

The limits of currencies like Bitcoin

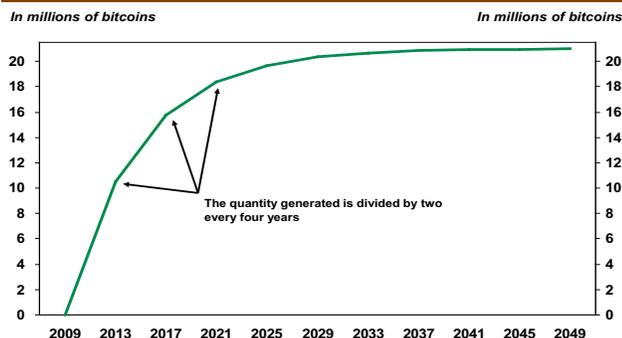
National currencies, whether in paper, metallic or scriptural (non-cash) form, fulfill different functions—from the simplest to the most complex—to keep our modern economies humming. Their role extends beyond that of an accounting unit and means of exchange for basic transactions between individuals and merchants. Currencies also offer access to savings, credit and a wide range of financial transactions.

This *Economic Viewpoint* looks at a new phenomenon in the world of money—digital money that is, such as the Bitcoin. The use of this type of currency is far from widespread and is limited to basic transactions, but many people see a broader potential for bitcoins and are encouraging their procurement. However, there's a world of difference between these new currencies and their conventional national counterparts. These currencies are not backed up by a government or central bank; the absence of a regulatory framework and monetary adjustment mechanisms is in fact a major issue. Individuals who are interested in purchasing these new currencies must proceed with caution and acknowledge the inherent risks.

WHAT IS BITCOIN?

Bitcoin is a digital currency that is not available in paper or metallic form. Bitcoins are generated by a computer program that determines the quantity of money issued based on a predetermined rate, among other things. This rate is divided by two every four years, which means that by 2020, the bulk of bitcoins will already have been generated (graph 1). About 12 million bitcoins have been generated to date out of a total of only 21 million set to be created, and not one more!

Graph 1 – Bitcoins are generated at a predetermined rate



Source: Desjardins, Economic Studies

The Bitcoin network is completely decentralized. Transactions take place directly between the parties involved and trust depends on the robustness of the cryptographic processes used. Because of these processes, digital currencies like Bitcoin are also called “cryptocurrencies.” Anyone with a sufficiently powerful computer can help support the network once the required software has been downloaded. Simply put, users contribute to the network by lending the formidable calculation abilities of their computers to validate blocks of trades. As a reward, newly created bitcoins are distributed between contributors based on the number of blocks that each contributor successfully validates.

A multitude of cryptocurrencies have been developed in the trailblazing wake of the Bitcoin, but the underlying principles remain the same. The creators of these other currencies sometimes boast that their network is less cumbersome to support, transaction times are faster and the financial reward for creating new currencies is better. Some are counting on the faster or longer expansion of the money supply. This latter difference has no impact on the real purchasing power of these currencies, however. The cast-iron economic laws remain—a more ample supply will

François Dupuis
Vice-President and Chief Economist

Yves St-Maurice
Senior Director and Deputy Chief Economist

514-281-2336 or 1 866 866-7000, ext. 2336
E-mail: desjardins.economics@desjardins.com

Hendrix Vachon
Senior Economist

NOTE TO READERS: The letters **k**, **M** and **B** are used in texts and tables to refer to thousands, millions and billions respectively.

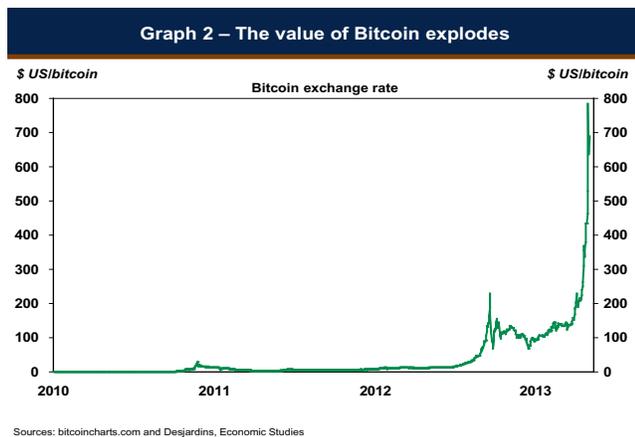
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only reduce the currency's value if demand fails to rise to a sufficient level.

KEY ADVANTAGES

Confidentiality and low transaction costs are two advantages users highly appreciate. Bitcoins and other cryptocurrencies are easily bought and sold around the world through the Internet without an intermediary, meaning that some costs are saved. These currencies are used as a store of value and as a means to make purchases, provided that they are accepted by the seller. And since digital currencies lack a physical form, counterfeiting is impossible. This type of currency is exposed to hacking, however.

Gains can also be made if the value of the currency appreciates. The first Bitcoin purchasers enjoyed enviable returns (graph 2), but not all cryptocurrencies have the same success. The currency's value hinges primarily on demand. The more popular the currency, the more valuable it will become. At the moment, Bitcoin is still the most popular of all the cryptocurrencies.



VERSION 2.0 OF COMMODITY MONEY OR JUST FIAT MONEY?

The first currency ever used was merchandise. Goods or services were bartered for common merchandise that was accepted by everyone involved in the process. Gold and other precious metals in particular were used for this purpose.

In some respects, cryptocurrencies are similar to commodity money. On a conceptual basis, the money creation mechanism is a mathematical simulation of mining for precious—and more importantly, scarce—metals. Scarcity coupled with high demand is essentially what keeps gold prices afloat. This principle is the basic premise behind limiting the expansion of the supply of

cryptocurrencies. Much like it is becoming increasingly difficult to extract gold from the Earth's subsurface (the best deposits having already been excavated), the rate used to generate cryptocurrencies slows over time.

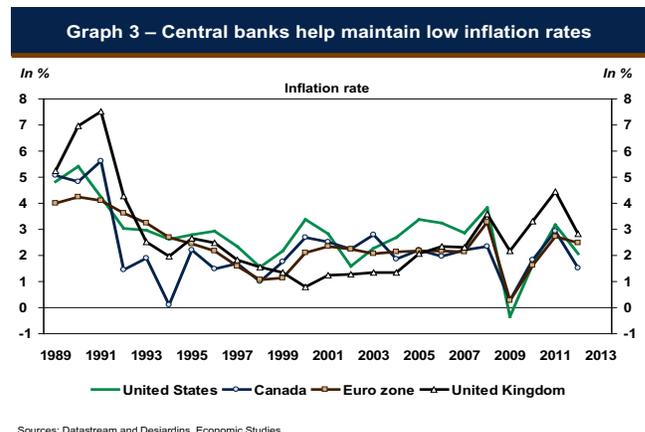
Cryptocurrencies have other attractive characteristics as well. Unlike commodity money, cryptocurrencies are easy to move and store: everything is done online. Cryptocurrencies can also be divided indefinitely. Could this be V2.0 of a new and improved form of commodity money?

The answer is no, since one of the baseline characteristics of commodity money is its non-zero intrinsic value. While gold is no longer used as an official currency, it still has a market value. Bitcoins and other cryptocurrencies have no intrinsic value and this fundamental characteristic puts these currencies in the fiat money category, the most common form of currency. All major national currencies are fiat money.

NATIONAL CURRENCIES AND THE RISK OF STRONG MONETARY GROWTH

Unlike cryptocurrencies, national currency issuances are centralized. In most countries, the central banks fulfill this function, but the growth of the money supply is not set out in advance. The decision to increase or reduce the money supply is made according to the issuer's specific objectives.

Some people have their doubts about the ability of central banks to make good decisions. In most industrialized countries, the central banks set targets for a low and stable inflation rate, which upholds a currency's value. Looking back at the weak price advances seen in the past two decades, we have to acknowledge that this system works very well (graph 3).



Criticisms about national currencies have more weight in countries where the central bank is less independent or where the members of government exercise greater decision-making power over currency issuances. Price stability as an objective is not highly regarded in these conditions—currency values thus become much more volatile and episodes of soaring inflation can occur.

Countries that have very high public debt also raise doubts about their currencies. A country that cannot pay its debts could resort to expanding its money supply to pay its creditors. Governments therefore have to maintain good levels of trust in their ability to support their debt. That being said, governments also have a substantial capacity to tax their citizens, which reduces the risk of having to resort to monetary expansion. Supranational organizations such as the International Monetary Fund (IMF) offer another avenue for countries that are grappling with public finance issues, and another safety net for national currencies. Cryptocurrencies have no support system to deal with potential problems that could have an impact.

THE BITCOIN MODEL DOES NOT NECESSARILY ENSURE RARITY

Nothing guarantees that the supply of cryptocurrencies will outpace demand. A programmer could overestimate the demand for his currency. The multiplication of cryptocurrencies is also a problem. Even if a computer program controls each currency's limited supply, the high degree of substitutability between these currencies and their ever-growing number is such that the total combined supply could grow indefinitely, and inconsistently.

This possibility sets cryptocurrencies further apart from commodity money. We cannot create other types of gold; we could of course use another precious metal, but the substitutability would not be as perfect. More importantly, there is only a little number of potential substitutes.

THE IMPORTANCE OF MONETARY ADJUSTMENT MECHANISMS

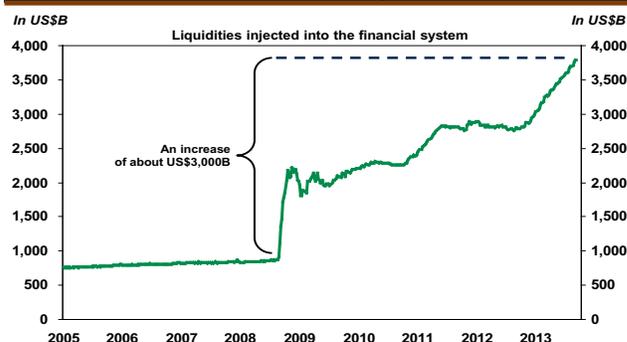
Cryptocurrencies make it difficult to implement monetary adjustment mechanisms, which are required to ensure our economies run smoothly. As an example, the central banks can temporarily lend liquidities to another financial institution in difficulty as a last resort. This mechanism allows a panic situation to be contained and prevents the domino effect from rippling through the financial system.

Monetary policy is, however, the primary adjustment mechanism. The way the central banks control the money supply and short-term interest rates enables them to not only contain inflation, but also to smooth out economic

cycles and contribute to financial stability. A situation may sometimes call for a quick injection of a large amount of money, as has been the case since 2008. Nevertheless, we must bear in mind that if a central bank can create new money easily, it can also destroy money just as quickly when the situation calls for it.

To compensate for the absence of a central bank in a cryptocurrency system, reserves could be set aside to cover downturns. The amounts required would be considerable, however. To provide a general idea, since 2008 the Federal Reserve has injected more than US\$3,000B to support the financial system and the economy (graph 4). In addition, taxpayers would have to build these reserves, which would reduce economic activity. Lastly, the amount held in reserve would constitute a form of waste, since it would be unproductive most of the time. It seems more efficient to have the power to temporarily create money rather than stockpiling permanent reserves.

Graph 4 – The Federal Reserve could swiftly inject liquidities into the financial system



Sources: Federal Reserve and Desjardins, Economic Studies

THE DEFLATION PROBLEM

Deflation is a serious threat to the economy. When prices are on a constant slide, consumers and businesses are less inclined to spend and invest. Debt loads also rise automatically since debt does not dwindle as prices fall, and a home purchase can become a financial black hole. Reducing the risk of inflation is the reason why central banks set a target inflation rate above 0% (usually 2%). If inflation is too low, interest rates are lowered and the money supply is increased.

If a country were to introduce the widespread use of a cryptocurrency, it would likely lead to deflation. Using bitcoins as an example, the computer program is set to generate more than 80% of the currency by 2020. If we use an almost stagnant supply of money to purchase more goods and services, prices will invariably have to be adjusted



downwards. Bitcoin holders might be happy to see their currency gain value on a constant basis, but they wouldn't be compelled to spend and the economy would suffer.

The risk of deflation could be reduced if a country were to use a cryptocurrency where the supply is set in advance at a fairly high level and no ceiling is imposed. The inflation rate would still be highly volatile since the demand for the currency would not grow at a consistent and predictable pace. As a result, inflation expectations would be inadequately anchored and the risk premium charged for an investment or long-term loan would probably be high.

NO REGULATORY FRAMEWORK

The widespread use of a virtual currency with no government backing and no adjustment mechanisms—and the risk of unstable inflation—is hard to imagine. Moreover, a robust regulatory framework would be needed to ensure the various users do not lose out. If the fees for account maintenance, currency exchanges and transactions remain low for cryptocurrencies, it is largely because there are no safeguards in place or recourse for users who suffer damages. Our traditional monetary system offers several ways to protect citizens, but these structures come at a price. Deposit insurance is a prime example.

The need for regulations increases based on how the currency will be used to cover new risks that arise. Let's look at loan activity, for example. The Bitcoin network allows for the currency to change owners, but it does not allow for money to be lent. Technically, a user would have to consent to the transfer of his bitcoins to another user and reach an agreement with that user, outside the network, to guarantee that the lender would recoup the loan amount plus interest. Yet at the moment a borrower does not have any legal obligation to repay his loan. Much like the underground economy, lenders could demand high interest rates, like a loan shark, and use strong-arm tactics to get paid back.

A SHADY SIDE

Anonymity and the absence of rules provide fertile ground for illegal activity. The Silk Road website, which the Federal Bureau of Investigation (FBI) shut down in last October for illicit trade, accepted payment in bitcoins exclusively. Other similar websites are flourishing online, and because of the benefits cryptocurrencies offer, they are the ideal complement to the service offer.

Another less honourable characteristic of these currencies is their veneer as a potential Ponzi scheme. The way cryptocurrencies are created seems to give the first movers the edge. This might explain why so many people are

trying to kick-start these types of currencies. The growth of the supply accelerates early on, so those who get in on the ground floor to support the network enjoy a better financial reward and the potential to make bigger gains. This potential depends on the number of new users that will swell their ranks. The demand for these currencies has to grow continuously if they are to gain value.

Lastly, cryptocurrencies could also be used for tax evasion purposes. Using bitcoins to pay for something is almost like using cash to settle a purchase. "Under the table" payments become "behind the screen" payments. If these transactions are not reported, governments could lose out on sales tax revenues.

TARGET OF SPECULATIVE BUBBLES

The recent and spectacular returns posted by bitcoins have made headlines everywhere, which only attracts new takers. The risk of a bubble grows when individuals buy an asset only because they expect future performance to mirror past performance. The value of bitcoins could very well keep rising for a while. More buyers mean higher values, and higher values will attract even more buyers. Except that nothing lasts forever and when the euphoria gives way to panic, the correction could be very severe.

One event that has a negative impact on demand is all that would be needed to trigger a correction. Governments could eventually legislate the use of cryptocurrencies, for example. This would undoubtedly undercut the confidentiality aspect and probably push up the cost of using these currencies. With fewer benefits to offer, the demand for bitcoins would wane. By ripple effect even a weak drop in demand could turn into a major correction. As soon as the returns would start to lag, several investors could opt to sell to cash in on their gains. More sellers would simply erode the currency's value, and the more the currency loses value, the more the number of sellers would swell.

Trust in this currency could also nosedive from one day to the next if an operational risk were to emerge, for instance, a computer failure. In such situations, paper money would look very attractive, but this format is not available to bitcoins. Users are also exposed to hackers and electronic theft. With no recourse to recover potential losses, some users would probably be encouraged to withdraw their money after a hacking incident or a massive theft, which would be widely reported in the media.

Bitcoin is the number one cryptocurrency right now, but its supremacy is not assured. The Bitcoin network is far from perfect. To provide an example, it takes at least 10 minutes to conduct a Bitcoin transaction—this is the time required



for the network to complete security control calculations and validate the results. Over time, this could irritate users and push them to use another, much quicker, currency. Additionally, if another currency starts to appreciate more than the Bitcoin, demand could switch to this new currency. The Bitcoin bubble would burst, and a new bubble would start to form with this other currency.

CONCLUSION: NATIONAL CURRENCIES HAVE LITTLE TO FEAR

Bitcoin's main innovation is its computer encryption process that allows trades in this electronic currency to be completed without a third party. This is the underlying principle behind most similar currencies that have been created in Bitcoin's wake. Other aspects about cryptocurrencies are less convincing, however. There are several substantial setbacks to confidentiality and low usage costs. All told, users are taking on high risk levels when dealing with these currencies and caution is indeed recommended.

The use of cryptocurrencies should remain minimal. National currencies have built-in advantages because of the oversight provided by the regulatory framework and the presence of monetary adjustment mechanisms. Concerns about the uncontrolled explosion of the money supply are exaggerated for most national currencies, given the taxation power of governments together with the inflation targets set by the central banks and the credibility they enjoy.

That said, not all central banks around the world are trustworthy. The strong volatility of certain currencies could prompt users of that currency to seek a replacement solution. By opting for a cryptocurrency, these people would grapple with the deflation problem, the absence of regulations and the risk of a speculative bubble. The exchange rate for a cryptocurrency could be just as volatile as a poorly managed national currency. In such situations, a stable national currency with an international reach—like the U.S. dollar or the euro—is still the best choice.

Hendrix Vachon
Senior Economist