The State of Crypto-Currencies

A Short Primer on Blockchain and Its Famous Offspring

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Introduction

Crypto-currencies are getting renewed attention nowadays. Prices have recovered, hacking scandals have subsided, government crackdowns have slowed, and institutions are dipping their toes back in. Citing investor interest, Goldman Sachs is starting a bitcoin trading desk, Bloomberg is launching a crypto-currency index, and the Chicago Board Options Exchange (CBOE) is forming a bitcoin ETF. The sentiment is decidedly favorable again.

In discussing crypto-currencies it is imperative to understand the appeal of blockchain, which to the surprise of many, is a 10-year-old technology. It can be described as a distributed ledger, or a database in the form of an immutable record of transaction history. If done right, this property has the potential to rewire societies and upend existing power structure, in ways similar to electricity, oil, and the internet.

Breaking the Trust Barrier

In one of his brilliant books *Nonzero*, journalist/author Robert Wright postulates that human societies are continually progressing toward more complexity on the backs of energy and information revolutions, overcoming communications and trust barriers in the process. Blockchain, as a distributed ledger, enables people who do not know or trust each other to create a secured record (truth) of who owns what and when that is not centrally controlled (abused). This is a vast improvement over the existing system made up of webs of intermediaries and has vast applications ranging from property registry, commercial transactions, and data storage/transmission across all societies by reducing corruption, waste, control, and overhead in almost any industry or government. By the same token, it can open up all kinds of economic possibilities, for instance, democratizing asset ownership by “tokenizing” a farmland in Mozambique or an idle family car in Bangkok (imagine a collectively owned self-driving car that earns income in its spare time by shuttering tourists and automatically

deposits money in owners' accounts without centralized control and manipulation). Blockchain is therefore a general utility technology that has far-reaching implications.

It's an App...It's a Contract...It's Crypto

Crypto-currencies can be considered an app, or one of a class of "dapp" (decentralized app) of blockchain, which allows users to transact and contract directly with each other without middlemen, or simply to store values or records securely. Dapps can also take the form of decentralized marketplace (which can replace EBay/Amazon) or decentralized data depository (which can replace Facebook or even governments?). The threat of an independent, unaccountable, and subversive crypto-economic model is the reason why governments around the world are uneasy with crypto-currencies and are scrambling to figure out how to clamp down or regulate them. However, history has also demonstrated that a technology this profound cannot be suppressed for long - people will simply adapt to it.

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For all the wide-eyed speculation about bitcoin replacing fiat currencies, we can look at gold's repeated failure to do so. Any valid currency serves two main functions: medium of exchange and store of value. Gold is not the easiest thing to lug around and partition into transactable pieces for commerce, but it has great visual appeal and is rare enough to be highly appreciated as a value store. Crypto-currencies for now are not yet widely accepted for commerce due to their slowness in transactions, government resistance, high mining cost, and security issues. Hacking is fairly rampant at the moment but should eventually be safer and easier to access than gold bars in a vault. In addition, second-generation cryptos like Ethereum can serve a wide variety of useful functions with embedded "smart contracts" language.

We are in the early days of building layers of applications onto crypto-currencies which are built on top of blockchain, akin to internet protocols spawning web search functionality, in turn allowing advertising applications to be built on top of searches. No serious proponent, however, believe that crypto-currencies will eventually replace fiat currencies

(the complex subject of inherent values of fiat currencies vs gold vs crypto is a topic for another day). Human societies will always need physical organizations.

Generation Gap

Bitcoin represents the first generation of crypto-currency to successfully overcome the obstacles that doom previous attempts at decentralized databases/services (recall peer-to-peer craze). Its robust anti-cheating design, limits on ultimate quantity (21 millions), and variable mining cost create sufficient incentives and instill enough confidence for strangers around the world to help it prosper and build a mini-economy. Ethereum, which packs more data and a useful programming language, allows users to bypass incompatible databases and so facilitates low-friction transactions across organizations, marks the second generation.

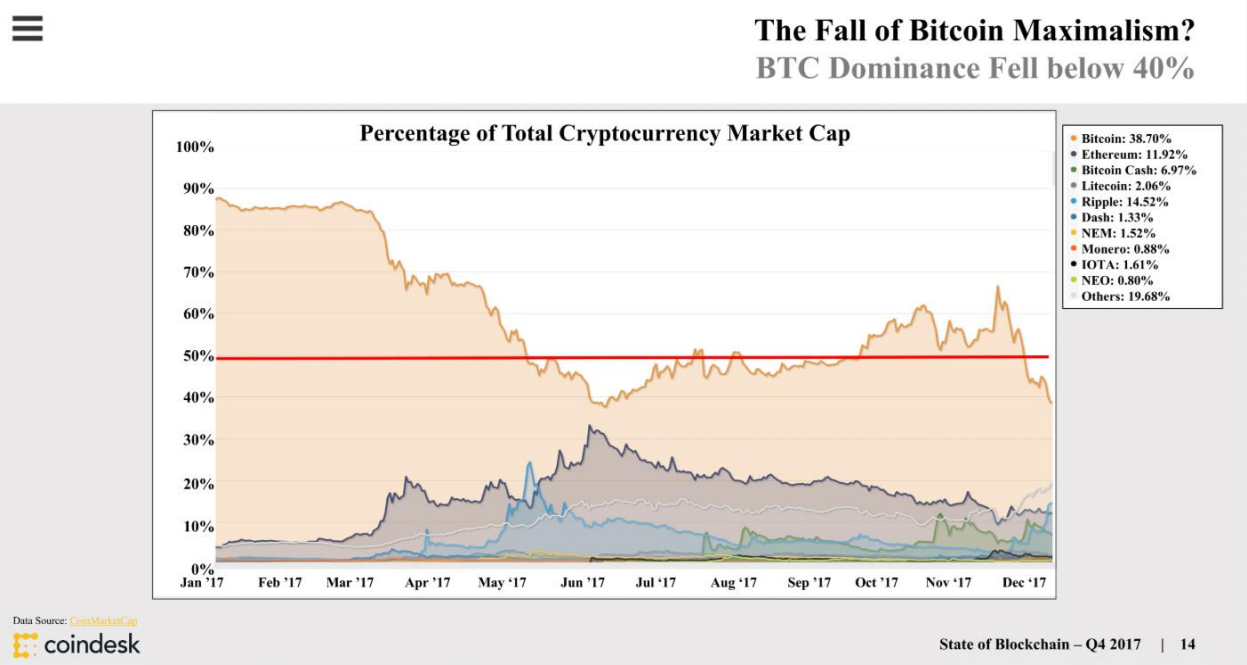

Figure 1. Market Capitalization of Crypto-Currencies

Recent evolution of crypto-currencies mainly focuses on addressing the perennial scalability and governance issues plaguing the first- and second-generations. Some feature internal evolution mechanisms so users can propose and vote on changes to

mitigate governance problems which led to the bitcoin/bitcoin cash forking crisis. Progress on scalability is more stubborn and presents tradeoffs with security, cost, and monopoly. Speeding up transactions by increasing the size of “blocks” can make them less secured and more susceptible to concentration of power in fewer hands. As such, despite their first-mover advantage, Bitcoin and Ethereum may not be the ultimate winners in the crypto-currency space due to the sluggishness in their design. They do, however, have the potential to become “online gold” which have little practical use but a store of value.

Golden Age of Blockchain

Crypto-currencies have a rightful place in the future. As governments and institutions learn how to regulate and adapt to the transformative forces unleashed by blockchain, like that of electricity and the internet, they could become a powerful tool with layers and layers of applications built on top of each other to enhance many functions of societies. In time, they may very well evolve into a new concept which combines currency, gold, identity, data registry, contracts, and many other things. But, as in the case of the internet, breakthrough technologies are notorious for not following linear extrapolation. With smart regulations and security, we can expect to see blockchain and crypto-currencies unleash a burst of creative destruction rippling through our economic and social life for years to come.