Design And Application Of Blockchain In Asset-Backed Securitization Risk Prevention

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Abstract: An increasing amount of asset-backed securitization (ABS) risk appears with the development and innovation of ABS in China. This risk, however, could be effectively reduced by the unique structure of blockchain technology. Therefore, the financing market is currently focusing on decreasing ABS risks with the combination of blockchain. Based on the domestic ABS market and risk, this article discusses the design and application of blockchain in ABS information asymmetry, supervision risk and prepayment risk prevention.

1. Application status of blockchain in ABS

Nowadays, as one of financial technology methods, blockchain has been widely adopted in the banking system. Services including supply chain finance, cross-border payment and settlement, as well as foreign exchange and transfer have all used the blockchain technology as a way of risk aversion and cost reduction in banks. As the decentration of the market caused by Internet finance, every trading entities links together directly. Although unique features of the blockchain, such as data encryption, shared ledger and consensus mechanism, are not innovative, the combination of all the above points solves the dilemma of credit mechanism unintentionally, and is applied in many financial scenarios. In addition, ABS could enable enterprises to choose the less liquid but reliable assets, such as, accounts receivable. By establishing the special purpose vehicle (SPV), enterprises can revitalize their debt and address the capital demand effectively Therefore, the ABS market has developed rapidly in China since 2014. Up to the first half of 2020, the total cumulative number of ABS products has exceeded that of 2019, and the issuance amount has reached nearly 400 billion, among which ABS issued by enterprises accounts for the largest proportion.

2. Risks of Blockchain and ABS

2.1 The Risks of Blockchain

Blockchain technology is like a distributed network, in which there are numerous nodes. Every node is associated with each other to form data blocks based on the principle of cryptography within a certain period. At the same time, it generates keys to link external commands or blocks to ensure that data cannot be altered. However, the risks of blockchain shouldn't be ignored.

2.1.1 Safety issues

As a computer-based technology, the security of blockchain is getting increasingly higher, but it is easy to be attacked by hackers, which will not only lead to the loss of data, but also the loss of abundant funds.

2.2.2 Lack of efficiency

The distributed ledger of blockchain technology makes data transmit between nodes, which reduces efficiency to some extent. The reason is that although the time required for a single data input is short, the speed for huge network transactions is far from enough. Besides, with an increase of data storage, data storage will also be a problem as the blockchain is immutability.

2.2.3 Supervision risk

For each country, blockchain is a new emerging technology and the existing financial system as well as the legal system has not been reformed accordingly. In the absence of supervision, there may be some shady deals. The reason why there exists supervision risk is the lack of central control system and all operations executed by codes which are decided by developers. So developers may modify the programming process without others' supervision.

2.2 The Risks of ABS

With the rapid growth of ABS in Chinese financial market, it could bring false prosperity while enhance the allocation of social funds. Its main risks are analyzed as follows.

2.2.1 Information Asymmetry

Information asymmetry risk, also called liquidity risk, refers to information failure because of long chain of ABS, which may cause outbreak of crisis by sell products blindly according to the failure of comprehensive information acquisition. For example, it is difficult for investors of CDO^2, who takes collateral debt obligations (CDO) as basic assets to adopt ABS again, to know the basic information, risk characteristics and structural composition of subprime mortgage-backed bonds. Because the chain is too long and the information could not reach the later level investors, on the basis of their blindly judgment of risks, investors would sell products in large scale for the sake of insurance. Then the crisis occurs.

2.2.2 The Regulatory risk

Financial innovation means breaking with the tradition, and it is always developing on the supervision edge and exceeds the regulatory practice. Moreover, mathematical-model-based financial derivatives are not accurately learned by the regulatory authorities and are not included in the scope of system monitoring. There would be no corresponding emergency measures when risks occur, and the best time to solve the crisis would be missed. Additionally, supervision risks sometimes could be caused by rating risks and moral risks. On the one hand, rating risks mainly come from the interest temptation faced by credit rating agencies, which includes two aspects. Firstly, bond issuers may provide rating agencies with tremendous amount of interest to obtain higher ratings and occupy larger markets. Furthermore, giving better ratings can keep or attract customers for the agencies. Rating companies act against investors because of these factors. Therefore, improving the management of rating agencies and strengthening external supervision is an effective way to reduce risks. On the other hand, Li Li (2018) suggests that moral hazard means that individuals and institutes purse maximization of their own interest and utility, even to damage others' interests without taking risks into account.

2.2.3 The Prepayment risk

This risk comes from the fact that the debtor has paid in advance before the prepayment time. Taking mortgage-backed securities (MBS) for an example, to use mortgage as the underlying asset would be ended earlier, if debtors repay the mortgage in advance. Reasons behind this are the change of external interest rates and the choice of internal investors.

3. Risk prevention designs

Due to the immature blockchain technology, the existing problems need to be solved with the continuous development of science and technology. Therefore, this article focuses on the design of ABS risk reduction.

3.1 Solving the information asymmetry

The issue of information asymmetry can be solved by setting up a timely and monitored blockchain involving loan originators, the special purpose entity, rating agencies to ABS, CDO and

investors, which means to form a monitored chain which could record every step or unit to deal with liquidity risks based on information transparency. Because all participants, such as issuers, SPV, investors and so on, can learn about the actual status of underlying assets in time, the possibility of issuing non-performing assets securitization and the risk of investors' blind investment has been decreased .

3.2 Improving regulatory efficiency

The distributed structure of blockchain transforms the single centralization into single-node centralization, and each node sets regulatory requirements by programming, containing the lowest rating line, end value of default, automatic repayment, etc. For instance, an alert signal will be warned when the rating of the underlying asset is lowered by one. Then, in order to reduce moral hazard and rating risk, part of the fund will be automatically repaid if the rating reaches the minimum line. Moreover, due to the characteristic of impossible modification and permanent record of blockchain technology, the regulatory authorities can set up new evaluation mechanisms based upon data and default situations to detect market turbulence earlier and put forward countermeasures in time.

3.3 Reducing prepayment risk

Utilizing data record of blockchain and big data technology analysis, people could get the external interest rate when investors repay the interest rate in advance. Besides, by adopting smart contract to set the prepayment risk value of external interest rate and a separate node to record the interest rate value of the central bank, and using programming to set a reminder , securities issuers will be reminded to react immediately when the prepayment risk value is equal to the interest rate of the central bank

4. Application

The current application of blockchain in Chinese ABS mainly includes BaiQian automobile leasing ABS, ChanganXinsheng automobile loan ABS of Baidu finance, Boshi assets of Jingdong finance and ABS of Du Xiaoman finance. The following is an example of the transaction process of Du Xiaoman financial ABS.

Du Xiaoman financial ABS mainly includes three levels: the top-level due diligence, product design, issuance, purchase, duration management and the blockchain platform in the middle, which integrates nodes of asset risk analysis and customer information, as well as the underlying level, such as issuers, rating companies, banks and accounting firms. All related information is collected into the blockchain from the bottom to top to realize the supervision, transparency, and efficiency of the whole process.

The development of a blockchain throughout the whole process can make the data transparent, reduce the risk of information asymmetry and supervise the process in time according to the data of each node. Du Xiaoman, however, does not deal with the prepayment risks. It could add another information chain in the bank node to input interest rate timely from the bank, and then use programming to realize the prepayment risk interest rate reminder.

Conclusion

The application of blockchain technology can effectively reduce the information asymmetry, supervision risk and prepayment risk of traditional ABS transaction structures. It enhances the data exchange among participants and availably improve the efficiency and quality of transactions. Additionally, the impossible modification and recording characteristics of blockchain are not only a helper for the regulatory authorities in data collection, but also provides data support for every participants to carry out product innovation, risk aversion and self-problem solving. However, because of defects and limitations of current blockchain technology, there are still problems existing in the combination of blockchain and ABS, among which cultural differences, technology

development and customer acceptance are inevitable issues (CHEN 2018).

References

[1] Chen K, Stegerean R, Trinca V. Blockchain technology applied in financial industry. Managerial Challenges of the Contemporary Society 2018; 11(1): 23-30.

[2] Cohen LR, Samuelson L, Katz H. How securitization can benefit from blockchain technology. The Journal of Structured Finance 2017; 23(2); 51-54.

[3] Zhu Y. The design and appliance of block chain and fintech in risk prevention of ABS investment [Master's thesis]. Hangzhou: Zhejiang University; 2019. p. 10-41.

[4] Guan T. Application of Block Chain in Asset Securitization Risk Control (in Chinese). New Finance 2018; 348: 27-33.

[5] Yuan Y, Wang FY. Blockchain: The state of the art and future trends. Acta Automatica Sinica 2016; 42(4): 481-494. doi: 10.16383/j.aas.2016.c160158.

[6] Qu Z. Research of application of blockchain technology on risk management of supply chain financing [Master's thesis]. Jinan: Shandong University; 2018; p. 5-11.

[7] Liu Z. Study on the application of block chain technology in accounts receivable ABS - A case study of JingDong Baitiao account receivable ABS [Master's thesis]. Kunming: Yunnan University of Finance and Economics; 2019. p.18-38.

[8] Yan J. Application research of blockchain technology in the field of asset securitization - Taking Du Xiaoman Finacial ABS as an example [Master's thesis]. Wuhuan: Central China Normal University; 2018. p. 17-36.

[9] Hunang X. A research on design of domestic security companies' asset secritization product [Master's thesis]. Xiamen: Xiamen University. 2014; p. 20-28.

[10] Zhao H, Yan Y. A study on the risk and prevention and control of asset securitization business in China (in Chinese). Shanghai Finance 2018; 12: 85-91. doi: 10.13910/j.cnki.shjr.2018.12.013