Understanding Platform-Based Digital Currencies

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- With advances in technology and the rapid spread of the Internet, various digital currencies have emerged. While digital currencies could increase the efficiency of retail payments, they could also raise some important policy issues if they were to become widely used.
- This article focuses on digital currencies issued by Internet platforms such as Facebook and Amazon. Depending on the platform's business model, its digital currency may be equipped with different attributes that affect how users can acquire, transfer or redeem the digital currency. In most cases, platforms restrict the functionality of their digital currencies to enhance the business model and maximize their profits.
- A platform-based digital currency has the potential to become a widely accepted means of payment outside of its platform if it is transferable among its users. None of the platform-based digital currencies with this feature is widely used at this point. This could change, however. Therefore, it is important to closely monitor the evolution of these digital currencies.

Innovations in technology and the widespread use of the Internet have made online commerce, social networks and online gaming a significant part of our lives. The key players in these areas are platforms like Facebook and Amazon.[1] Some of these platforms have issued tokens, such as Facebook Credits or Amazon Coins, that individuals can use to purchase real or virtual goods within the platform. These tokens are often referred to as "digital currency." With millions of users in many countries, Internet platforms have a global reach. Some industry observers have speculated that these currencies could become widely accepted and could even compete with national currencies.

This article distinguishes between digital currencies and the digitization of national currencies such as the Canadian dollar or the U.S. dollar, which involves the electronic transfer of a national currency between two accounts (e.g., using debit or credit cards). Digital currencies, in contrast, have no

1 Platforms are enterprises where the value of using the platform increases with the number of market participants that join. In the case of Facebook, the more friends that are using it, the more attractive the platform becomes. In the Amazon Marketplace, the more sellers selling their products, the more attractive that platform is to buyers, and Amazon's tablet, Kindle Fire, becomes more attractive to users as developers provide more applications for it.

Box 1

Bitcoin: A Digital Currency Without a Central Issuer

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In contrast to platform-based digital currencies, Bitcoin is a completely decentralized currency without a central issuer.[1] Based on specialized open-source software, a set amount of bitcoins is given to users in exchange for specific contributions to the operation of the Bitcoin system. Users can transfer bitcoins among themselves or use them to purchase goods and services, provided they can find merchants willing to accept them. Bitcoins can also be bought and sold for national currencies through several unofficial Internet-based "exchanges."

Since bitcoins are purely digital and there is no central institution controlling their use, there is a substantial risk that some users may try to duplicate or counterfeit them. The Bitcoin software solves this problem by using the open community of users to check bitcoin transaction records and validate new transactions.[2] The first user to successfully validate new transactions is rewarded with newly released bitcoins. There is a maximum amount of bitcoins that can be supplied, although this amount will not be reached until 2140.

Although Bitcoin automatic teller machines have been introduced in some major Canadian cities, very few Canadian merchants accept bitcoins as a means of payment. And while the Department of Finance Canada has indicated that the Bitcoin currency is not legal tender in Canada, the Canada Revenue Agency has announced that standard tax rules apply in the use of bitcoins or other digital currencies.

Potential benefits associated with bitcoins include lower transaction costs to online merchants than for conventional payment instruments such as credit cards, since there is no third-party intermediary. Similarly, the costs of international remittances might also be lower than for conventional remittance methods. However, Bitcoin users face a number of challenges, particularly the extreme volatility of the price of bitcoins.[3] As well, it is relatively easy to delete or misplace personal holdings of bitcoins. There have also been a number of security incidents that have compromised either Bitcoin accounts or some other part of the Bitcoin infrastructure (such as Bitcoin exchanges).

In addition, governments may become concerned about a number of legal, security and law-enforcement issues associated with bitcoins. For example, given the private nature of bitcoin transactions, bitcoins could easily be used to facilitate criminal transactions and to evade taxes.[4]

As they do with platform-based digital currencies, central banks are studying and closely monitoring decentralized digital currencies such as Bitcoin. There could be potential risks to overall financial stability if Bitcoin became a significant means of payment and the Bitcoin system remained unstable. As well, Bitcoin users need to be aware of the potential financial risks to which they might be exposed, in light of the ongoing volatility of bitcoin prices and the risk of failure of Bitcoin exchanges.[5] In particular, given that digital currencies such as Bitcoin are not regulated and do not have a centralized issuer, users bear all of the risks themselves and have no legal recourse should they wish to reverse a bitcoin transaction.

1 For more information on Bitcoin, see Brito and Castillo (2013); Elwell, Murphy and Seitzinger (2013); ECB (2012); Nielsen (2013); Šurda (2012); and Velde (2013).

2 The records are public, but each user and each bitcoin are encrypted with unique identities.

3 For example, Bitcoin's price rose to above US$1,200 in early December 2013 and then fell to around US$800 by the middle of that month, after an announcement that the world's largest Bitcoin exchange (BTC China) would no longer accept new customers in China.

4 The federal government recently introduced amendments to the Proceeds of Crime (Money Laundering) and Terrorist Financing Act that would make digital currencies (such as Bitcoin) subject to the application of the Act.

5 Mt. Gox, once the world's largest Bitcoin exchange, recently filed for bankruptcy protection in Japan and the United States.

physical counterpart and do not represent a claim on assets. They are usually not denominated in the national currency and thus provide their own unit of account. The focus of this article is on digital currencies that are centralized and issued by proprietary Internet platforms, rather than digital currencies that are decentralized, for example, Bitcoin (**Box 1**). Platform-based digital currencies are characterized by two main features: (i) the platform maintains control over the design and supply of the currency, and (ii) the platform introduces its currency for objectives other than payment services.

In finance and economics, currency is defined as (i) a unit of account, (ii) a medium of exchange and (iii) a store of value. As will be discussed in the next section, Facebook Credits and other popular platform-based digital

currencies are limited in functionality and may not satisfy this definition. Nevertheless, to facilitate discussion, we refer to Facebook Credits and the other examples in this article as platform-based digital currencies, since this term is used by the popular press.

What drives platforms to introduce their own digital currencies? Why do platforms design their digital currencies in a particular way? Under what circumstances could these digital currencies become more widely used outside the platform? To answer these questions, we conduct an in-depth analysis of Facebook Credits to develop a framework for studying and monitoring developments in platform-based digital currencies more generally. We then use the framework to assess other prominent platform-based digital currencies. Finally, we discuss the relative importance of different elements of the framework for understanding the potential impact of a platform-based digital currency on a national currency.

Central banks and other public authorities are studying and monitoring these platform-based digital currencies for a number of reasons. First, it is important to assess their potential impact on the demand for bank notes. Second, digital currencies represent innovations that could increase the efficiency of retail payments by, for example, providing a cheaper, faster or more convenient alternative to existing payment methods, especially for online transactions.[2] Third, digital currencies could raise a range of public policy and regulatory issues if they were to become a widely used means of payment.[3]

Not All Platform-Based Digital Currencies Are the Same

Facebook Credits

In mid-2009, Facebook, the most popular social networking site in the world, introduced its digital currency—Facebook Credits (FB Credits). With FB Credits, users could purchase premium content for games and applications on Facebook, allowing them to play longer or achieve better results. For example, users could buy fertilizer for virtual plants to increase the "harvest" in their virtual farm. They could earn FB Credits by filling out surveys or testing a beta version of a game, and they could buy FB Credits with national currency. Once acquired, however, FB Credits could not be redeemed for national currency or transferred to another user. They could be "spent" only on the Facebook platform.

Given the large number of Facebook users (over 1 billion) and its international reach, industry observers speculated that FB Credits could become the currency of the web or a global means of payment. However, it was in Facebook's best interest to restrict the functionality of FB Credits (Gans and Halaburda 2013), which made them not viable for use outside the platform. Facebook's main source of revenue is advertising, and the value of advertising space increases with the length of time users spend on the platform. By buying virtual goods with FB Credits, users enhanced their experience and therefore would stay on the platform longer. This had positive spillovers,

2 In Canada, credit cards are the most popular payment instrument for online transactions (Statistics Canada 2012). However, the fees that credit cards charge merchants are very high, particularly for small-value transactions. In addition, concerns about fraud, privacy and identity theft may deter some consumers from using credit cards to make online purchases (The Paypers 2014).

3 For a discussion of issues related to the regulation of digital currencies, including protecting consumer funds and the privacy of data, as well as preventing money laundering and terrorist funding, see ECB (2012). For a discussion of potential policy issues such as the impact on monetary policy and financial stability, see BIS (1996).

since with Facebook, as with many platforms, the value of spending time on the platform (consuming) depends not only on how long an individual is there, but also on the length of time the individual's friends spend there; this is known as "consumption complementarity." When one user acquired FB Credits and therefore logged more hours on the platform, other users stayed on the site longer as well. They were also more likely to acquire FB Credits themselves, further increasing their time on Facebook. As users engaged more with the platform, Facebook's value to advertisers would rise and advertising revenue would increase.

Since Facebook allowed users to acquire FB Credits by earning as well as buying them, it attracted users with less money but more time to earn credits, as well as those with less time but more money to buy credits. Both types of users would likely increase their time on Facebook as they spent their FB Credits on virtual goods. Allowing users to redeem FB Credits for the national currency would have therefore undermined Facebook's objective of enticing users to indulge in longer sessions on the platform. Allowing users to transfer FB Credits among themselves would have also undermined this goal, since users who earned the FB Credits could have sold them to other users (perhaps at a lower price), instead of using the credits to enhance their own Facebook consumption.[4] By limiting the functionality of FB Credits, Facebook sought to maximize the length of time users were on the platform and, hence, its advertising revenue.

Although eliminating the restrictions on FB Credits would have undermined this objective, it could have allowed Facebook to offer a means of payment. And if it became widely accepted, Facebook could have earned both fees and seigniorage revenue.[5] However, the profit resulting from offering payment services would not likely be larger than that coming from advertising. For example, the Bank of Canada's annual seigniorage revenue is in the range of Can$1 billion to Can$2 billion, which is dwarfed by Facebook's 2013 total revenue of almost US$8 billion (Edwards 2014).[6] Introducing a payment service may also be undesirable from a business standpoint, since Facebook would be subject to regulation as a financial institution in many countries, which could limit its use of the personal data collected from users. In the end, Facebook has to weigh the pros and cons of offering payment services.

In mid-2012, Facebook announced plans to phase out FB Credits by September 2013. This decision was driven by conflicts with large developers of Facebook games that had introduced their own digital currencies before FB Credits became available. For example, Zynga found its own currency, zCoins, to be profitable for the same reason that Facebook did with FB Credits—they increased user activity. However, to play the game, users needed to change national currency into FB Credits and then change FB Credits into zCoins. In response to users' complaints, Facebook first tried to convince Zynga to abandon zCoins and adopt FB Credits. When that effort failed, Facebook simplified the process by abandoning FB Credits.

4 Because of the nature of the activities through which users earned FB Credits, the time spent earning them did not contribute to Facebook's advertising revenue.

5 Seigniorage is the revenue earned from the issue of money. In the case of the Bank of Canada, it can be calculated as the difference between the revenue earned on a portfolio of Government of Canada securities—in which the Bank invests the total value of all bank notes in circulation—and the cost of issuing, distributing and replacing those notes. For more details, see www.bankofcanada.ca/wp-content/uploads/2010/11/seigniorage.pdf.

6 Almost all of Facebook's revenue comes from advertising. Although Facebook's user population is larger than the population of Canada, only a small fraction of that user population had ever used FB Credits.

Table 1: Summary of attributes of selected platform-based digital currencies

Platform	Acquirability	Transferability	Redeemability
FB Credits	Both (buy and earn)	No	No
Amazon Coins	Buy	No	No
WoW gold	Earn	Yes	No
Q-coin	Both (buy and earn)	Yes	No
Linden dollars	Both (buy and earn)	Yes	Yes

This analysis of FB Credits allows us to develop a framework for assessing the functionality of platform-based digital currencies, examining not only the size and reach of a platform, but also the reasons why a platform introduces its digital currency. A platform's goal is to increase profits. Depending on the platform's business model, the role of the currency may be different, and thus the platform may equip it with different attributes, specifically whether users can (i) buy or earn the tokens (acquirability), (ii) transfer the tokens between each other (transferability), and/or (iii) redeem the tokens for national currency (redeemability). We call a currency "fully equipped" when it has all three attributes. In most cases, however, a platform prefers to limit the functionality of its currency to fit its business model.

Depending on the platform's business model, the role of the currency may be different, and thus the platform may equip it with different attributes

For a digital currency to be used outside the platform as a means of payment, it must meet two conditions. First, it must be equipped with the attributes just described, which could make it possible for people to adopt it as a currency. Second, individual market participants must decide to adopt the currency. A large existing literature (e.g., Kiyotaki and Wright (1989) and Lagos (2013)) has focused on what induces people to adopt one currency over another. This article focuses on the first condition and investigates whether proprietary Internet platforms have incentives to develop their currencies in a way that allows them to be used outside the platform.

In the remainder of this section, this framework is used to characterize the attributes of other prominent examples of platform-based digital currencies and to assess whether they could be adopted as a currency. **Table 1** summarizes the main attributes found in each of these currencies.

Amazon Coins

Since May 2013, Amazon has been giving away millions of U.S. dollars in Amazon Coins to customers who purchase its newest tablet, the second-generation Kindle Fire. However, Amazon has imposed tight restrictions on the use of its coins. They can be spent only on approved applications (apps) for the Kindle Fire and cannot be used to purchase books or other merchandise from Amazon.com. Moreover, users cannot transfer Amazon Coins to another user or redeem them for dollars.[7] These restrictions are aligned with the role of the coins in Amazon's business model, which is to improve the market position of Amazon's Kindle Fire as a platform for its apps.

Amazon is a relative latecomer to the tablet market. To make the Kindle Fire more attractive to customers, Amazon supports the development of attractive Kindle-specific apps. By offering Amazon Coins to customers (as a gift or for purchase) and limiting the spending of the coins to these apps, Amazon provides incentives to the developers to create popular apps on which the coins will be spent.[8] Allowing Amazon Coins to be a fully equipped currency would be at odds with this objective.

7 In addition to receiving US$50 worth of Amazon Coins when purchasing a Kindle Fire, users can buy coins from Amazon. However, they cannot earn them.

8 The developers (but not the users) redeem Amazon Coins for dollars.

World of Warcraft gold

World of Warcraft (WoW) is the most popular multi-player role-playing game online, with around 8 million gamers worldwide paying subscription fees. Among many activities on the platform, gamers can earn tokens, WoW gold, and use them to buy additional gear for their avatars.[9] Since gamers can buy items from other gamers, WoW gold is transferable among members within the platform. However, users acquire WoW gold only by earning it and cannot buy it with national currency, since earning WoW gold is directly related to activity on the platform. By showing items bought with WoW gold, players are displaying their level of experience and skill to other players—an important element of the game, for example, when choosing a team to go on a quest. Therefore, allowing gamers to buy the items with national currency would break the link between WoW gold and skill level, and would thus undermine the attractiveness of the game.[10] For the same reason, WoW gold is not redeemable for national currency.

Tencent's Q-coin

A popular Chinese social networking site, Tencent, introduced Q-coin to enable users to pay for virtual goods on the site (e.g., to send virtual flowers). Q-coin can be earned or bought, and can also be transferred among members of the platform, although it is not redeemable. Q-coin is an interesting example of a digital currency, because it gained traction outside of its own platform.[11]

While Q-coin was intended for the purchase of virtual goods and services provided by Tencent, it started to be used for peer-to-peer payments. Not only online merchants, but also brick-and-mortar stores started accepting Q-coin (Fowler and Qin 2007).[12] In 2008, the value of Q-coin reportedly reached several billion renminbi (RMB).[13] The Chinese government responded in June 2009 with regulation banning the exchange of a digital currency for real goods and services, in order to "limit its possible impact on the real financial system."[14]

Q-coin had the potential to be used as an alternative to national currency, despite not being redeemable. This is because transferability allowed users to indirectly redeem Q-coin by transferring it among themselves inside the platform and exchanging it for real goods and services, and unofficially for national currency, outside the platform.

Linden dollars

Linden dollars, a platform-based digital currency for the game Second Life, are a fully equipped currency, since economic activity (e.g., setting up and operating shops) is part of the game. Players earn Linden dollars by trading

9 In gaming, an avatar is the graphical representation of a user's character.

10 There is, however, a thriving "black market" outside of the WoW platform, where people buy and sell not only WoW gold, but also other items, including fully equipped avatars from higher levels. Such "impostors" are policed by the WoW community and, when discovered, expelled from the game.

11 Not enough information on Tencent's business model is available to draw firm conclusions on the rationale behind the design of Q-coin.

12 One possible explanation for why Q-coin and other innovative online payment schemes have flourished in China in recent years is that China's less-developed financial system, compared with those of advanced economies, is unable to meet all the payment needs of its consumers. For example, in 2012, the number of credit cards per capita in China was only 0.25, compared with 2.3 in Canada (CPSS 2013). China's inconvertible currency and capital controls may also provide incentives to use digital currencies.

13 See the Government of China news release at http://english.mofcom.gov.cn/aarticle/newsrelease/commonnews/200906/20090606364208.html.

14 Ibid.

with other players for virtual goods; thus, they are transferable. Players bring more Linden dollars into the game by buying them with national currency, and Linden dollars earned in the game can be redeemed for the national currency (at the exchange rate regulated by Linden Labs, the game's developer). Although fully equipped, Linden dollars are not widely used outside the platform. This highlights the point that having all of the desired attributes is not a sufficient condition for a currency to become widely accepted.

Could Platform-Based Digital Currencies Be Widely Used Outside the Platform?

The examples in this article illustrate that platform-based digital currencies may vary considerably in their design. Platforms introduce their own tokens instead of relying on the existing means of payment (e.g., credit cards), because they are able to design the currency's properties to suit their business model. For example, platform-based digital currencies could provide more flexibility in acquiring goods by allowing users to both buy and earn them within the platform (such as with FB Credits), or platforms can impose more restrictions on how these currencies are spent (as seen in the limitation of Amazon Coins to the purchase of Kindle Fire apps). These currencies also facilitate the creation of an economy in a virtual world that is separate from the one in the real world, but enhances the virtual experience (as done in World of Warcraft).

Some of the digital currencies described in this article—FB Credits, Amazon Coins and WoW gold—are too limited in their functionality to become a widely accepted means of payment. Since the respective platforms imposed these limitations to maximize profits, it is not in their best interest to issue fully equipped currencies. At the same time, Q-coin, despite not being redeemable, demonstrated its potential to be widely adopted outside of the platform in the real economy, resulting in a ban by authorities. So, what attributes might contribute to these platform-based digital currencies being widely adopted as a digital alternative to national currency?

According to our assessment, transferability appears to be the attribute that gives a digital currency the potential to become a means of payment outside its platform. Transferability is more important than how users can acquire the tokens (either by buying or earning them), or whether they can redeem them for the national currency. As seen in the examples, with transferability, individuals can buy the tokens even when officially prevented by the platform, as is done with WoW gold.[15] Individuals can also unofficially exchange the digital currency for national currency, as was done with Q-coin.

◀ *Transferability appears to be the attribute that gives a digital currency the potential to become a means of payment outside its platform*

Redeemability is not a necessary attribute for the currency to become widely accepted as a means of payment. All that is needed is the *belief* that the tokens that an individual has acquired will be accepted in the future to pay for the desired goods and services. For example, before 2009, many people had accumulated and spent thousands of Q-coins to buy real goods and services without ever exchanging them for RMB.

Yet, it is important to note that not every currency that is transferable will be used outside the platform. WoW gold is an example, and, more notably, Linden dollars, which, despite being available for over a decade and being fully equipped, have not been widely adopted outside the economy of Second Life. The issue of adoption is beyond the scope of this article and, as noted earlier, has already been discussed extensively in the literature.

15 In World of Warcraft, however, effective community policing prevents such unofficial purchases from becoming widespread.

Conclusion

For the most part, digital currencies issued by proprietary Internet platforms are unlikely to affect existing national payment systems in any significant way. Platforms introduce their currencies to enhance their business model and increase their profits. In most cases, this objective requires limiting the functionality of the platform's currency, which will prevent it from becoming a widely accepted means of payment.[16]

Digital currencies issued by proprietary Internet platforms are unlikely to affect existing national payment systems in any significant way

The online marketplace will continue to evolve, and platforms will develop innovative products and perhaps new digital currencies. Our analysis helps to identify the attribute of digital currencies that needs to be monitored most closely—transferability among users—since it provides the currency with the greatest potential to be adopted as a means of payment outside the platform. However, a digital currency will be adopted by market participants only if it is more attractive to use or better suited to meet their payment needs than existing alternatives.

16 Platforms may also change their business model to adapt to the evolution of the competitive environment. The questions of when and how this could occur are beyond the scope of this article. There is, however, extensive literature on strategic renewal that focuses on these issues (e.g., Mische (2000)).

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