Can Blockchain Concepts Be Used in the Financial Close Process?

Diane Janvrin
Iowa State University

I appreciate the helpful discussions and feedback from Jim Davis, Melvin Lamboy-Ruiz, Kelly Leonard, and Maureen Mascha and presentation preparation assistance from Yogita-Amit Shah.
Outline

• Motivation
• Blockchain concepts to cover
• Can blockchain be used in the financial close process?
• Summary
Word of Caution
Blockchain

- 26,000 projects were started in 2016
- Only 8 percent were active in 2017
Motivation

• Blockchain concepts are important for accounting students
• Blockchain most useful for structured transactions
• Accounting students are generally familiar with structured accounting transactions and the financial close process
Learning Objectives

• Students will understand basic blockchain concepts
• Students will analyze whether blockchain concepts may apply to a more familiar process (i.e. financial close process)
Blockchain

- Possible infrastructure of choice for managing exchanges of value just as the Internet provided the infrastructure for managing exchanges of information

Benefits to Finance and Accounting

- Better reporting with data published simultaneously
- Fewer reconciliations
- Easily updated data
- Easier to authenticate transactions

Strengths and Weaknesses

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visibility</td>
<td>Lack of privacy</td>
</tr>
<tr>
<td>Aggregation</td>
<td>Lack of standardization</td>
</tr>
<tr>
<td>Validation</td>
<td>Garbage in, garbage out</td>
</tr>
<tr>
<td>Automation</td>
<td>Black box effect</td>
</tr>
<tr>
<td>Resiliency</td>
<td>Inefficiency</td>
</tr>
</tbody>
</table>

- Visibility – ability of participants to follow items through the entire process
- Aggregation – information on blockchain comes from a variety of sources: firms, customers, regulators, etc.
- Validation – once information is captured in a distributed ledger, it has been authenticated and thus, it is difficult to temper with.
- Automation – ability to execute certain transactions automatically in response to pre-specified conditions.
- Resiliency – entire blockchain database is fault-tolerant because it is replicated on every node.

Source: Babich and Hilary 2018.
Key Elements of Blockchain

- Distributed ledgers
- Smart contracts
- Consensus algorithm
- Cryptography
- Permission

Types of Blockchain

- Public
- Private
- Hybrid

## Types of Blockchains by Permission Model

<table>
<thead>
<tr>
<th></th>
<th>Read</th>
<th>Write</th>
<th>Commit</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Public permissionless</strong></td>
<td>Open to anyone</td>
<td>Anyone</td>
<td>Anyone*</td>
<td>Bitcoin, Ethereum</td>
</tr>
<tr>
<td><strong>Public permissioned</strong></td>
<td>Open to anyone</td>
<td>Authorized participants</td>
<td>All or subset of authorized participants</td>
<td>Sovrin</td>
</tr>
<tr>
<td><strong>Consortium</strong></td>
<td>Restricted to an authorized set of participants</td>
<td>Authorized participants</td>
<td>All or subset of authorized participants</td>
<td>Multiple banks operating a shared ledger</td>
</tr>
<tr>
<td><strong>Private permissioned (‘enterprise’)</strong></td>
<td>Fully private or restricted to a limited set of authorized nodes</td>
<td>Network operator only</td>
<td>Network operator only</td>
<td>Internal bank ledger shared between parent company and subsidiaries</td>
</tr>
</tbody>
</table>

Key Success Factors for Blockchain

- Widespread understanding
- Maturity of blockchain technology, interoperability, and standardization
- Integration with legacy systems
- Regulatory and legal frameworks
- Increasing the number of participants

<table>
<thead>
<tr>
<th>Myth</th>
<th>Reality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blockchains are ‘trustless’</td>
<td>Blockchains always require some degree of trust</td>
</tr>
<tr>
<td>Blockchains are immutable or ‘tamper-proof’</td>
<td>Transactions on a blockchain network can be reversed by network participants under specific circumstances</td>
</tr>
<tr>
<td>Blockchains are 100 percent secure</td>
<td>Blockchains are not automatically more secure than other systems</td>
</tr>
<tr>
<td>Blockchains are ‘truth machines’</td>
<td>Garbage in / garbage out applies to every blockchain that uses non-native digital assets and/or external data inputs</td>
</tr>
</tbody>
</table>

Why Auditing Will be Needed?

- Transaction recorded in a blockchain may still be
  - Unauthorized, fraudulent, or illegal
  - Executed between related parties
  - Linked to side agreement that is ‘off-chain’
  - Incorrectly classified in financial statements
- Many transactions recorded in financial statements reflect estimated values that differ from historical cost
- Auditors need to consider and perform audit procedures on these estimates

## Differences between ERP and Blockchain

<table>
<thead>
<tr>
<th>ERP</th>
<th>Blockchain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Centralized</td>
<td>Decentralized and distributed</td>
</tr>
<tr>
<td>High tampering risk</td>
<td>Low tampering risk</td>
</tr>
<tr>
<td>Many data operations</td>
<td>Append only</td>
</tr>
<tr>
<td>Relational database</td>
<td>Linear transactional database</td>
</tr>
<tr>
<td>Human labor-intensive</td>
<td>Non labor-intensive</td>
</tr>
<tr>
<td>Currently do not have self-enforcing</td>
<td>Easier to create self-enforcing smart contracts</td>
</tr>
<tr>
<td>contracts</td>
<td></td>
</tr>
<tr>
<td>Controls are specifically designed and</td>
<td>Controls could be set through smart contracts – smart controls</td>
</tr>
<tr>
<td>in place</td>
<td></td>
</tr>
<tr>
<td>Accounting-specific modules</td>
<td>Currently no accounting-specific modules</td>
</tr>
</tbody>
</table>

Distributed Ledger Technology

- New type of database that enables multiple parties to share database and to modify that in a safe and secure way even if they don’t trust each other
- Enable transfer of digital files without relying on central authority
- Participants can independently verify state and integrity of blockchain
- Participants have shared control over evolution of data

Blockchains and Distributed Ledgers

Permissioned blockchains

Permission Model
Read: public vs private
Write/Commit: permissionless vs permissioned

Data Structure and Diffusion
Chain of cryptographically linked blocks and/or global data broadcast

Adversarial Model
Presence of malicious nodes assumed

Distributed databases

EY 5 Point Blockchain Fit Test

- Are there multiple parties in this ecosystem?
- Is establishing trust between all parties an issue?
- Is it critical to have detailed transactional record of activity?
- Are we securing ownership or management of finite source?
- Does network of partners benefit from increased transparency across ecosystem?

Definition of Financial Close Process

- process of completing the accounting cycle and preparing internal and external reports (PCAOB 2007; Chasan 2012)
Why is financial close process important?

- Last chance to identify problems (including earnings management issues) (Myllymaki 2014, 5)
- Recent economic volatility and increase in number of restatements has increased pressure on companies to timely report performance
- Regulations (i.e., Sarbanes-Oxley, fair value accounting standards, SEC’s XBRL mandate) have increased accountants’ period-end workload
- Several recent SEC filings have significant control weaknesses related to financial close process
- Time needed to complete the financial close process = internal information environment quality??
Financial Close Process

Enter & Process Transactions

ERP

Evaluate & Test Controls

Remediate Controls

Aggregate & Analyze Results

Report & Disclose Information

§302 Certification

Audit Opinion

Excel

E-mail

Word

Aggregate Financial Amounts

Review Preliminary Results

Perform Final Adjustments

Report & Disclose Information

Form 10-Q

10-K

Board Book

Audit Opinion??
Characteristics of Financial Close

JE created

Is it complete and accurate?
- No: Flag any errors and automatically send to the individual responsible
- Yes: Is there a financial impact?
  - No: Automatically post directly to the ERP
  - Yes: Who has ownership of journal?
    - Yes: Send to BPO, captive, local individual responsible for approval
    - No: Automatically post directly to the ERP
Characteristics of Financial Close

- Need to determine time period that each transaction occurred
- Account reconciliations are very time consuming

Source: Janvrin and Mascha (2014)
Financial Close Application

- Steps needed to trust accounting records
  - Costly reconciliations
  - Confirmations
  - Verifications
  - Audit procedures
- Block chain facilitates innovation of triple-entry accounting systems – system whereby all transactions are cryptographically sealed by third entry and reside in shared ledger.
- Third entry serves as digitally signed receipt for parties involved in transaction which can be verified without need for central certifying authority or clearing house

Financial Close Application

- Blockchain is a distributed ledger technology
- With new technology, time to complete close cycle is shrinking (use to be 7 business days for large company)
- During close time, transactions sit in limbo between various steps in billing, invoicing, and payment cycle
- Accountants need to determine which period each transactions occurs

Financial Close Application

- Accountants need to determine which period each transaction occurs.
- With distributed blockchain, no need for transactions to sit in limbo.
- With distributed blockchain, instant transactions will allow month-end close processes to be cut down or eliminated completely.

EY 5 Point Blockchain Fit Test

- Are there multiple parties in this ecosystem?
- Is establishing trust between all parties an issue?
- Is it critical to have detailed transactional record of activity?
- Are we securing ownership or management of finite source?
- Does network of partners benefit from increased transparency across ecosystem?

Limitations

- Early work
- Addresses EY five questions – are these the appropriate questions to concentrate on?
- Limited class validity
- Preliminary learning objectives
Summary

- Blockchain concepts are important for our students to understand
- Consider taking a common application and ask students to evaluate whether blockchain may be appropriate
- Develops students’ critical thinking skills
- Addresses EY five blockchain fit questions
Questions?

Thank you for your feedback…
References


