single transaction is. Where's the actual ceiling?



Herman

This is where the sources disagree, and I find that more interesting than a clean answer. There's a commonly cited number. Nine billion, nine hundred ninety-nine million, nine hundred ninety-nine thousand, nine hundred ninety-nine dollars and ninety-nine cents.



Corn

That is a suspiciously specific ceiling.



Herman

It's about ten billion, and it's a legacy of a 1987 circular from the New York Fed that limited transaction size. The formatting limit from that era stuck, and a lot of Fedwire documentation still cites it.



Corn

So there is a hard cap.



Herman

Maybe. The EAC's Fedwire instructions and Finzly both cite that cap. But Augustus's documentation states flatly that Fedwire has no network limit on the size of a wire. Atlar says it does not operate with a transfer limit at all.



Corn

Two camps. That's uncomfortable.



Herman

It's honest, is what it is. My read is that the constraint that actually binds is not the message format. It's whether the sending bank has ten billion dollars in reserves or can borrow it intraday, and whether the Fed's debit caps and collateral rules allow it to.



Corn

The cap didn't get raised. It just stopped mattering because the real cap is the balance sheet.



Herman

That's where I land. The system doesn't have a cliff where a transfer stops being possible. It has a gradient. The larger the amount, the more liquidity the sending bank has to line up, and the more collateral the Fed wants behind the intraday credit if the bank is short.



Corn

So could a bank move ten billion dollars with one payment instruction?



Herman

In principle, yes. It's one message with a big number in a field. And then the bank has to make the number true, and if it can't, the payment doesn't go.



Corn

I want to flag something Daniel's going to appreciate, because it's the kind of thing he asks about on this show. That 1987 circular is still shaping what's theoretically possible in a single transaction in twenty twenty-six.



Herman

Forty years. A policy decision from the era of fax machines and telex is still the number in the docs, even if the system has outgrown it. That's a slow-moving piece of infrastructure if there ever was one.



Corn

Okay, let me argue with you slightly on the framing. You keep saying the number is the same and the plumbing differs. I half buy it. But I'd push on one thing.



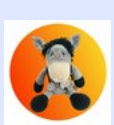
Herman

Go on.



Corn

You said a billion dollars is the same message as a hundred dollars. But it isn't, practically. If I'm the receiving bank, I see a hundred dollars and I don't even glance at it. I see a billion and I've got someone watching that account. The message is the same. The event is not.



Herman

That's the right objection and I'll take it. The bytes are the same. The consequences to the two banks are completely different. A hundred dollar payment can't move a bank's position. A billion dollar payment absolutely can.



Corn

It can move a bank.



Herman

It can move a market, and if the timing is wrong it can put the sending bank into a deficit the Fed is watching minute by minute. That's not a message problem. That's a capital problem.



Corn

So the honest answer to Daniel is: no, the system does not treat a billion dollars as fundamentally different from a hundred dollars in terms of how the transfer is represented. And yes, it treats them as completely different animals in terms of risk, liquidity, and operational machinery.



Herman

Both halves are true and I don't think you can collapse it to one.



Corn

I'll take that. Now, one thing bothers me about the netting story.



Herman

What's that?



Corn

If the billion gets netted down to almost nothing, then the sending bank didn't really need the billion. The whole thing was a bookkeeping exercise. Doesn't that undermine the liquidity argument?



Herman

It doesn't, because the netting only works if someone else's payment happens to be crossing in the opposite direction at the right time. The bank can't count on that. It has to be prepared to fund the gross amount if the schedule doesn't work out, and the netting is a bonus, not a guarantee.



Corn

The bank holds the billion in reserve against the bad day.



Herman

The bank holds the billion against the bad day, and the netting is what makes the average day cheap.



Corn

Which is the most financial-system thing I've ever heard. Everything is a bet on the average and a prayer about the tail.



Herman

That's the whole industry, Corn.

L

Larry

Are YOU still paying full freight for your high-value wire transfers? Stop. Introducing WireWhiz Plus by Patented Kinetics. For a limited time, move up to one hundred billion dollars per click using our proprietary Gentlemen's Agreement Accelerator, which lets you bypass the Fed by simply agreeing with the other bank in writing that the money has already moved. No message format, no reserves, no debit caps, just confident paperwork. WireWhiz Plus comes pre-loaded with twenty-six to one liquidity efficiency out of the box, and if your transfer is rejected for any reason including non-existence of funds, we'll refund the ninety-seven cents. Visit us at WireWhiz, that's W-I-R-E-W-H-I-Z, dot not-real, and use code SAME-NUMBER-MORE-ZEROS for a free compliance fax form. WireWhiz Plus is not a bank, not a settlement system, not affiliated with the Fed, not affiliated with CHIPS, not affiliated with SWIFT, not affiliated with the concept of money, and cannot be held liable for anything occurring in central bank money. Individual results may vary. Ask your counterparty if WireWhiz Plus is right for them.



Corn

What's the price on the hundred billion tier.



Herman

Corn.



Corn

I'm asking a practical question.



Herman

There's no hundred billion tier. There's no fax form. It's called Patented Kinetics.



Corn

They had a code, Herman. SAME-NUMBER-MORE-ZEROS.



Herman

We're not doing this. Where were we.



Corn

We were at the liquidity argument, and I was about to concede it.



Hilbert

The number's nine point nine, not ten.



Hilbert

You said ten billion dollars. The number in the EAC instructions is nine billion, nine hundred ninety-nine million, nine hundred ninety-nine thousand, nine hundred ninety-nine dollars and ninety-nine cents. There's no round ten. There's a decimal and two digits.



Herman

That's right, Hilbert. That's the formatting limit.



Hilbert

I tried to send it.



Herman

The formatting limit.



Hilbert

Just under. Nine point nine nine nine billion and change. I won't say the change.



Corn

You tried to send nine point nine nine nine billion dollars.



Hilbert

I tried to send what I tried to send. The wire got kicked back. Not the amount. A field. Filled out the wrong field. Field seventy-two.



Herman

Field seventy-two in the MT103 is the sender-to-receiver information field.



Hilbert

That's the one. Bank called and asked me to fax a form.



Corn

Fax a form.



Hilbert

High-value payments still run on fax machines if you push them hard enough. You'd be surprised how much of that system is a handshake and a fax.



Herman

Some legacy processes do persist.



Hilbert

Anyway, the receiving bank flagged it. Compliance. Suspiciously round, they said. Nine point nine nine nine billion, nine hundred ninety-nine million, nine hundred ninety-nine thousand, nine hundred ninety-nine dollars and ninety-nine cents, and they called that round.



Corn

I'd call that anything but round.



Hilbert

They wanted a letter. Notarized. I sent it. Explanation of source of funds.



Herman

What was the money in?



Hilbert

Mostly nickels.



Corn

Nickels.



Hilbert

Mostly. There were other coins. I don't want to get into it.



Herman

Hilbert, what on earth does mostly nickels mean.



Hilbert

It means exactly what it means. The letter covered it. I still have the letter. It's framed, in the hallway, next to the coat hooks.



Corn

You framed a compliance letter.



Hilbert

It's a good letter. I can read it if you want. I know it by heart. To whom it may concern, regarding the wire of nine point nine nine nine billion dollars and ninety-nine cents, I am writing to confirm that the source of these funds is legitimate and that the amount, while unusual, is not in itself indicative of anything. Signed and notarized on the fourth of...



Herman

Hilbert.



Hilbert

I can keep going.



Herman

We're on the clock.



Hilbert

Suit yourself. The point is the amount wasn't the problem. The number was never the problem. Somebody in an office decided the number looked funny and the lot stopped for a week.



Herman

A week.



Hilbert

A week and a half. That's what actually constrains it. Not the field, not the cap. A person deciding the number's too neat to be real.



Corn

The number is trivial, and the liquidity is everything.



Hilbert

And the letter's still framed.



Herman

The reserve account picture is worth restating one more time, because it's where all of it lands. The central bank adjusts two reserve balances. Everything else is that plus bookkeeping. Whether you're sending a hundred dollars or ten billion, the final move is two balances in central bank money being edited.



Corn

The number is the same number. The plumbing is not. And the constraint was never the computer.



Herman

Never the computer. It's the sending bank's balance sheet, the Fed's collateral rules, and occasionally a notarized letter about nickels.



Corn

If you take one thing from this, it's that the size of a payment doesn't change what a payment is. It changes what it costs to be the bank that sends it.



Herman

The message is free. The reserves are not.



Corn

If the representation is trivial and the liquidity is everything, the open question is which one wins as the retail rails keep climbing. FedNow at ten million is getting close to territory that used to belong to Fedwire. Does the distinction between large and small erode, or does the liquidity constraint always catch up?



Herman

The liquidity catches up. Raising a limit doesn't create reserves. Somebody still has to fund the payment.



Corn

And the 1987 dollar cap is a fossil. A forty-year-old policy decision is still the number in the documentation even though the real limit is a balance sheet. Whether it gets raised is almost beside the point, because the balance sheet was always the wall.



Herman

The formatting limit was never what anyone was actually pressing against.



Corn

Thanks as always to Hilbert Flumingtop for producing, and to Daniel for the prompt. For more along these lines, there's episode thirty-three forty-six, How $500M Trades Actually Work (Not Venmo); episode forty-three oh nine, Where Does Your Money Go During Those Three Days; and episode ten twenty-five, The Three-Day Money Gap. This has been My Weird Prompts. If you enjoyed following the plumbing, leave us a review, it helps other people find the show.



Herman

And if you've got a question about the machinery behind something, send us your own prompt on Telegram at t dot me slash MWP listener bot. We'll be back soon.

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