DUKE FUQUA SCHOOL OF BUSINESS

Fuqua Insights

Breaking Down Bitcoin

DECEMBER 9, 2017

Professor Campbell Harvey on the digital currency's prospects

For the past five years, Professor Campbell Harvey has taught an Innovation and Cryptoventures course at Duke University's Fuqua School of Business, focusing on bitcoin and other applications of the underlying blockchain technology. Harvey was 2016 president of the American Finance Association and is an internationally recognized expert in portfolio management, asset allocation, the cost of capital and global risk management. His knowledge of bitcoin and the investment landscape gives him the perspective to put the trailblazing digital currency in a market context.

Harvey gives his perspective on the past, present and future of the bitcoin craze in this Fuqua Q&A.

What is bitcoin and why is it generating so much interest?

Bitcoin is a digital currency – a computer program that has a hard-wired rate of money creation that decreases to zero by 2141. Unlike traditional currencies, it has no centralized control. It has some similarity to gold. To mine gold, you need to invest in costly equipment, power, and labor. There are "miners" in the bitcoin space too. They invest in costly equipment and require a lot of power to provide the verification and security of all the transactions on the bitcoin network.

This takes extraordinary computing power and electrical energy. If it were a country, bitcoin would rank 61st in the world in power consumption. These are the costs of security. No run-of-the-mill hacker can mess with bitcoin's technology. So bitcoins are scarce – just like gold. It is an algorithmic scarcity. Bitcoins are expensive to produce – just like gold. There is no central authority for bitcoin – just like gold.

How widely is it used? Can we expect its use to spread?

There is a bitcoin exchange called Coinbase, co-founded by a 2009 Duke grad. It has 13.3 million customers. In contrast, Charles Schwab has 10.6 million active users. Coinbase added 300,000 customers during just one week in November. One of the sites that tracks cryptocurrency prices has more than 3 times the web traffic than the *Financial Times* – and the duration of the page views are also much longer.

As of November 2017, the value of bitcoin is much greater than all of the gold and gold mining ETFs. The Chicago Mercantile Exchange also announced plans to begin trading bitcoin futures. So, this is spreading – rapidly.

How did Bitcoin come about, and how important are its origins to its future?

The founder goes by the name Satoshi Nakamoto. A paper was posted on the Internet in 2008 that provided the foundation of bitcoin. Nakamoto's identity has been the subject of many unsuccessful media investigations. Satoshi is thought to have about one million bitcoins. Given current market values, that's about $10 billion worth.

Why is bitcoin so volatile, and is that volatility intrinsic?

There are many explanations for the extreme volatility of bitcoin. People talk about it being relatively new, difficult to understand, and relatively illiquid compared to financial assets like a stock market index. However, I believe it is volatile because there is such wide disagreement about its value.

For a company's stock, with some research you can come up with the forecasted cash flows and an assessment of the risk. The present value of those cash flows give a fair market valuation of the stock. Sure, people can disagree, so there is a range of values – but the range is relatively narrow. For a currency, say the dollar or pound, even though they are fiat currencies we have an idea of real GDP growth and expected inflation in both countries and we can come up with a fairly narrow band for the currency value. For bitcoin, there is no forecasted cash flow, there is no GDP, and there is no collateral. Many believe the true value is

zero. Many believe the value of a single bitcoin could be $1 million. This massive range of disagreement surely contributes to the volatility.

How risky is holding bitcoin as an asset?

There are two dimensions to risk. First, bitcoin is wildly volatile. The worst day for the S&P from 1928 was October 19, 1987 when the market dropped 20.4 percent. Since 2011, bitcoin has had seven days that are worse than that. Most people benchmark to the global financial crisis when the S&P dropped 9.03 percent on October 15, 2008 – the second worst day since the 1940s. Bitcoin has had 65 days worse than that – and ten of them occurred in 2017 alone.

Bitcoin does better on the second dimension of risk. It is relatively uncorrelated with other assets, so it provides a good diversification. Indeed, you could argue in a real crisis where traditional currencies collapse that bitcoin might hold its value because there is no inflation mechanism and no central authority. However, this is just conjecture because bitcoin has only been actively traded since 2011 and has no track record in a crisis.

Should you invest in bitcoin or is it just a bubble?

Many investors are piling into bitcoin because they fear being left behind. They see some of their friends getting rich in bitcoin and they jump on the bandwagon. Some are borrowing to invest in bitcoin or putting bitcoin into their pension. I definitely worry about that. Holding any single asset – that is, an undiversified portfolio, is not wise. In addition, the volatility of bitcoin is 6 times the equity market volatility – so beware. If you are speculating, only gamble as much as you can afford to lose. I have no problem with some bitcoin being part of a well-diversified portfolio.

What are the threats to bitcoin in the future?

With any new technology, there are threats. To me, the biggest threat will come from another cryptocurrency – Fedcoin. It is just a matter of time before all central banks will use blockchain-based cryptocurrencies. Just as today, the central banks will control the money supply growth. The cryptos have the advantage of keeping track of all transactions. This will greatly increase the difficulty of doing illegal transactions. I find it extraordinary that 78 percent of the value of U.S. currency is in $100 bills. Very few people carry $100 bills and very few retailers accept them. The US $100 is the medium of choice for criminals. It is anonymous and untraceable. With most blockchain-based currencies, all transactions are visible.

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