

Blockchain Technology and Small and Medium Enterprises' Access to Finance

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Abstract: Small and medium enterprises (SMEs) are essential in developing the world economy. However, they face financing distress due to high information asymmetry and lack of collateral and credit. From the enterprises' sustainable development perspective in the big data era, this study explores whether and how blockchain technology can alleviate the information asymmetry problems of SMEs and further improve the convenience of accessing finance. Blockchain technology's decentralized, unchangeable, and transparent natures can reduce information asymmetry between SMEs and the financing parties. SMEs become more creditable to the bank with a more transparent share of businesses' operation information and financial conditions based on blockchain. At the same time, market investors can also learn more about the operation of corporate funds. Overall, this study provides new insights on how to use blockchain technology to increase SMEs' development efficiency by lessening information asymmetry, reducing the cost of equity and bond financing for SMEs, and effectively reducing SMEs' financing difficulties in this age of big data.

Keywords: blockchain, SMEs, information asymmetry, financial distress

1. Introduction

Small and medium enterprises (SMEs) are integral to the national economy. 90% of the world's enterprises are SMEs. In most countries, the percentage of SMEs is about 95%. They account for over 50% of the country's employment, enabling employment needs. According to the World Trade Organization (WTO, 2016), SMEs represent 55% of GDP in developed economies, proving their importance as a significant part of a country's economy. SMEs aim for profit maximization and allocative efficiency, which correspond to the economic development goal of an advancing economy. Using China as an example, SMEs play a significant role in its economy. The SMEs contributed 50% of total government revenue, 60% of GDP, 70% of technological innovation, 80% of urban employment, and 90% of total enterprises in China. The long-term continuous development of the SMEs can ensure the country's low unemployment rate, long-run economic expansion, and technological competitiveness with other countries. Their well-being positively correlates with the economy's well-being.

Despite the importance of SMEs, these enterprises face several problems. They lack high-quality human resources, have small and inefficient cash flow, and have high vulnerability in front of crises such as the coronavirus in 2019, Etc. Nevertheless, the biggest concern among all the issues is

financing difficulty, which has become the bottleneck of their development since there would be a lack of money for innovations, employment of high-standard employees, and the maintenance of business operations. There are two main reasons causing financing difficulty: (1) information asymmetry and (2) lack of collateral and credit [1].

As the importance of SMEs has been proved to be high, and the problem of financial distress is actively concerned, there is great theoretical and practical significance to analyze the SMEs' financing problems and explore the potential ways of alleviating the problem.

With the extreme popularization and development of modern Internet technology in recent years, many technologies have brought convenience to people's lives and improved company operations' efficiency, such as blockchain technology, one of the most powerful Internet technologies [2]. In this internet era, individuals demand security and fairness, and blockchain technology can complement people's needs in this aspect to some extent. Blockchain provides Internet users with decentralized transaction patterns and absolute openness of information [3]. Meanwhile, blockchain scenarios mainly lie in cryptocurrency--virtual money derived from blockchain technology and system mechanism--trading and transfer. Using blockchain technology, people can transfer money or make deals without third-party supervision, and the information becomes available to all blockchain users globally, so that information becomes transparent [4]. Users and governments have recognized the value of cryptocurrency in various countries or regions. Therefore, it has generally become a way of trading. Its advantages over traditional currencies lie in its convenience and accuracy. Every transfer is recorded in the system and cannot be tampered with in any existing way. Transactions between companies and individuals can be made public and recognized by the public [5]. In addition, blockchain can be used for on-chain cloud computing, securing information storage, recording company operations, and breaking information asymmetry. It is becoming a choice for the SMEs to solve the problem, prove their value, and reduce the information asymmetry between banks and themselves, which can help them gain more credit for financing.

Unlike previous studies, this paper mainly focuses on the impact of blockchain technology on SMEs' financing access. This study has the following contributions. First, it discusses the potential influences and changes that blockchain technology may bring to SME financing. Second, it provides a new reference perspective for SMEs. It triggers SMEs to consider the power of internet technology and the changes in enterprises' logic in a big data era. The development of technology and data services' potential is vital to reducing information asymmetry and improving financing availability.

2. Institutional Background

One of the biggest problems for SMEs is that they do not have enough collateral to help them gain enough credits from banks. Thus, the dilemma of financial constraints remains a significant problem for SMEs [6].

2.1. The Financial Constraints of SMEs

As discussed before, the importance of SMEs is too significant to be ignored by countries or regions worldwide. However, they face the same problem as well globally. Financial distress is a major obstacle to their development, which indirectly impacts their advancements in business scale and innovative approaches such as technology or medical research & invention. The stagnation of SMEs' developments at the micro aspect will lead to further macroeconomic problems, resulting in unemployment and decreased production. Thus, the reason for lacking financial access is worth discussing and studying so that reasonable solutions for future breakthroughs can be found.

2.1.1. Information Asymmetry Between SMEs and Banks

The most significant issue which creates this financing distress is the existence of information asymmetry. Specifically, information asymmetry refers to the situation where the relevant information is obtained by one party, and the other does not. As money flow and business operations are invisible, investigating and evaluating a company has a high cost. In this case, it would be tough for an SME to borrow money from the bank as the information obtained by the bank is not enough to create credit for this company [7]. The origin of information asymmetry is related to SMEs' small, economically disadvantaged nature. Specifically, the calculated financial report form is vital for a business to prove its success in profiting, developing, and operating. A reliable, comprehensive report is a powerful persuasion when a firm regards the case of loaning from banks. Companies with low cash flow and limited financial resources do not have enough business budgets to fund their finances to hire professional accountants or accounting firms- those with a high level of trust from the government or the bank. Thus, it becomes difficult for SMEs to request higher loans without financial reports that are highly convincing.

Meanwhile, when the bank conducts small and medium loans, they will have less incentive to take the investigations on SMEs because of their tiny capital amount and business size—the number of loans made is way too small for a bank while making investigations would cost the bank over the interest rates they may receive from these SME. Likely, the banks will not conduct an investigation but rather acquire collateral and lend less money to ensure low risk, such as the SMEs being unable to repay their loans.

Thus, information asymmetry arises because companies cannot provide financial reports with high confidence. At the same time, banks do not want and cannot clearly understand the operating conditions of the companies, so they cannot provide high loans. After all, sufficient collateral from the firm is the only way to ensure the credit of SMEs so that the bank can lend money.

2.1.2. Collateral Requirements of Banks

Collaterals are something pledged as security for the repayment of a loan. The SMEs will have to provide the bank with collateral to gain credit for higher loans.

The collaterals usually require the natures of high values and low price volatility, such as cars, real estate, and even factory machinery. These collaterals put businesses at high risk, as the collaterals may play a vital role in the invention and production of goods or services. By pledging their capital and assets, the SMEs stand no chance of developing or surviving if they cannot repay the loans in the short term because the collateral will be confiscated. Examples include basic factors of production (land, capital, labor), and houses are also considered valuable collateral. Indeed, pledging this asset may earn quite high credits, but no business at an early stage would risk losing it, as they need places for their business to work. If taking these risks is essential, the risks for the businesses become high, putting pressure on them as an obstacle to their growth; business owners will have to consider their decisions more conservatively, as they are too vulnerable to the requirements of repaying loans.

Another problem is that the SMEs' total quantity and value of collateral are low compared to large businesses. Even if they provide a certain amount of collateral under the high burden, the loan credit will still stay relatively low, so financial distress remains a problem for SMEs.

2.1.3. Information Asymmetry Between Investors and SMEs

In addition, investments from the market are a significant part of the financing, considering the ones interested in the company's industry or the potential of this business in the future [8]. Investments in SMEs have relatively high risk, as the company size determines its market power--too weak and too vulnerable in the market. It would most likely be proper for the investors to investigate the enterprise's

status of operation and the extent of its development. However, Most SMEs run privately, keeping most of their internal structure, operational decisions, and developments blurry. In other words, the information about themselves that is shown to the public is not accurate and detailed enough, which results in a loss of interest or high uncertainty about the company's value for investors, as they know little about the business and are uncertain with the business's actual value. Therefore, this information asymmetry leads to a lack of market investments and worsens the SMEs' financial distress.

2.2. Development and Uses of Blockchain

Satoshi Nakamoto put forward the concept of "blockchain" in 2008. Its birth means that "The blockchain is a shared public ledger on which the entire Bitcoin network relies. All confirmed transactions are included in the blockchain" [9]. Blockchain operates as a public ledger. It keeps a detailed record of every transaction and transfer made by blockchain-based cryptocurrencies, where the first and most famous among all is Bitcoin (BTC). The transaction records are nearly impossible to tamper with or delete and are entirely public to be publicly recognized by all users.

2.2.1. How Blockchain Functions

To recast the data preservation logic of blockchain: digital currency transactions or transfers on the blockchain are broadcast to blockchain users worldwide, and the transaction records are packaged into "blocks" and connected to the ends of a "chain" of blocks that can theoretically be stacked indefinitely. The chain is updated in real-time and stored on every blockchain user's device [10]. Because each block contains the cryptographic hash--a high-level mathematical topic--of the previous block, the new block can verify the correctness of previous blocks. Therefore, no information in previous blocks can be changed in any potential ways. Even if the data is corrupted or tampered with on one, ten, or even a thousand computers, the part of the corrupted blockchain will not affect the entire blockchain.

As we are familiar with traditional finance, where transferring money through the bank is a centralized process. The bank acts as a third party to authenticate the balance in the user's account to determine whether the user has enough money to transfer. If person A wants to transfer \$100 to person B even though he only has \$20 in his account, the bank is responsible for monitoring the account's contents and rejecting the transaction.

However, blockchain is "decentralized" because no third-party acts as a centralized manager to verify or manage every transaction. Unlike banks, transactions on the blockchain will be based on the transaction history of each account rather than checking the account's real-time balance [11]. If person A wants to transfer 1 Bitcoin to person B, and A has received one or more bitcoins in the history of the blockchain without another spending, then the transaction can be recognized and proceeded. Conclusively, the nature of the technology gives it unlimited potential to store essential data or record the cash flows of users safely, efficiently, and accurately.

2.2.2. Uses of Blockchain

With the continuous development of blockchain, the application of this technology has long gone beyond uses such as transactions of cryptocurrency—more and more application scenarios have been developed and created, for instance, cloud computing, data saving, software creation, Etc. Computer programmers, software developers, digital artists, videogame producers, and even farmers have explored this area to assist their work or even implant their projects or ideas within the blockchain.

The past, present, and future of blockchain are all worth discussing. It is considered a revolutionary technology that will lead to revolutionary applications. When combining the advantages of this

breakthrough with the topic of SME financing, it could be perceived that blockchain may be the key to changing SMEs' financial distress and eliminating information asymmetry.

3. The Impact of Blockchain on the Access to Finance of SMEs

The following paragraphs will explain the potential uses of blockchain from several aspects, including bank loan acquisitions, bond issuances, and stock issuance.

3.1. The Impact of Blockchain on the Bank Loan Acquisitions of SMEs

Blockchain's decentralized characteristics ensure the crypto asset's safety and reliability, which can play an important role in alleviating the information asymmetry in the financing process of enterprises. Encouraging small and medium enterprises to use a blockchain lend & loan system can help to avoid multiple procedures and transactions between financial institutions, which is very helpful in improving work efficiency [12].

Transforming the assets into crypto can enable enterprises to obtain more loan funds from banks to support their development. As the bank has verified information of a business that can prove their ability to repay the loan, they can confidently lend money. For example, if the bank has an accurate blockchain address owned by the business, it can always trace the money flow and the amount left within its account. Because they have full accuracy access to this information at any time, there would be no concern for the bank to mind potential risks such as manipulating accounts or money laundering by quick transactions, as all the transactions are traceable [13].

There are many methods for enterprises to transform and move their assets onto the blockchain with low risks and costs. Firstly, many "stablecoins" are traded among blockchain webs, which are directly synchronized with real-world currencies. For example, Circle USD (USDC), Tether USD (USDT), and Binance USD (BUSD) are all coins that have the same value as the US dollar. The companies behind these tokens have their ways of maintaining the price, either based on algorithms or reserves. Take Tether, the most used stablecoins, as an example. Their official website claims that the Tether tokens are referred to as stablecoins as they offer price stability. These tokens are pegged to a fiat currency, so owners and users don't need to be concerned about their volatility and loss of value. With sufficient reserve to keep the price correspondingly stable, the assets transforming into cryptocurrency hold their value while becoming more creditable.

3.2. The Impact of Blockchain on the Bond Issuances of SMEs

Apart from banks financing, investment from the market is also considered an important source of financing, where inventors buy bonds issued by the enterprises. However, the bond's value will be underestimated due to asymmetric information between business owners and investors, where owners are more distinct from the business's real value. In contrast, the investors have less information, so they can only make brief estimations and investigations on limited information released from the business. These limited sources of information and unreliable quality of information will increase the risk of investments, as the availability of paying back money and interest is not promised. As a result, there may be problems such as corporation default [14].

Cheng & Wang (2020) also indicated that, after transforming the enterprises' assets into crypto assets or making money transactions via blockchain, records and information about the enterprises become visible to the market. Thus, it can help reduce information asymmetry and increase investors' reliability. Indeed, this action may cause the companies to lose competitiveness compared to the same industry or market rivals. However, it is still a worthy action for SMEs because acquiring access to finance, especially from market investors, is fundamentally more important for them, who may struggle during the early development phase.

With a more outward share of information, the investors (bond buyers) will have a clearer view of the companies' financial status to make concrete investigations. Then the investment risks can be reduced. With the investigations based on the information provided, the investors can determine if the companies can afford returns for the bond.

3.3. The Impact of Blockchain on the Stock Issuance of SMEs

Throughout the process of stock issuance and investment, stakeholders may gain advantages or disadvantages as they have differentiated levels of understanding of the enterprise. This differentiated level of information acquisition becomes significant, especially when estimating the value of an enterprise [15]. If the company's real value is higher than the market's expected value, it would be more likely for the owner to sell fewer stocks. That leads to losses in investment opportunities. Alternatively, the owners would sell their stock if the market estimation is higher than its actual value. However, that action brings suspicion to the investors, as they would consider the possibility that these stocks' actual value should be much lower. The real value can hardly be proved as they do not have enough information to measure accurately.

With the same process of adapting to blockchain technology to make money transactions or store value, information asymmetry can be reduced for investors interested in investing in an SME's stock. The changes that blockchain can bring to companies' stock issuance work similarly to that of bond issuance, whether individual or organization, and can know more about the business and its financial state. Therefore, they can make accurate investment decisions after analyzing the value and potential of the enterprise. This technological use of blockchain brings a rather healthy and positive loop of competition. After information asymmetry has been reduced, the most important thing that matters is the objective performances of these enterprises [16]. As the companies no longer hide most of the information, the investors would be less worried about the value but focus on the up-to-date data that can help the investors to seek the potential of development and increase in value of the stocks.

3.4. Policy Implications

The policy implications of this study are as follows. First, the government should encourage the development and use of blockchain technology. Governmental spending is an effective stimulation to support talented human resources and market investments to take part in this brand-new area. This new industry could change the structure of the internet-related industries. Second, the government should relax the restrictions on using blockchain, especially on the non-profit institutions that aim to use blockchain technology as a service tool, rather than making investments or making illegal fundraising. If SMEs can use the technology to extend their business scale and make developments, they could contribute back to society and the government. Third, governmental regulators should also pay attention to strictly regulating the use of technology during the development of blockchain. Moreover, illegal money laundering, fundraising, and fraud should be limited.

China's legislation lags after technological progress. To achieve the goals and effects mentioned in this paper, the governments must put on the agenda the revision of laws and regulations. Such as the Law on Commercial Banks and the General Provision of Loans.

4. Conclusion

By analyzing and evaluating the financing difficulties of SMEs and the main reasons, this paper suggests using the advancing technology to solve the problem, most importantly, breaking the information asymmetry with the implant of blockchain and a decentralized financial system. With blockchain's "transparent" nature, businesses can become more creditable and outward. They can provide more accurate information, can access more financial sources. By adapting companies' data

to the blockchain, which can be stored safely on the chain, investors can further recognize the stock value. Relying on stablecoins and changing assets into crypto has become a wise choice, making business transactions and financial supply clearer, safer, and even more efficient.

Through blockchain, SMEs can be released from financial distress and overcome these rough financing procedures. They can gain more access to finance, more growth and development space, and contribute to society with job opportunities, technological advancements, and economic growth over a longer period.

This paper has several limitations, as the information is collected through different sources. The use of blockchain is still at an early stage, mainly used as a system of finance and investment, so there is a lack of real-world examples to prove this paper's logic on adapting blockchain to enterprises.

Many points are also worth exploring in the future. The effectiveness can be evaluated by analyzing real data from companies using blockchain. Also, by analyzing numerous cases, the limitations of blockchain can be figured out, thus making focused technological developments to make it more adaptable.

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