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Bitcoin: Questions, Answers, and Analysis of Legal Issues

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Summary

Bitcoin first appeared in January 2009, the creation of a computer programmer using the pseudonym Satoshi Nakamoto. His invention is an open source (its controlling computer code is open to public view), peer to peer (transactions do not require a third-party intermediary such as PayPal or Visa), digital currency (being electronic with no physical manifestation). The Bitcoin system is private, but with no traditional financial institutions involved in transactions. Unlike earlier digital currencies that had some central controlling person or entity, the Bitcoin network is *completely decentralized*, with all parts of transactions performed by the users of the system.

With a Bitcoin transaction there is no third party intermediary. The buyer and seller interact directly (peer to peer) but their identities are encrypted and no personal information is transferred from one to the other. However, unlike a fully anonymous transaction, there is a transaction record. A full transaction record of every Bitcoin and every Bitcoin user's encrypted identity is maintained on the public ledger. For this reason Bitcoin transactions are thought to be pseudonymous, not anonymous. Although the scale of Bitcoin use has increased substantially, it still remains small in comparison to traditional electronic payments systems such as credit cards and the use of dollars as a circulating currency.

Congress is interested in Bitcoin because of concerns about its use in illegal money transfers, concerns about its effect on the ability of the Federal Reserve to meet its objectives (of stable prices, maximum employment, and financial stability), and concerns about the protection of consumers and investors who might use it.

Bitcoin offers users the advantages of lower transaction costs, increased privacy, and long term protection of loss of purchasing power from inflation. However, there are also a number of disadvantages that could hinder wider use. These include sizable volatility of the price of Bitcoins, uncertain security from theft and fraud, and a long term deflationary bias that encourages the hoarding of Bitcoins.

Bitcoin also raises a number of legal and regulatory concerns including its potential for facilitating money laundering, its treatment under federal securities law, and its status in the regulation of foreign exchange trading.

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The digital currency called Bitcoin has been in existence since 2009 and for most of that time it remained little more than a technological curiosity of interest to a small segment of the population. However, over the last year and a half, Bitcoin use has grown substantially; attention by the press has surged, and recently Bitcoin caught the attention of Congress, being the subject of two Senate hearings.[1]

This report has three major sections. The first section answers some basic questions about Bitcoin and the operation of the Bitcoin network and its interaction with the current dollar-based monetary system. The second section summarizes likely reasons for and against widespread Bitcoin adoption. The third section discusses legal and regulatory matters that have been raised by Bitcoin and other digital currencies.

Some Basic Questions

What Is Bitcoin?[1]

Bitcoin first appeared in January 2009, the creation of a computer programmer using the pseudonym Satoshi Nakamoto. His invention is an open source (its controlling computer code is open to public view), peer to peer (transactions do not require a third-party intermediary such as PayPal or Visa), digital currency (being electronic with no physical manifestation).[2]

Like the U.S. dollar, the Bitcoin is a *fiat currency* in that it is not redeemable for some amount of another commodity, such as an ounce of gold. Unlike the dollar, a Bitcoin is not legal tender nor is it backed by any government or any other legal entity, nor is its supply determined by a central bank. The Bitcoin system is private, but with no traditional financial institutions involved in transactions. Unlike earlier digital currencies that had some central controlling person or entity, the Bitcoin network is *completely decentralized*, with all parts of transactions performed by the users of the system.

How Does the Bitcoin System Work?

Bitcoin is sometimes referred to as a *cryptocurrency* because it relies on the principles of cryptography (communication that is secure from view of third parties) to validate transactions and govern the production of the currency itself. Each Bitcoin and each user is encrypted with a unique identity and each transaction is recorded on a decentralized public ledger (also called a *blockchain*) that is visible to all computers on the network, but does not reveal any personal

[1] On November 18, the Senate committee on Homeland Security and Governmental Affairs held a hearing on: *Beyond Silk Road: Potential Risks, Threats, and Promises*, available at http://www.hsgac.senate.gov/hearings/beyond-silk-road-potential-risks-threats-and-promises-of-virtual-currencies. On November 19, the Senate Committee on Banking, Housing, and Urban Affairs held a hearing on: *The Current and Future Impact of Virtual Currencies,* available at http://www.banking.senate.gov/public/index.cfm?FuseAction=Hearings.Hearing&Hearing_ID=955322cc-d648-4a00-a41f-c23be8ff4cad.

[2] General background discussions about Bitcoin can be found at Bitcoin, available at http://bitcoin.org/en/; Jerry Brito and Andrea Castillo, *Bitcoin: a Primer for Policymakers,* Mercatus Center, George Mason University, 2013, available at http://mercatus.org/publication/bitcoin-primer-policymakers; and Federal Reserve Bank of Chicago, *Chicago Fed Letter,* Bitcoin: A Primer, 2013, available at http://www.chicagofed.org/digital_assets/publications/chicago_fed_letter/2013/cfldecember2013_317.pdf.

information about the involved parties. The public ledger verifies that the buyer has the amount of Bitcoin being spent and has transferred that amount to the account of the seller.

The public ledger is a unique attribute of Bitcoin (and other cryptocurrencies) because it solves the so called *double spending* problem (i.e., spending money you do not own by use of forgery or counterfeiting) and the need for a trusted third party (such as a bank or credit card company) to verify the integrity of electronic transactions between a buyer and a seller.

How Are Bitcoins Obtained?

To interact on the Bitcoin network users first need to download the free and open-source software. Once connected to the network, there are three ways to obtain Bitcoins. First, a user can exchange conventional money (e.g., dollars, yen, and euros) for a fee on an online exchange (e.g., Mt. Gox, Coinbase, and Kraken). The exchange fee falls with the size of the transaction, ranging from 0.5% for small transactions down to 0.2% for large transactions.

The price of Bitcoin relative to other currencies is determined by supply and demand. In mid-December, 2013, a single Bitcoin was valued at around $800. However, the price has been quite volatile, having been above $1200 in early December and around $200 in early November.[3]

Second, a user can obtain Bitcoins in exchange for the sale of goods or services, as when a merchant accepts Bitcoin from a buyer for the sale of his product.

Third, a user can generate Bitcoins through a process called *mining*. Mining involves applying the user's computer's processing power to solve a complex math problem to discover new Bitcoins. The probability of an individual discovering Bitcoins through mining is proportional to the amount of computer processing power that can be applied. This prospect is likely to be very small for the typical office or home computer. The difficulty of the math problem is such that Bitcoins will be discovered at a limited and predictable rate system wide.

Therefore, the supply of Bitcoins does not depend on the monetary policy of a virtual central bank. In this regard, although a fiat currency, the Bitcoin system's operation is similar to the growth of money under a gold standard, although historically the amount of gold mined was more erratic than the growth of the supply of Bitcoins is purported to be. Depending on one's perspective this attribute can be a virtue or a vice.

Currently, about 12 million Bitcoins are in circulation. However, the total number of Bitcoins that can be generated is arbitrarily capped at 21 million coins, which is predicted to be reached in 2140. Also, because a Bitcoin is divisible to *eight* decimal places, the maximum amount of spendable units is more than *2 quadrillion* (i.e., 2000 trillion).

Purchased or mined Bitcoins are thereafter stored in a digital wallet on the user's computer or at an online wallet service.

[3] The current price of a Bitcoin can be obtained from Bitcoin-Charts available at http://bitcoincharts.com/.

Are Bitcoin Transactions Anonymous?

Bitcoin transactions are not truly anonymous.[4] An example of an anonymous transaction is an exchange for cash between two strangers. In this case, no personal information need be revealed nor does there need to be a record of the transaction. At the other extreme a non-anonymous transaction is a typical online purchase using a credit card. This transaction requires validation by a third-party intermediary to whom the buyer's and seller's identities and pertinent financial information is known and who maintains a record of the transaction. A Bitcoin transaction falls between these two extremes.

With a Bitcoin transaction there is no third-party intermediary. The buyer and seller interact directly (peer to peer), but their identities are encrypted and no personal information is transferred from one to the other. However, unlike a fully anonymous transaction, there is a transaction record. A full transaction record of every Bitcoin and every Bitcoin user's encrypted identity is maintained on the public ledger. For this reason Bitcoin transactions are thought to be pseudonymous, not anonymous.

Because of the public ledger, researchers have found that, using sophisticated computer analysis, transactions involving large quantities of Bitcoin can be tracked and claim that if paired with current law enforcement tools it would be possible to gain a lot of information on the persons moving the Bitcoins.[5] Also, if Bitcoin exchanges (where large transactions are most likely to occur) are to be fully compliant with the bank secrecy regulations (i.e., anti-money laundering laws) required of other financial intermediaries, Bitcoin exchanges will be required to collect personal data on their customers, limiting further the system's ability to maintain the user's pseudonymity.

What Is the Scale of Bitcoin Use?

Despite significant growth since its inception, Bitcoins scale of use remains that of a "niche" currency. In mid-November 2013, the total number of Bitcoins in circulation globally is approaching 12 million, up about 2 million coins from a year earlier. With its recent market price of over $1,000, Bitcoin's current market capitalization (price x number of coins in circulation) exceeds $20 billion. However, large swings in the price of Bitcoin have caused that market capitalization to exhibit similarly large changes during the year. As recently as July 2013, with Bitcoin exchanging at the much lower price of around $65, the market capitalization was below $800 million. During 2013, Bitcoin daily transaction volume fluctuated in a range of between $20 million and $40 million, representing about 40,000 daily transactions.[6]

For comparison, in September 2013 the U.S. money supply (the sum of currency, demand deposits, saving deposits including money market saving accounts) was about $10.8 trillion (about 1,000 times larger.)[7] The credit card company Visa reports that for the year ending June

[4] Joshua Brustein, "Bitcoin May Not Be Anonymous After All," *Bloomberg Business Week,* August 27, 2013, available at http://www.businessweek.com/articles/2013-08-27/bitcoin-may-not-be-so-anonymous-after-all.

[5] Sarah Meiklejohn, Marjori Pomarole, Grant Jordan, Kirill Levchenko, Damon McCoy, Geoffrey M. Voelker, and Stefan Savage, "A Fist Full of Bitcoins: Characterizing Payments Among Men with No Name," University of California, San Diego, December 2013, available at http://cseweb.ucsd.edu/~smeiklejohn/.

[6] Bitcoin data from Bitcoin Charts available at http://bitcoincharts.com/.

[7] Board of Governors of the Federal Reserve System, *Money Stock Measures(H.6),* available at
(continued...)

2013 its total dollar volume was $6.9 trillion, with an average number of daily individual transactions of near 24 million.[8] In 2012, *daily* transactions in dollars on global foreign exchange markets averaged over $4 trillion.[9]

Would Bitcoins Affect the Fed's Conduct of Monetary Policy?

The Federal Reserve conducts monetary policy to affect the flow of money and credit to the economy in order to achieve stable prices, maximum employment, and financial market stability. At Bitcoin's current scale of use, it is likely too small to significantly affect the Fed's ability to conduct monetary policy and achieve those three goals. However, if the scale of use were to grow substantially larger, there could be reason for some concern. *Conceptually*, Bitcoin could have an impact on the conduct of monetary policy to the extent that it would (1) substantially affect the quantity of money or (2) influence the velocity (rate of circulation) of money through the economy by reducing the demand for dollars.

Regarding the money supply, if Bitcoin transactions occur on a *pre-paid* basis whereby Bitcoins enter into circulation when dollars are exchanged and then are withdrawn from circulation when exchanged back to dollars, the net effect on the money supply would be small.

Regarding the velocity of money, if the increase in the use of Bitcoin leads to a decrease in need for holding dollars, it would increase the dollar's velocity of circulation and tend to increase the money supply associated with any given amount of base money (currency in circulation plus bank reserves held with the Fed). In this case, for the Fed to maintain the same degree of monetary accommodation, it would need to undertake a compensating tightening of monetary policy. At a minimum, a substantial use of Bitcoins could make the measurement of velocity more uncertain, and judging the appropriate stance of monetary policy uncertain.

Also, a substantial decrease in the use of dollars would also tend to reduce the size of the Fed's balance sheet and introduce another factor into its consideration of how to affect short-term interest rates (the instrument for implementing monetary policy). However, the Fed's ability to conduct monetary policy rests on its ability to increase or decrease the reserves of the banking system through open market operations. So long as there is a sizable demand by banks for liquid dollar-denominated reserves, the Fed would likely continue to be able to influence interest rates and conduct monetary policy.[10] [11]

(...continued)

http://www.federalreserve.gov/releases/h6/current/default.htm.

[8] Visa, Inc., Fact Sheet, available at http://corporate.visa.com/_media/visa-fact-sheet.pdf.

[9] Bank for International Settlements, "Foreign Exchange Turnover in April 2013: Preliminary Global Results," Triennial Central Bank Survey, September 2013, https://www.bis.org/publ/rpfx13fx.pdf.

[10] See also: European Central Bank, Virtual Currency Schemes, October 2012, pp33-39, available at http://www.ecb.europa.eu/pub/pdf/other/virtualcurrencyschemes201210en.pdf.

[11] In a recent letter to the Senate Committee on Homeland Security and Governmental Affairs, Fed Chairman Bernanke noted that virtual currencies have the potential to be beneficial, but also carry risks, and while not a direct regulatory responsibility, are monitored by the Fed. He did not express any concern about virtual currencies hindering the Fed's ability to conduct monetary policy. Available at http://online.wsj.com/public/resources/documents/VCurrenty111813.pdf.

Again, any sizable effect on the U.S. monetary system is predicated on Bitcoin's scale of use becoming substantially greater than it is at present. An important force that is likely to hinder such growth in Bitcoin use is the strong preference for dollar use generated by what economists call *network externalities* (i.e., the value of a product or service is dependent on the number of others using it). Network externalities create a self-generating demand for a dominant currency. The more often a currency is used as a medium of exchange, the more liquid it becomes and the lower are the costs of transacting in it, leading, in turn, to its becoming even more attractive to new users. Network externalities create a tendency toward having one dominant currency and confer a substantial *incumbency advantage* to the dollar in both domestic and international use. The legal tender status of the dollar, discussed below, reinforces this advantage. [12]

The U.S. economy reaps considerable benefit from having a single well-defined and stable monetary unit to work as a medium of exchange and unit of account to facilitate its vast number of daily economic transactions. If greater use of Bitcoin (and other cryptocurrencies) leads to multiple monetary units, these benefits could be threatened, particularly if these new currencies continue to exhibit a high degree of price volatility. (Price volatility is discussed more fully below.)

Reasons For and Against Wider Use of Bitcoin

Why Would One Want to Use Bitcoins?

Bitcoin purportedly offers three potential benefits to users: lower transaction costs, increased privacy, and no erosion of purchasing power due to inflation.

Lower Transaction Costs for Electronic Economic Exchanges

Because there is no third-party intermediary, Bitcoin transactions are purported to be substantially less expensive for users than those using traditional payments systems such as Paypal and traditional credit cards, which charge merchants significant fees for their role as trusted third party intermediary to validate electronic transactions. In addition, Bitcoin sales are *non-reversible*, which removes the possibility for misuse of consumer charge-backs, which merchants find costly. Merchants would presumably pass at least some of these savings on to the customer. While there is considerable anecdotal evidence that this is true, there are no comprehensive data on the size of Bitcoin's transaction cost advantage.

Some of the transaction cost advantage could be offset by the slow speed at which Bitcoin transactions currently occur, which, depending on the size of the transaction, can take a minimum of 10 minutes or as long as an hour.[13]

In addition, Bitcoin's advantage in transaction cost could be offset by the substantial volatility of Bitcoin's price. A rising dollar price of Bitcoin is likely to deter potential buyers who would

[12] Varian, Hal R., 2003, "Economics of Information Technology," in "Academic Papers and Books, 2004 and Earlier Non-technical papers," available at http://www.sims.berkeley.edu/~hal.

[13] See Data on transaction times at Blockchain, available at http://blockchain.info/charts/avg-confirmation-time.

expect to see their purchasing power be greater in the future. A falling Bitcoin price is likely to deter potential sellers who would expect to see their potential sales receipts be greater in the future.

Increased Privacy

Those who seek a heightened degree of privacy may find more comfort using Bitcoins for their (legal) commercial and financial transactions. The risk of identity theft may also be less, and some may find the removal of government from a monetary system attractive. However, as discussed above, Bitcoin transactions do not have the anonymity afforded by cash transactions, as there is a permanent and complete historical record of Bitcoin amounts and encrypted identities for all transactions on the Bitcoin system that is potentially traceable.

No Erosion of Purchasing Power by Inflation

Inflation is defined as a broad increase in the prices of goods and services. This is equivalent to saying that there is a fall in the value of the circulating currency. That fall in value means that each unit of the currency is exchangeable for a reduced amount of goods and services. Inflation is commonly thought to be a monetary phenomenon in which the supply of the currency outpaces the demand for the currency causing its unit value (in terms of what it can buy) to fall.

Most often governments (or their central bank) regulate the supply of money and credit and most often some degree of mismanagement of this government function is at the root of a persistent high inflation problem. In the case of Bitcoin, however, there is no government or central bank regulating the supply of Bitcoins. The supply of Bitcoins is programmed to grow at a steady rate regulated by the degree of mining activity (a process likely linked to a growing demand for Bitcoin) and then is capped at a fixed amount.

Inflation could occur if the demand for Bitcoin decreases relative to the fixed supply. Inflation could also occur if the Bitcoin network develops fractional reserve banking (i.e., banks that hold only a fraction of their deposits in reserve and lend out the rest), which would also be a vehicle that effectively increases the supply of circulating Bitcoins. If these digital banks move to a situation where held reserves stabilize, this source of inflation would diminish.

What Factors Might Deter Widespread Bitcoin Use?

There are a number of factors that could discourage widespread use of Bitcoin.

Not Legal Tender

The dollar is legal tender and by law can be used to extinguish public or private debts. A creditor is required to accept legal tender for the settlement of a debt. At a minimum, the payment of taxes forces U.S. individuals to hold dollars. Arguably, for many, such a government endorsement is comforting and creates a strong underlying demand for the dollar. By contrast, a currency like Bitcoin that is linked to a complex computer program that many do not understand and that operates without accountability to any controlling entity, could be an unattractive vehicle for holding wealth for many people.

Does Not Enjoy the Dollar's Network Externalities

As noted above, the attractiveness of using a dollar is dependent on the number of people already using it. Thus widespread use of the dollar encourages its continued use and is an impediment (although not an insurmountable barrier) to the use of other currencies, including Bitcoins.

Price Volatility Discourages Its Use as Medium of Exchange

Bitcoin's price has been volatile since its creation in 2009, subject to sharp appreciations and precipitous depreciations in value. However, 2013 has seen a much higher level of price fluctuation. During March and April of 2013, Bitcoin's dollar exchange rate moved from about $50 up to $350, and back to near $70. Bitcoin's price has moved up even more sharply during the fall of 2013, rising from near $50 in September to above $1,200 by early December, and down to near $800 by mid-December. This is a price pattern more typical of a commodity than a currency to be used as a medium of exchange, and suggests the market for Bitcoin is currently being driven by speculative investors, not a growing demand for Bitcoin due to increased transactions by traditional merchants and consumers.

The problem with having the Bitcoin network dominated by speculators is that it gives users an incentive to hoard Bitcoins rather than spend them—just the opposite of what would need to happen to make a currency a successful medium of exchange such as the dollar. [14]

Speculation could be more likely to dominate the market for Bitcoins because its value cannot be anchored to some underlying 'fundamental' such as an amount of some physical commodity such as gold, the value of an earnings stream that undergirds the price of a company's stock, or the perceived basic soundness and stability of an economy and its governing institutions (as is, arguably, true for the dollar).

The System's Long-Term Deflationary Bias Will Discourage Its Use as Currency

Because the supply is capped in the long run, widespread use of Bitcoin would mean that the demand for Bitcoin would likely outstrip supply, causing Bitcoin's price to steadily increase. The corollary of that increase is that the Bitcoin price of goods and services would steadily fall causing deflation. Faced with deflation, there is a strong incentive to hoard Bitcoins and not spend them, causing the current level of transactions to fall. [15]

If generalized to an economy-wide phenomenon deflation could cause slower than normal economic growth and higher than normal unemployment.

This possible outcome highlights the likely importance of the economy's principal currency being *elastic,* its supply increasing and decreasing to meet the changing needs of the economy, and of the important role of the central bank in implementing such a monetary policy. The perils of an

[14] Felix Salmon, "The Bitcoin Bubble and the Future of Currency," *Medium,* April 2013, available at https://medium.com/money-banking/2b5ef79482cb.

[15] Dan Kervick, "Bitcoin's Deflationary Weirdness," New Economic Perspectives, April 2013, available at http://neweconomicperspectives.org/2013/04/talking-bitcoin.html.

inelastic currency were evident, for a period from about 1880 to 1914, when the United States monetary system operated under a gold standard. At this time, the deflationary bias of an inelastic supply of gold led to elevated real interest rates, caused periodic banking panics, and produced increased instability of output. The Federal Reserve was created in 1913 to provide an elastic currency. In particular, the generally good economic performance of the post-war era speaks to the benefits of having a central bank to administer an elastic currency, not only to meet the changing transaction needs of the economy, but also to proactively use monetary policy to stabilize output and inflation.

Bitcoins Networks Security Is Uncertain

While counterfeiting is purportedly not possible, Bitcoin exchanges and wallet services have at times struggled with security. Cash and traditional electronic payment systems also have periodic security problems, but a high incidence of security problems on a system trying to establish itself and gain customer confidence could be more damaging. Some notable examples of security breaches on the Bitcoin network have included the following:

- Hackers mounted a massive series of distributed denial-of-service (DDoS) attacks against the most popular Bitcoin exchange, Mt.Gox, in 2013.[16]
- In late August 2012, an operation titled Bitcoin Savings and Trust was shut down by the owner, allegedly leaving around 5.6 million USD in bitcoin-based debts.[17]
- In September 2012, Bitfloor, a Bitcoin exchange, reported being hacked, with 24,000 Bitcoins (roughly equivalent to 250,000 USD) stolen. As a result, Bitfloor temporarily suspended operations.[18]
- On April 3, 2013, Instawallet, a web-based wallet provider, was hacked, resulting in the theft of over 35,000 Bitcoins. With a price of 129.90 USD per b\Bitcoin at the time, or nearly 4.6 million USD in total, Instawallet suspended operations.[19]
- On August 11 2013, the Bitcoin Foundation announced that a bug in software within the Android operating system had been exploited to steal from users' wallets. [20]
- October 23 and 26, 2013, a Bitcoin bank, operated from Australia but stored on servers in the USA, was hacked, with a loss of 4,100 Bitcoins, or over 1 million AUD. [21]

[16] Mitt Clinch, "Bitcoin Hacked: Price Stumbles After Buying Frenzy," CNBC, April 4, 2013, available at http://www.cnbc.com/id/100615508.

[17] Adrianne Jeffries, "Suspected Multi-Million Dollar Bitcoin Pyramid Scheme Shuts Down, Investors Revolt," The Verge, August 27, 2012, available at http://www.theverge.com/2012/8/27/3271637/bitcoin-savings-trust-pyramid-scheme-shuts-down.

[18] Vitalik Burterin, "Bitfloor Hacked, $250,000 Missing," Bitcoin Magazine, Sept 4, 2012, available at http://bitcoinmagazine.com/2139/bitfloor-hacked-250000-missing/.

[19] Joe Weisenthal, "Bitcoin Service Instawallet: We've Been Hacked and are Suspending Service Indefinitely," Business Insider, April 3, 2013, available at http://www.businessinsider.com/instawallet-suspended-2013-4.

[20] Richard Chirgwen, "Android Bug Batters Bitcoin Wallets," The Register, August 12, 2013, available at http://www.theregister.co.uk/2013/08/12/android_bug_batters_bitcoin_wallets/.

[21] Ben Grubb, "Australian Bitcoin Bank Hacked: $1 Million + Stolen," Brisbane Times, November 8, 2013, available at http://www.brisbanetimes.com.au/it-pro/security-it/australian-bitcoin-bank-hacked-1m-stolen-20131108-hv2iv.html.

Legal and Regulatory Issues

Legal Considerations Generally

In order to provide some information on recent efforts by federal, state, and international authorities to study, monitor, or regulate digital currencies, this section of the report (1) identifies the clause in the U.S. Constitution giving power to Congress over money; (2) describes some of the recent federal, state, and international activities and studies dealing with digital money; and (3) identifies some of the federal laws that might be implicated or that have been used with respect to digital money.

In providing this information, we have identified some federal statutes and regulatory regimes that may have some applicability to digital currency, although none contains explicit language to that effect or explicitly mentions currency not issued by a government authority. Some federal statutes, because of their broad coverage, are likely to be held by courts to apply in connection with digital currency. For example, courts are likely to hold that the federal criminal mail and wire fraud statutes apply to fraudulent schemes designed to result in monetary losses in connection with buying, selling, or trading digital currencies.[22] Federal statutes providing consumer protection with respect to consumer financial transactions, however, such as the Truth in Lending Act[23] and the Truth in Savings Act,[24] include no language specifically referencing digital currency transactions.[25]

Power of Congress under Article I of the U.S. Constitution

One of the direct powers of Congress under the U.S. Constitution, the grant of authority "to coin Money" and "regulate the Value thereof,"[26] appears to provide sufficient authority for extensive oversight and control of digital money. The Supreme Court has interpreted this clause broadly. It has been upheld to authorize legislation chartering the First Bank of the United States and giving it power to issue circulating notes.[27] Legislation requiring U.S. Treasury notes to be treated as legal tender for antecedent debts[28] and legislation that abrogated gold clauses in private

[22] These include 18 U.S.C. §§1341 (mail fraud) and 1343 (wire fraud). The wire fraud statute, for example, applies to "[w]hoever, having devised or intending to devise any scheme or artifice to defraud, or for obtaining money or property by means of false or fraudulent pretenses, representations, or promises, transmits or causes to be transmitted by means of wire, radio, or television communication in interstate or foreign commerce, any writings, signs, signals, pictures, or sounds for the purpose of executing such scheme or artifice." Regulation Z, 12 C.F.R. 226, implementing the Truth in Lending Act (TILA) is premised on credit transactions, interest, and fees in terms of U.S. money. At present it is a matter of pure speculation as to whether the Consumer Financial Protection Board (CFPB), the agency charged with implementing TILA, could reasonably interpret the statute, given its language, structure, and legislative history, as a basis for issuing regulations to cover transactions in digital money.

[23] 15 U.S.C. §§1601 *et seq.*

[24] 12 U.S.C. §§4301-4313. (This applies to deposits held at depository institutions, i.e., banks, thrifts, savings associations, and credit unions.).

[25] A list of the regulations implementing federal laws providing consumer protection for financial transactions can be found on the Consumer Financial Protection Bureau's website at http://www.consumerfinance.gov/regulations/#ecfr,\.

[26] U.S. Const., art. I, §8, cl. 5.

[27] McCulloch v. Maryland, 17 U.S. (4 Wheat.) 316 (1819); Veazie Bank v. Fenno, 75 U.S. (8 Wall.) 533 (1869).

[28] Legal Tender Cases (Knox v. Lee), 79 U.S. (12 Wall.) 457(1871); Juilliard v. Greenman, 110 U.S. 421 (1884).

contracts[29] have also been upheld on the basis of this clause of the Constitution. The breadth of the power can be discerned from a statement of the Court in the Legal Tender Cases when the Court opined that "[e]very contract for the payment of money simply is necessarily subject to the constitutional power of the government over the currency, whatever that power may be, and the obligation of the parties is therefore assumed with reference to that power."[30]

Recent Activity

This section provides a brief survey of some of the concerns and activities of federal, state, and international governmental entities with respect to the emergence of digital currencies.

Recent Legislative Activity: Congress

In Congress, interest in virtual currencies is at the exploratory stage. The Senate Finance Committee directed the Government Accountability Office (GAO) to review any tax requirements and compliance risks implicated and to assess the Internal Revenue Service (IRS) efforts at informing the public in view of the offshore and internet sources of these currencies. On May 13, 2013, GAO released a survey[31] describing the types of virtual currencies, the inadequacy of available data on them, and the extent of IRS efforts. It noted that IRS guidance on virtual currencies[32] concentrates on currencies used in virtual communities, such as Linden Dollars in Second Life, and overlooks currencies, such as Bitcoin, that can be used in the real economy. GAO also notes that the tax code lacks clarity about how virtual currency is to be treated for reporting purposes. Is it property, barter, foreign currency, or a financial instrument?

The Senate Homeland Security and Governmental affairs Committee has begun to look into how federal agencies are confronting the rise of virtual currencies. On August 12, 2013, the Committee's Chairman and ranking Member sent letters[33] to several federal agencies, including the Departments of Justice (DOJ), the Treasury, and Homeland Security; the Securities and Exchange Commission (SEC); the Commodity Futures Trading Commission (CFTC); and the Federal Reserve, seeking information on their virtual currency policies, initiatives, activities, guidelines, or plans regarding virtual or digital currency. The committee envisions a government-wide approach to the threats and promises of digital currency.

Federal Reserve and European Central Bank Studies

At least one Federal Reserve economist is studying digital currencies and Bitcoin, in particular.[34] On the international front, the European Central Bank released a study[35] of virtual currencies that

[29] Norman v. Baltimore & Ohio R.R., 294 U.S. 240 (1935).

[30] Legal Tender Cases (Knox v. Lee), 79 U.S. (12 Wall.) 457, 549 (1871).

[31] U.S. Government Accountability Office, "Virtual Economies and Currencies: Additional IRS Guidance Could Reduce Tax Compliance Risks" (May 2013).

[32] Internal Revenue Service, "Tax Consequences of Virtual World Transactions," http://www.irs.gov/Businesses/Small-Businesses-&-Self-Employed/Tax-Consequences-of-Virtual-World-Transactions.

[33] http://www.hsgac.senate.gov/reports/letters

[34] François R. Velde, "Bitcoin: A primer," Chicago Fed Letter (December 2013). http://www.chicagofed.org/digital_assets/publications/chicago_fed_letter/2013/cfldecember2013_317.pdf.

[35] European Central Bank, "Virtual Currency Schemes," (October 2012). http://www.google.com/url?sa=t&rct=j&q=& (continued...)

assesses both the prospects for growth and some of the potential problems that might accompany widespread use.

Federal Regulatory Activity

Federal regulatory activity includes guidance[36] issued by Treasury's Financial Crimes Enforcement Network (FINCEN) and a Winkelvoss Bitcoin Trust registration statement[37] filed with the Securities and Exchange (SEC) Commission. In addition, the SEC published an advisory[38] for investors on the threat of virtual currency scams on the Internet, filed a criminal fraud complaint[39] charging a Bitcoin exchange with engaging in a ponzi scheme, and successfully convinced a federal district court that Bitcoins are money. The court reasoned that because Bitcoins are used as money to purchase goods or services and can be exchanged for conventional currencies, they are money, and, thus, a contract for the investment of Bitcoins is an "investment contract," and, therefore, a security under federal securities law.[40] In another enforcement action, the Department of Homeland Security charged Mt. Gox, which is the Japanese-based largest Bitcoin exchange in the United States, with operating an unlicensed money services business in violation of 18 U.S.C. §1960 and seized its bank account.

State Regulatory Activity

State authorities moving in the direction of regulating virtual currencies are sometimes discovering problems in applying existing laws to the technological currencies. New York's Superintendent of Financial Services is investigating whether new regulation is needed and has issued subpoenas seeking information on a raft of virtual currencies.[41] California's Department of Business Oversight may have misdirected a cease and desist order to the Bitcoin Foundation because the Foundation confines itself to advocacy work.

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[36] U.S. Department of the Treasury, Financial Crimes Enforcement Network, "Application of FinCEN's Regulations to Persons Administering, Exchanging, or Using Virtual Currencies," (March 18, 2013), http://www.fincen.gov/statutes_regs/guidance/html/FIN-2013-G001.html.

[37] Form S-1 Registration Statement, Winkelvoss Bitcoin Trust. http://www.sec.gov/Archives/edgar/data/1579346/000119312513279830/d562329ds1.htm.

[38] U.S. Securities and Exchange Commission Press Release 2013-132, "SEC Charges Texas Man with Running Bitcoin-Denominated Ponzi Scheme," (July 23, 2013). http://www.sec.gov/News/PressRelease/Detail/PressRelease/1370539730583.

[39] http://www.sec.gov/litigation/complaints/2013/comp-pr2013-132.pdf.

[40] Securities and Exchange Commission v. Shavers, 2013 WL4028182, No. 4:13-CV-416 (E.D. Tex. Aug. 6, 2013). This appears to be the first ruling addressing the question of whether digital currency issued without the backing of a government or other official entity is to be legally considered money.

[41] New York State, Department of Financial Services, "Notice of Inquiry on Virtual Currencies," August 12, 2013. http://www.dfs.ny.gov/about/press2013/memo1308121.pdf.

Applicability of Selected Laws to Digital Currency

Counterfeiting Criminal Statutes

The basic governmental interest in enacting laws against counterfeiting obligations of the United States is protecting the value of the dollar and the monetary system. Under title 18 U.S.C. §§470-477 and 485-489 counterfeiting and forging of U.S. coins, currency, and obligations is subject to criminal sanctions, and under 18 U.S.C. §§478-483, criminal sanctions are prescribed for counterfeiting foreign coins, currency, and obligations. None of these statutes, however, applies expressly to a currency that exists only on the Internet and in computers in a digital form. Although the usual prosecution under these statutes involves attempts to replicate Federal Reserve notes or coins produced by the U.S. Mint, at least one case involved a conviction for issuing and circulating Liberty Dollars, designed as similar to but distinguishable from U.S. dollars and intended to "limit reliance on, and to compete with, United States currency."[42] Whether a digital currency, even if it is designed to attack the value of U.S. legal tender, could be prosecuted under the current language of these statutes is not clear.[43]

The Stamp Payments Act of 1862, 18 U.S.C. §337

The Stamp Payments Act makes it a crime to issue, circulate, or pay out "any note, check, memorandum, token or other obligation, for a less sum than $1, intended to circulate as money or to be received or used in lieu of lawful money of the United States." This law was enacted in 1862 to protect postage stamps from competition by private tokens. Congress had approved stamps as currency for fractions of $1 because metal coins were being hoarded and were virtually out of circulation.[44] It does not seem likely that a currency[45] that has no physicality would be held to be covered by this statute even though it circulates on the internet on a worldwide basis and is used for some payments of less than $1. The language of the statute, "not, check, memorandum, token," seems to contemplate a concrete object rather than a computer file; moreover, a digital currency such as Bitcoin, without a third-party issuer, cannot be said to be an obligation. However, there are some arguments that could be made, particularly should a digital currency become pervasive enough to be considered a possible competitor to U.S. official currency.[46]

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[42] Derek A. Dion, "Defendant Convicted of Minting His Own Currency," Press Release, U.S. Attorney's Office, Western District of North Carolina (March 18, 2011). http://www.fbi.gov/charlotte/press-releases/2011/defendant-convicted-of-minting-his-own-currency.

[43] For a discussion, see, "I'll Gladly Trade You Two Bits on Tuesday for a Byte Today: Bitcoin, Regulating Fraud in the E-conomy of Hacker Cash," 2013 University of Illinois Journal of Law, Technology and Policy (Spring 2013).

[44] For further exposition of the genesis, legislative history, and analysis of the Stamp Payments Act, including the possibility that it may apply to electronic currency, *see* Thomas P. Vartanian, Robert H. Ledig, and Yolanda Demianczuk, "Echoes of the Past with Implications for the Future: The Stamp Payments Act of 1862 and Electronic Commerce", 67 BNA's Banking Report (September 23, 1996).

[45] Virtual currencies, such as Linden Dollars, are not likely to conflict with this statute because they do not appear to "circulate as money or be received in lieu of lawful money," within the meaning of the statute. They circulate only in a limited environment and are redeemable only in virtual goods, and, thus, are similar to the tokens and tickets redeemable in goods and services on a limited basis that courts have found not to have been issued in violation of the Stamp Payments Act. United States v. Monongahela Bridge Co., 26 F. Cas. 1292 (W.D. Pa. 1863) (No. 15796); United States v. Roussopulous, 95 F. 977 (D. Minn. 1899).

[46] See Vartanian, et al., supra, n. 8, and Reuben Grinberg, "Bitcoin: An Innovative Digital Currency, 5 Hastings

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The Electronic Fund Transfer Act, 15 U.S.C. §§1693 et seq.

The Electronic Fund Transfer Act (EFTA) establishes a framework for transfers of money electronically, but its coverage is limited in such a way that it appears not to be applicable to a digital currency in transactions involving no depository institution. EFTA specifically applies to transfers of funds initiated by electronic means from a consumer's account held at a financial institution. It covers transfers "initiated through an electronic terminal, telephonic instrument, or computer."[47] Its application is limited to deposit accounts "established primarily for personal, family, or household purposes,"[48] "held by a financial institution,"[49] with "financial institution" limited to banks, thrifts, savings associations, and credit unions.[50]

Federal Tax Law

Digital currencies have characteristics of traditional tax haven jurisdictions: earnings are not reported to the Internal Revenue Service (IRS) and users are provided some level of anonymity. Unlike traditional tax havens, however, digital currencies are able to operate without involving a financial institution.[51] The IRS provides limited guidance on the tax consequences of activities involving the virtual world. It cautions: "[i]n general, you can receive income in the form of money, property, or services. If you receive more income from the virtual world than you spend, you may be required to report the gain as taxable income. IRS guidance also applies when you spend more in a virtual world than you receive, you generally cannot claim a loss on an income tax return."[52] The guidance is limited and does not appear to target a digital currency such as Bitcoin that is used as a medium of exchange for goods and services in the real world. A Government Accountability Office (GAO) report earlier this year found inadequate IRS efforts to address tax implications of virtual currencies not used within a virtual economy.[53] As a step to counter misinformation circulating and the possibility for growth in such currencies, rather than recommending a costly rigorous compliance approach, GAO recommended that IRS "find relatively low-cost ways to provide information to taxpayers, such as the web statement IRS developed on virtual economies, on the basic tax reporting requirements for transactions using virtual currencies developed and used outside virtual economies."[54]

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Science & Technology Law Journal 159 (2012).

[47] 15 U.S.C. §1693a(6).

[48] 15 U.S.C. §1693a(2).

[49] 15 U.S.C. §1693a(2).

[50] 15 U.S.C. §1693a(11).

[51] For further information see, Marian, Omri, "Are Cryptocurrencies Super Tax Havens?," 112 Michigan Law Review First Impressions 38 (2013).

[52] Internal Revenue Service, "Tax Consequences of Virtual World Transactions," http://www.irs.gov/Businesses/Small-Businesses-&-Self-Employed/Tax-Consequences-of-Virtual-World-Transactions.

[53] U.S. Government Accountability Office, "Virtual Economies and Currencies: Additional IRS Guidance Could Reduce Tax Compliance Risk," (May 2013).

[54] U.S. Government Accountability Office, "Virtual Economies and Currencies: Additional IRS Guidance Could Reduce Tax Compliance Risk," 17 (May 2013).

Federal Anti-Money Laundering Laws

Under the criminal anti-money laundering laws,[55] engaging in financial transactions that involve proceeds of illegal or terrorist activities or that are designed to finance such activities is prohibited. Money laundering crimes generally involve transactions processed by financial institutions, which is why the Bank Secrecy Act (BSA) imposes various recordkeeping requirements on banks and other financial institutions.[56] Under the Currency and Foreign Transaction Reporting Act[57] component of the BSA, financial institutions must file reports of cash transactions exceeding amounts set by the Secretary of the Treasury in regulations, and file suspicious activity reports (SARs) for transactions meeting a certain monetary threshold or intended to evade reporting requirements. Financial institutions, as required by the Secretary of the Treasury, must also develop and follow anti-money laundering programs and customer identification programs. All of these requirements apply to "money services businesses" (MSBs), a category of financial institution which must register with the Department of the Treasury.[58] MSBs include a variety of businesses, including dealers in foreign exchange, check cashers, traveler's check issuers, providers of prepaid access cards, and money transmitters.[59] These entities must register with the Department of the Treasury and comply with BSA requirements. On March 18, 2013, FINCEN issued interpretative guidance[60] requiring Bitcoin exchanges—individuals and businesses that change Bitcoins into U.S. or foreign currency into Bitcoins—to register as money services businesses pursuant to the BSA.

Federal Securities Regulation

Securities regulation may focus on two different legal issues involving Bitcoins—investments purchased with Bitcoins and investing in Bitcoins.

Investments Purchased with Bitcoins

The United States District Court for the Eastern District of Texas held in August 2013 that it had subject matter jurisdiction over possible fraud in investments purchased with Bitcoins because of its determination that investments purchased with Bitcoins are securities.[61] The Securities and Exchange Commission (SEC) alleged that the defendant had violated provisions of the Securities Act of 1933[62] and the Securities Exchange Act of 1934[63] and had conducted a kind of Ponzi scheme. According to the facts stated by the SEC, the defendant, Trendon T. Shavers, who was the founder and operator of Bitcoin Savings and Trust (BTCST), had "made a number of

[55] 18 U.S.C. §§1956 and 1957.

[56] Titles I and II of P.L. 91-508, including 12 U.S.C. §§1829b, and 1951-1959; 31 U.S.C. §§5311 et seq.

[57] 31 U.S.C. §§5311 *et seq.*

[58] Bank Secrecy Act requirements for money services businesses are listed on the Financial Crimes Enforcement Network's website at http://www.fincen.gov/financial_institutions/msb/msbrequirements.html.

[59] 31 C.F.R. §1010.100(ff).

[60] U.S. Department of the Treasury, Financial Crimes Enforcement Network, "Application of FinCEN's Regulations to Persons Administering, Exchanging, or Using Virtual Currencies," (March 18, 2013), http://www.fincen.gov/statutes_regs/guidance/html/FIN-2013-G001.html.

[61] *Securities and Exchange Commission v. Shavers*, No. 4:13-CV-416 (E.D. Tex. Aug. 6, 2013).

[62] 15 U.S.C. §§77a *et seq*.

[63] 15 U.S.C. §§78a *et seq*.

solicitations aimed at enticing lenders to invest in Bitcoin-related investment opportunities." Shavers had advertised that he sold Bitcoins and that he would pay an investor up to 1% interest daily until the investor withdrew the funds or until BTCST could no longer be profitable. Investors lost a considerable amount of money, and the SEC brought suit. Shavers defended that the BTCST investments were not securities under federal securities laws because Bitcoins are not money and are not regulated by the United States. Shavers seemed also to argue that, because the investments were not securities, the court had no jurisdiction over a lawsuit alleging violations of the federal securities laws. The SEC argued that the BTCST investments were investment contracts, thus bringing them within the definition of "securities" and therefore subject to regulation by the SEC.

The court held that it did have jurisdiction over the case because of its determination that investments purchased with Bitcoins are securities. 15 U.S.C. section 77b defines a "security" in a very broad way as "any note, stock, treasury stock, security future, security-based swap, bond ... [or] investment contract." Cases such as SEC v. W.J. Howey & Co[64] and Long v. Schultz Cattle Co.[65] have set out a kind of template for an investment contract: An investment contract involves (1) an investment of money (2) in a common enterprise (3) with the expectation of profits from the efforts of a promoter or a third party. Thus, according to the court, it had to determine whether the BTCST investments were an investment of money. The court found that, because Bitcoins can be used to purchase goods or services and even used to pay for individual living expenses, they are a "currency or form of money" and that "investors wishing to invest in BTCST provided an investment of money." The court also found that there was a common enterprise because the investors were dependent upon Shavers's expertise in Bitcoin markets and that Shavers promised a significant return on their investments. Finally, the Eastern District of Texas found that the third prong of the investment contract template was met because the BTCST investors had an expectation of deriving profits from their investments. Because it found that the BTCST investments satisfied the investment contract definition, the court held that it had subject matter jurisdiction over possible fraud in investments purchased with Bitcoins.

Investing in Bitcoins

Investing in bitcoins may trigger regulation by the SEC. For example, it has been reported that Cameron and Tyler Winkelvoss are forming a public exchange-traded fund (ETF) for bitcoins and have filed paperwork with the SEC.[66] The ETF may be traded on a major exchange and open to retail investors. According to the SEC's website, an ETF is often registered as an open-end investment company or unit investment trust under the Investment Company Act of 1940. The regulatory requirements for ETFs include the following:

> As investment companies, ETFs are subject to the regulatory requirements of the federal securities laws as well as certain exemptions that are necessary for ETFs to operate under those laws. Together, the federal securities laws and the relevant exemptions apply requirements that are designed to protect investors from various risks and conflicts associated with investing in ETFs.

[64] 328 U.S. 293 (1946).

[65] 881 F.2d 129 (5th Cir. 1989).

[66] http://qz/99632/winkelvoss-bitcoin-etf-risk-factors.

> For example, ETFs, like mutual funds, are subject to statutory limitations on their use of leverage and transactions with affiliates. ETFs also are subject to specific reporting requirements and disclosure obligations relating to investment objectives, risks, expenses, and other information in their registration statements and periodic reports.
>
> In addition, ETFs are subject to oversight by boards of directors.[67]

Commodity Futures Trading Commission Regulation

The Commodity Futures Trading Commission (CFTC) has authority to regulate commodities futures and their markets and certain foreign exchange instruments. It is possible that CFTC could conclude that a digital currency such as Bitcoins falls within the Commodity Exchange Act's (CEA's) definition of "commodity," which includes a catch-all phrase—"and all other goods and articles."[68] There is also the possibility that the CFTC could include such a digital currency within its foreign exchange regulations because the CEA does not define "foreign currency" or "foreign exchange," although it covers and defines "foreign-exchange forwards" and "foreign-exchange swaps."[69]

International Legal Issues

Because digital currency knows no national boundaries, it may require an international solution and, thus, has drawn the attention of international regulators. Traditional payment systems which involve monetary systems are set up in statutes and regulations and overseen by central banks and transactions processed by banks and other authorized or chartered financial institutions. With virtual currencies, however, no laws and regulations define the duties and obligations of parties, provide for finality of settlement, resolution of disputes, or supervision of services provided. One recent study of digital currencies by the European Central Bank is premised on the possibility that growth of digital currencies will carry with it a need for international cooperation in developing a regulatory framework.[70] According to the report, the current level of virtual currencies poses little risk to price stability; there are, however, risks to users and a potential for criminal schemes.[71] According to the report, neither the European Monetary Directive nor the European Payment Services Directive clearly applies to virtual currencies such as Bitcoin.[72]

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[67] sec.gov/investor/alerts/etfs.pdf.

[68] 7 U.S.C. §1a(9). It reads:

The term "commodity" means wheat, cotton, rice, corn, oats, barley, rye, flaxseed, grain sorghums, mill feeds, butter, eggs, Solanum tuberosum (Irish potatoes), wool, wool tops, fats and oils (including lard, tallow, cottonseed oil, peanut oil, soybean oil, and all other fats and oils), cottonseed meal, cottonseed, peanuts, soybeans, soybean meal, livestock, livestock products, and frozen concentrated orange juice, and all other goods and articles, except onions (as provided by section 13–1 of this title) and motion picture box office receipts (or any index, measure, value, or data related to such receipts), and all services, rights, and interests (except motion picture box office receipts, or any index, measure, value or data related to such receipts) in which contracts for future delivery are presently or in the future dealt in.

[69] 7 U.S.C. §§1a(24) and (25).

[70] European Central Bank, "Virtual Currency Schemes," (October 2012). http://www.ecb.europa.eu/pub/pdf/other/virtualcurrencyschemes201210en.pdf. (Hereinafter, European Central Bank Report.)

[71] European Central Bank, "Virtual Currency Schemes," (October 2012). http://www.ecb.europa.eu/pub/pdf/other/virtualcurrencyschemes201210en.pdf. (Hereinafter, European Central Bank Report.)

[72] European Central Bank Report, at 43. The report notes noted that there are attempts in some of the countries (continued...)

Concern About International Monetary Fund Authority

One issue that has received some attention is the ability of the International Monetary Fund (IMF) to defend a traditional currency of one of its member countries from a speculative attack involving a digital currency such as Bitcoin since the IMF's Articles of Agreement do not explicitly permit it to acquire a currency not issued by one of its members. There is at least one commentary[73]examining possible options for amending or reinterpreting the IMF's authority.

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belonging to the European Union to develop a means of regulating such currencies. Apparently courts in France are looking into whether Bitcoin transactions are subject to electronic money regulations. See Finextra.http://www.finextra.com/news/fullstory.aspx?newsitemid=22921.

[73] Nicholas Plassarus, "Regulating Digital Currencies: Bringing Bitcoin within the Reach of the IMF," 14 Chicago Journal of International Law 377 (2013), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2248419.