Class 14 Overview

• Readings and Study Questions
• 10 Years and Counting – Happy Anniversary
• Payment Systems and ‘Pain Points’
• Payment System & Blockchain Technology
• Blockchain Payment Companies
• Conclusions
Class 14 (11/1): Study Questions

• What lessons can be drawn from the challenges for blockchain related payment applications? Might Layer 2 solutions, such as Lightening, resolve these challenges?

• What are the opportunities in cross-border payments? In domestic P2P or P2B payments?

• What are tradeoffs of utilizing permissioned vs. permissionless payment applications?
Class 14 (11/1): Readings

• ‘How Blockchain Can Finally Fulfill its Promise in global Payments’ CoinDesk

• ‘Extending the World of Payments to Blockchain’ ACI Worldwide

• ‘The Payment Industry is About to be Struck by Lightning: Expert Take’ Coin Telegraph

• ‘Why Stripe Gave up on Bitcoin and Blockchain Payments’ Fortune

• ‘How XRP Fits into Ripple’s Payment Products Explained’ CoinDesk
“I've been working on a new electronic cash system that's fully peer-to-peer, with no trusted third party.”
Bitcoin Anniversary

• Price: $6300
• Market Capitalization: $110 Billion
• Outstanding Supply: 17,352,000
• Blocks: 548,300
• Blockchain Size: 189 GB
• Transactions per Day: 250,000
• Hash Rate: 50 Exahash ($10^{18}$)/Sec
• Difficulty: 7.2 Trillion
• Unique Addresses: 500,000

Source: Blockchain
Bitcoin Network: 10000 Nodes

Courtesy of Addy Yeow at Bitnodes. Used with permission.
Smart Contracts & Initial Coin Offerings

Token Sales, Jan14-Aug18
Total Raised: $28,366,035,804

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Payment Systems

A Method to Amend and Record Entries on Ledgers for Money Authorizing, Clearing and Recording Final Settlement

Digital wallets:
- Apple Pay
- Android Pay
- Amazon Pay
- PayPal
- Facebook Payments
- Visa Checkout
- MasterPass
- PayPal
- Venmo
- Samsung Pay
- Alipay
- Chase Pay
- Other Pay [...]

Access method
- Phone
- POS
- Web | e-commerce Gateway

Financial instrument
- Bank account
- Debit Card
- Credit Card
- Prepaid Card
- Others

Acquirer
- Merchant Bank

Cryptocurrency (Bitcoin)
Payment System ‘Pain Points’

- Costs
- Delayed Settlement
- Chargebacks
- Fraud
- Privacy
- Financial Inclusion
- Cross Border Payments
- Centralization of Ledgers
- Complexity
Benefits of Blockchain Technology

• Verification Costs:
  • Direct Costs
  • Privacy Costs
  • Censorship Risks
  • Settlement and Finality Risks
  • Costs of Trust
  • Economic Rents

• Networking Costs:
  • Token Incentive Systems - Reward, Affinity or Identity
  • Start-up Costs
  • Operating Costs
Payment System & Blockchain Technology?

• Possible Suitability
  • Payment Systems use Ledgers to Store and Move Value
  • Multiple Parties Read and Write to these Ledgers
  • Verification and Networking critical to Payment Systems
  • Tokens Store Value
  • Peer to Peer Capabilities
  • Micro Payments
Payment System & Blockchain Technology?

• Challenges
  • Performance, Scalability & Latency
  • Security, Custody & Privacy
  • Regulatory Compliance
  • Customer User Interface
  • Adoption
  • Token Volatility
Blockchain Technology Payment Companies

• Crypto – Start-Ups
  • BitPay
  • Coinbase

• Fiat – Start-Ups
  • Chain
  • Interbank Information Network (built on Quorum)
  • R3
  • Ripple

• Incumbents
  • ICE’s start-up Bakkt
  • MasterCard Patent for Crypto Fractional Banking
  • Visa B2B Connect
Possible Use of Bridge Crypto for Payments

Fiat → Crypto → Fiat
Class 15 (11/6): Study Questions

• What strategic considerations should go into Central Banks thinking of expanding access to digital reserves through central bank digital currency (CBDC)?

• How might design considerations – retail vs wholesale access; token or account based; interest bearing and level of service – weigh in such decisions?

• What are the challenges CBDCs might pose to commercial banking models, monetary policy implementation, payment systems resilience and financial stability?
Class 15 (11/6): Readings

- ‘Central Bank Digital Currencies’ BIS
- ‘Central Banks and Digital Currencies’ Broadbent
- ‘A Perspective on electronic alternatives to traditional currencies’ Camera
- ‘Bitcoin is Fiat Money, Too’ Economist
Conclusions

• Payment Systems Amend and Record Ledgers for Money

• Technology is Rapidly Changing Payment Systems around the Globe

• Payment Systems have Many ‘Pain Points’

• Blockchain Technology may Provide new Methods to Make Payments

• Due to Challenges, though, No Widely used Blockchain Payment Apps

• In Assessing Potential Use Cases the Devil will be in the Details