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Can Bitcoin Become a Major Currency?

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Abstract:

At present, bitcoin is held mostly as a speculative vehicle, little used to pay for goods and services. Its value has been unstable, which impedes bitcoin's wider use as a payment medium. We explain why the value of bitcoin has been so unstable. Then, we discuss entrepreneurial efforts that might enable bitcoin to become a more commonly accepted payment medium.

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1. Introduction

The continuing spread of Bitcoin, a private “crypto-currency” that launched in 2009, elicits a variety of reactions from economists. Some consider its remarkable growth in market valuation (\$6.7 billion for the total in circulation as of 23 May 2014) to be only a self-feeding bubble, due to collapse. Others foresee great growth in the peer-to-peer encrypted payment technology for which bitcoin is the runaway leader. (The second most popular crypto-currency, Litecoin, has a market valuation only about 5% as great.) Still others, ourselves included, have been surprised by its success to date and wait to see how it will play out in the marketplace. Bitcoin can be called a bubble in the sense that its value derives from nothing but expectations about its future value, but the same could be said of irredeemable government-launched monies.¹

Is bitcoin a real money? Students are routinely taught that anything is money that functions as a commonly accepted medium of exchange, i.e. people routinely accept it in payment in order to later use it to buy other things. In his popular money and banking textbook, Frederic Mishkin (2004, p. 44) defines money as “anything that is generally accepted in payment for goods or services or in the repayment of debts.” Bitcoin is *sometimes* used as a medium of exchange today, but it is nowhere a *common* medium of exchange. Even its greatest enthusiasts do not buy groceries or pay rent with it.

¹ See Luther and White (2014) on the non-necessity of continued government backing for an irredeemable currency, as exemplified by the Somali shilling. Luther and Olson (2013) provide a brief overview of bitcoin and discuss its similarities to the concept of money as employed by contemporary monetary economists. White (2014) discusses whether bitcoin fits Ludwig von Mises’ classic account of the valuation of monetary units.

One obstacle that bitcoin faces in widening its payment use is that its purchasing power varies widely, making it risky to hold for short periods.² Granted, the trend was mostly upward for a while. The value of bitcoin climbed from around \$13 on January 1, 2013 to a high of \$1132 on November 28, 2013.³ But during the months of April and May 2014, it averaged roughly \$463 with a daily closing price ranging from \$363 to \$530. Large daily fluctuations in value make it a dangerous way to hold the rent money that is due next week.

In what follows, we explain why the value of bitcoin has been so unstable. Then, we discuss entrepreneurial efforts that might enable bitcoin to succeed more widely as a medium of exchange, despite its unstable purchasing power.

2. The Value of Bitcoin

As with anything, the value of bitcoin depends on supply and demand. The supply of bitcoin is programmed to grow along a pre-determined path. New bitcoin are created when a “miner” successfully processes a new block of transactions, providing the incentive for the block-processing that validates transactions.⁴ The total number of bitcoin in circulation, currently around 13 million, will never exceed 21 million. The market demand for bitcoin, meaning the real asset value that investors in the aggregate desire to hold in bitcoin, on the other hand, is free to vary. Since the bitcoin protocol ensures that a high value for bitcoin does not bring forth any additional supply, a surge in

² In what follows, we quote the closing price on the BitStamp exchange. Exchange rate data from a variety of exchanges is available from www.bitcoincharts.com.

³ It would hit \$1132 again on December 3, 2013. The US\$ during this period was not the source of the variation in the \$/BTC exchange rate. Against other currencies, and against the CPI basket, the dollar varied little.

⁴ Those successfully processing a block might also be rewarded with transaction fees, which will presumably become more important as the amount of new bitcoin created falls to zero.

demand can only be accommodated by a run-up in the dollar price of bitcoin (and a fall in demand by a fall in price).

As an irredeemable digital currency, the demand for bitcoin is in no way tied to the usefulness of some underlying commodity. Rather, it depends on (a) the eagerness of speculators to hold bitcoin as an asset, and (b) the willingness of transactors to hold bitcoin as a medium of exchange. Today's speculative holders are at least in part betting that tomorrow will bring greater transactions demand. If no one were ever expected to use bitcoin to make payments, it would presumably be worthless. On the other hand, if transactions demand for bitcoin were so high that everyone replaced their existing balances of local currency with bitcoin, it would be worth a lot. To make a rough back-of-the-envelope calculation, consider that the market value of all US-dollar coins and currency notes in circulation today is around \$1.28 trillion and there are roughly 13 million bitcoin in circulation. If bitcoin were to have an aggregate market valuation equal to that of the present-day dollar currency, one bitcoin would be worth \$98,462. Hence, a conservative estimate for the potential range of the value of bitcoin is \$0 to \$98,462.⁵

With such a large range of potential values, and nothing else to restrict the range more narrowly, it is not hard to see why the value of bitcoin has fluctuated so much. Any change in the expectation that bitcoin will be used to make payments in the future will affect the willingness of individuals to hold bitcoin today. In recent months, there have been several shocks to the demand for bitcoin. In October 2013, the FBI shut down the Silk Road, a popular online drug marketplace, seizing 3.6 million dollars worth of bitcoin

⁵ Luther and Gochenour (2014) provide a more sophisticated analysis, but reach similar conclusions. Elsewhere, one of us has argued that there is some non-monetary demand for bitcoin (Luther 2013). Although a definite real volume of non-monetary demand would increase the lower bound, the substantive point remains: there is a large range of potential valuations for bitcoin.

in the process. Baidu, China's largest search engine, and Subway, the American restaurant franchise, began accepting bitcoin in October and November, respectively. December saw 96,000 bitcoin stolen from Sheep Marketplace, an online drug site, and China's central bank issue a ban on bitcoin transactions. In January 2014 the major American online retailer Overstock.com began to accept bitcoin. Charlie Shrem, the CEO of BitInstant, was arrested over allegations of money laundering in January and the Mt. Gox exchange suspended trading in February. By altering expectations of future transaction use, such shocks to demand have the potential to produce huge swings in the value of bitcoin.⁶

3. Entrepreneurship in the Market for Bitcoin

Strictly speaking, an item need not hold its value well to be a useful medium of exchange. Cuadras-Morató (1997) demonstrates that even a perishable item might function as money, despite being a poor store of value. Nonetheless, an item's unattractiveness as a store of value would likely dissuade many potential users from employing it as a medium of exchange.

Recognizing that the value of bitcoin is unstable, some entrepreneurs have responded to mitigate the potentially depressing effect on the demand to use bitcoin as a medium of exchange.⁷ Two new services, market exchange pricing and instantaneous exchange facilities, enable shoppers and retailers to use bitcoin as a medium of exchange more conveniently. We discuss each service in turn.

⁶ Luther and Young (2014) consider the significance and magnitude of various demand shocks to the value of bitcoin.

⁷ Nair and Cachanosky (2014) explain how entrepreneurial efforts might help bitcoin overcome the network effects problem.

Market exchange pricing facilities enable retailers to set prices in one currency (say, the US dollar) while displaying them simultaneously in one or more other currencies (say, bitcoin) at current market exchange rates. This can be accomplished in one of two ways. The first (and most common) way is to price all goods in dollars and then display the bitcoin price once the buyer has signaled interest in paying with bitcoin. The at-checkout conversion enables sellers to attract new bitcoin-paying clients without changing the shopping experience for their existing local-currency-paying clients. Some retailers may prefer to display the bitcoin price of all of their goods prior to checkout. This is relatively straightforward for online retailers, where a few lines of code makes it possible to price a particular good in the local currency while (also) displaying the bitcoin price at the current market rate. BitTag, a product launched by Samuel Cox in January 2014, solves the problem for traditional brick-and-mortar stores.⁸ With BitTag, the price of a particular item in both bitcoin and the local currency is displayed on a small OLED screen. The bitcoin price is updated wirelessly via Bluetooth low energy technology to reflect the market exchange rate. Market exchange pricing facilities remove the need for online and brick-and-mortar retailers to manually update bitcoin denominated prices as the value of bitcoin fluctuates.

While market exchange pricing facilities make spending bitcoin easier for shoppers, instantaneous exchange facilities make accepting bitcoin easier for retailers. Simply put: instantaneous exchange facilities enable retailers to accept bitcoin as payment without actually receiving bitcoin. In processing a transaction, payment service providers like Coinbase and BitPay receive bitcoin on behalf of the seller but transfer equivalent local currency (net of fees) to the seller at the current market exchange rate.

⁸ See: Lee (2014).

Since sellers never actually receive bitcoin, they avoid the exchange risk that comes from holding bitcoin. Payment service providers bear the exchange risk, for which they are compensated by a small exchange fee (usually around 1% of the transaction) on top of the payment-processing fee (akin to the 2-3% typically charged by credit- and debit-card processors, but possibly much lower because bitcoin payments carry no chargeback risk and need no centralized clearing and settlement node). As a result, retailers can accept bitcoin as a payment medium without concern for its variable exchange value.

4. Conclusion

An inelastic supply in the face of volatile demand makes the value of bitcoin unstable relative to established currencies. While a drawback, this need not preclude bitcoin from spreading as a medium of exchange. Entrepreneurial innovations—market exchange pricing and instantaneous exchange facilities—enable bitcoin to function as a medium of exchange while allocating the speculative risk of holding it to those who are most willing to bear it (for a small price). Although it is still too early to know how greatly these innovations will widen bitcoin use, they give it a better chance of becoming a commonly accepted medium of exchange. If nothing else, the evolution of bitcoin and rival crypto-currencies will continue to provide us with the opportunity to ponder alternative payment systems and the possibilities for non-state money.

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