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In this article, Connelly and Myers examine the federal income tax consequences of cryptocurrency hard forks and argue that a taxpayer who receives a new currency from a hard fork should not be taxed until he spends the new currency or converts it into U.S. dollars.

Imagine this: You own a cryptocurrency. Maybe it is Bitcoin. Maybe it is Ethereum. Maybe it is one of the thousands of other cryptocurrencies. One morning, a coalition of skilled software developers, aggressive business leaders, and innovative marketers announces its intent to "hard fork" your cryptocurrency's blockchain.

So, what is a hard fork? A hard fork, in the simplest terms, means that one currency becomes two currencies. The original currency continues as the old blockchain (explained later), which we can think of as Chain A. And the newly forked currency is a new blockchain that begins on the date of the hard fork. We can think of this as Chain B. The computer networks, and the protocols that govern communication between computers on the network, also split. The result is two disparate networks.

This article examines the federal income tax consequences of cryptocurrency hard forks.[1] We assume that the currency is decentralized and trustless, like Bitcoin, as opposed to a more centralized currency like Stellar or Ripple (again, explained later). And we argue that a taxpayer who receives a new currency from a hard fork should not be taxed until he spends the new currency or converts it into U.S. dollars.

I. What Do All These Words Mean?

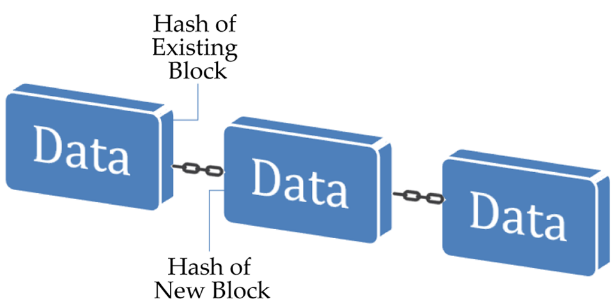
A. What Is Blockchain?

Blockchain is the technology that makes cryptocurrency, as well as other types of digital asset transfers, possible. A public blockchain allows two parties to conduct transactions securely and permanently without a central, trusted authority. Imagine a chain of blocks. Inside each block are hundreds or even thousands of transactions. For example, Sally recently paid John 100 coin in a transaction. A moment later, Steve paid Suzy 600 coin in another transaction. Each of these individual transactions is broadcast to all the computers on the network. Each computer (that is, node) on the network collects these transactions and stores them in a temporary holding block called a mempool. From the mempool, transactions are consolidated into a

[1] Soft forks and software forks are beyond the scope of this article.

new, larger block. The only way that this new block can be attached to the existing chain of blocks (that is, the blockchain) is if enough nodes (that is, computers) on the blockchain network validate that (1) the uniquely generated "hash" (that is, special code) that identifies the new block matches up with (2) the uniquely generated hash of the last block on the chain.

Figure 1



There are different schemes to generate these unique hashes for a new block. One scheme is called "proof of work."[2] In a proof-of-work-based network, like Bitcoin, a globally distributed set of specialized hardware competes to generate the new block in the chain. The hardware does this by solving a computationally intensive math problem; in fact, the problem is so intensive that it can only be solved by guessing and checking. This process of solving the math problem is called "mining," and the specialized hardware (plus the hardware's owner) is called a miner.

Eventually, one of the miners gets lucky and solves the math problem. The computer node associated with the miner then takes all of the pending network transactions from its mempool. All those pending transactions are consolidated into a new block, and the new block of transactions is added to the existing blockchain.

From there, the new chain is broadcast to the rest of the network, and the rest of the network validates the new chain. If the new block hash matches up correctly, and all the transactions are valid, the rest of the network will add this new block to their own copy of the chain. Then, the whole network will begin to solve for the next block of transactions.

If at any point a single transaction inside the new block changes, the entire hash of that block changes and the block is invalid. All the nodes on the network have a copy of the hash for the last block in the chain as well as the hash for the new block. The network will not add the new block to the chain if it has been corrupted. This is why people say that blockchain, as traditionally conceived, is so secure. If someone tampers with a single transaction inside a block, the network will reject that tainted block. That makes fraudulent transactions very unlikely to occur.

B. What Is a Trustless Network?

People often talk about centralized versus decentralized or "trustless" networks. The now famous 2008 Satoshi Nakamoto white paper[3] envisioned a decentralized cryptocurrency. Bitcoin, the cryptocurrency that spawned from that white paper, remains decentralized and trustless. There is no single management team, foundation, or individual that defines the rules of the road. Instead, there are myriad stakeholders. Hardware manufacturers produce specialized cryptocurrency mining equipment. Cryptocurrency miners buy the hardware, install the software, and get to work validating transactions and blocks (that is, hashing). There are also software developers who maintain, update, and sometimes change the software that the miners run. Finally, there are end-users who can choose to run software without mining and who act as validators enforcing the protocol rules. Voting schemes allow all the stakeholders to agree to or reject new proposals.

The IRS acknowledges the distinction between centralized and decentralized currency. In the section titled "Locating Taxpayers and Their Assets," the Internal Revenue Manual says that centralized currency "is regulated by a centralized repository (similar to a bank) with a central administrator. The administrator issues the currency, establishes the rules, maintains the

[2] There are other consensus schemes besides proof of work, but for purposes of this article, we will only discuss this scheme.

[3] Satoshi Nakamoto, "Bitcoin: A Peer-to-Peer Electronic Cash System," Bitcoin.org (Oct. 31, 2008).

Figure 2

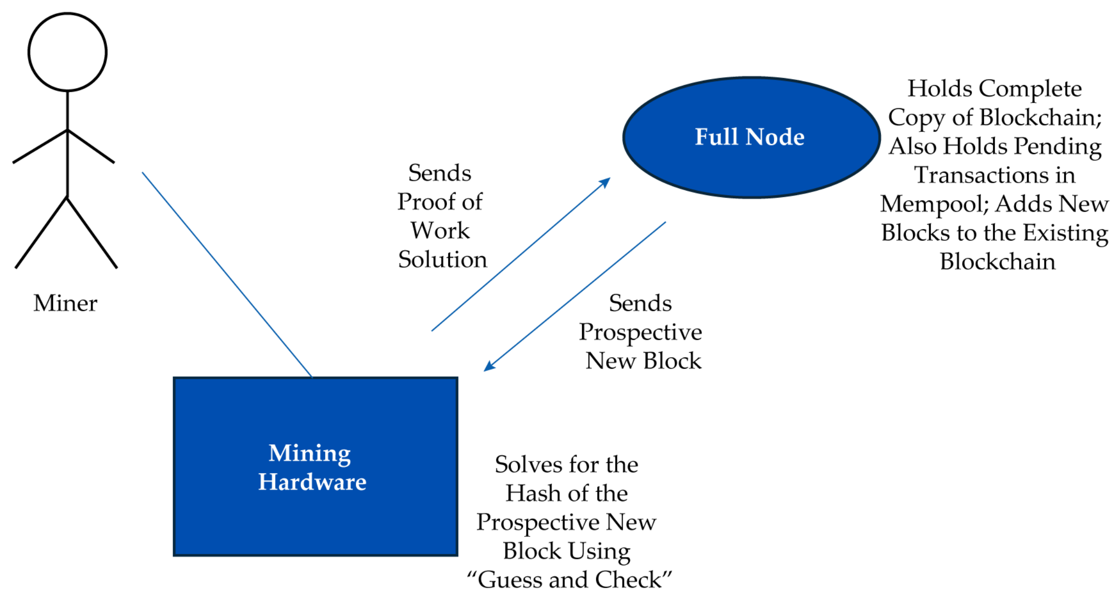
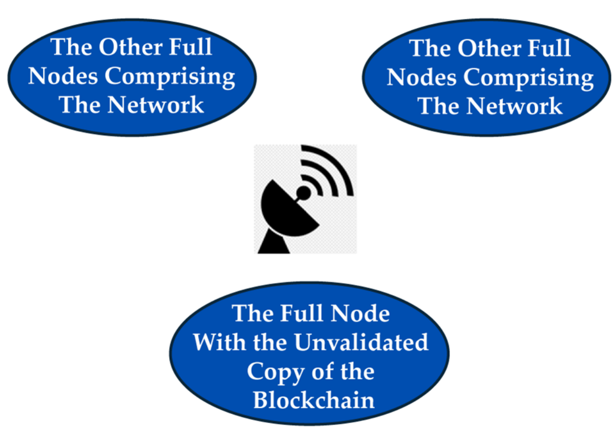


Figure 3



central ledger, and redeems the currency."[4] In contrast, decentralized currency:

> is unregulated and lacks a centralized repository and administrator. Decentralized virtual currency is exchanged from one person to another without an administrator's oversight; these transactions are referred to as peer-to-peer (P2P). Decentralized transactions rely on users to solve algorithms, also known as hashing, to verify the validity of the transactions. The hashed blocks are recorded in a distributed ledger using blockchain technology.[5]

Decentralization matters in the context of hard forks because it means that no single individual or executive decides to hard-fork a currency; instead, a hard fork results from stakeholder consensus and is usually preceded by years of heated community debate.

C. What Is a Hard Fork, Technically?

A hard fork means the blockchain will split. The split happens because a portion of the underlying hardware and software is updated and now operates a slightly different, backwards-incompatible version of the "protocol." The protocol is the set of rules that govern the network communication behind the currency. Often, the teams driving this protocol change have a different vision for scaling and marketing the currency. Perhaps they are unhappy with the progress that is being made on the original project. After years of disagreement, the protocol

[4] IRM section 5.1.18.20.1.

[5] *Id.*

change generally means that the size of a "block" (that is, the container that stores the various currency transactions) changes. For example, the block size might change from 1 megabyte to 8 megabytes, as it did during the Bitcoin XT hard fork in late 2014 or the Bitcoin Cash hard fork in 2017. A protocol change may also increase the time required to solve a block. After a hard fork, it becomes technologically impossible to attach blocks that run under the old protocol to anything but the old chain because the new chain only accepts blocks with the new protocol. Owners of the old currency generally, but not always, receive a pro rata amount of the new currency.

D. What Is an Airdrop?

Airdrop and hard fork are sometimes used interchangeably, but they are independent concepts. If a cryptocurrency hard-forks, the newly forked cryptocurrency might be airdropped into the owner's account or wallet. But airdrops can also be arbitrary. For example, last year, a coin called KickToken was airdropped into Ethereum accounts according to a "magic algorithm." The press release is so remarkable that we reproduce part of it here:

> KickEX will transfer 888,888 [frozen] Kick Tokens to each of 167,375 crypto users in the next month starting from 26 November 2019.
>
> The terms and conditions of the tokens "unfreezing" process are very simple and fair and will be announced after the official launch of KickEX exchange soon. The Frozen Drop will be distributed among 167,375 users of the crypto industry according to our magic algorithm, so there is a possibility that you will be the lucky recipient of some of 888,888 KickTokens. Watch closely what is going to happen. The magic is underway.
>
> We cannot disclose how the algorithm works, but we can say that it takes into account many factors, such as the active use of your Ethereum wallet, whether you have moved funds in or out in the last 30 days and the number of popular tokens on your balance. There are a lot more factors that will determine whether you receive your KickTokens or not.[6]

It is important to note that while a currency hard fork can generate an airdrop into your account, currency can also be airdropped into your account arbitrarily, as in the case of a newly created token like KickToken. This is important because there is a real policy question about whether randomly received tokens like KickToken should be taxable.

E. How Is Cryptocurrency Held and Owned?

Cryptocurrency is stored in a publicly available open ledger that is secured by strong encryption. For public blockchains, read access is available to everyone. All transactions are published on a shared global ledger that is viewable to anyone with an internet connection who can connect to the network. Write access is available only to users who possess private keys, or a complex, special string of characters that unlocks the ledger. Paired with special software or a wallet, this secret information allows the end-user to perform transactions on a specific, publicly viewable account. To receive cryptocurrency, you use your private key to create a public address while keeping the key secret, and the sender sends cryptocurrency to that public address. To spend cryptocurrency, you create and sign a transaction with the public address using your private key. The signed transaction is then broadcast to the entire network to be verified and placed in the next created transaction block. Once added, the coin locked in the blockchain can only be moved with the original signing private key. Using a private key ledger wallet is like storing paper stock certificates in a private safe deposit box. The one who possesses the private key is the only one in the world physically able to move the coin. There is no personal or company identity tied to this address. In contrast, cryptocurrency also can be custodied with an exchange. This does not require specialized software or cybersecurity knowledge.

[6] Kick Ecosystem, "888,888 KickTokens Frozen Drop to Each of 167,375 Crypto Users Is Coming" (Nov. 26, 2019).

II. How Does the IRS Tax Hard Forks?

In October 2019 the IRS issued Rev. Rul. 2019-24, 2019-44 IRB 1004, on the taxation of cryptocurrency hard forks (the hard fork ruling). The hard fork ruling provides that if a currency hard-forks and the owner does not receive units of the new currency, he does not have gross income under section 61.[7] But if the owner does receive units of the new cryptocurrency, he has gross income under section 61. In other words, there is income tax on the FMV of the new currency on the day the airdrop is recorded on the distributed ledger. FMV is measured in U.S. dollars, and the tax rate is the ordinary income tax rate. The owner receives tax basis in the new currency that can offset any gain on a future sale of the new currency, and basis in the new currency is the amount of taxable income that was recognized.[8]

III. What Is Section 61 Really About?

Section 61 is the constitutional gateway into the federal income tax. That income tax is levied on "gross income," and section 61 defines gross income as "all income from whatever source derived." This definition, not coincidentally, mirrors the U.S. Constitution. The 16th Amendment was ratified by the states in 1913 and gave Congress the power to "lay and collect taxes on incomes, from whatever source derived." In other words, if something is gross income under section 61, then it is constitutional for the government to tax it. If something is not gross income under section 61, it is likely unconstitutional for the government to tax it. Not surprisingly, when Congress enacted section 61, it deliberately adopted a broad definition of gross income — one that reflects the full scope of its constitutional power to tax.[9]

[7] *Id*.

[8] For more discussion, see Nelson C. Yates, "Stock or Livestock? Hard Fork Basis Allocation," *Tax Notes*, Jan. 7, 2019, p. 61.

[9] The Supreme Court concurs. In 1955 it discussed the definition of gross income in the tax code and said, "This Court has frequently stated that this language was used by Congress to exert in this field 'the full measure of its taxing power.' . . . Congress applied no limitations as to the source of taxable receipts, nor restrictive labels as to their nature. And the Court has given a liberal construction to this broad phraseology in recognition of the intention of Congress to tax all gains except those specifically exempted." *Commissioner v. Glenshaw Glass Co.*, 348 U.S. 426 (1955).

IV. Entering the Tax Net — But When?

Should new currency received in a hard fork be gross income under section 61? Yes. No one is arguing that cryptocurrency should be outside the U.S. tax net, or that it is beyond the constitutional power of Congress to tax it.

The more interesting question is: When does cryptocurrency enter the U.S. tax net? Is cryptocurrency income on receipt because it has independent value? Or should cryptocurrency be taxed only when it is converted to U.S. dollars or spent? The IRS's hard fork ruling seems to take the first view — that cryptocurrency has independent value — because it calls for immediate taxation. But the better view is that cryptocurrency should be taxed only when it is converted or spent. That is because cryptocurrencies, especially newly hard-forked currencies, generally are less liquid than U.S. dollars.

V. Why Is Crypto Taxed on Receipt?

The IRS seems to believe that cryptocurrency is taxable on receipt because it appears to treat hard forks like pennies from heaven. In section 61 parlance, pennies from heaven are "treasure trove."[10] The section 61 regulations say that "treasure trove, to the extent of its value in United States currency, constitutes gross income for the taxable year in which it is reduced to undisputed possession."[11] This generally means that a taxpayer pays tax at his ordinary federal income tax rate on the FMV of the thing received, as measured in U.S. dollars. For example, if someone opens a new checking account and the bank gives him a $50 signing bonus, he pays ordinary federal income tax on that bonus (for example, $17.50, assuming a 35 percent marginal tax rate). Or take the famous case of the taxpayer who found $4,467 hidden in a piano that he had purchased at auction for $15 seven years earlier.[12] The court found that the $4,467 was taxable ordinary income. Pennies from heaven can also be received in kind. When Oprah Winfrey gave away 276 new Pontiac sedans in 2004, each lucky audience

[10] Reg. section 1.61-14(a).

[11] *Id*.

[12] *Cesarini v. United States*, 428 F.2d 812 (6th Cir. 1970), *aff'g* 296 F. Supp. 3 (N.D. Ohio 1969).

member who accepted the car also had a federal tax bill on the FMV of the car.

VI. Why Is Treasure Trove Awkward?

For taxpayers, the rules on treasure trove have long felt a bit uncomfortable for three reasons: (1) surprise, (2) control, and (3) liquidity. Imagine how Oprah's audience members felt when they realized they had a surprise $7,000 tax bill. Many sold their cars just to get the liquidity to pay the tax. While it's great to receive surprise cash or a new car, it is also true that there is no control over the amount or timing of the associated tax bill. It all comes as a complete surprise.

VII. Other Ways to Tax Hard Forks?

The IRS's seminal guidance on cryptocurrency (Notice 2014-21, 2014-16 IRB 938) says, "For federal tax purposes, virtual currency is treated as property. General tax principles applicable to property transactions apply to transactions using virtual currency."[13] The notice also says that a taxpayer generally realizes capital gain or loss on the sale or exchange of virtual currency, unless the taxpayer holds the currency as inventory or property for sale in a trade or business. And it clarifies that virtual currency is not treated as currency that could generate foreign currency gain or loss for U.S. federal tax purposes.

If cryptocurrency is property that is generally capital in nature, it makes sense to look at how other distributions of property from capital assets are taxed. Publicly traded stock comes to mind. Stock splits and stock dividends, like cryptocurrency hard forks, are situations in which existing owners receive additional property or cash. Granted, new currency from a hard fork is a new asset, not more of something that the owner already owns. Thus, a hard fork is not perfectly analogous to a stock split or a stock dividend, in which shareholders receive more of something that they already own.[14] Nevertheless, the parallels are worth exploring.

A. How Are Stock Splits Taxed?

Section 305(a) says, "Except as otherwise provided in this section, gross income does not include the amount of any distribution of the stock of a corporation made by such corporation to its shareholders with respect to its stock." A shareholder does not recognize taxable income when he receives new shares of stock. Instead, the shareholder's original tax basis and holding period attach to all shares of stock pro rata.

For example, assume a shareholder has owned 100 shares of XYZ publicly traded stock for five years. His cost basis in the stock is $10 per share or $1,000 in the aggregate. Assume further that the stock splits and the shareholder receives an additional 100 shares of XYZ stock. He now owns 200 shares total. If the shareholder later sells his 200 shares of XYZ stock for $3,500, he typically will have a long-term capital gain of $2,500 (that is, the difference between his $1,000 aggregate cost basis and his sale proceeds). Cryptocurrency received in a hard fork could be treated similarly; cost basis could be spread among all coins, and tax could be deferred until the cryptocurrency is sold.[15]

B. How Are Stock Dividends Taxed?

Under section 305(b), stock dividends generally are not included in gross income and are not taxable unless one of five exceptions applies. Those exceptions are: (1) any shareholder can elect to take stock in lieu of what would otherwise be a cash distribution; (2) the stock distribution is disproportionate, meaning that some shareholders get property and other shareholders end up with a larger share of the assets or earnings of the company; (3) some shareholders get preferred stock while others get common stock; (4) the stock distribution is on preferred stock; or (5) the distribution is of convertible preferred stock.[16] None of these exceptions would apply to a cryptocurrency hard fork, unless perhaps some owners receive the new currency while others do not. Thus, there is an argument that, like in a stock dividend, tax should

[13] Notice 2014-21, Question 1.

[14] Cryptocurrency hard forks could also be likened to cash dividends, rather than stock dividends. But the analogy to cash is difficult because the newly forked currency is less liquid than cash and because the IRS takes the position that cryptocurrency is property.

[15] American Bar Association Section of Taxation comment letter on tax treatment of hard forks (Mar. 19, 2018).

[16] Section 305(b).

be deferred until the owner of the newly hard-forked currency converts the currency to U.S. dollars.

C. Is Foreign Currency Taxed?

Although Notice 2014-21 provides that cryptocurrency is not foreign currency under sections 985 to 989, it is important to note the realization requirement in these provisions, too. Foreign currency held for personal use is a capital asset,[17] and an individual taxpayer does not recognize capital gain or loss when he converts U.S. dollars to foreign currency in a personal, nonbusiness transaction. Instead, tax is deferred until the individual either (1) buys something with the foreign currency and realizes gain greater than $200 or (2) converts the foreign currency back to U.S. dollars and realizes gain greater than $200.[18] Thus, tax on the capital asset is deferred until realization. Certainly, the rule could be that a taxpayer recognizes gain the day he converts U.S. dollars to euros for a European vacation. But it is not. Here, the code delays tax until the taxpayer commercially transacts or reenters the U.S. currency net. Similarly, tax on cryptocurrency received in a hard fork could be delayed until there is a realization event.

VIII. Delaying Tax Until Realization?

In the hard fork ruling, the IRS essentially determined that cryptocurrency received in a hard fork is like Oprah's Pontiac. Or, more aptly, new cryptocurrency in a hard fork is as though a stranger set gold bars on your doorstep. This interpretation misses so much of what goes on behind the scenes in cryptocurrency. A hard fork is like guerilla warfare. Consequently, the newly created currency from a hard fork is often illiquid, valueless, or both.[19] Since August 1, 2017, there have been more than 40 hard forks of the Bitcoin blockchain. Only four of those forks (Bitcoin Cash, Bitcoin Diamond, Bitcoin Gold, and Bitcoin Private) have trading volume of more than $100,000 per 24 hours. The hard fork ruling does account for illiquidity, and situation 2 of that guidance implies that the ability to immediately dispose of the new cryptocurrency is a prerequisite to the recognition of gross income. Also, gross income equals FMV, so receipt of a new currency with zero value will not generate a tax bill. Nevertheless, it seems draconian to recognize ordinary income from a hard fork.

The most likely outcome of the ordinary income treatment in the ruling is simply a mismatch in the character of income. This plays out as follows: Cryptocurrency owner owns $100 of coin. The coin hard-forks, and the owner now owns $100 of old coin and $25 of new coin. (We assume, somewhat generously, that there is an exchange that recognizes the newly forked coin and reports a FMV in U.S. dollars on the day of the hard fork.) Two months later, the new cryptocurrency goes the way of the other hard forks that have failed because there are not enough nodes to support it. The unsuspecting taxpayer is lucky and sells his newly forked coins for $1. He has $25 of ordinary income and a $24 capital loss, which is an unnecessary mismatch.

IX. Conclusion

The question of how to tax newly created cryptocurrency is confusing because we are forced to grapple with the heart of what cryptocurrency is. Cryptocurrency is novel. And it is not going away. But what is it? Is cryptocurrency digital gold or "commodity money"? Is cryptocurrency an IOU from a central authority or "fiat money"? Does it fall somewhere in the middle?[20] We do not purport to have the answers. But if cryptocurrency is in fact a commodity like gold, then many newly forked cryptocurrencies could be likened to cheap alloys.

The IRS has said that a newly forked coin is like finding cash in a piano, winning a car, or having gold bars dropped on your doorstep. If that is true, then certainly new currency received in a hard fork should be taxed as ordinary income on receipt. But because newly forked currency generally is illiquid and has uncertain value, it makes sense to delay tax until realization, the way the code treats stock dividends and stock splits. In

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[17] Rev. Rul. 74-7, 1974-1 C.B. 198.

[18] Section 988(e)(2).

[19] Although the open transaction doctrine is interpreted narrowly, it's unclear whether it might apply to cryptocurrency hard forks. *See Burnet v. Logan*, 51 S. Ct. 550 (1931); *cf.* Rev. Rul. 58-402, 1958-2 C.B. 15.

[20] *See* George Selgin, "Synthetic Commodity Money" (Apr. 10, 2013).

short, if cryptocurrency is something less than digital gold, perhaps new currency received in a hard fork should be taxed only when the recipient turns it into U.S. dollars. ■