Virtual Currency, Real Tax: Taxation and Valuation Issues Related to Emerging Digital Payment Systems

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This discussion summarizes how the future of digital payment systems is being realized today and how this progress affects both financial accounting and income tax accounting. First, this discussion defines and explores concepts such as digital payment systems and virtual currencies. Second, this discussion examines the implications of the emerging digital payment systems from both a taxation and a valuation perspective.

INTRODUCTION

The Onion posted a satirical story not long ago with the headline: "U.S. Economy Grinds to a Halt as Nation Realizes Money Just a Symbolic, Mutually Shared Illusion." That article humorously described dumbstruck citizens reacting to then Federal Reserve Chairman Ben Bernanke's remarks that modern money is just a meaningless and intangible social construct.[1]

Money is an illusion of sorts, but it works because we trust it. Our laws and governmental backstops have conditioned us to accept the notion of the U.S. currency with confidence. We even trust the U.S. currency when it's just a number in a computer somewhere.

We became reliant on symbolic, "digitized" currency a long time ago with the advent of electronic funds transfers and credit cards. Nonetheless, it is fashionable to speak of the "digital economy" as a recent phenomenon.

This "digital economy" assumes that typing in a credit card number to purchase shoes online from Zappos is fundamentally different than presenting the credit card to a clerk in a brick-and-mortar store.

But payment systems really haven't changed much in decades. Credit cards, debit cards, gift cards, and the like, are all just account numbers embodied in plastic. Payment transactions have remained more or less the same—until now.

The emergence of new payment technologies such as Apple Pay and Bitcoin signals a transformation taking place in payment processing that raises a number of taxation and valuation issues.

DIGITAL PAYMENT SYSTEMS

A digital payment system can be defined simply as a system by which money is transferred from one account to another electronically, such as payments for goods and services.

It may be instructive to examine how the credit card payment system works before venturing further into a discussion of emerging digital payment systems.

The conventional credit card payment system typically involves four parties:

1. The merchant offering goods and services
2. The card issuer administering a credit or debit account
3. The merchant acquiror recruiting merchants
4. The service provider, such as VISA or MasterCard, relaying transaction information to the proper card issuer for processing[2]

When a consumer makes a purchase, two major processes occur:

1. The credit card transaction is authorized
2. The transaction is then cleared

In authorizing a transaction, a point-of-sale terminal or computer sends the merchant's identification number, the card information (including a primary account number), and the purchase amount to the service provider. The service provider then requests an authorization for the transaction from the card issuer. The merchant acquiror receives the response and relays it to the merchant.

Once the transaction is authorized, it is cleared. The merchant sends transaction information to the acquiror. The information is passed along through a clearinghouse to process transactions between participating depository institutions. Through this clearinghouse, the merchant's account is credited with the amount of the transaction less a transaction fee amounting to about 2 to 5 percent of the purchase amount.

The selection of which credit card to use for a transaction is made by the consumer. This selection may entail physically reaching into a wallet and pulling out a plastic card.

Modern payment systems have translated this paradigm to digital form. PayPal was one of the first such digital payment systems to implement the wallet approach. It allowed a participant to create a PayPal account—effectively, a digital wallet—through the PayPal website.

The PayPal account held account numbers and other information for one or more credit cards and banks associated with the participant. Using this digital wallet, participants could access credit or funds from any of the accounts to send it to others or pay for goods and services.

Google Wallet extended the digital wallet idea to the smartphone, making payments from a digital wallet more accessible and convenient. Using an app, the smartphone owner would select which credit card to use from the wallet and hold the smartphone near an appropriate contactless reader device at a merchant location.

However, few card issuers enrolled in the system, which severely limited its adoption with consumers. One of the concerns with Google Wallet was that it stored the participant's credit card information in the smartphone, making it vulnerable to theft.

Apple Pay aims to overcome the deficiencies that have hobbled Google's payment system. While it also employs the participant's smartphone, it does not store the participant's sensitive credit card information in the smartphone itself.

It relies instead on the use of "tokens" to represent each credit card account number and expiry date—or any other account information—held in the digital wallet. These tokens are passed to the merchant in lieu of sensitive credit card information. Ultimately, the tokens are used by the issuer to access the appropriate credit card account.

The transaction is otherwise processed in the conventional manner. The token itself is a randomly generated number that is meaningless to a smartphone thief and cannot be used apart from the smartphone to perform transactions. Due in part to this and other security improvements, such as fingerprint authentication, Apple Pay has been widely embraced by merchants and card issuers.

Until now, digital payment systems have focused on extending the utility of conventional payment methods like credit cards. But certain features of Apple Pay hint at a future that incorporates the use of unconventional forms of money as well. For example, one of Apple's recent patent applications discloses a digital wallet that uses "vouchers, coupons, or mobile credits" to pay for goods and services in addition to conventional credit cards and debit cards.[3]

These additional forms of digital money are known as virtual currency, which we will explore shortly.

Castronova (2014) labels this emerging approach a "digital value transfer system (DVT)."[4] What is most interesting about the DVT concept is consideration of the wallet as more than a mere container of different virtual currencies.

The wallet also facilitates the exchange of these virtual currencies into a transactional real-world value, including combining the use of multiple virtual currencies to achieve the required purchase amount. When a consumer buys something, the wallet acts to transfer purchasing power from him or her to the seller using one, some, or all of the available virtual currencies.

Using the example of purchasing a car, Castronova explains:

> Much of this is invisible to the buyer and seller. The seller states a price in terms of one currency. The buyer indicates a desire to buy. The DVT figures out a package of value equivalent to the stated price and transfers it to the seller. It may require nothing more than a single tap on the buyer's smartphone to send the value to the seller. The buyer does not need to know that the he bought the [car] using a combination of dollars, yen, US Airways frequent flyer miles, VISA Reward Points, and Indiana University Basketball Seating Priority Points. Neither does the seller. The DVT makes sure that the combined portfolio of monies adds up, at current exchange rates, to the stated price of the car.[5]

This use of virtual currencies for a transaction, as discussed below, can have taxation consequences. But before this discussion continues, it may be helpful to better define the concept of virtual currency.

WHAT IS VIRTUAL CURRENCY?

According to the U.S. Department of Treasury, virtual currency is a medium of exchange that operates like a currency in some environments, but does not have all the attributes of real currency.[6] Notably lacking is its status as legal tender. In the United States, the National Banking Acts of 1863 and 1864 restricted legal tender to U.S. Notes, Federal Reserve Notes, and coins minted by the U.S. Mint.[7]

Nevertheless, virtual currency can act as a substitute for real currency and can be exchanged for real currency. This latter characteristic is important to our later discussion on tax implications.

Many virtual currencies have been created and more are invented as time passes. The concept is not new. There are many things that can act as a substitute for real currency. The earliest instance of a virtual currency in the United States may be attributed to the Coca-Cola Company, which issued the first-ever coupon in 1887.

What's new for virtual currencies is that, in the computer age, they've taken on digital form—essentially an account number stored on some form of computer-readable media. Hence, the Internal Revenue Service, echoing other governmental authorities, describes virtual currency as "a digital representation of value."[8]

Many commentators distinguish between digital currency and virtual currency, giving the latter a more narrow focus. By this understanding, digital currency is a digital representation of value that encompasses virtual currency, but it is not limited to virtual currency.

Digital currency includes credit cards, store credit, gift cards, and similar noncash means of payment that are denominated in widely accepted monetary units, like U.S. dollars and British pounds, and readily usable as a cash substitute.[9]

But virtual currency generally requires a further step of conversion to be expressed in U.S. dollars or similarly acceptable monetary units. Examples of virtual currency include credit card reward points, airline frequent flyer miles, and barter club trading points.

More recent forms of virtual currency include Amazon Coins, Linden Dollars, and Bitcoin. For the purpose of this article, the term "virtual currency" is intended generally to refer to this narrower meaning.

Digital currencies, including virtual currencies, can be categorized as either centralized or decentralized. The distinction is important, as we shall see. Most are centralized.

A centralized digital currency is administered by a central authority, which in the context of e-commerce is often a merchant or virtual world administrator. It is often intended to facilitate transactions within a particular domain, and the authority governing that domain governs the use of the virtual currency.

For example, Linden Labs, the creator and administrator of Second Life (SL), issues Linden Dollars as the official currency for the virtual world. SL is an online role-playing environment where users interact with one another using visual representations of themselves called avatars.

Despite the virtual world's video game appearance, SL mimics the real world in many respects. Its 10 million residents have used digital object construction tools provided by SL to build cities full of homes, shops, movies theaters, and night clubs as well as parks, countryside vistas, and waterfalls.

Shops sell home décor and clothing with which to personalize the virtual world experience. These sales reflect in-world transactions facilitated by the exchange of Linden Dollars.

As another example, the Delta Airlines frequent flyer miles are redeemable for a flight on that particular airline. And Amazon Coins are intended only to purchase apps from Amazon.

On the other hand, many credit cards and gift cards, such as those provided through VISA, are not

specific to any particular domain or merchant—they are designed for ubiquitous use and convenience. As discussed, modern extensions of the credit card system include PayPal and Apple Pay, which facilitate credit card payments using personal computers and smart phones without the need for carrying a traditional plastic credit card.

Given the advantages, why not always use a credit-card-based system? The short answer is that credit card payments generally require the use of third-party payment processors like VISA, which increases the complexity of the transaction and its processing costs. Merchants will pay a transaction fee to the payment processor, which either diminishes the merchant's profit or increases the price to the consumer.

Further, many transactions are poor candidates for credit card transactions for one or more of the following reasons:

■ Size: The transaction is too small to justify the credit card processing fees, particularly payments less than one U.S. dollar (also known as micropayments).

■ Value: The transaction involves the exchange of virtual items that are difficult to value in terms of legal tender.

■ Taxation: Transactions with a readily ascertainable real-world fair market value are more susceptible to taxation (this issue is discussed in more detail later).

■ Administration: Processing many small transactions through third-party payment processors can result in significant administrative overhead.

■ Anonymity: One or more parties does not want to reveal his or her identity.

In contrast to a centralized digital or virtual currency, a decentralized currency is one that requires no central repository or single administrator to process transactions.[10]

Notably, it allows payments to be sent from one party to another party without going through any financial institution. Decentralized currencies tend to be virtual currencies.

Bitcoin and Ripple are the leading contenders. Other decentralized virtual currencies include Litecoin, Dogecoin, and Peercoin, which generally build on the constructs invented for Bitcoin. Like Bitcoin, these other virtual currencies are convertible to U.S. dollars through exchanges.

But Bitcoin is the only virtual currency to date to gain acceptance from major retailers and billion dollar businesses, which may provide a clue as to

its endurance. At present, Overstock.com, Target, Microsoft, Amazon, eBay, Expedia, Whole Foods, and Zappos, among others, accept Bitcoin as payment for merchandise.

Because of its oversize influence on emerging digital payment systems, let's examine Bitcoin in a little more detail.

BITCOIN

Bitcoin is both a virtual currency and a digital payment system. It relies on peer-to-peer (P2P) networking and complex cryptographic software protocols to generate a virtual currency by the same name, and to validate transactions based on that currency.[11]

It was introduced in 2008 to little fanfare outside of a select group of computer enthusiasts. The virtual currency initially grew in popularity among traders of illicit goods once they realized its utility for providing secure and anonymous transactions. As its other advantages became recognized and exploited as well, namely low-cost processing, Bitcoin entered the mainstream.

After tolling in relative obscurity for several years at less than a penny on the dollar, the iconic digital coin made headlines in late 2013 when its exchange rate topped $1,200 per Bitcoin.

Some commentators heralded the emergence of Bitcoin as the latest wave of the disruptive information technology revolution that has upended tired and outdated business models repeatedly over the past few decades. Bill Gates called Bitcoin "a technological tour de force."[12]

Other commentators took a more skeptical view in the wake of a number of Bitcoin-related scandals that occurred during 2014, likening the whole affair to a modern version of the tulip mania of the 1630s in which foolish investors bid up Dutch tulip prices to ridiculous heights only to suffer ruin when prices eventually collapsed—a reference popularized by Charles MacKay's book on financial manias titled *Extraordinary Popular Delusions and the Madness of Crowds*.

Whether Bitcoin will survive or thrive as a virtual currency is unknown. But the technology upon which it is based represents the introduction of a key innovation that is expected to have a far-ranging impact on commerce irrespective of the success or failure of the virtual currency itself: an open ledger system for recording and validating transactions. Because it is distributed, publicly available, and verifiable, no central intermediary is required to record and validate transactions.

Bitcoin employs the open ledger to record payments of the virtual currency. The open ledger

technology can be modified to handle other kinds of transactions, too, such as contracts between people or transfers of other kinds of property. A number of companies are already pursuing this, which makes the technology a game-changer irrespective of Bitcoin itself.

The open ledger contains a sequential record of all transactions and current ownership. It reflects a chain, or sequence, of blocks; each block representing one or more new transactions. For this reason, it is commonly referred to as the "block chain."

The block chain is maintained by computers distributed all over the world by an activity called mining, wherein computer owners contribute their computing resources to track and validate transactions in exchange for a fee (typically in Bitcoins).

The block chain allows participants to check whether transactions are legitimate, that is, whether the transferor of a Bitcoin is authentic and the Bitcoin hasn't already been spent. The block chain is communicated directly among participating computers using P2P networking—an older concept first popularized in 1999 when Napster introduced P2P music file sharing.

Validation of a transaction relies on cryptography, and for this reason Bitcoin and similar virtual currencies are often called "cryptocurrencies." The basic premise of cryptography is that certain mathematical problems are too complex to be solved in a reasonable amount of time by the computing resources available to a potential attacker.

Bitcoin employs cryptographic hash functions designed by the U.S. National Security Agency to ensure the integrity of transactions. A hash function serves as a kind of fingerprint to uniquely identify a transaction and prevent its fraudulent alteration.

All the data associated with a transaction is used to generate a unique hash number. If a single character of data is changed in the original transaction, the hash function will not generate the same hash number—that is, its fingerprint will be different.

Because the possible range of hash numbers that can result from the hash function approaches an astronomical number, it's practically impossible for different transactions to have the same hash number. So the hash numbers employed by Bitcoin generally are considered unique and secure. They are the modern equivalent of wax seals placed on important documents—if they're tampered with, everyone would know.

Bitcoin also employs a cryptographic mechanism called a digital signature to validate the identity of a Bitcoin owner. It involves the use of a digital public/private key pair: a private key (a secret number known only to the holder) and a corresponding public key (provided to others) that is mathematically married to the private key.

A Bitcoin owner possesses the private key with which it "signs" a transaction to transfer a Bitcoin, thereby attaching a digital signature to the transaction data along with the signer's public key.

This digital signature works somewhat like a combination safe by encrypting the hash number of the transaction using the secret key. The true hash number is unreadable to others—essentially locked in the safe—until the corresponding public key is used to unlock it.

The public key only unlocks a digital signature created by the private key of the key pair, so anyone can use the public key to verify that the digital signature was provided by the true owner of the Bitcoin (the one possessing the private key).

Having unlocked the digital signature, the revealed hash number can be used to validate the associated transaction since any new hash of a valid transaction must always match the hash number contained in the digital signature.

The block chain technology adds a further degree of security by using the hash number of the preceding transaction to generate the hash number of the current transaction in addition to the current transaction data. Each time a transaction is validated, therefore, the entire block chain is validated.

This validation helps to prevent an attacker from altering a previous transaction in the block chain, such as changing the ledger to indicate, falsely, that 5,000 Bitcoins were transferred to an account instead of 50. It makes it nearly impossible to "cook the books."

Validation of a transaction is confirmed by a "consensus" protocol that relies on agreement among the Bitcoin miners. Essentially, once several different miners reach the same results for a block of transactions, the block is considered to be validated and is accepted into the block chain.

Let's look at a simple example. Suppose Bob wants to send 100 Bitcoins to Alice. In order to send Bitcoin, Bob would use a Bitcoin software program operating on his computer—often referred to as a client—to access a "wallet" containing his balance of Bitcoins. The wallet contains one or more Bitcoin addresses, which are analogous to credit card account numbers in that the account number identifies a particular account containing a balance of funds.

In this case, the address identifies a certain amount of Bitcoins (including, perhaps, a fraction of a Bitcoin, as a Bitcoin can be divided) and would correspond to a transaction in the Bitcoin block chain in which Bob received the particular Bitcoins.

Alice also operates a Bitcoin client on her computer, which she uses to create a new address in her wallet. She informs Bob of the address. Now that Bob has Alice's address, he tells his Bitcoin client to transfer 100 Bitcoins to the address provided by Alice. The Bitcoin client signs his transaction request with his private key and broadcasts it to the Bitcoin network.

Larry is a Bitcoin miner who participates in the network. He receives Bob's request and aggregates it with a number of other requests into a block. Larry then calculates a hash number for the block in accordance with the protocols used by Bitcoin.[13]

Larry competes against other miners to be the first to calculate the hash number because only the first solution "wins" the transaction fee.

Larry wins and is rewarded with a number of Bitcoins for his effort. The block containing the validated transaction is held by Larry until several other miners also validate the block, at which time the block is added to the block chain.

Once the transaction is added to the block chain, Alice's Bitcoin client can access it and verify that it is legitimate by verifying Bob's digital signature using his public key and by verifying Alice's possession of the address to which Bob has transferred the 100 Bitcoins using her private key. Once the transaction is verified by Alice's Bitcoin client, the balance of her wallet will reflect the newly added Bitcoins.

One drawback to the Bitcoin approach is that possession of the private key associated with a Bitcoin address is all that is needed to possess and spend the virtual currency. In this sense, Bitcoins are like bearer bonds—ownership is dictated by whoever is holding the instrument.

The onus of security, therefore, is on the user of the virtual currency to keep safe any private keys associated with Bitcoins. One Bitcoin owner inadvertently threw away a hard disk containing the private keys associated with about $8 million worth of Bitcoins, as estimated at the time of the loss.[14]

Other Bitcoin owners have suffered thefts of their private keys held by exchanges. The most famous theft involved about $800 million worth of Bitcoins pilfered in early 2014 from Mt. Gox—at the time the largest exchange for Bitcoins—prompting its closure and bankruptcy.[15]

Such losses have heightened public concern over the security of the virtual currency.

Other drawbacks to the Bitcoin approach involve time and scalability. It takes time to settle a transaction by validating it and reaching consensus among Bitcoin miners, typically on the order of minutes.

Compared to the nearly instantaneous approval experienced for credit card transactions, the lag may prove unacceptable for common e-commerce transactions if it cannot be improved. Further, the block chain may prove to be too cumbersome for handling large numbers of transactions since the block chain continues to grow as transactions are added to it.

Ripple is a competing platform. The Ripple approach is interesting in that it aims to solve both the time and the scalability problems of Bitcoin. Like Bitcoin, Ripple employs an open ledger system. However, it departs from the use of the block chain.

Rather than storing the entire history of transactions, the Ripple ledger contains the information necessary to establish the current ownership and balances for all Ripple accounts. Not only is the system more scalable, it is also much faster because it obviates the need for cryptographic hash functions to be calculated, which are computationally expensive and time consuming.

As new sets of transactions are processed under Ripple, the ledger is updated by a voting process conducted among participating computer servers in which a supermajority of the vote is required to validate a transaction. The integrity of the system is based on the idea that a sufficiently large number of independent servers makes the occurrence of a fraudulent transaction an extremely unlikely event because it would require an extraordinary conspiracy.

Income Tax Issues

In March 2014, the Internal Revenue Service ("the Service") provided guidance on how existing federal tax principles apply to transactions using virtual currency, including Bitcoin.[16]

In Notice 2014-21, the Service stated that virtual currency is a form of property, and general tax principles applicable to property transactions apply to transactions using virtual currency. As a consequence, taxpayers are required to determine the fair market value of the virtual currency in U.S. dollars as of the date of payment or receipt.

Notices, like Notice 2014-21, permit the Service to state a position on a particular tax matter in a timely manner without having to pursue the more laborious and lengthy effort required to issue a Revenue Ruling or facilitate a Treasury regulation.

A Notice generally is sufficient to support a tax position to the Service at the administrative level, but it is not binding law and courts may not give the weight to Notices that they afford to Revenue Rulings and Treasury regulations. So, Notice 2014-21 should be interpreted with that in mind.

According to Notice 2014-21, a taxpayer who receives virtual currency as payment for goods and services must, in computing gross income, include the fair market value of the virtual currency.

If the virtual currency is paid by an employer as remuneration for services, then the fair market value of the virtual currency paid is subject for federal income tax withholding, Federal Insurance Contributions Act (FICA) tax, and Federal Unemployment Tax Act (FUTA) tax, and must be reported on Form W-2, Wage and Tax Statement.

If the virtual currency is derived by the taxpayer from any trade or business carried on by the taxpayer as other than an employee, the fair market value of the virtual currency earned generally constitutes self-employment income and is subject to self-employment tax. The Service notes, in particular, that the mining of Bitcoin and similar virtual currencies constitutes a trade or business and, therefore, gross income derived from the activity constitutes self-employment income.

Notice 2014-21 explained that the same tax rules for the exchange of property applied to virtual currency. Ordinarily, a taxpayer realizes a gain or loss on the exchange of virtual currency for other virtual currency or property.

If virtual currency held by a taxpayer is a capital asset in the hands of the taxpayer, the taxpayer generally realizes a capital gain or loss on the sale or exchange of the virtual currency. Otherwise, the taxpayer realizes an ordinary gain or loss.

Not all transactions using a virtual currency are taxable, however, even if an accession to wealth is recognized from an economic perspective. A taxable transaction using virtual currency generally satisfies four conditions:

1. It falls within the definition of gross income
2. It is realized
3. Its value is readily ascertainable in U.S. dollars
4. It has real-world economic consequences[17]

Gross income is defined in section 61 of the Internal Revenue Code as "all income from whatever source derived."[18]

The Supreme Court has long interpreted the language in Section 61 to extend as far as constitutionally permissible, declaring that Section 61 contains "no limitations as to the source of taxable receipts, nor restrictive labels as to their nature."[19]

While seemingly boundless in its reach, there are a number of recognized exclusions to gross income. Some are explicitly established in the Internal Revenue Code, such as exclusions for gifts and inheritances under Section 102 and the subtraction of a property basis under Section 1001. Others are established by Treasury regulations, Internal Revenue Service rulings and guidance, or case law. But such exclusions are based on factors other than whether a transaction uses virtual currency.

With regard to the second requirement, the Supreme Court has held that before a transaction is reportable as gross income, it must be realized.[20]

The realization of income is premised upon the occurrence of a market transaction in which a taxpayer has actualized what until then was only the potential accession to wealth. That is, it involves a discernable market event—an exchange of property, a purchase of goods or services, and the like—that consummates a measurable increase in wealth over which the taxpayer retains dominion.

The first and second conditions are rather easy to satisfy. A barter club transaction, for example, where one member provides accounting services to another member in exchange for barter club trading points (a virtual currency used to facilitate transactions among club members) qualifies as reportable gross income to the performing member because it satisfies the definition of gross income and has been realized by the performance of services.[21]

The third condition is more complicated as to whether a transaction using a virtual currency is taxable. Under the Internal Revenue Code, taxes are reported by taxpayers in U.S. dollars.[22]

So in order to satisfy reporting requirements, the value of transactions using virtual currency

must be readily ascertainable in U.S. dollars. To this end, Notice 2014-21 addresses only the federal tax consequences of "convertible" virtual currency that have an "equivalent value in real currency."[23]

Barter club trading points, in the example above, are a form of convertible virtual currency because the fair market value generally can be ascertained from prevailing wage rates (for bartered services) and resale prices (for bartered goods) stated in real currency. The points earned tend to be convertible at a predictable exchange rate based on the market activity of the club members.

Bitcoin is a convertible virtual currency because currency exchanges exist with which to set the value of Bitcoins in U.S. dollars and other real currency. Likewise, Linden Dollars are traded on certain currency exchanges into U.S. dollars.

But what if no market rate is readily ascertainable for a virtual currency? The IRS has on occasion announced the nonenforcement of certain virtual currency transactions where ascertaining the value in terms of U.S. dollars has been problematic.

One example is the treatment of airline frequent flyer miles—a form of virtual currency redeemable for flights, hotel rooms, and rental cars, among other things. In Announcement 2002-18, the Service stated that it "will not assert that any taxpayer has understated his federal tax liability by reason of the receipt or personal use of frequent flyer miles or other in-kind promotional benefits attributable to the taxpayer's business or official travel."[24]

Ordinarily, awards constitute taxable income where the award is not simply a discount or return of a purchase amount. This distinguishes frequent flyer miles provided as gifts or awards—such as a bonus of 1,000 miles for opening a new account—from frequent flyer miles earned from business travel purchases. The IRS considers the latter to be a rebate or discount to the purchase price.[25]

Treasury regulation 1.74-1(a)(2) requires that awards be reported as gross income to the extent of their fair market value. But the volatility and unpredictability of airline pricing, the uncertainty of when and for what flight the frequent flyer miles will be redeemed, and the lack of a viable market for trading frequent flyer miles has made it difficult to establish a fair market value for miles received as awards.

For the most part, the Service has considered the matter an administrative problem. And, the Service has elected not to pursue taxation so long as an award of frequent flyer miles remains unconverted.

But what if the taxpayer converts the frequent flyer miles to an airline ticket? Consideration of that scenario brings us to the fourth condition: real-world economic consequences.

In Notice 2014-18, the Service stated that "the sale or exchange of convertible virtual currency, or the use of convertible currency to pay for goods or services in a real-world economy transaction, has tax consequences that may result in a tax liability."[26]

The Service's position is consistent with Announcement 2002-18, wherein it stated that relief from reporting frequent-flyer awards as taxable income would not apply where the awards are converted to cash or its equivalent.[27] This is known generally as the "cash out" rule.

In 2014, the U.S. Tax Court upheld a position taken by the Service in *Shankar v. Commissioner* that frequent flyer miles awarded by Citibank to new account holders as part of a promotional campaign were taxable.[28]

In that case, the recipient had redeemed the frequent flyer miles for a flight, and Citibank had issued a Form 1099-MISC to the recipient, which assigned a fair market value to the award based on the price of a comparable airline ticket, as determined by Citibank. By redeeming the frequent flyer miles, the taxpayer effectively had converted the frequent flyer miles to real-world property—an airline ticket—that had a value ascertainable in real currency.

Citibank characterized the award of frequent flyers miles as a gift.[29] Ordinarily, taxes are paid on the gain enjoyed by the taxpayer, which is computed as the fair market value of the property received in the exchange less the taxpayer's adjusted basis of the property given.[30]

The court noted that the taxpayer presented no evidence in this regard and, therefore, the entire amount of the airline ticket was included in the taxpayer's gross income. It seems that the taxpayer could have argued that his adjusted basis of the award was equivalent to that in the hands of Citibank, the donor, at the time the gift was made. Subtracting this adjusted basis from the fair market value of the airline ticket received would have lowered the reportable gain.

In any case, as illustrated with the frequent flyer miles example, there may be tax consequences for converting virtual currency to real-world property as part of a digital payment transaction. This presents a number of administrative and reporting challenges. This is because sufficient information will be tracked and provided to the taxpayer for determining any gain or loss on the virtual currency exchanged and the nature of that gain or loss (e.g., whether capital gains treatment applies). This is an especially challenging prospect given the increasing proportion of digital transactions involving small purchase amounts.

Payments via smartphones already provide precedence for this. For example, millions of consumers have purchased cups of coffee at Starbucks using the company's smartphone app in a manner somewhat akin to Apple Pay. In 2014, purchases using the app exceeded $1.5 billion.[31]

What if a virtual currency instead were used to purchase a cup of coffee? One can do this already via the app using Starbucks' Rewards—a virtual currency designed to encourage customer loyalty similar to credit card reward points. Some reward points appear to be offered merely for registering with Starbucks—no purchase of coffee needed.

So should these reward points be treated for tax purposes like the frequent flyer miles were treated in *Shankar*? It would seem so.

Because virtual currencies are considered property and not foreign currency, the Service provides no "de minimus" exclusion for gains and losses on conversion. Notice 2014-21 simply states that the use of a convertible virtual currency to purchase real-world goods and services is a taxable event.

Another smartphone app allows Starbucks customers to pay for coffee and even tip the barista using Bitcoin. Let's suppose that, each day before going to work, Alice purchases a cup of coffee priced at $2 using Bitcoins, realizing a small gain on each transaction, say 10 cents. In order to comply with the Service guidelines as currently understood, every exchange through which Alice converts her Bitcoins to U.S. dollars would need to track her transactions and send her a Form 1099-B listing at least the date and price of the transactions processed during the tax year.

At tax filing time, Alice should be prepared to aggregate these 1099s and file a Form 8949 with the Service listing each sale of Bitcoins corresponding to each of the hundreds of cups of coffee purchased. That's just for a daily cup of coffee! Clearly, the current reporting requirements present a serious administrative hurdle to the use of virtual currency. Without a more workable solution, it could encourage an atmosphere of noncompliance with the law.

The same administrative and reporting challenges exist for virtual worlds and online games where participants are allowed to "cash out" accumulated virtual currencies. The Service provides on its website a guide titled "Tax Consequences of Virtual World Transactions," which states in part:

> Online games create computer-generated settings for multiple users to interact as characters called avatars. These avatars frequently exchange goods and services in both the real and virtual worlds. Cyber-economic activities in the online world may have tax consequences that real world avatar counterparts need to consider.

The IRS has provided guidance on the tax treatment of bartering, gambling, business and hobby income—issues that are similar to activities in online gaming worlds. In 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.[32]

The guidance is vaguely worded. However, in view of Notice 2014-21, it suggests that income derived from virtual world transactions may have tax consequences roughly analogous to bartering clubs. To illustrate, let's suppose Alice, an SL participant, receives 50 Linden Dollars from Bob in exchange for making a virtual shirt for his avatar.

If Alice converts her 50 Linden Dollars to 2 U.S. dollars, she would recognize a $2 taxable gain assuming an adjusted basis of zero dollars. Note that if Alice and Bob were members in a bartering club and Alice had made a real-world shirt for Bob in exchange for 50 trading points, the value of those trading points in U.S. dollars would be reportable as taxable income.

Notice 2014-21 serves to delay Alice's virtual economy transactions from becoming taxable until converted to cash or real-world property, whereas the barter club transactions already take place in the real world.

As a practical matter, the condition of real-world economic consequences serves to limit the administrative burden of tax reporting. Taxes on some transactions using virtual currency may be administratively impractical to enforce, as we have seen from earlier examples. Transactions in the virtual world are no different.

The value of Alice's collection of Linden Dollars may be ascertainable in U.S. dollars via the SL currency exchange. But taxing every small transaction in SL would become a tedious affair for the taxpayer and the Service alike, and it could put the Service in the position of having to argue over the real-world value of a virtual shirt.

The condition of real-world economic consequences also is rooted in accounting theory. Camp (2014) argues that taxing only transactions with real-world economic consequences comports with the tax treatment of imputed income.[33]

Taxpayers commonly derive economic income from self-benefiting activities and self-owned property that have both readily ascertainable value and may be fully realized, yet such income is not taxable. If Alice cleans her own house and repairs her own

car, she does not pay income taxes on the value of the services she provided for her own benefit.

In this vein, Camp distinguishes between activities directed to play and those directed to profit. Role-play activities in virtual worlds like SL and online games like World of Warcraft "are not normal market transactions but represent self-provided services or, at most, enjoyment of self-owned property. The service provided is play and the property is the right to play."[34]

In effect, Alice may accumulate Linden Dollars from her role play in SL, which should not be taxed because it is an extension of her play—a self-benefiting activity, like earning Monopoly money.

It's the conversion of virtual property and virtual currency into cash and real-world property that breaches the boundary between the virtual economy and the real one, Camp notes. The converted property is no longer the fruit of play. Instead, it assumes the characteristics of a normal market transaction, including a real world accession to wealth, which is taxable.

But that boundary is beginning to blur. As our lives become increasingly integrated with online and virtual experiences, the distinction between the virtual world and the real one is becoming less obvious. No one today thinks of e-mail, instant messaging, or web browsing as visiting some otherworldly digital place. They're a part of our ordinary lives, and we routinely conduct taxable transactions using these tools.

Emerging technologies will one day seem ordinary as well. Facebook, for example, announced at a 2014 conference an ambitious plan to put 1 billion people into a massive virtual world as a new communication platform based on virtual reality technology it has developed called Oculus Rift.[35]

If Facebook's vision succeeds, then working, shopping, and socializing in the virtual world will become a mere extension of one's ordinary activities, and the real economy will incorporate this new platform just as it has for other tools of communication. One may expect that the Service will expand its enforcement into these virtual activities in response to their growing significance to the economy.

VALUATION ISSUES

For taxation purposes, as outlined in Notice 2014-21, transactions using virtual currency should be reported in U.S. dollars and the fair market value should be determined as of the date of payment or receipt. How is fair market value determined?

Financial Standards Board (FASB) Accounting Standards Codification (ASC) topic 820 defines the fair value standard as follows:

Fair value is a market based measurement, not an entity-specific measurement. For some assets and liabilities, observable market transactions or market information might be available. For other assets and liabilities, observable market transactions and market information might not be available. However, the objective of a fair value measurement in both cases is the same—to estimate the price at which an orderly transaction to sell the asset or to transfer the liability would take place between market participants at the measurement date under current market conditions.[36]

If a virtual currency is listed on an exchange, and the exchange rate is determined by supply and demand, then the exchange provides observable market transactions by which fair market value can be determined. This analysis of observable market transactions is known as a market approach to valuation. While this seems straightforward in theory, it may not be in practice.

Many virtual currencies, like Bitcoin, are very volatile. Exchange rates can vary widely during the trading day and between exchanges. Does one select the closing price? At which exchange? The lack of official guidance may allow taxpayers to "game the system" by reporting favorable exchange rates that minimize or eliminate taxes.

What if the virtual currency is not listed on an exchange? The Service does not specifically address this issue in Notice 2014-21. Depending on the circumstances, an appraisal or valuation may be performed to estimate the fair market value. To this end, a valuation analyst would consider the three generally accepted property valuation approaches: (1) the market approach, (2) the income approach, and (3) the cost approach.

Analysts may use more than one valuation approach, or more than one method of a particular valuation approach, and then synthesize the results. We've already introduced the market approach. The most reliable market information for valuing a virtual currency is the direct observation of its trading on an exchange, assuming that the trading is established by market supply and demand, notwithstanding the problem of selecting which observations are most appropriate.

If the virtual currency is not listed on an exchange, the market observations of property with comparable characteristics often can be used by a valuation analyst to develop units of comparison to the property at issue, such as using the stock prices of comparable public companies to inform the value of private companies.

The unique nature of many virtual currencies may make an indirect, comparative approach difficult and costly. But if a virtual currency is "pegged" to a good or service, the market price of that good or service can be informative of the fair market value of the virtual currency.

For example, if a dozen Starbucks reward points can be exchanged for a $2 cup of coffee, the price of a cup of coffee reflects observable market information that can be used to determine the value of a reward point, which in this example equates to about 17 cents.

The income approach employs methods to estimate the value of property by calculating the present value of future income streams expected to be generated by use of the property over its remaining useful life. These methods generally differ in how those income streams are determined.

Stock, for example, represents a claim on the future income of a company, and the expected future income informs the fair market value of the stock. But a virtual currency represents a medium of exchange and normally does not generate income by its use. So, generally speaking, the income approach offers little help in determining the fair market value of virtual currency.

The cost approach estimates the fair market value of property by considering what cost a prudent person would incur at current prices to replace the property and then adjusts that cost for any depreciation and obsolescence. The valuation analyst should also consider as cost components both (1) developer's profit and (2) entrepreneurial incentive. These two components are often overlooked by inexperienced analysts.

The developer's profit reflects the reasonable profit expected on the development costs incurred in the asset creation. And the entrepreneurial incentive reflects the economic benefit required to motivate the asset creator into the development process, which is often viewed as an opportunity cost.

The cost approach may sometimes serve as the "floor" for estimating fair market value. This is because the cost approach doesn't take into account any accession to wealth that may accrue from holding and using the virtual currency.

Like the income approach, however, the cost approach may be of little help in determining the fair market value of typical virtual currencies. This is because an incremental unit of virtual currency costs essentially nothing to create. What, for instance, is the incremental cost to generate another frequent flyer mile or reward point? They are just entries created instantly in a computer file.

Bitcoin may be an exception if one considers the costs of mining a Bitcoin, which involves expending enormous computational power to solve complex mathematical problems. That computational power has significant costs associated with it, namely the costs of specialized equipment and the energy to power it.

These costs can be quantified. However, determining the replacement cost of a Bitcoin can be especially challenging due to the winner-take-all rules of Bitcoin mining. It involves predicting the computational effort that will be required to "win" a newly generated Bitcoin in a dynamic, highly competitive environment.

The level of computational difficulty is constantly increasing due to the built-in scarcity of the Bitcoin protocol that limits the rate at which new Bitcoins can be generated and caps the total number that can be generated at 21 million.

In many ways, estimating the fair market value of Bitcoin is a lot like estimating the fair market value of gold. The value of gold is largely a matter of what market participants say it is by exchanging real currency for it.

So it is not surprising that gold is valued most reliably using the market approach. Gold itself has little practical utility (outside of jewelry and limited industrial use), and it does not generate income. The income approach, therefore, is not feasible. And, the cost approach offers only limited help. While there is a cost to extracting from the ground and refining it, this cost varies widely and does not correlate closely—at least on a short-term basis—to the observed market price of gold.

Unlike gold, however, virtual currency may not last forever. Consideration, therefore, should be given to the remaining useful life (RUL) of a virtual currency. RUL is integral to determining value under the general valuation approaches.

In the cost approach, RUL serves as a means to quantify obsolescence, if any. A longer RUL ordinarily results in a greater value of a virtual currency because the currency suffers less obsolescence.

In the market approach, RUL is useful in selecting and adjusting guideline assets. If the RUL for a subject virtual currency is different from that of the guideline assets, then an adjustment may be warranted to the transaction multiple used to price the guideline assets, or it may indicate a lack of marketability for the subject virtual currency.

Determining the RUL of a virtual currency requires consideration of the environment in which the currency operates. Common factors that influence the RUL of a virtual currency include the following:

1. Functional factors: Virtual currencies suited for specific purposes typically have shorter remaining useful lives than those suited for more general purposes because the risk of

obsolescence increases at greater levels of specificity.

A virtual currency associated with a particular store, such as Starbucks, will tend to have a shorter RUL than one designed for universal commercial use.

2. Contractual factors: The RUL of a virtual currency may be affected by contractual stipulations that govern its use. For example, the terms of use for frequent flyer miles commonly provide for the expiration of miles earned if they are not used within a particular period of time.

3. Economic factors: The RUL of a virtual currency may be affected by economic circumstances or events outside the course of normal activities. Examples of such events include legislative action affecting the regulatory environment and the granting of patent rights.

4. Technological factors: A virtual currency can suffer technological obsolescence when it is tied closely to a platform, product, or service with a high risk of being substituted for more technologically advanced platforms, products, or services.

Cryptocurrencies, like Bitcoin, supplanted prior forms of digital currency. This is because cryptocurrencies offered technological advancements such as the distributed ledger system and public key encryption.

Another consideration is whether the technology platform upon which a virtual currency is based is open source or proprietary. This can influence the extent to which others adopt the virtual currency and make innovations with it.

5. Cultural factors: Cultural issues may affect a virtual currency's RUL. It may quickly become obsolete if the public perceives that the virtual currency is not trustworthy or its use is associated with illegal or socially undesirable activities.

After a meteoric rise, Bitcoin's reputation was sullied by its association with online sales of illegal drugs and the perception that it was vulnerable to theft by cybercriminals.

Each of these RUL factors may be considered in estimating the RUL of a virtual currency. Multiple factors may be involved. Under ordinary circumstances, however, the factor indicating the shortest RUL warrants primary consideration in the valuation analysis.

Conclusion

This discussion addresses the impact of emerging digital payment systems on tax accounting and valuation. Until now, digital payment systems have focused on extending the utility of conventional payment methods like credit cards.

But emerging digital payment systems likely will incorporate virtual currency as well. Examples of virtual currency include credit card reward points, airline frequent flyer miles, barter club trading points, Amazon Coins, and Bitcoins.

Transactions involving virtual currency may have federal tax consequences. The Service's position is that virtual currency is a form of property, and general taxation principles applicable to property transactions apply to transactions using virtual currency.

As a consequence, taxpayers are required to determine the fair market value of the virtual currency in U.S. dollars as of the date of payment or receipt. A taxable transaction generally satisfies four conditions:

1. It falls within the definition of gross income
2. It is realized
3. Its value is readily ascertainable in U.S. dollars
4. It has real world economic consequences

If a virtual currency is listed on an exchange, and the exchange rate is determined by supply and demand, then the fair market value of the virtual currency can be determined from the exchange rate.

If the virtual currency is not listed on an exchange, a valuation analyst could estimate fair market value by considering three generally accepted valuation approaches: (1) the market approach, (2) the income approach, and (3) the cost approach.

In performing the valuation analysis, the valuation analyst should consider how the RUL of the virtual currency affects each of these generally accepted valuation approaches.

The Onion may have had it right that money is an illusion of sorts. The increasing use of virtual currency accentuates this point. But the illusion may have real taxation consequences.

> "The Service's position is that . . . general taxation principles applicable to property transactions apply to transactions using virtual currency."

Notes:

1. "U.S. Economy Grinds to a Halt as Nation Realizes Money Just a Symbolic, Mutually Shared Illusion," *The Onion* (February 16, 2010). Ben Bernanke did not actually make the remarks attributed to him in the satirical story.

2. Ramon DeGennaro, "Merchant Acquirers and Payment Card Processors: A Look Inside the Black Box," *Economic Review* (First Quarter 2006).

3. U.S. patent application no. 13/753,189.

4. Edward Castronova, "Digital Value Transfer Systems," *Washington and Lee Law Review* 71, No. 2 (September 2014): 15.

5. Ibid.: 16.

6. U.S. Department of Treasury, Financial Crimes Enforcement Network (FinCEN), Guidance on the Application of FinCEN's Regulations to Persons Administering, Exchanging, or Using Virtual Currencies (FIN-2013-G001, March 18, 2013).

7. 31 U.S.C. § 5103.

8. Internal Revenue Service Notice 2014-21.

9. Note that while credit cards may come in the form of plastic cards, the pertinent information related to the credit card account is stored digitally within the magnetic strip affixed to the plastic card.

10. Based on testimony of FinCEN Director Jennifer Calvery before the Senate Committee on Banking, Housing and Urban Affairs on November 19, 2013.

11. Satoshi Nakamoto, "Bitcoin: A Peer-to-Peer Electronic Cash System," www.bitcoin.org (October 31, 2008).

12. Interview with Bill Gates, *Fox Business News* (May 6, 2013).

13. Generation of the hash number must conform to certain rules, including the rule that the hash number must conform to a certain format that can change over time. There is no way to tell whether an acceptable hash number will result until the calculation is performed, so miners often have to make several attempts, expending considerable computational resources in the effort. Further reading on the subject of Bitcoin mining can be found at www.bitcoin.org/en/resources.

14. "Missing: Hard Drive Containing Bitcoins Worth £4m in Newport Landfill Site," *The Guardian* (November 27, 2013).

15. "Apparent Theft at Mt. Gox Shakes Bitcoin World," *New York Times* (February 25, 2014).

16. IRS Notice 2014-21.

17. These conditions are generalized and ignore exceptional provisions such as mark-to-market rules where taxable events may occur even though no closed transaction has occurred.

18. 26 U.S.C. § 61.

19. Commissioner v. Glenshaw Glass Co., 348 U.S. 426, 429 (1955) (the Court stated further that gross income includes "instances of undeniable accessions to wealth, clearly realized, and over which taxpayers have complete dominion").

20. Id., at 431.

21. Under Treasury Regulation § 1.6045-1, a barter club is required to report transactions by club members to the Internal Revenue Service.

22. 26 U.S.C. § 985. There is one exception to the use of the U.S. dollar: a qualified business unit may use a currency of the economic environment in which a significant part of such unit's activities are conducted and which is used by such unit in keeping its books and records. But functional currency other than the U.S. dollar must be translated into dollars for reporting to the Internal Revenue Service.

23. Convertibility to U.S. dollars is understood to mean the value in U.S. dollars is readily ascertainable by some exchange mechanism. The conversion to U.S. dollars need not be direct, as it can be achieved by the intermediate conversion to another real currency.

24. Announcement 2002-18, 2002-1 C.B. 621.

25. It's not always clear, however, when the receipt of frequent flyer miles constitutes an award and when it constitutes the return of a purchase amount.

26. IRS Notice 2014-21, Section 3.

27. Announcement 2002-18, 2002-1 C.B. 621.

28. Shankar v. Commissioner, 143 T.C. No. 5 (2014).

29. M. White, "Income Taxes on Frequent Flyer Miles?!" *Time* (January 30, 2012). Note that under the Internal Revenue Code, gifts in excess of $600 are reportable to the Internal Revenue Service.

30. 26 U.S.C. § 1001(a).

31. J. Heggestuen, "An Inside Look at the Starbucks App, the Most Successful Mobile Payments System in the US," *Business Insider* (October 17, 2014).

32. IRS, "Tax Consequences of Virtual World Transactions," available at http://www.irs.gov/Businesses/Small-Businesses-&-Self-Employed/Tax-Consequences-of-Virtual-World-Transactions.

33. Bryan Camp, "The Play's the Thing: A Theory of Taxing Virtual Worlds," TaxBlog.com (February 4, 2014), Section II(B)(3).

34. Ibid., Section III(B)(3).

35. "Oculus Rift CEO: We Want to Put 1 Billion People in Virtual Reality," *The Guardian* (May 7, 2014). Oculus Rift is a virtual reality headset.

36. Accounting Standards Codification topic 805-05-1B.

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