Chapter 7
Blockchain Business and Its Regulation

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As the blockchain industry becomes larger, a new decentralized financial ecosystem is now developing. New financial instruments, represented by terms like tokens, coins, and ICOs are introduced to finance projects on blockchain. Blockchain is a technology that makes it possible to assign ownership of each piece of data to individuals who create that piece. As Pu and Yano (2020) points out, that may be the first step towards creating a high quality market.[1] At the same time, like a lock, blockchain is merely a technology that is designed to protect a type of property. Such a technology is of no use unless the society agrees a proper set of rules concerning

[1] See Yano (2019) for details on market quality.

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how to prevent the abuse of the technology, what should be protected and how to protect it. The present study is concerned with this issue.

Many countries are now studying how to create a new financial ecosystem in which a high quality market can be supported for blockchain products. The USA is now regulating it under the Securities Act whereas Japan is applying the Money Settlement Act and the Financial Instruments and Exchange Act. In this chapter, without going into country-specific regulatory issues, we investigate how society may deal with the new decentralized financial ecosystem from a regulatory viewpoint to create a macroeconomy with high quality markets.

To design a desirable financial system for the blockchain industry, we should examine blockchain applications from the following four perspectives.

1. Comparison between decentralized and conventional financial devices.
2. Different fundraising methods for blockchain projects.
3. Desirable regulations for current blockchain applications.
4. Regulation and self-regulation of the future blockchain industry.

Before starting our discussion, it is worth emphasizing that experts regard a completely decentralized blockchain to be ideal. In such a blockchain, although someone has central control in the developmental stage, no single entity is legally charged with responsibility to maintain and improve a blockchain (although there are organizations such as the Ethereum foundation that voluntarily maintain and improve different blockchains). Maintenance and improvement are left to development community members (most likely computer specialists), who make voluntary contributions. This clearly differs from ordinary businesses, which have owners, and even the way companies are set up.

As discussed in Chapter 1, there are two types of blockchain applications: currencies and business applications. It is not desirable to treat the two types of applications under a single regulation. In what follows, we discuss the design of regulations on blockchain applications for each of these types.

In Sect. 1 of this chapter, we discuss regulations on blockchains for currency purposes, such as Bitcoin and Bitcoin Cash. To understand why currency blockchains should be treated separately from those for business projects, it is important first to understand the difference between money and standard businesses and how they are treated in a conventional financial ecosystem. We will then cover regulations on currency blockchain.

In Sect. 2, we discuss the current state of fundraising for blockchain businesses. ICOs are often designed as a way of bypassing securities regulations; issuers have argued coins and tokens do not fall under the regulatory definition of securities. As blockchain businesses expand, however, various ICOs are regarded as securities offerings in more and more countries. To adjust to this atmosphere, some issuers of blockchain tokens have started to issue tokens more in line with securities regulations. These offerings are referred to as security token offerings (STOs).

In Sect. 3, we discuss issues in designing regulations on fundraising for blockchain businesses from the viewpoint of information disclosure. We discuss the difficulties of continuous information disclosure after the project is completed and opened to the general public.

In the long run, it may be desirable to develop a system of financial regulations and compliances that is more in line with the decentralized features of blockchain businesses. In Sect. 4, we discuss regulatory issues in a future decentralized financial ecosystem after blockchain establishes its position in the real-world economy.

1 Risky and Risk-Free Decentralized Assets

At the moment, there is no general consensus in the world on how to regulate fundraisings by blockchain businesses. The ways in which regulations are designed in many countries do not perfectly match blockchain technology. Regulators are still struggling to decide how they should deal with fundraisings for blockchain projects.

The biggest cause for this situation probably stems from the fact that the term "virtual currency" is used in a broad manner. Fundraisings for blockchain projects are associated with various instruments: Tokens, coins, and currencies. What they are is, however, very unclear.

To clarify various concepts associated with blockchain, it may be desirable to take an economic approach. From the economic viewpoint, assets can be classified into two types: risky and riskfree. To set a benchmark for our discussion, it is important to understand their difference in a simple stylized framework.

For that purpose, consider two states of nature: 1 and 2. Which of the two states of nature is realized is not known for sure, but the probabilities with which they are realized are known. In Fig. 1, the returns to a project for the cases in which states 1 and 2 are realized are measured along the horizontal and vertical axes, respectively.

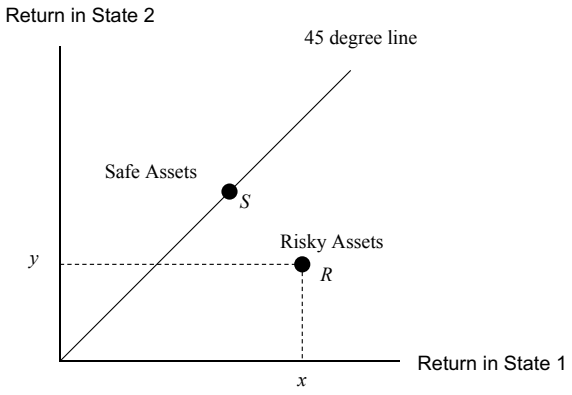

Fig. 1 Risky assets and safe assets

In Fig. 1, the return to a risk-free asset can be indicated by a point on the 45-degree line; when such a point implies that the return in one state of nature is equal to that in the other state of nature, the underlying project is said to be risk free. In contrast, the return to a risky asset can be indicated by a point off the 45-degree line. If the return at point (x, y) implies that it is equal to x in state 1 whereas it is equal to y in state 2. The underlying project in this case is said to be risky.

Stocks and bonds issued by companies are thought of as risky assets, the values of which tend to fluctuate. Money is regarded as a risk-free asset in the world without inflation and deflation. It is generally agreed that risky assets and risk-free asset s should be regulated separately because the nature of underlying risk differs between risky and risk-free assets.

Blockchain projects can also be classified into two types. Risk-free projects aim to create risk-free assets such as Bitcoin, Ethereum (the base currency for Ethereum), and IOTA. Although Bitcoin and Ethereum are currently subject to large risks, the nature of the risks are similar to those associated with international currencies; for that reason, they may be classified as risk-free assets. The other type aims to create various applications for online services like those provided by DApps.

1.1 Roles on Securities Markets

Traditionally, as is noted above, fundraisings for creating risk-free and risky assets are regulated under completely separate systems. To understand this separation, it is desirable to start with how businesses are started and developed into established entities.

It is a prerequisite for business investment to evaluate the business. At an early stage of an enterprise, it is not economical for market participants to gather necessary information on business prospects. In that case, a company has to rely on bank loans and its own funds. Once the business grows, it becomes economical for market participants to invest in a company after evaluating business performance. Two types of markets exist for companies at such a stage to raise funds: venture capital markets and initial public offering (IPO) markets.

In a venture capital market, companies that are not yet very established raise funds from professional investors called venture capitalists, who are specialized in investing companies at early stages. In an IPO market, companies that are well established sell their stocks to open markets in which ordinary investors, with less accurate information, participate.

1.2 Securities Regulations: From Caveat Emptor to Caveat Venditor

When the Great Depression started in 1929, many people found that it was caused by shady operations in the financial industry during the 1920s (Seligman 1982). To fix these problems, President Roosevelt established the Securities Act of 1933 and the Securities Exchange Act of 1934. The US Securities and Exchange Commission (SEC), established under the 1934 Act, adopted Rule 10b-5, which stipulated that it is illegal "for any person

(a) To employ any device, scheme, or artifice to defraud,
(b) To make any untrue statement of a material fact or to omit a material fact necessary in order to make the statements made, in the light of the circumstances under which they were made, not misleading, or
(c) To engage in any fact, practice, or course of business which operates or would operate as a fraud or deceit upon any person, in connection with the purchase or sale of any security."

From an economic viewpoint, it is desirable to maintain symmetric information between sellers and buyers; in other words, they should make their respective decisions based on common information. In general, the seller has an informational advantage with respect to an object to be traded, although in many cases the informational disparity can easily be fixed if sufficient diligence is exercised before the transaction. In certain cases, however, fixing is difficult or highly costly. This is particularly so in the case of securities transactions, in which a large informational advantage is held by the issuer of a security and insiders of a company of which the securities are on open market. The Securities Act and the Securities Exchange Act are intended to maintain informational parity in the securities market.

These Acts represent a landmark in securities regulations shifting from the long traditional rule of *caveat emptor* (let the buyer beware) to *caveat venditor* (let the seller beware). Since the eighteenth century, in the USA, it had been held that "[t]he law requires the purchaser in all cases to use the utmost diligence in the investigation of the right, title and quality of the thing to be purchased, and if he does not, then in the absence of positive fraud on the part of the vendor, he must take the goods he finds them with all faults."[2]

This conventional rule has been shifted by the Securities Act and the Securities Exchange Act, which regulates IPOs and insider trade in the stock market. Securities issuers are, as we discuss in detail in Sect. 3, required to disclose information relevant for ordinary investors in stock markets to allow them to make informed decisions.

An exception to this rule can be found in venture capital investment (private placement), in which securities are sold not in an open market but to a small number of chosen investors. Although, even in private placements, securities issuers are subject to the Securities Act, they are not required to register their securities with

[2]For old cases on *caveat emptor*, see Chandelor v. Lopus, 79 Eng. Rep. 3 (1603). Also see Lowenthal (1891).

the SEC, which is rather costly. In the case of private placements, investors are professional experts rather than ordinary investors in stock markets, in which case they can be expected to be capable of obtaining necessary information on investment target by exercising due diligence.

1.3 Money and Tokens

In ICOs (or fundraising for blockchain projects), money is often provided in exchange for a certificate called a token or a coin rather than a security. In general, coins refer to the base currency in blockchain systems. Examples are Bitcoin and Ethereum. Tokens are digital currencies that can be issued and distributed using smart contracts and Dapps on blockchains. In many cases, however, tokens and coins are not clearly distinguished.

Traditionally, token is a synonym for ticket; for example, a ticket for New York Subway used to be called a token, which was a coin-shaped metal piece. Tokens are also used in many amusement arcades.

Within a subway system or within an amusement arcade, tokens are risk-free assets. If the subway toll is 25 cents, a quarter can be used instead of a token that is sold for 25 cents. In other words, tokens and money are much the same within the subway.

In several respects, it makes good sense that investment certificates for ICOs are called tokens, instead of securities. First, blockchain projects are based on decentralization, in which sense they are completely different from centrally managed conventional enterprises in their nature. Second, it is highly costly to issue a security for fundraisers to comply with securities regulations.

1.3.1 Money and Securities Regulations

Money is the most common risk-free asset. The conventional currency system was explained in detail in Chapter 4. In nineteenth century United States, commercial banks issued banknotes that promised conversion with government-issued gold coins or government bonds and were circulated as currency. However, once a recession occurred, many individual commercial banks failed to repay the banknotes that they issued by whatever the banknotes were set to be convertible, which caused many bank runs.

To overcome this problem, the central banking system was created in 1913. The Federal Reserve Bank, established by law, started to issue dollar bills, which gradually replaced private banknotes by the 1930s. In 1933, during the Great Depression, the Federal Deposit Insurance Corporation was established, which provided insurance to deposits held by member banks. At the same time, the gold standard was abolished, whereby the fiat money system was adopted.

Risk-free assets such as currencies have not been regarded as securities and been placed outside of securities regulations. Instead, currencies are regulated by separate regulations with a different purpose. As discussed in Chapter 4, regulations on currencies aim to give and maintain trust in what the central authority circulates as a currency. In the case of a virtual currency, in contrast, trust is created by an algorithm without any involvement of the central authority. After it is put into use, a virtual currency protocol is improved and maintained on a voluntary basis by a community of software engineers.

The closer to money the service provided by a blockchain, the less likely fundraisings for the blockchain are to be subject to securities regulations. In a recent position paper, the SEC announced that if blockchain is more "immediately be used to make payments in a wide variety of contexts, or acts as a substitute for real (or fiat) currency," fundraisings for the blockchain are less likely to be regarded as a security issue. Moreover, if it is more likely that "essential tasks for development, improvement (or enhancement), operation, or promotion of the network are expected to be performed by an unaffiliated, dispersed community of network users (commonly known as a "decentralized" network)," fundraisings are less likely to be subject to securities regulations (Securities and Exchange Commission 2019a). This view reflects the unique feature of public network building to which many people contribute to without any payment for their services.

1.3.2 Token as a Ticket Under Securities Regulations

Conventional tickets, in particular for sporting events and concerts, are often traded in a secondary market. In some cases, tickets that are purchased purely for the purpose of attending an event will be sold in a secondary market if, for some reason or another, it becomes impossible for the ticket owner. In other cases, tickets are bought for scalping; that is, not for attending an event but for reselling them to those who want to attend the event at a higher price. Even if a ticket is purchased for attending an event, it is a risky asset, because it is always possible that circumstances may prevent attendance. If tickets are purchased purely for reselling, it is a speculation, in which case tickets are undoubtedly a risky asset. Thus, tickets are risky assets. However, in many countries, tickets are treated outside of securities regulations.

Because tickets are risky assets, a question has been raised as to whether tickets are subject to the securities law. For the moment, a ticket is thought of as "a commodity purchased for use or consumption" and is placed outside of the securities regulations. The SEC does not object to this interpretation.

Under the US securities regulations, investment contracts are regarded as securities. In 1946, the US Supreme Court defined an investment contract as a transaction or scheme that "involves [1] an investment of money [2] in a common enterprise [3] with profits to come solely from the efforts of others"; this standard for investment contracts is referred to as the *Howey* test.[3]

[3] "Securities and Exchange Commission v. W. J. Howey Co.," 328 U.S. 293 (1946).

It is generally considered that tickets do not pass this test and are not regarded as securities. That is, although a ticket purchase is an investment of money, it is not regarded as an investment in a common enterprise. This is because "the purchasers of tickets have no financial relationship with each other and that each purchaser's fortune relates to his or her sale of a ticket belonging solely to that purchaser."[4]

Moreover, investments that are not for profit are not considered as investment contracts. For example, according to the US Supreme Court, a contract in which you pay money only for the purpose of using a particular service with a promise that the money will be repaid when you no longer need that service is not regarded as a security.[5]

2 ICO

As noted above, many different functions are provided by what are called virtual currencies. Certain virtual currencies provide monetary function, like Bitcoin. Others function like securities of which the returns are linked with business performances. For example, one of the virtual currency exchanges, Binance, issued a virtual currency called BNB in 2017. In addition to discounted fees for trading in BNB, Binance promises buybacks of BNB tokens by spending 20% of Binance's annual profits.

2.1 Utility Tokens

During the early days of ICO funding, investments were concentrated on protocol projects that created the base of blockchain. At the stage of raising funds, it was common for a software developer to issue on Ethereum what was called an IOU token, which promised to be exchanged for a base currency coin to be created by the new blockchain project. When investors invested in IOU (monetary bond) tokens, money was sent in Ethereum (ETH) or Bitcoin (BTC) into the smart contract that the fundraiser had created on Ethereum in advance. The smart contract automatically recorded both the payment amount and the recipient's account (address) on Ethereum blockchain as well as the receipt of IOU tokens. Therefore, if the real value of the token was unclear for investors, at least the receipt of tokens was guaranteed.

The first problem in this process is that an IOU token may be regarded as a security. Once a particular protocol's base currency is in use, the IOU tokens will be exchanged for base currency coins. In some countries, those base currency coins may be recognized as securities, in which case they would become subject to securities regulations. In fear of being put under securities regulations, most ICO projects

[4] See Gonson (2003) and the SEC's response to the letter (Securities and Exchange Commission 2003).

[5] "United Housing Foundation, Inc. v. Foreman," 421 U.S. 837 (1975).

(especially protocol development projects) argued that their coins were utility tokens. According to them, in other words, they were like tickets to use the services created by the project that the issuer was to create.

If utility tokens are tickets purely to be used to receive the services of a project, they are not securities, and, as a result, placed under regulations that are looser than securities regulations. It is generally thought that fundraising by means of a utility token is appropriate in the case of projects creating completely distributed blockchain, such as Ethereum and Bitcoin. However, because creating such a project is not easy, many projects have created new virtual currencies to use for their Dapp or applications and services built by using smart contracts. Some tokens, such as the BNB token, guarantee returns by offering token buybacks.

As regulatory agencies have tightened control of token sales in many countries, more and more ICO projects no longer sell tokens to general investors, and, instead, offer only to qualified investors.

2.2 From ICO to STO

As the size of ICOs became larger, people in the financial industry became more and more involved in the virtual currency industry. Having noticed the contradiction of ICOs and securities regulations, they started raising funds by offering tokens that completely conform to securities regulations, known as security token offerings (STOs) . In September 2018, Elevated Returns, a shareholder of Regis Aspen Resort, securitized its real estate investment trust shares of St. Regis Aspen Resort by creating what is called the Aspen Coin and raised 18 million dollars by selling to eligible investors. The Aspen Coin is written on Ethereum and can be stored in Ethereum wallet. However, unlike ETH and BTC, Aspen Coins cannot be freely transferred from one wallet to another.

To fundraise using STO, it is necessary to create a new type of smart contract on Ethereum to keep the token in line with securities regulations. Such smart contracts, for example, need to restrict token trade, to record the nationalities of token purchasers, and to incorporate a system that makes it possible to reissue a password (private key) in case the original password is lost. However, implementing these functions requires the program developer to create central control over a blockchain token. If that is done, the resulting system becomes similar to the current centralized client/server network model. This pulls blockchain away from its original philosophy of decentralization. Many pure blockchain experts object to such a shift.

Ex-CEO of the largest Chinese ICO platform in 2017, James Gong, has compared STOs with WinFax. WinFax is a faxing software developed for Windows 3.x in the 1990s. It sends Windows documents directly to either a fax machine or a PC that can receive fax. Although not widely known, WinFax was a very popular program. A peculiar thing is that it transforms digital data on PC into analog data and sends it through a phone line so the data can be received by a fax machine. From the viewpoint of modern Internet users, WinFax appears to have gone against the trend of

the Internet and its technological progress to transform analog communications into digital communications. However, before society realized the revolutionary change that the Internet was about to bring to personal computing, WinFax was a useful technology as an interface between the coming digital world and the analog world that was still in use.

STO may be at a position similar to that at which WinFax was in the 1990s. In other words, STO is a device that tries to go against the strong current transforming the conventional centralized financial system into the coming decentralized system. As society becomes familiar with the decentralized financial system, STOs may become less and less popular just like WinFax, which became less popular as society became familiar with the Internet and email. WinFax has helped shift people from analog communications into digital communications. Similarly, STO may help people to get acquainted with the decentralized financial system, which is currently forming.

3 ICO and Securities Regulations

Various approaches can be considered for regulating ICOs and tokens. We focus on the features of ICOs and tokens as securities and study their regulations in that context.

3.1 Types of Tokens and Proper Regulations

ICO is a generic term for issuing electronic tokens (or simply tokens) to raise funds from the public for entrepreneurial purposes. There are various types of tokens. In addition to the IOU tokens discussed in the previous section, virtual currencies that are issued on blockchain in exchange for IOU tokens are also referred to as tokens.

Different countries adopt different classifications for tokens in light of their economic functions and purposes. Below, we explain the Swiss classification, which is relatively simple and easy to understand. In February 2018, the Swiss Financial Market Supervisory Authority (FINMA) issued a guideline that classifies tokens into three categories by focusing on their economic function and purpose. They are:

1. **Payment token**: A payment token is a synonym for a virtual currency. It is used as a means of payment for goods and services and has nothing to do with other development projects.
2. **Utility token**: A utility token is a type of ticket that is to be used for acquiring a specific digital application or service.
3. **Asset token**: An asset token is the representation of a claim concerning assets, for example, to receive dividends and interest payments from companies and income-generating businesses.

Of course, there are many real-world tokens that do not fit one of these categories. FINMA points out that some tokens have features that overlap more than one of these categories.

The security token described in the previous section is included in the asset token under the FINMA classification. An asset token is similar to stocks and corporate bonds. It gives the token holder the right to receive dividends and property distribution from the business. For this reason, FINMA specifies that asset tokens are regulated as securities. In many countries, similar asset tokens are regulated as securities. In Japan as well, under the Financial Instruments and Exchange Act, an asset token is classified as a security as a group investment scheme share (Financial Instruments and Exchange Act Article 2, paragraph 2, item 5) and is considered to be subject to that regulation.

Payment tokens are currencies, and FINMA does not treat them as securities. Bitcoin is a good example of a payment token. It is also common in many countries that tokens that do not have features other than a currency are not treated as securities.

It has been argued that utility tokens as well are not like securities because they are just like tickets for using services. FINMA also states that if the sole purpose of a token is to give the right to use digital applications, the token is not regarded as a security but as a right to use services, so long as it does not function as an investment.

In this regard, the SEC has taken a position that whether a token is regarded as a security depends on its economic substance, not whether it is called a utility token (Munchee case. Dec. 11, 2017, Exclusion order dated). This case addressed whether the token that Munchee, which operates the restaurant evaluation app used on the iPhone, attempted to issue by ICO (named "MUN token") is a security. In its white paper, which explained the business of a company planning an ICO, Munchee emphasized that the value of the token issued by the ICO was expected to appreciate because of the following business plan. The company would issue MUN tokens to the users who uploaded pictures and reviews on restaurants that they visit, and, in the future, make it possible for MUN token holders to pay at the restaurants reviewed. Moreover, the company made firm commitment to make it possible for token holders to resell their tokens in multiple secondary markets. In light of these facts, the SEC concluded that although the MUN token did not promise to pay dividends, Munchee created a reasonable expectation among purchasers of MUN tokens that its value will appreciate once the company made the software application available to the public. In this finding, the SEC followed its conventional position that a device creating a reasonable expectation that investors will benefit from the business effort of the investee is an investment contract and is categorized as a security. This shows the SEC's position that tokens creating such an expectation are regarded as a security under US law. In short, although its issuer calls it a utility token, the MUN token, creating an expectation that its value will appreciate, is regarded as a security. This agrees with the FINMA guidelines.

On April 3, 2019, the SEC announced a framework to determine whether a particular digital asset falls in the category of an "investment contract" (Securities and Exchange Commission 2019a). The SEC clearly pointed out that the conventional test, described above in relation to Munchee, applies in determining whether the

ICOs and the sales of other digital assets are covered by the Securities Act. In addition, it provided various examples that may or may not be treated as an "investment contract." At the same time, the SEC communicated that the token that TurnKey Jet (TKJ) was about to issue is not regarded as an "investment contract" for the following reasons (Securities and Exchange Commission 2019b).

- TKJ will not use any funds from Token sales to develop the TKJ Platform, Network, or App, and each of these will be fully developed and operational at the time any Tokens are sold;
- the Tokens will be immediately usable for their intended functionality (purchasing air charter services) at the time they are sold;
- TKJ will restrict transfers of Tokens to TKJ Wallets only, and not to wallets external to the Platform;
- TKJ will sell Tokens at a price of 1 USD per Token throughout the life of the Program, and each Token will represent a TKJ obligation to supply air charter services at a value of 1 USD per Token;
- If TKJ offers to repurchase Tokens, it will only do so at a discount to the face value of the Tokens (1 USD per Token) that the holder seeks to resell to TKJ, unless a court within the United States orders TKJ to liquidate the Tokens; and
- The Token is marketed in a manner that emphasizes the functionality of the Token, and not the potential for any increase in the market value of the Token.

This shows that the SEC also takes into consideration technological innovation, while assuming that whether a token falls under the Securities Act is determined on a case-by-case basis regarding factual manners. Thus, it is apparent that the SEC is trying to establish clear criteria for blockchain token issuers.

3.2 Information Disclosure

If a token is regarded as a security under the laws of a particular country, before the issuance, the issuer is required to disclose material information concerning the issuer's business, although the requirements differ across countries. There are exceptions in which this requirement does not apply; for example, the cases in which targeted investors are limited to a small number of individuals or to professional informed investors. This requirement on information disclosure is to eliminate the so-called asymmetry of information; that is, to ensure that the investors who are interested in buying the security to have all the material information that would be relevant for the valuation of the issue. In short, the main purpose is to let investors make informed decisions.

The disclosure of information at the time of a security is referred to as initial disclosure. For the case in which the issuer's business continues after the initial issuance, periodic disclosure of information is required if the issuer's security is continuously circulated on the market over time. The holders of securities often purchase a security in hopes of recovering their investments by selling it later. For

the secondary market of such securities to function properly, it is necessary for the sellers and buyers of the securities to evaluate the value of the securities based on the same information. Therefore, if issued securities are expected to be distributed, the issuers of the securities are required to periodically disclose important information on the securities. This is often referred to as continuous disclosure or ongoing disclosure.

If a token is identified as a security, the ICO for that token will usually be viewed as an act of soliciting purchases of securities to an unspecified and/or large number of people. The issuer is, therefore, required to disclose relevant information regarding the business relating to the token. Moreover, when the token is expected to be traded on the market over time, it should be assumed that the issuer will be required to disclose relevant information over time.

3.3 Blockchain Characteristics and Security Regulation Conformance

As discussed above, there are cases in which the ICOs on token are subject to securities regulations, and, therefore, to information disclosure requirements. However, as explained below, it is unclear whether applying securities regulations and requiring information disclosure is enough to protect the holders of tokens and those interested in investing in tokens.

First, there are many kinds of tokens, and their contents vary. In comparison with traditional securities such as stocks and bonds where the holder's right is legally established, it is unclear what kind of right you may obtain if you hold the token. That is why it is important to let investors know what right they will obtain and what they can do with the token. Therefore, it is undoubtedly important to require disclosure of information for token issuance. It is also possible to impose damages, criminal penalties, and administrative sanctions under securities laws on those who give false or misleading information. At this moment, there is no legal protection for a token holder's right to monitor the progress of the project, nor is the method of monitoring the progress stipulated. Under corporate law, stockholders are given the right to attend a general meeting of shareholders and make decisions on important matters and to receive business reports and financial statements. In contrast, the legal relationship between the token holders and the token issuer is unclear, for there is no legal provision for the nature of the token. As such, it is not clear what token holders can claim against the token issuer or what rights they have. At this moment, it is unclear whether any contractual relationship exists between the token holder and the token issuer, and what contents the contract, if it exists, may have. Therefore, for now, we can only take a case-by-case approach.

Second, blockchain technology is characterized by its ability to provide open-source and distributed ledgers. In a typical blockchain project, the protocol and software will be open to the public upon completion; once publicly released, the original developers cannot modify the contents freely. It is the nature of open-source

programs that, once publicly released, there are no owners of the system/network and thus no administrator can be identified. The developer is not obligated to perform maintenance after completion. Even if the developer of the project funded by an ICO is asked to perform continuous disclosure, once the project becomes public, the developer will no longer be either the owner or the administrator. Under such circumstances, it is unclear whether such continuous disclosure is possible.

Some projects do not adopt an open-source model, in which case continuous disclosure is theoretically possible. However, because problems on protocol and software are most of the time not understandable for ordinary investors, the problems arising from asymmetric information might be even more serious.

Logically speaking, it is difficult to establish the relationship between the business performance to which a token is linked and the value of the token except for asset tokens for which the distribution of dividends and a residual claim are explicitly guaranteed. If, like the MUN token issue, the token issuer explicitly explains to investors that the token value is likely to go up once the project become publicly available, it is not very clear how the token value is affected by information on the development of the project and on business performance after the public release of the project. If no clear explanation is given as to why the token value will rise, the information disclosed could become misleading rather than informative, although the positive aspect of information disclosure should not be discounted.

Third, generally speaking, it is extremely difficult for nonexperts to evaluate the success probability of a new project. This implies that if information is completely disclosed before an ICO, it is unclear whether it is permissible to accept investment from anyone. This is not limited to token issuances; the exact same issue arises in the case of investment in venture companies. In that case, experts in venture investment such as venture capital companies examine and evaluate a business model in a direct interview with an entrepreneur; this process is called due diligence. Usually, at this stage, venture companies do not seek investment from the general public but rather invite a few specific experts. For this reason, venture capital offerings of stocks are treated as an exception to the SEC's disclosure requirements. Typically, venture capital investors negotiate out a deal with entrepreneurs with respect to various rights and obligations on equity investment.

An IPO of corporate shares to the public is conducted after a company's business is expected to generate profits without big risks. In a typical IPO, an investment bank or securities company underwrites the initially offered shares; that is, they purchase the entire offer at a price negotiated right before the IPO. In the real world, some IPOs fail, meaning that the initial market price of a share is set below the negotiated price. To avoid such failures, even IPOs are subject to a process in which the investment bank or securities company fully evaluate the business of an equity issuer before the IPO.

In short, before corporate shares are made available to the general public for investment, there is a long process of evaluating companies at the stages of venture capital investment and IPO underwriting.

It could be argued that an ICO requires even deeper scrutiny of a project than an IPO, because ordinary investors are, at least at this moment, far less familiar with

the technological aspects of an ICO than general businesses that are represented by an IPO. Even if disclosure of information is sufficient for an expert's evaluation, it may not be appropriate to solicit investment from those who are not experts at the stage at which the business plan of a project is subject to a large risk.

Fourth, there is an important question as to which country's security regulations should govern an ICO. In many ICOs, investments have been made in virtual currency through the Internet; for example, MUN tokens were available to individuals not only in the USA but also in every other country. In that case, an important question is: under the regulations of which country are investors protected? In all countries, securities laws are drafted primarily to protect domestic investors. Moreover, the details of securities laws and regulations differ across countries. As a result, the regulation of ICOs involves rather messy international legal issues.

3.4 Desirable ICOs

If the future value of a token may depend on the success or failure of a particular project, it may not be appropriate to allow an issuer to solicit investment from ordinary investors before the issuer completes the project. This is also the case even if the token issuer explains that the project is not yet developed.

In practice, this concern could be substantially eliminated by treating the token as a security. If a token is recognized as a security, and if the ICO is subject to both initial and continuous disclosure of information under the securities law, it will be a considerable burden on the token issuer. As a result, token issuers will avoid an ICO, which subjects the issuer to the disclosure restrictions. Specifically, as in the case of stocks, the company will offer tokens only to certain specialists such as venture capital and prohibit the transfer of tokens by investors who have obtained tokens for the time being. A token ICO will be conducted when the development of the project has progressed considerably. At that time, issuance disclosure and subsequent disclosure will also be required if securities regulations are applied.

Even if a project is to develop an application that is absolutely distributed and decentralized, and if the developer does not have any right after the development is completed, it may have a feature of a utility token that is associated with the right to use some service offered by the software. Even in that case, if the value of the token is affected by the state of that service, continuous disclosure should be required with respect to the service, once the token starts circulating on the open market. In such continuous disclosure, care must be taken that the disclosed information does not mislead investors with respect to the relationship between the success or failure of the business and the value of the token.

For payment tokens, their values are not related to the success or failure of other projects. In that case, a token may be a security. For tokens that are not subject to securities regulations, it is not expected that ICOs will be suddenly barred. Even in that case, certain types of information should be disclosed. They are: (1) the identity and history the token issuer (and the director of the issuer if the issuer is a

corporation); (2) the current status, development schedule, and technical issues of the program/protocol; (3) the rights guaranteed by the program/protocol upon completion; (4) plans for future maintenance and the way to cover the resulting costs; and (5) methods for program/protocol modification in the future. Moreover, it is important to disclose details on the protocol and the system of protocol maintenance in the future; more specifically, for the case in which a foundation organized by experts is expected to conduct voluntary evaluations and maintenance, the process of organizing the foundation should be explained. In addition, it may be worth considering having third-party experts evaluate the program or protocol and to disclose the evaluation.

Of course, it is of utmost importance to explain the content of the token and the right that comes with ownership of the token. This implies that regardless of the type of token (i.e., whether it falls into the category of a security), it is necessary to disclose accurate information on the ICO, including: (1) the function/use of the token; (2) legal rights of token holders and legal obligations of the token issuer; (3) method of issuance (as well as future issues); (4) volume of tokens owned by the token issuer; (5) objective explanation and analysis on token value; (6) future circulation of the tokens; (7) use of funds; and (8) information on risk factors. Needless to say, it is important to make proper information disclosure so as to avoid speculative activities.

4 Towards Building a Healthy Blockchain Ecosystem

Because blockchain technology is introduced with Bitcoin, many countries are considering adopting financial regulations for the blockchain industry. Japan is no exception.

Every new business is associated with new risks. When Edison started a power company, people suffered from power failures and fires caused by electrical leakage; some people were electrocuted in avoidable careless accidents.

The aim of this book is not just to explain virtual currencies but to study blockchain technology, which by creating distributed ledgers makes it possible to safely and efficiently use personal and industrial data in production processes. Examples might include a small farmer's plant-by-plant agricultural data, health data relating to lifestyle-related diseases, and congestion data on city traffic. Blockchain technology will make it possible to utilize these types of data without intruding personal privacy and trade secrets. If such data were to become available, the amount of agricultural waste products may be reduced, middle-aged and older people could use data to modify lifestyle habits to gain health benefits, and forecasts of traffic congestion may become readily available for drivers. Furthermore, blockchain technology will open the possibility that various digital assets and utility tokens will be made available by DApps. Moreover, this technology may create a stable virtual currency that makes various micropayments possible.

Placed in this broad perspective, issues surrounding blockchain technology boil down to the choice of an ecosystem in which human life faces digital data as productive resources. Next, we consider the financing of the startup phase and the credibility of a virtual currency.

4.1 Professional Market for Financing

In the United States, on the one hand, ICO regulations are built on the Securities Act. In Japan, on the other hand, they are studied in the context of the Financial Instruments and Exchange Act. Because there is no proof of success for a business startup, the informational asymmetry between an entrepreneur and ordinary investors must be heeded. It is important to build an ecosystem in which blockchain projects are funded by professional investors, who go through careful due diligence.

An ICO is based on a business model that issues tokens to raise funds by taking advantage of the features of blockchain technology. However, just like usual startups, it is possible to raise funds from investment professionals. In light of the original philosophy of blockchain technology, at the same time, the success of a blockchain project may not depend on that of an ICO.

Silicon Valley has produced many successful Internet companies such as Hewlett Packard, Apple, and Google. In that region, there is a global concentration of venture capitalists, who actively invest in new businesses. One of the areas in which those investors have competed against each other is FinTech, which is the new applications, processes, products, or business models in the financial services industry, providing various financial services through the Internet.

In the field of FinTech, many startups competed in the early 2010s with a focus in the USA, the United Kingdom, and Ireland. After several years, however, only a very small number of projects survived. A number of venture capitalists have participated as investors in this process. However, in the end, only a handful of Silicon Valley investors specializing in FinTech have become successful. These investors, in addition to having financial knowledge, were familiar with the state of the art at the forefront of algorithm development.

It is foreseeable that the blockchain industry will follow a similar course. Investors should not only have a strong insight into a business model but also should be familiar with algorithm development in many of the areas discussed in this book. Blockchain technology has features that are unique relative to conventional targets for investment. Multiple individuals cooperate to develop algorithms and make their contents publicly available, which is often called the open-source model. The operating entity of a business that uses the algorithm may be an entity that is not even a joint-stock company. If it is not a legal entity, a completely new device is necessary to distribute the return from investments to investors. From such an ambiguity, an innovation may emerge that is suitable for projects based on blockchain technology.

4.2 Reliability of Payment Tokens

An important issue is how to keep payment tokens credible. Whether virtual currency possesses the three functions of money (the unit of value, the medium of exchange, and the store of value) depends on whether the algorithm possesses these three functions. Experiences has accumulated at monetary authorities and central banks with respect to the stabilization of the value of the existing currency system. Blockchain technology has shown that this role of monetary authorities and central banks may be substituted with an algorithm. Countries adopt different monetary policies; as a result, degrees of freedom that countries' central banks have differ across countries. The virtual currency is not subject to such restrictions. It is quite possible that a virtual currency based on blockchain technology would offer the ecosystem a more reliable currency system than the current monetary systems.

However, macro economies are constantly fluctuating and are subject to big shocks. The central bank, as the keeper of the currency, can manage such crises. It is well known that in an unprecedented situation such as the Lehman shock, stock market players in each country continue to trade by following a preset algorithm, which enlarged the existing crisis.

Over the past 10 years, Bitcoin has successfully shown its basic reliability as a currency. However, its value has fluctuated significantly. This is expected from the systematic design of Bitcoin's algorithm. Thus, a question arises as to what kind of algorithm may function better as a currency. It is an important joint task for economists and computer scientists to come up with the basis of an algorithm-based currency that people can fully trust.

4.3 Application Safety and Quality

Blockchain technology has the advantage of being able to process data in a distributed manner without giving the data to a particular group of people. If a mechanism can be created that eliminates government regulations imposing responsibility for the safety and quality of applications on specific people, blockchain technology can be put to the most efficient use. This is reflected in the opinion that STO should be transitional, which is feared to harm the healthy development of distributed algorithms.

If the application is open source, it must be assumed that the person who created the application is not responsible for managing the resulting business. How then does one ensure the safety and quality of the application?

If an application is open source, it is desirable to have a third party that always checks the safety and quality of the application, to announce potential risks, and to acknowledge that a proper fix is made. An audit corporation may provide such a service in the way that bond credit rating companies do. However, because technological progress is very fast, a peer-review system for applications may be more suitable.

In particular, the certification of personal data protection and trade secret retention can be thought of as the basis for the sound development of the blockchain industry. Even if no problem is noticed at the time of application development, it is likely to become necessary to deal with new issues on computer security, because unforeseen issues can always occur. The peer-review system may be effective for dealing with these problems.

One of the infrastructures that fostered Japanese industrialization after World War II is the Japan Industrial Standard System, which is known as the JIS mark. Although this system involved both compulsory and voluntary standards, from a certain time, a bold shift to voluntary standards was initiated so as to leave the private sector's own initiatives to evaluate the safety and quality of a product. This is because the peer-review system using private experts was, and has been, regarded as reliable and as better in promoting innovation.

If applications have a large number of users, it may be a good idea to create more than one peer-review system for quality examination. If those peer-review systems compete with each other, the quality of reviews will naturally rise, which should make it possible to evaluate applications with a high standard based on the newest technological development and the highest expertise.

It is desirable that the developers of blockchain businesses create collaboratively multiple peer-review systems and protect the safety and quality of their applications. In that way, innovation can be made active without harming the merits and potential of the distributed ledger technology.

4.4 Creation of an International Ecosystem Beyond Borders

Although civil contracts are based on the principle of freedom of contract, they must conform to various laws and regulations for the purpose of security of transactions, securing equality of parties, and safety and security of society. Blockchain technology has great advantages in freely exchanging data across borders. Given the nature of trading personal and corporate data, it is necessary to verify in advance each country's laws and regulations from various points of view, not only for investment contracts but also for user terms and conditions. In addition, in the case of an application created by open source, it must be assumed that the operating entity cannot be identified; as a result, a problem arises as to who is responsible for contracts and terms.

With regard to contracts and terms that provide services, as represented by smart contracts, there may be a need for a system that allows legal and regulatory experts in each country to examine the contents and to determine that there are no problems. While each country has one or more actors, it will also be necessary to have an international Internet network that provides information on the compatibility of each country's legal system. On the one hand, it may be a good idea to create a non-governmental international organization similar to the International Organization for Standardization (ISO) for international dispute resolution. On the other hand,

some may desire governmental involvement in such a process. We believe that the international community is at the stage where it can start a discussion on this issue.

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