Cryptocurrency & Gambling: A Summary

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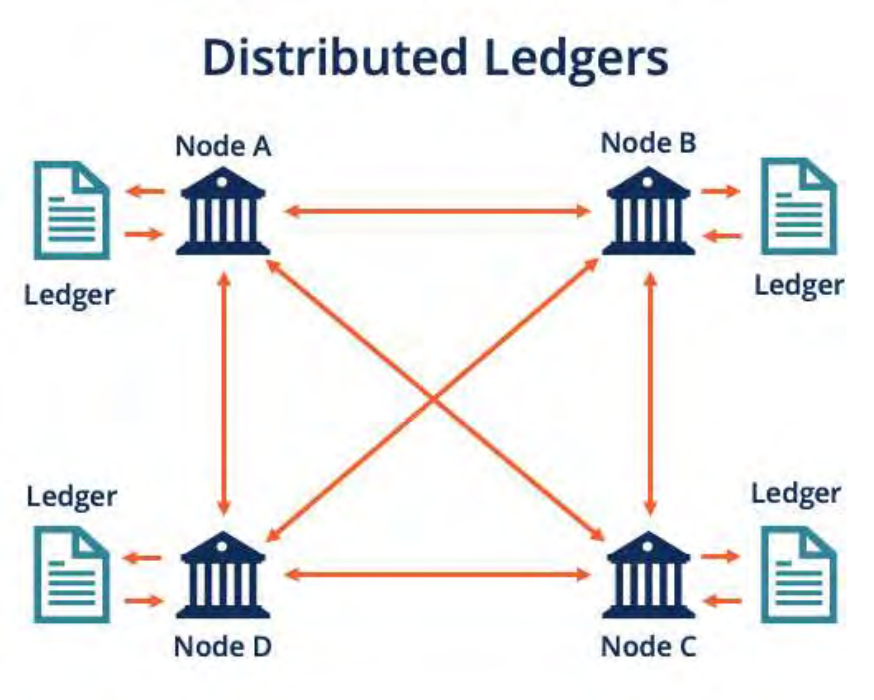
What is blockchain?

- Blockchain is a public distributed ledger recording methodology for transactions.
- The transactions can include anything of value—a house (deed), car (title), software (contract).
- Most often, blockchain transactions are used to record transaction involving virtual currency, or cryptocurrency.
- Blockchain technology keeps an automatically-generated encrypted record—or ledger—of all transactions in which it is employed.

What is blockchain?

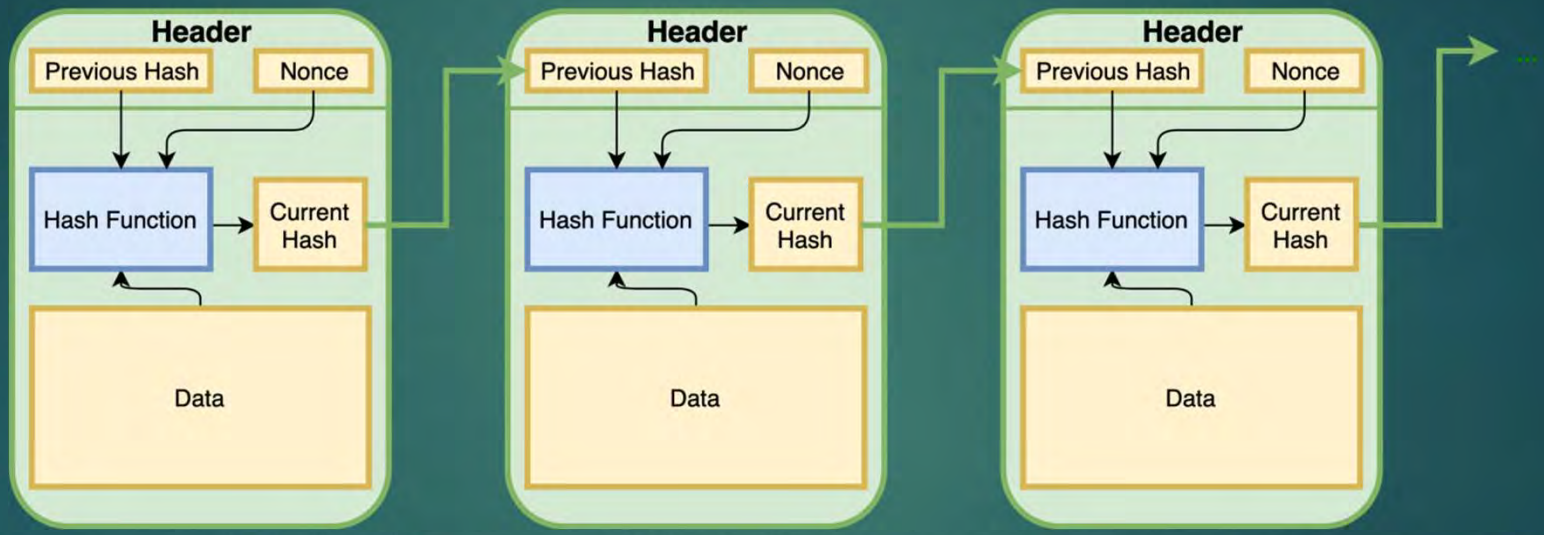


"Distributed Ledgers", 25 Aug. 2020, https://corporatefinanceinstitute.com/resources/knowledge/other/distributed-ledgers/. Accessed 24 May, 2021.

The "Block" in Blockchain & Transaction Security

- Each transaction recorded on the distributed record (or ledger) is saved in a metaphorical "block," which is added to the existing chain of similar transactional blocks.
- An ideal blockchain record is encrypted and contains redundancies, ensuring the record is not tampered with, falsified, or altered.
- The unbroken record adheres to strict "chain of custody" rules and is shared—or distributed—among every member of the blockchain, allowing comparisons of records between all members.
- Each new transaction is added to the record, is time-stamped, and verified by all those using the blockchain to ensure validity.

The "Block" in Blockchain & Transaction Security



"A Simple Blockchain Architecture", 16 Dec. 2021, https://medium.datadriveninvestor.com/build-a-blockchain-application-from-scratch-in-python-understanding-blockchain-1a6f1592e42a. Accessed 24 May, 2022.

Cryptocurrency & Blockchain

- Digital currencies are one application of blockchain technology. There are many of these—over 1500 different currencies. Their relative legitimacy varies widely.
- Cryptocurrencies are not issued by a bank or protected by government rules in the same way fiat currency is protected and controlled and issued by a central bank. They are, thus, decentralized.

Cryptocurrency & Gambling

- The intersection of digital currency and gambling was inevitable. Cryptocurrencies do provide certain transactional benefits, including the following:
  - Lower transactional fees;
  - Payment confirmation occurs quickly;
  - The transactions are irreversible, lowering certain fraud risks relative to traditional currency;
  - As certain indicators of ownership are recorded in each distributed block, some argue that personal identification is less important to the transaction.

Cryptocurrency & Gambling

- Lower cryptocurrency transactional fees may allow for greater casino bonusing, advocates argue.
- Fund transfers, which occur outside of the traditional banking system, are "simpler," advocates argue.
- Individual identities are not generally tied to a transaction, creating greater potential for a type of anonymity called "pseudonymity."
- The electronic nature of cryptocurrencies may appeal to a different demographic group.

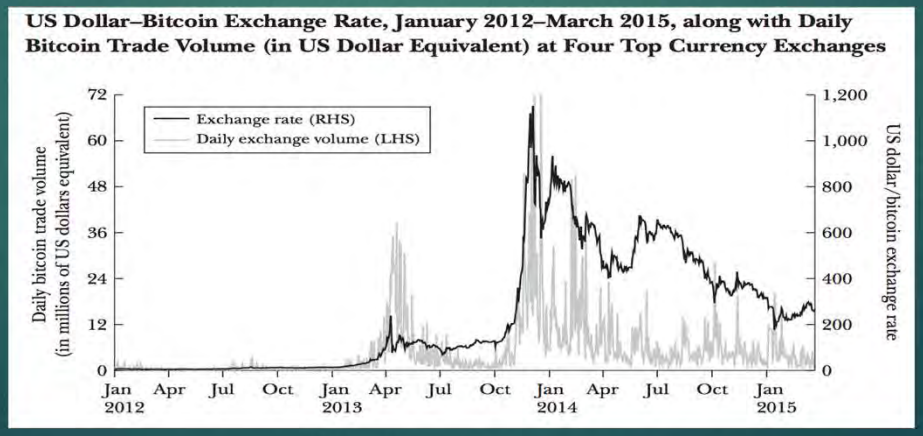
Risks & Challenges of Cryptocurrencies in Gaming

- Market risk
- Shallow market problems
- Counterparty risk
- Transaction risk
- Operational risk
- Privacy-related risk
- Legal and regulatory risk
- AML challenges, including use of currency "mixers"
- Multi-wallet transactions; multi-individual transactions; pooled transactions

Adapted from Narayanan, Bonneau, Felten, & Miller, Princeton.

Market Risk

- Cryptocurrency markets have shown some volatility.
- Still, new markets are often volatile, becoming less so as they mature.
- The current volatility, which we have recently witnessed, simply invites appropriate caution.



See, "Tyler Moore," Bitcoin Risks," University of Tulsa.

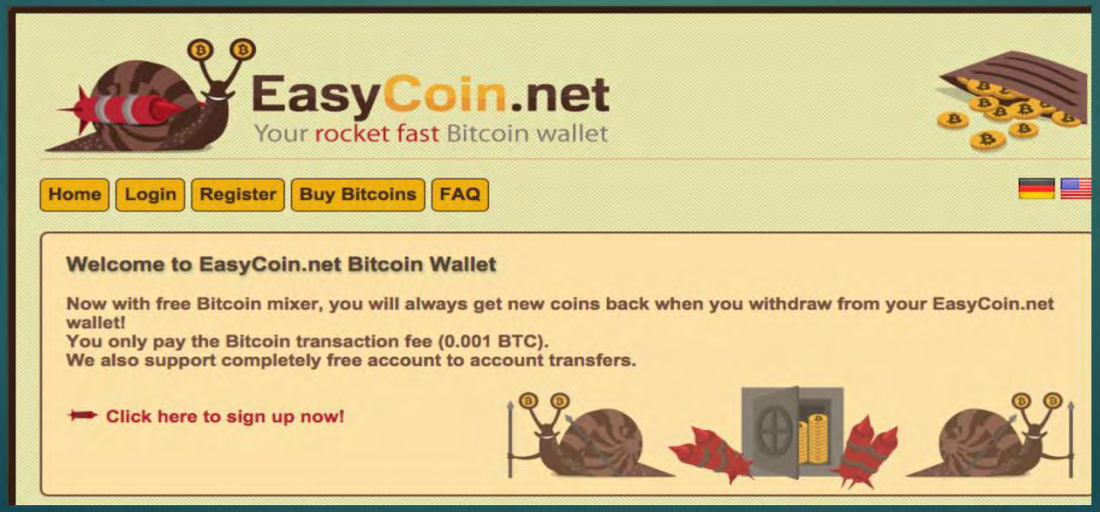
Shallow Market Problem

- With over 1500 types of cryptocurrency, some markets are extraordinarily shallow.
- The shallower the market, the greater the affect of buying or selling large amounts of the currency.

See, "Tyler Moore," Bitcoin Risks," University of Tulsa.

Counterparty Risk

- Exchanges are de facto banks, many closing suddenly and without customer reimbursement.
- Digital wallet services and cryptocurrency exchanges are targets for coin theft, some are obvious scams, and insurance, such as FDIC insurance for de facto bank failure is unavailable.



See, Tyler Moore, "Bitcoin Risks," University of Tulsa.

Counterparty Risk

Scam	Lifetime		Payout to scammer	
	Days	Alive?	BTC	USD
Scam wallets	535	yes	4 105	$359 902
Scam exchanges				
BTC Promo	98	yes	44	$22 112
btcQuick		no	929	$73 218
CoinOpend	29	no	575	$264 466
Ubitex	91	no	30	$96[16]
Mining scams	Data Source			
Labcoin	Blockchain		241	$48 562
AMC	BitFunder		18 041	$1 327 590
Ice Drill	BitFunder		14 426	$1 558 008
Asic Mining	Blockchain		12.6	$5 532
Dragon Miner	Blockchain		1.63	$1 019

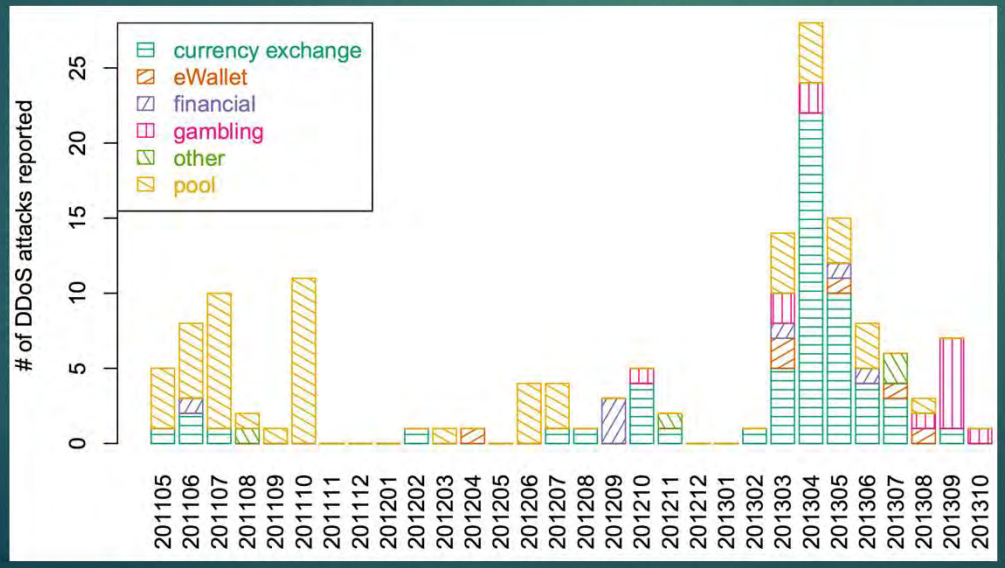
Vasek & Moore, "Financial Crypto," 2015.

Transaction Permanency & Transaction Risk

- When an irreversible cryptocurrency-based transaction is disputed, often no clear mechanism exists to resolve alleged fraud or error.
- See previous slide.

Operational Risks

- Actions that undermine a cryptocurrency's infrastructure and security assumptions creates operational risks.
- Examples of such risks include malware in wallets, vulnerabilities in bitcoin core software, DDOS attacks, operator error, and others.



Basek, Thornton, Moore, "BITCOIN," 2014.

Cryptocurrency & Anonymity

- Is cryptocurrency anonymous?
- Bitcoin addresses are public key hashes, rather than individual identities.
- This is called pseudonymity in computer science terminology.
- True anonymity = pseudonymity AND unlinkability
- For anonymity, different interactions of the same individual using different public key hashes should be difficult to link to the individual

Legal & Regulatory Risks

- A legitimate cryptocurrency user may lose funds if an exchange is seized or forced to stop operating due to its involvement in criminal activity.
- Untraceable digital currency may facilitate illicit activity, such as tax evasion, sale of illegal items, among others.

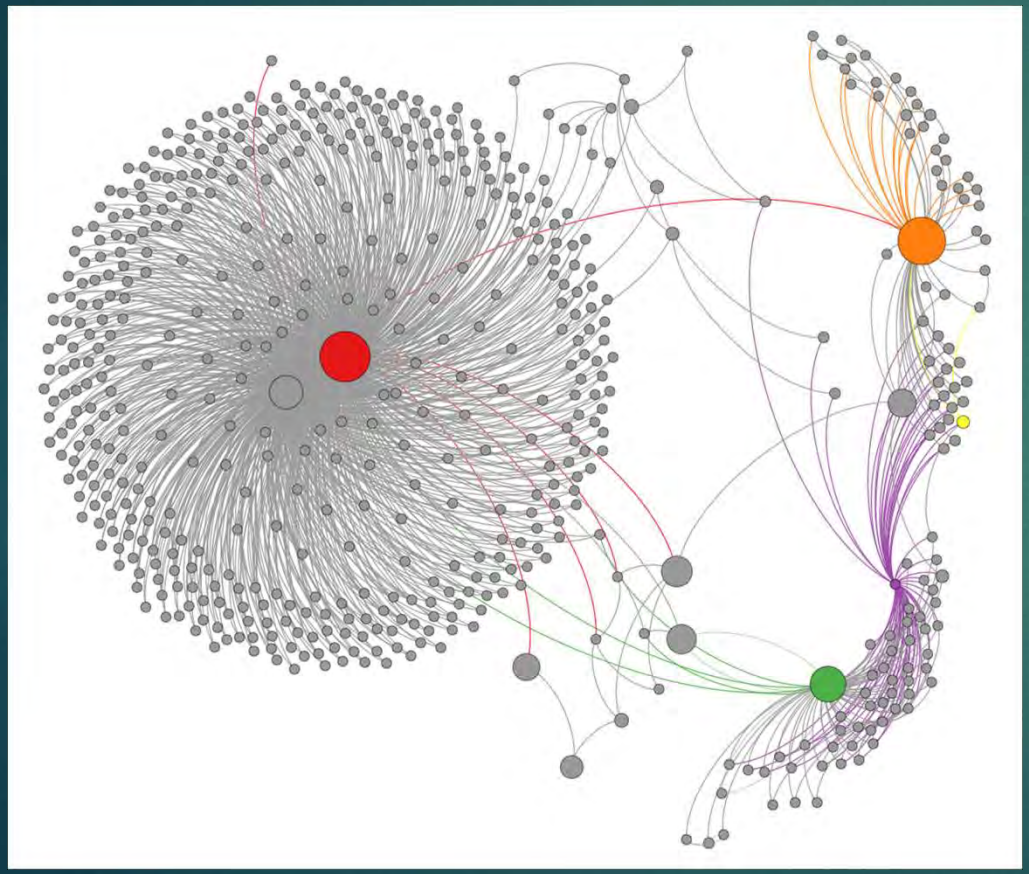
AML Challenges, Including Use of Currency "Mixers"

- What is a "mixer"? What other pooling mechanisms exist to confound attempts to deanonymize crypto use and to reasonably ensure a licensee knows its customer?
- Note Treasury's Office of Foreign Assets Control's recent designation of Blender.io and the $620 million hack. The group behind the hack? The North Korean sponsored Lazarus Group.
- Current nation states FINCEN has formally deemed potentially threatening to national security: Iran, Russia, and Venezuala.
- Why? These regimes have publicly declared their intention to use or develop digital currencies and/or cryptocurrencies for illicit activity, including to evade sanctions, such as those imposed on Russia due to its illegal invasion of Ukraine.

Multi-wallet Transactions; Multi-individual Transactions; Pooled Transactions

- See next slides.

Clustering of Addresses: Mixers

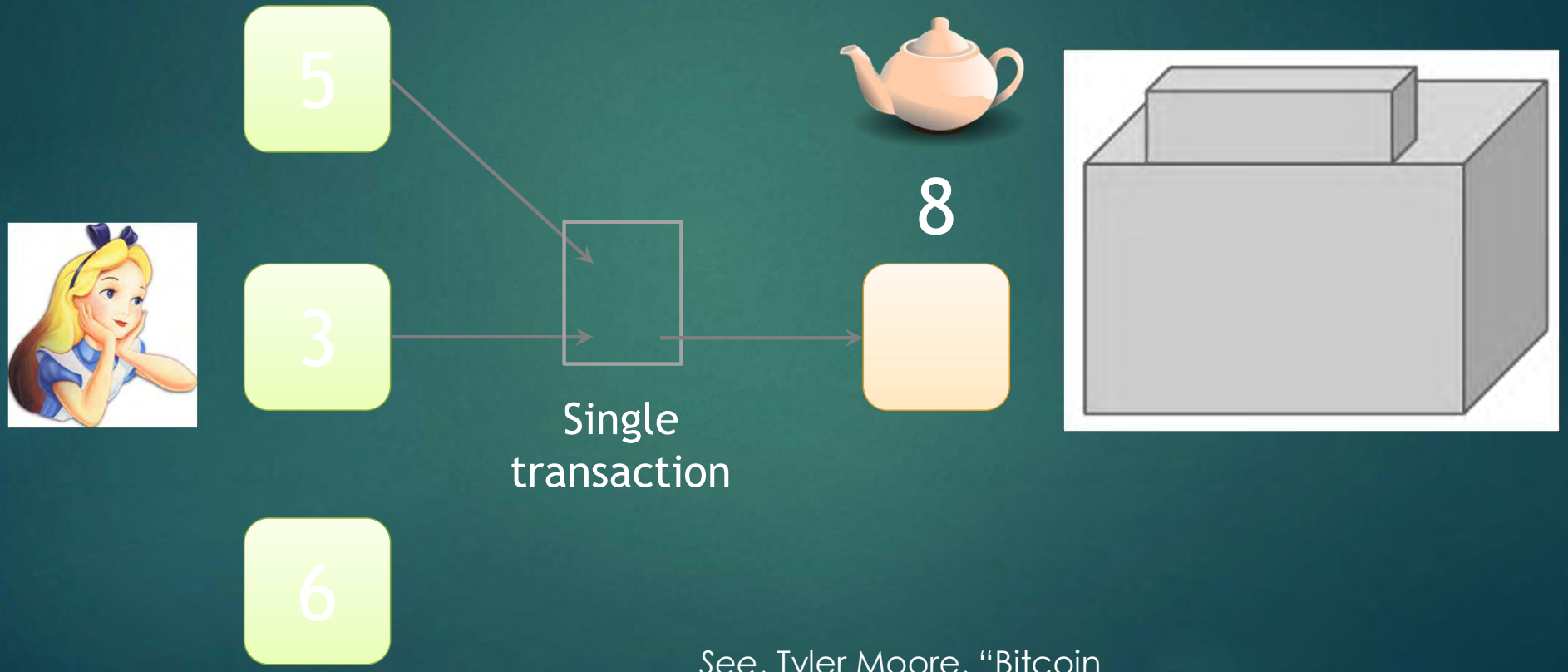


An Analysis of Anonymity in the Bitcoin System

F. Reid and M. Harrigan
PASSAT 2011

See, Tyler Moore, "Bitcoin Risk," University of Tulsa.

Multi-address Purchases or Pooling



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Enter FINCEN & President Biden's March 2022 Executive Order on "Ensuring Responsible Development of Digital Assets"

- Whole government approach to addressing risks and harnessing the potential of digital assets and distributed ledger technology.
- 6 Key Priorities of E.O.:
  - Consumer & Investor Protection;
  - Financial Stability;
  - Preventing Illicit Financing;
  - U.S. Leadership in Global Financing System;
  - Financial Inclusion;
  - Responsible Innovation.

May 19, 2022, Remarks of Alessio Evangelista, FINCEN Enforcement & Compliance Deputy Director

- National security, prevention of illicit financing, consumer protection, and financial stability must occur while also modernizing U.S. and global payment system.
- Fundamental Principle: Responsible Financial Innovation.
- Financial Institutions, including Casinos, are obligated to ensure new currency offerings are executed in coordination with controls commensurate with risk new payment offerings pose.
- New financial products must build-in compliance.
- Virtual Asset Service Providers (VASP) cannot "build first and comply later."

FINCEN Guidance and Casino Operations

- VASPs must proactively implement rigorous risk-based approach to compliance and to customer relationships and transactional activity.
- AML/CFT REQUIREMENTS APPLY TO FINANCIAL INSTITUTIONS (INCLUDING CERTAIN GAMING LICENSEES) DEALING WITH CRYPTOCURRENCIES AND OTHER DIGITAL ASSETS THE SAME WAY THEY DO TO FINANCIAL INSTITUTIONS DEALING IN FIAT CURRENCY.

Several of the previous slides, where noted, relied upon the work of Tyler Moore, "Bitcoin Risks," University of Tulsa and adapted the work of Narayanan, Bonneau, Felten, & Miller, *Bitcoin & Cryptocurrency Technologies: A Comprehensive Introduction*. July 2016, Princeton University Press. Our sincere thanks to them.