EXHIBIT A

Bitcoin and the Blockchain

By Olga Kharif | Updated Aug 3, 2016 4:52 PM UTC

When bitcoin broke into public consciousness in 2013, it couldn't have been sexier: a digital currency being used for everything from drug deals to cupcakes. Three years later, there's a new wave of excitement about an aspect of bitcoin that is a bit less sexy: public online ledgers. The blockchain – the technology used for verifying and recording transactions that's at the heart of bitcoin – is now seen as having the potential to reshape the global financial system and possibly other industries.

The Situation

More than 40 banks including Barclays and JPMorgan Chase are part of the R3 consortium, which is working on ways to use the blockchain for money transfers, record keeping and other back-end functions. Nasdaq Inc. is already using the blockchain – with help from startup Chain.com – for trading securities in private companies. In a pilot project, the exchange is also using the technology to allow people who have established "digital residency" in Estonia to cast absentee

shareholder votes in publicly traded companies there without a proxy. In January, the Australian Stock Exchange signed a contract with blockchain startup Digital Asset Holdings to speed up its clearing and settlement services in the cash equities market. But while blockchain is winning converts, digital currencies have had their ups and downs. In April, Russia said it's planning to punish users of cryptocurrencies. The price of ether, a newer virtual currency, plunged after hackers hit a crowdsourced venture capital fund that relied on it. The bitcoin community has become increasingly split over software and governance issues, leading a number of former proponents to walk away. The price of bitcoin rose through the first half of 2016 in anticipation of a reduction in supply written into the currency's software. But the theft of $65 million worth of bitcoin from a Hong Kong-based exchange and a subsequent drop in the currency's value was a reminder of its many uncertainties.

SOURCE: BLOOMBERG

The Background

Virtual currencies aren't new – online fantasy games have long used them – but the development of a secure digital currency without a central issuer rightly turned heads. The person or people who created the bitcoin system under the pseudonym

Satoshi Nakamoto solved a problem central to any currency – how to control its issuance, i.e., prevent counterfeiting – and did it without relying on a government's authority. The software also solved one specific hurdle for digital money – how to stop users from spending the same unit of currency twice. The breakthrough idea was the blockchain, a publicly visible, anonymous online ledger that records every single bitcoin transaction. It's maintained by a network of bitcoin "miners" whose computers perform the calculations that validate each transaction, preventing double-spending. The miners earn a reward of newly issued bitcoin. The pace of creation is limited, and no more than 21 million bitcoins will ever be issued.

The Argument

Since bitcoin first boomed, there's been no shortage of critics to call its rise a bubble and to argue that the currency has no intrinsic value. But entrepreneurs in the field say that focusing on the price of bitcoin is missing the point – its value is as proof of concept for a new kind of payment system not reliant on third parties like governments, big banks or credit-card companies. Promising applications of the blockchain system include moving money abroad, signing contracts, clearing complex financial transactions and as a medium for micro-payments in emerging countries. Others say blockchain advocates are hyping what amounts to no more than a new kind of database. Will bitcoin itself be left behind in the blockchain rush? Even some of the currency's canniest boosters always said there was no guarantee that it would ever break into the monetary mainstream. As the bitcoin community has grown more divided, some have grown more pessimistic. Mike Hearn, a former member of the core team that updates the bitcoin software, said in 2013 that the "most plausible outcome" was that bitcoin would become a niche currency. In January 2016, he called it an experiment that had failed.

The Reference Shelf

- A Bloomberg Businessweek article looking at how interest in blockchain is surpassing that in bitcoin.
- Bloomberg Television has a video primer as part of its "The 12 Days of Bitcoin" series

- Bloomberg Markets traced the interest of Silicon Valley investors in bitcoin.
- CoinDesk has a Bitcoin price index; Bitcoincharts.com has a range of data.
- Two explainers, one aimed at kindergarteners and the other a you-too-can-mine-bitcoin project, plus an exploration of the double-spending problem.
- The New Yorker looks at Dark Wallet, a project meant to speed the spread of bitcoin, from the law student who invented the printable gun.

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To contact the writer of this QuickTake:
Olga Kharif in Portland at okharif@bloomberg.net

To contact the editor responsible for this QuickTake:
John O'Neil at joneil18@bloomberg.net

Email

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