Money for Nothing? A Central Banker's Take on Cryptoassets

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"No mo fiat money/
we don't do that/
Get urself some coins/
fo the banks, take ur stash"

"Bitcoin's Here" by Zhou Tonged
(cover of Drake's *"Started From The Bottom"*)

Why central banks care about cryptoassets

Central bank mandate

- Monetary policy
- Currency issuance
- Financial stability

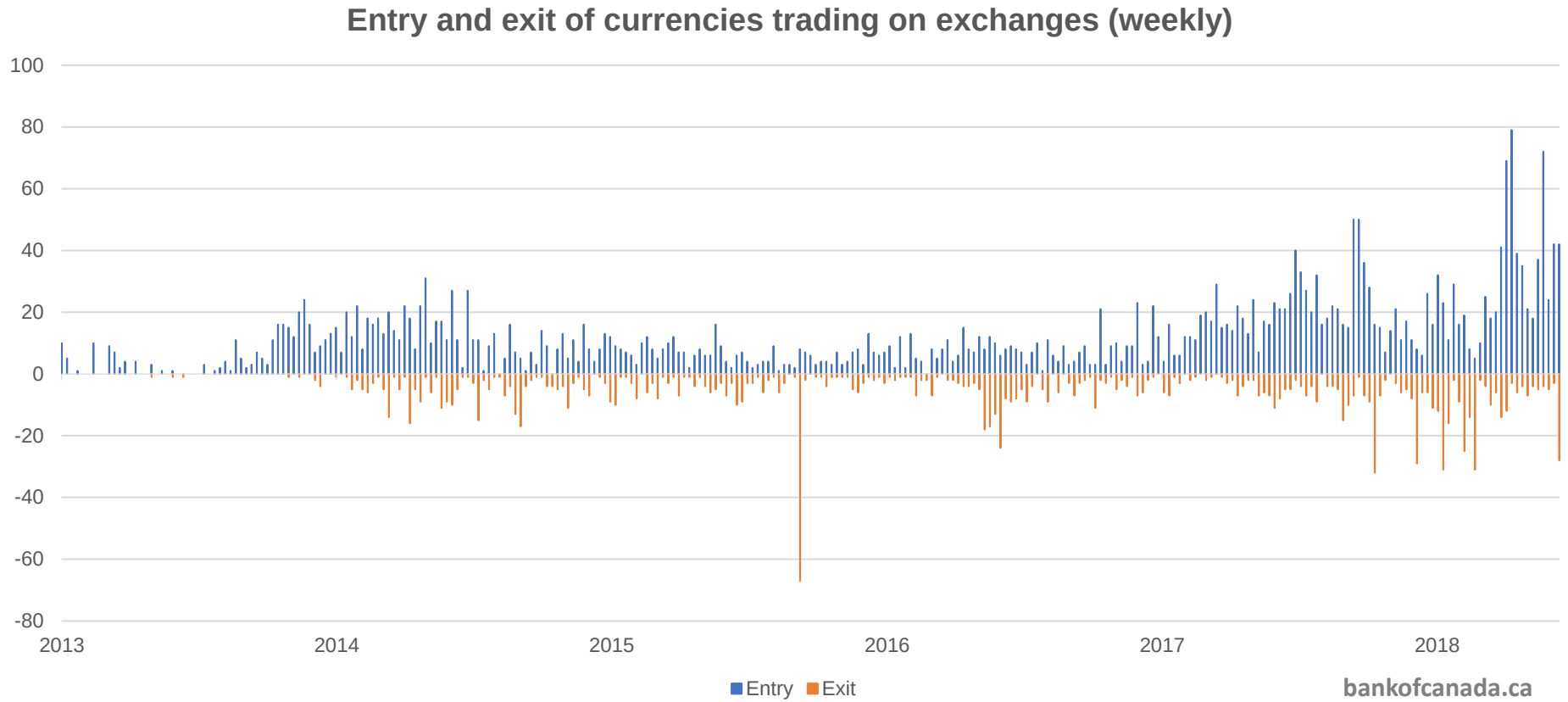
Road map

1. **The crypto landscape**
2. **Key questions for central banks (CBs)**
   i. **What's fundamentally new here?**
   ii. **Could private cryptocurrencies enable a better monetary policy (MP) regime?**
   iii. **Should CBs issue their own digital currencies?**
3. **Bank of Canada experiments with distributed ledger technology (DLT)**

➢ **Conclusions and avenues for further research**

1. The crypto landscape

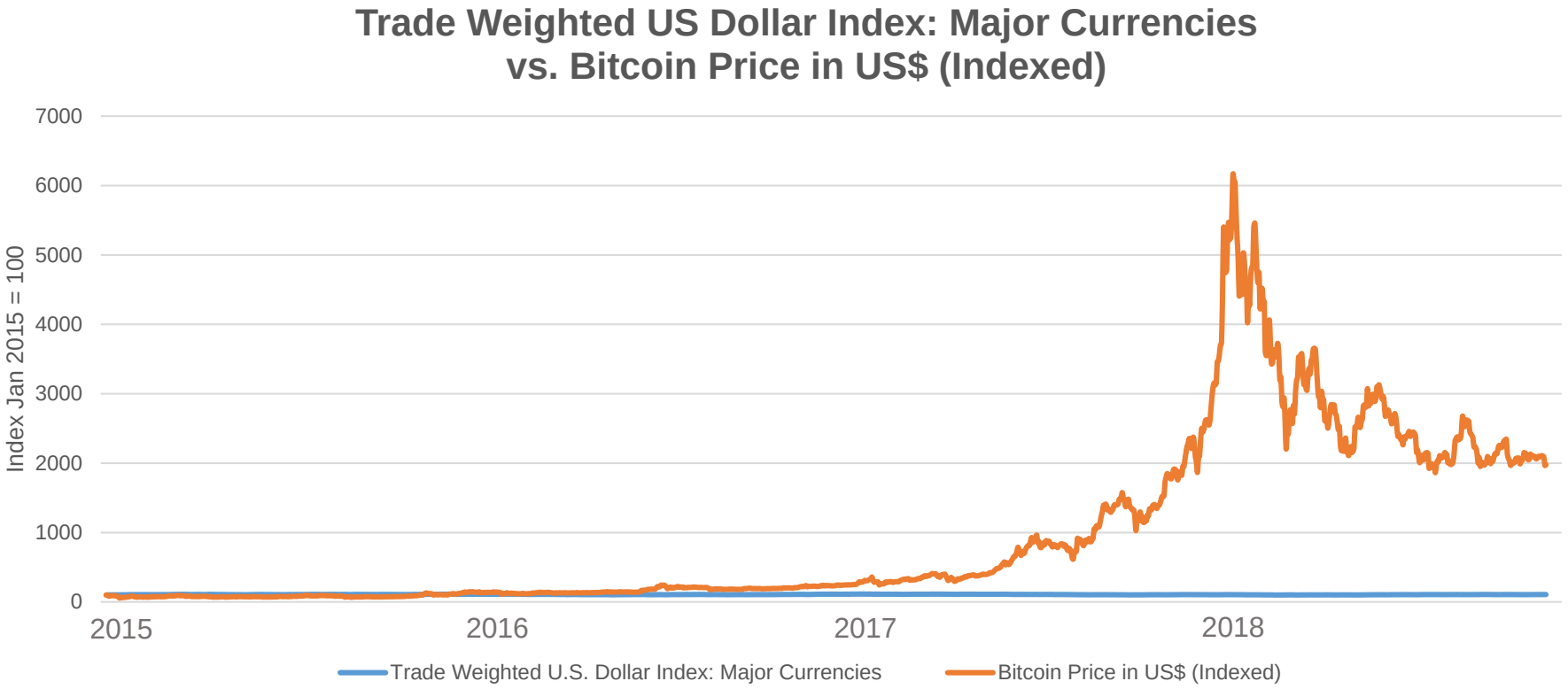
Revolving door in crypto markets has become busier



Cryptoassets heterogeneous, but three main types

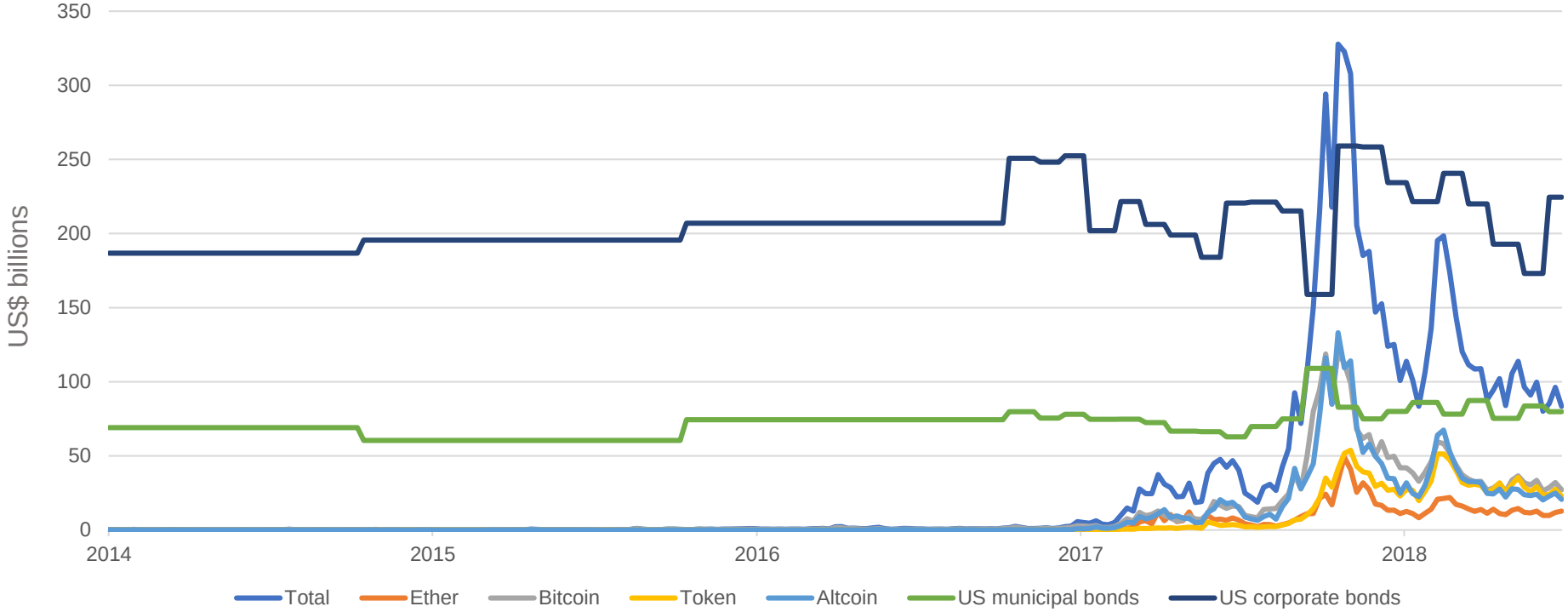
Crypto-currencies	Generally intended for making purchases of goods, services	Bitcoin (as envisioned) Monero Impak Coin
Security tokens	Allow buyers to take some sort of a position in a firm	DAO tokens
Utility tokens	Enable the user to consume goods or services specific to a platform	Ether Tether?

Crypto “currencies” not very useful as money yet….



….but trading activity of token-based assets is rising

Trading volumes of cryptoassets and US municipal and corporate bonds (weekly)



2. Key questions for CBs

i. **What's fundamentally new here?**

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Innovation in payment methods has a long history

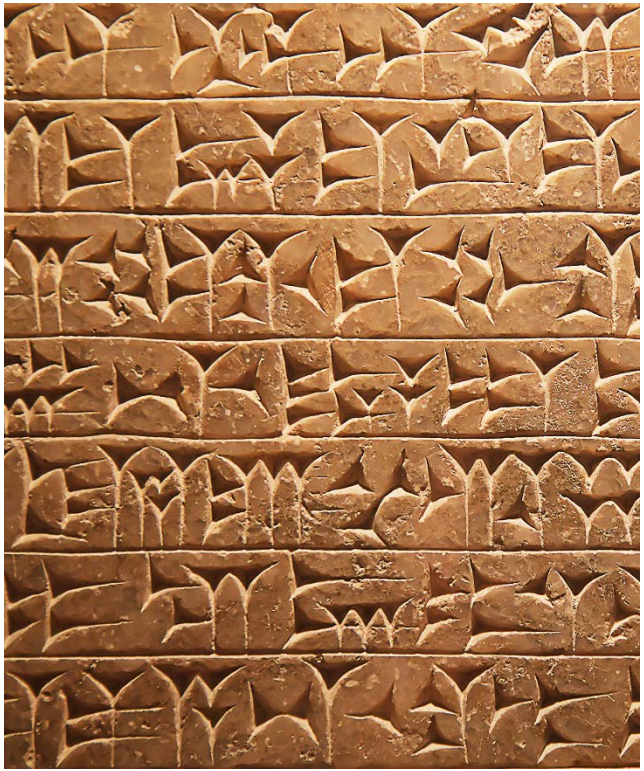
What DLT (aka blockchain) can deliver (1)

Record-keeping in a ledger

- Open or permission-based
- Time-stamped and organized in blocks
- Carries full history of transactions

Déjà vu

- Bookkeeping as far back as 5000 BC
- Double-entry bookkeeping emerged in 14th century
- Money is memory (Kocherlakota 1998, Townsend 1989)



What DLT (aka blockchain) can deliver (2)

Distributed consensus mechanism

- Transactions get on block by consensus among participants
- Consensus secured by cryptography and achieved by incentive structure, not trusted third party

Consensus mechanism is novel

- Can scale among strangers without recourse to central authority
- "Solves" the double-spending problem
- Supports integrity and resilience of the ledger

Blockchain potentially just a better mousetrap

Efficiency gains could be important

- Increased efficiency of ownership record-keeping
- …but need interoperability, and ownership/smart contracts still need to be enforceable

Transparency could reduce asymmetric information

- Data more complete and more widely available
- …but limited where there are monitoring costs, or "soft" information is important (ledgers likely to contain only "hard" information)

Blockchain only *shifts* the need for trust

The incentive structure for trust is not infallible

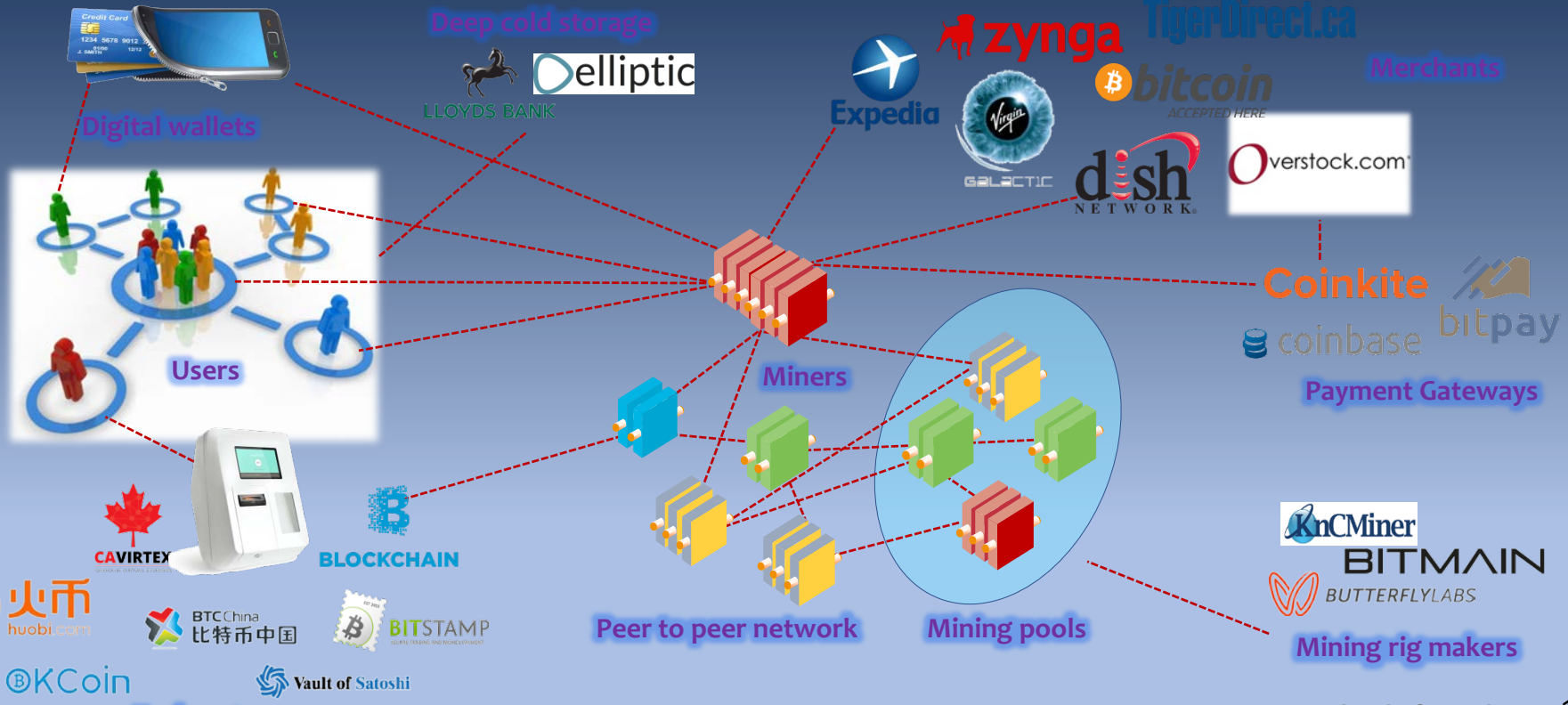
- 51% attacks by miners possible (Krypton, Coiledcoin)
- Incentive structure creates negative externalities (Chiu and Koeppl 2018, Abadi and Brunnermeier 2018)

Programmers have power; do they have responsibility?

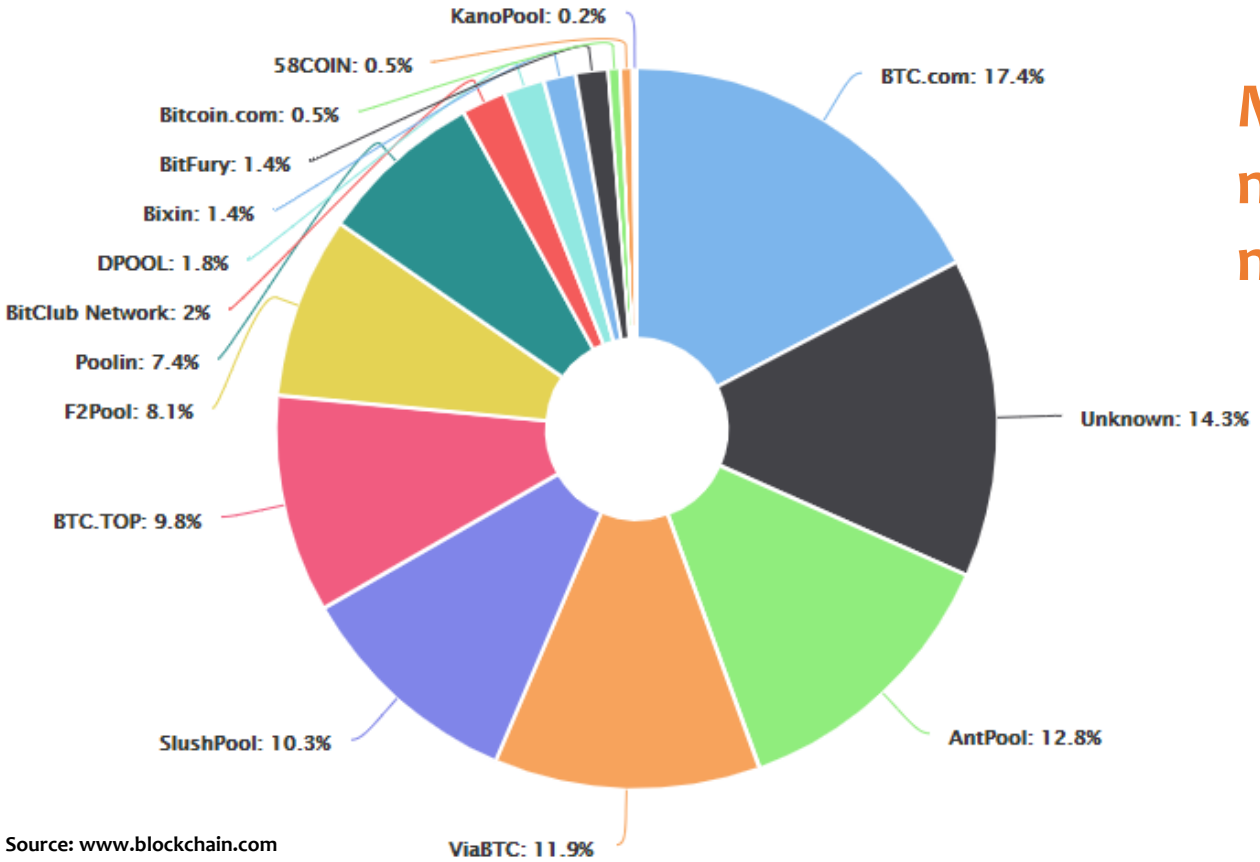
- Need to trust that program delivers what is on the label (DAO error, recent bug in Bitcoin software)
- Do programmers (and miners) have fiduciary duty? (Walch forthcoming)

Solutions to this issue are not straightforward—trilemma (Abadi and Brunnermeier 2018)

Bitcoin ecosystem: trust and dependencies abound



Blockchain doesn't eliminate network externalities



Market share of the most popular Bitcoin mining pools

Source: www.blockchain.com

2. Key questions for CBs

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Money growth by a rule – Déjà vu?

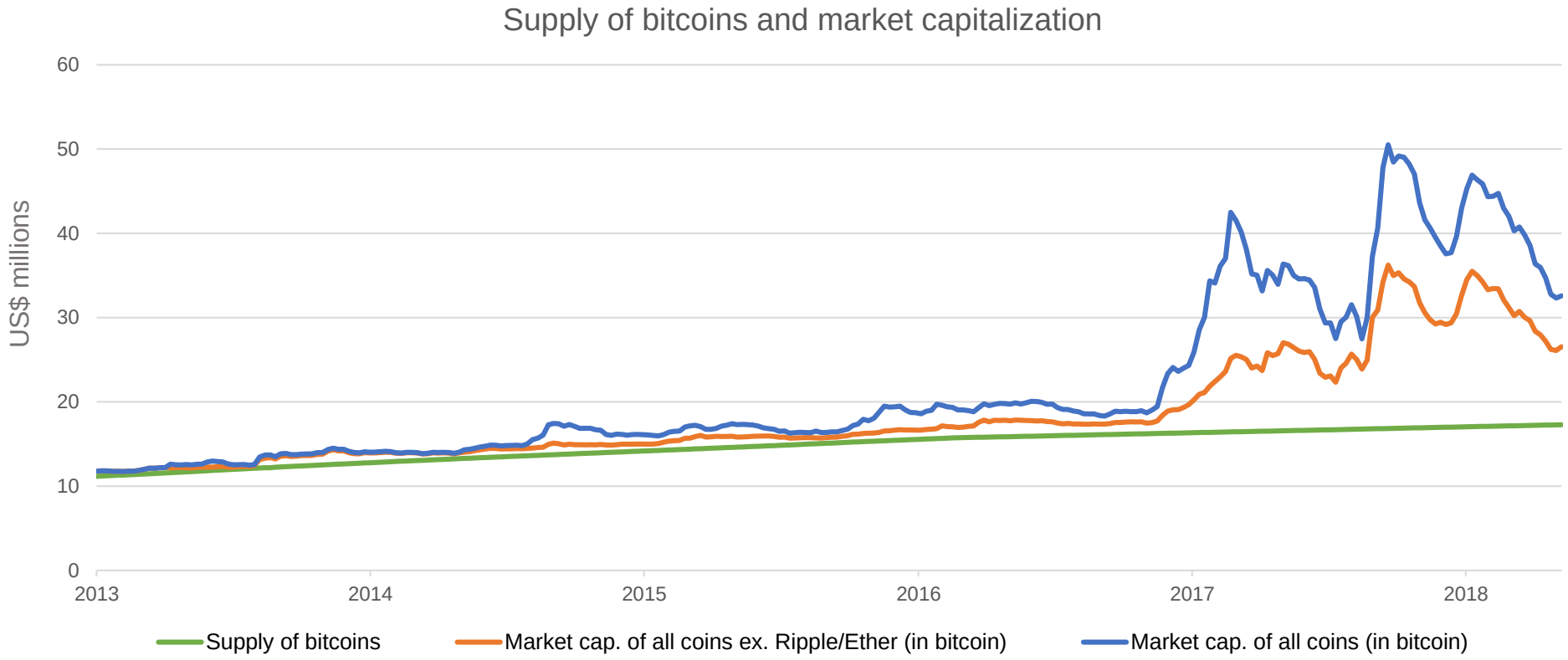
Bitcoin standard would be unstable, just as gold was

Weber 2016, "A Bitcoin Standard: Lessons from the Gold Standard"

Targeting money growth has been tried—and abandoned

- Canada and United States, parts of 1970s and '80s
- Money supply difficult to measure, as demand for money is unstable

Cannot control aggregate supply of money



What does a central bank need to conduct domestic MP?

If cryptocurrency dominated:

- Transmission of monetary policy would be weakened
- Lender-of-last-resort operations would be much more difficult

National and private currencies can co-exist, although:

- Coordination issues arise
  - Hendry and Zhu forthcoming, "A Framework for Analyzing Monetary Policy in an Economy with E-money"
- Strong regulations required for trust and robustness
  - Weber 2015, "The Efficiency of Private E-Money-Like Systems: The U.S. Experience with National Banks Notes"
  - Fung, Hendry and Weber 2017, "Canadian Bank Notes and Dominion Notes: Lessons for Digital Currencies"

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Should we care if cash disappears?

Maybe not, if private money is in sovereign currency:

- Could still conduct MP and LoLR operations
- Private sector money may be more innovative
- Could lower ELB (Rogoff 2016, *The Curse of Cash*)

Yet……

- Regular citizens will lose access to central bank money
- Commercial bank deposits are subject to default risk
- Many people still care about using cash (Riksbank 2018)
- E-money may not be a perfect cash substitute (Chiu and Wong 2014, "E-Money: Efficiency, Stability and Optimal Policy")

Most important question: Is public outside money a public good?

Yes. Universal access to safe medium of exchange supports trust

Efficiency and competition in banking services

Bank notes foster competition in financial services

- Central bank digital currency (CBDC) would continue role of additional payment option and "riskless" store of value in a cashless world
- CBDC competition could support market discipline, leading to lower-cost, higher-quality bank services

An additional payment method could make the payments system more resilient to operational failures

- Caveat: not a substitute for bank notes in a cyber event

Bottom line: Case for CBDC stronger when there is market failure

Bordo and Levin 2017, "Central Bank Digital Currency and the Future of Monetary Policy"
Fung and Halaburda 2016, "Central Bank Digital Currencies: A Framework for Assessing Why and How"
Kahn, Rivadeneyra and Wong forthcoming, "E-Money and Payments Policy"

CBDC: Reasons to give a central bank pause

Potential for bank runs

- Interest-bearing CBDC would compete directly with commercial bank deposits, a very stable form of bank funding
- Easier run mechanism during a crisis (Bank of Canada, Bank for International Settlements, CPMI, others)

Reputational risk

- Problems with CBDC could be much bigger than counterfeit $100 bills
- Hackings could put all holdings at risk
- Vehicle for illicit transactions?

Policy and technical design aspects intertwined

Many parameters to determine, including:

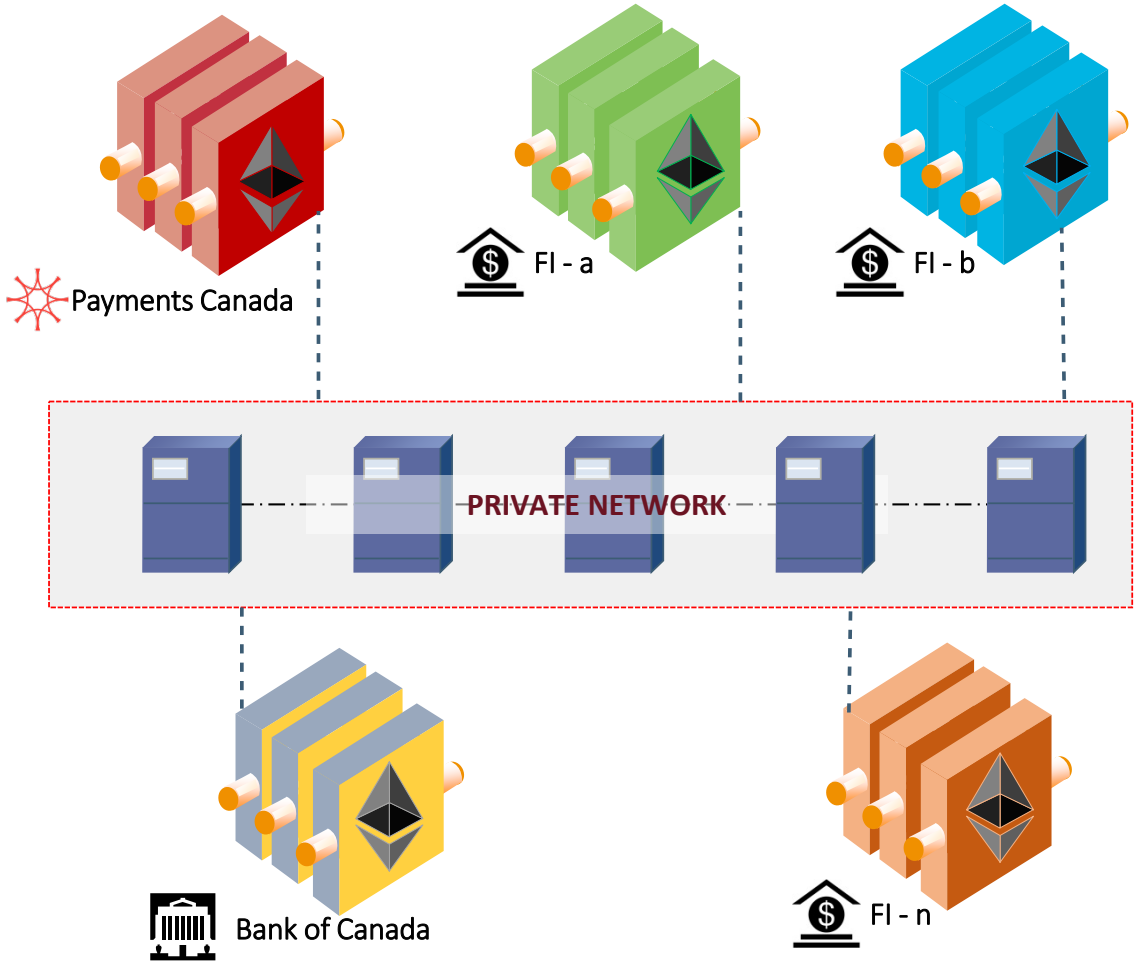
- ❑ Privacy or anonymity?
- ❑ Account or token-based?
- ❑ Interest-bearing?
- ❑ Access?

3. Bank of Canada experiments with DLT

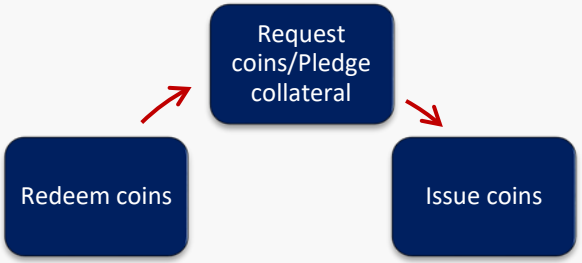
Looking under the hood of blockchain: Project Jasper

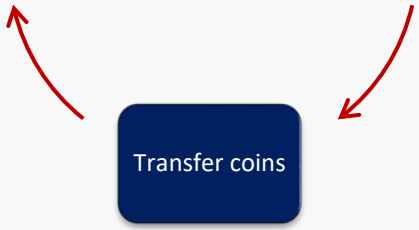
Phases 1–2	**Interbank payments**	**Payments Canada, R3, Canada's six biggest banks**	**Completed**
Phase 3	**Post-trade settlement of cash and securities transactions**	**Payments Canada, Toronto Stock Exchange**	**Completed**
Phase 4	**Cross-border payments**	**Monetary Authority of Singapore, Bank of England, commercial banks**	**In progress**

Project Jasper Phases 1-2



CENTRALIZED:
PERMISSIONING
ENTRY/EXIT





DECENTRALIZED
LEDGER

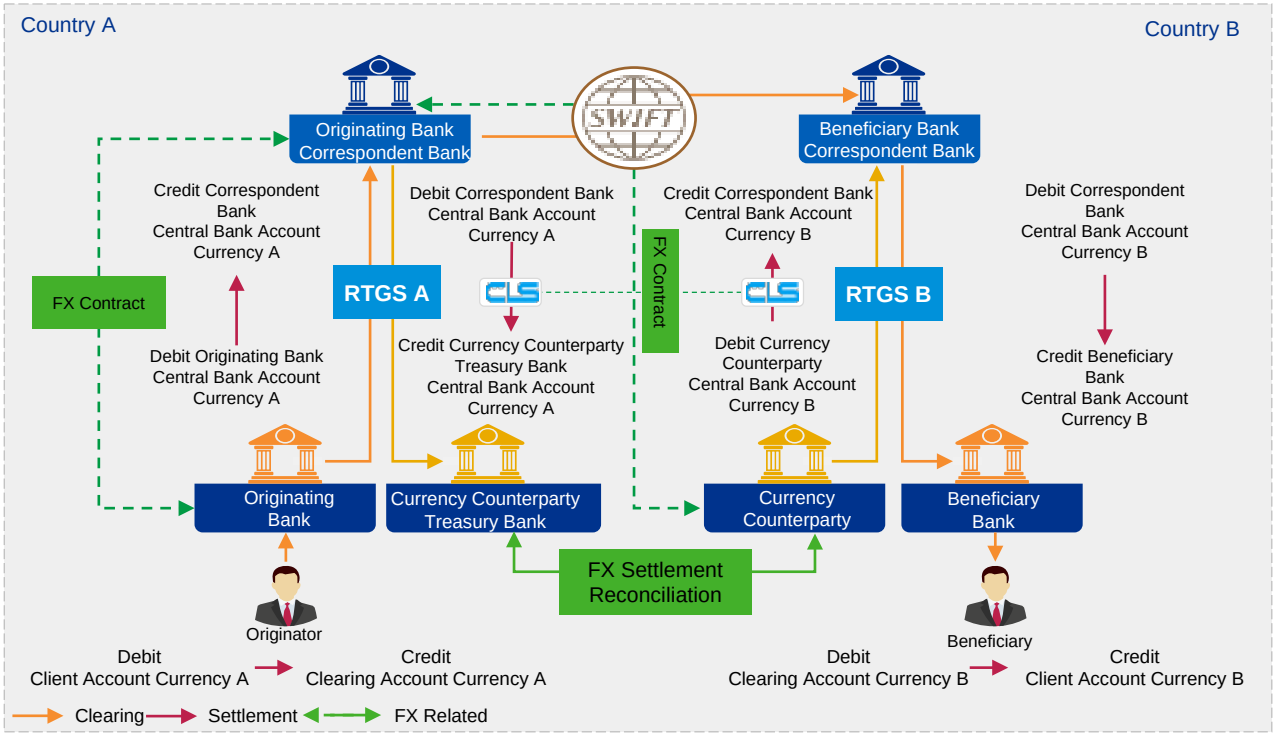
General lessons so far (Jasper 1–3)

DLT for narrow scope only is unlikely to yield cost savings

Centralization is still required

Cost-savings potential from back office and more assets on ledger

Jasper Phase 4 motivated by inefficiencies in cross-border payments



Conclusions and avenues for further research

Messages to highlight

Ironies abound in the crypto sphere

- *Decentralized* 'solution' is all about *centralization*
- Need for trust is not reduced, just shifted
- Money supply rule may turn out to be more Achilles heel than strong suit

Cryptoasset threat to financial system small, but growing

- Moving fast, and incentives point to trouble down the road

Answers to Central Bank Digital Currency questions will shape the future

- Implications for financial inclusion, privacy, access to safe asset
- Major commercial interests at stake

Ambitious questions for further study

Financial stability:

- What do cryptoassets mean for the charter value of banks?
- Would credible crypto or CBDC exacerbate bank runs, and to what degree?

Transmission mechanism of monetary policy:

- How might different types of money alter transmission in normal versus crisis times?
- Could CBDC blur lines between MP and fiscal policy? (e.g., differential interest rates)

Other policy issues:

- Would CBDC be used; how would adoption work in two-sided markets?
- What is the social value of privacy?
- Do we need CB outside (retail) money at all?

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Digital Currencies and Fintech

Learn more about three areas of our ongoing work on digital currencies and financial technology (Fintech).

RESEARCH

Understanding the benefits and risks of digital currencies and electronic payments is important. That's because they could have an impact on our core central bank functions.

For the past few years, we have researched private and central bank digital currencies. More recently, we've been studying other uses of Distributed Ledger Technology (DLT).

Learn more about our fintech research

EXPERIMENTS AND PROJECTS

With many possible applications of DLT, we need to look at a range of questions. Test cases between authorities and the private sector can help deepen our understanding.

The Bank works with academics and the private sector to build and test this technology.

Learn more about our projects

COLLABORATION ON THE REGULATORY AGENDA

Managing the benefits and risks of financial technology through a global regulatory framework is essential.

The Bank of Canada contributes to this agenda through the Financial Stability Board, the Committee on Payments and Market Infrastructures, and the Basel Committee on Banking Supervision.

Learn more about this work

Speeches, Panels and Presentations

FinTech and the Transformation of Financial Services April 19, 2017

Remarks - Carolyn A. Wilkins

Archived panel discussion at the International Monetary Fund (IMF)

Content Type(s): Press, Speeches

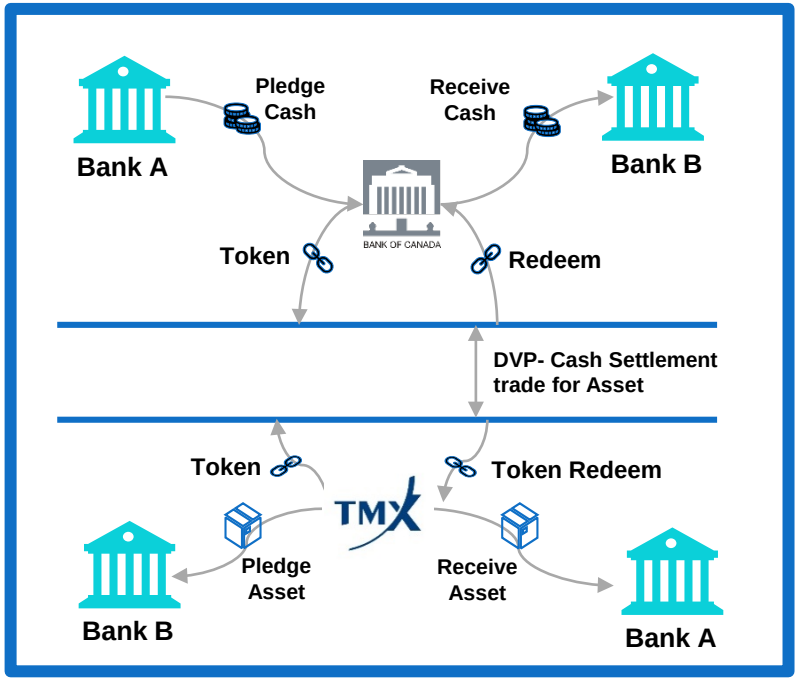
Interviews and Public Appearances

Governor Poloz Speaks with CNBC about Digital Currencies January 25, 2018

An interview with CNBC's Karen Tso during the World Economic Forum Annual Meeting in Davos, Switzerland.

Content Type(s): Press, Selected Interviews

Background: Project Jasper Phase 3



Facilitated the integration of two separate settlement systems

- cash system
- equity system

Loose integration likely easier to achieve than full combination of the two systems into one