Game Studies on Accounting Entity Behavior Based on Blockchain Technology

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Abstract

Blockchain technology has been favored by various industries since its emergence because of the concept of data sharing, and the accounting industry is no exception. Integrating blockchain technology into the accounting information system can not only break the development restrictions of the accounting information system, but also realize the sharing of resource information among enterprises in the industry, including existing customers and suppliers. However, due to the openness and transparency of blockchain technology, there have been speculations similar to the free-rider problem among corporate accounting entities. The author uses game theory to analyze speculative behavior among accounting entities based on blockchain technology. Through analyzing the prisoner's dilemma, the selection tendency of the interests represented by each node on the blockchain is obtained after the game. Based on the boxed pig game analysis, it is concluded that under the influence of factors such as optimal prices, sales prices, negotiation costs, and production costs, larger companies in the same industry will take the initiative to negotiate prices with customers. By contrast, under the influence of factors such as optimal prices, purchase prices, and negotiation costs, larger companies in the same industry will first negotiate prices with suppliers. Given this analysis, in order to avoid speculative behaviors disrupting economic development, this paper will propose countermeasures including legal constraints, institutional punishments, privacy protection, policy support, etc., to achieve a smooth transition of integrating blockchain technology into the accounting information system.

CCS CONCEPTS

CCS→Information systems→Information systems applications→Decision support systems→Data analytics

Keywords

Blockchain, Accounting entity, Behavior, Prisoner's dilemma, Boxed pig game

CIAT 2020, December 4–6, 2020, Guangzhou, China

ACM ISBN 978-1-4503-8782-8/20/10…$15.00
https://doi.org/10.1145/3444370.3444621

1 Introduction

In 2008, Satoshi Nakamoto sent an email entitled Bitcoin P2P *e-cash paper*, which is considered to be the origin of the blockchain. Since then, a new technological innovation has been launched worldwide. As far as China is concerned, in December 2016, the State Council issued the *15th Five-Year Plan for National Informatization*, which is the first time that China has incorporated blockchain technology into a national plan in the form of an official document. The application of blockchain technology to accounting information systems is a direction for the development of accounting information systems in China. The use of blockchain technology to transmit data helps achieve the integrity, originality, accuracy, and traceability of the data in the transmission, fitting in with the original intention of the accounting information system research and development. However, as shown in Figure 1 and Figure 3 below, the blockchain is a decentralized peer-to-peer system in which the data of each node is transparent. The information recorded by each node, such as transaction object, transaction amount, transaction goods, transaction quantity, transaction time, payment account, etc., can be queried by other node users on the same chain. Therefore, private information such as corporate customers and suppliers is made public, which leads to speculation and even collaborative cheating among different entities in the same supply chain. In the meanwhile, different companies in the same industry can also make self-interested speculation by using the information on the customers and suppliers of companies in the same industry found on the blockchain.

2 Prisoner's dilemma game analysis among accounting entities under blockchain technology

2.1 Prisoner's dilemma model (1)

The prisoner's dilemma refers to the strategic choice of denial of guilt made by suspects A and B when facing the police's isolated interrogation. Assuming that both of them pleaded guilty, both of them will be imprisoned for 4 years; if neither of them pleaded guilty, based on the evidence at the scene, both will be imprisoned for 1 year; if one pleads guilty and the other does not plead guilty, one will be exempted while the other will be imprisoned for 7 years. The details are shown in the following table:

Table 1 Prisoner's Dilemma

Prisoner B / Prisoner A	Plead guilty	Plea not guilty
Plead guilty	（4,4）	（0,7）
Plea not guilty	（7,0）	（1,1）

Table 1 shows that both prisoner A and prisoner B have two choices, that is, whether to plead guilty or not to plead guilty. For prisoner A, if he chooses to plead guilty, he will be convicted for 4 years, and if he chooses not to plead guilty, he will be convicted for 7 years. In this case, Prisoner A is more inclined to choose to plead guilty. However, for prisoner B, when prisoner A chooses to plead guilty, if B chooses to plead guilty, B will be convicted for 4 years, and if B chooses not to plead guilty, B will be convicted for 7 years. When prisoner A chooses not to plead guilty, if B chooses to plead guilty, B will be exempted, and if B does not plead guilty, B will be convicted for 1 year. In this case, whether Prisoner A denies guilt or not, choosing to confess will be the best choice for Prisoner B. After the above game analysis, both prisoner A and prisoner B will choose to plead guilty, which is their dominant strategy.

2.2 Application of the prisoner's dilemma model

The prisoner's dilemma is a one-time game between two parties, and each party aims at maximizing benefits. As a result, neither side of the game can maximize the benefits, leading to the end of a non-cooperative game. After the blockchain technology is integrated into the accounting information system, since the transaction information of the accounting entity will be recorded in the node of the blockchain, other node users on the blockchain can directly obtain the node information. The hash puzzle makes the calculation cost of falsifying blockchain node information very high, so the node information cannot be tampered with technically and economically. If the user of a certain node in the blockchain wants to unilaterally modify the transaction data on the node to maximize their benefits, this feature determines that it is not feasible. Therefore, if anyone wants to modify the data, it requires all parties in the supply chain related to the modified data to cooperatively cheat.

2.2.1 Game assumptions

Taking the four-node users on the blockchain as an example, now there are enterprise A, customer C of enterprise A, material supplier S of enterprise A, and tax department T. Enterprise A, customer C, and material supplier S are in the same supply chain, as shown in Figure 1 below. Now make the following assumptions:

(1) Enterprise A purchases raw materials from material supplier S at the price of P_1 (excluding tax), and processes the raw materials into finished products;

(2) Enterprise A sells finished products to customer C at the price of P_2 (excluding tax);

(3) Enterprise A pays value-added tax (P_2-P_1) to the tax department T by 13%;

(4) Only value-added tax is involved in the entire transaction, and no value-added tax reduction or refund is involved;

(5) Enterprise A is the upstream enterprise of customer C and the downstream enterprise of supplier S. Customer C is a downstream company of company A and an upstream company in its supply chain. Supplier S is the upstream enterprise of enterprise A and the downstream enterprise in its supply chain. Therefore, the behavior of enterprise A can represent the behavior pattern of enterprise C and enterprise S. Here, enterprise A is taken as an example for analysis.

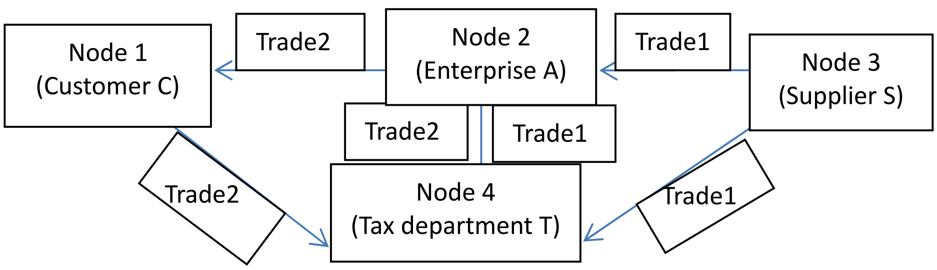

Figure 1 Node data transfer in the blockchain

2.2.2 Game model

In the traditional accounting information system, the business of enterprise A is only processed in enterprise A, and the processing results are only stored in enterprise A. Finally, Enterprise A provides purchase and sales invoices to the tax department and declares value-added tax accordingly. In the traditional system, the transaction information between enterprise A and its customers and suppliers is not transparent, so the tax department cannot obtain transaction information directly from customers and suppliers, which will allow enterprise A to cheat unilaterally. After the blockchain technology is integrated into the accounting information system, since the information of each node on the blockchain is transparent, the transaction data between enterprise A and customer C is passed to the tax department. At the same time, the transaction data of customer C located on the blockchain node will also be passed to the tax department. The data of the same transaction can be verified through the hash value during the transfer process. As shown in Figure 2, based on the independent hash algorithm, if the hash value 1 of the data obtained by the tax department from the customer or supplier is equal to the hash value 2 of the data obtained from enterprise A, it proves that the transaction data received by the tax department has not been changed. Otherwise, the transaction data received by the tax department has been changed during the transfer process.

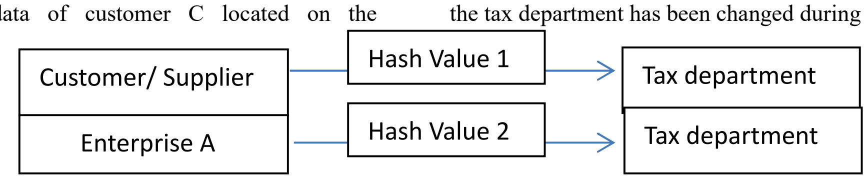

Figure 2 Calculation and comparison of the independent hash value (2)

The application of hash value makes the possibility of unilateral cheating by the middle party of the transaction, enterprise A, extremely small unless enterprise A can solve the hash puzzle. Because of this dilemma, if enterprise A wants to cheat, it must cooperate with customers and suppliers. If the customer agrees to cheat and sets the price of the blockchain node as (P_2-P_2'), and the supplier agrees to cheat and enters the price of the blockchain node as (P_1-P_1'), the results in Table 2 can be obtained:

Table 2 Dilemma of enterprise A

Supplier S / Enterprise A / Customer C	Cheat（P_1-P_1'）	No cheating（P_1）
Cheat（P_2-P_2'）	（P_2- P_1）x13%-（P_2'- P_1'） x13%	（P_2- P_1）x13%-P_2'x13%
No cheating（P_2）	（P_2- P_1）x13%+P_1' x13%	（P_2- P_1）x13%

2.2.3 Game analysis

It can be seen from Table 2, if both customer C and supplier S disagree to cheat, enterprise A will eventually pay the value-added tax of (P_2-P_1) x13%. If customer C disagrees to cheat and supplier S agrees to cheat, enterprise A will pay the value-added tax of [(P_2- P_1)x13%+P_1' x13%]. Since this amount exceeds the normal tax payment, enterprise A will not agree with this situation. If customer C agrees to cheat and supplier S disagree to cheat, enterprise A will pay the value-added tax of [(P_2- P_1)x13%-P_2'x13%]. Since this amount is lower than the normal tax payment, enterprise A will accept this result. If both customer C and supplier S agree to cheat, enterprise A will pay [(P_2- P_1)x13%-(P_2'- P_1') x13%]. Whether this amount is larger than or less than that of enterprise A's normal tax payment depends on the cheating amount agreed by customer C and supplier S. When the cheating amount by customer C is larger than that by supplier S, enterprise A will accept it, otherwise enterprise A will not accept it.

As analysis above shows, the preferred result of enterprise A is that the customer cheats and the supplier does not cheat, or the amount cheated by the customer is larger than the amount cheated by the supplier. The analysis results are also applicable to the hypothetical customer C and supplier S. That is, in each supply chain on the blockchain node, whether downstream companies cheat and the extent of the cheating will directly affect the taxes of their upstream companies. After multiple cooperative games, each company in the supply chain and its downstream companies will eventually develop a tendency to underreport or conceal transaction data at the same time. Therefore, whether the transaction information obtained by the tax department from the blockchain node is authentic or not depends on whether the downstream company of each transaction participates in collaborative cheating.

3 Boxed pig game analysis among accounting entities under blockchain technology

3.1 Boxed pig game model (1)

The boxed pig game refers to the strategic game in which the dominant pig and the subordinate pig in the box decide who will press the lever. There is a lever on one side of the box and a device that can provide food to the pigs on the other side. It takes 2 units of energy to press the lever, and then 10 units of food energy enter the device. If the subordinate pig presses the lever, the dominant pig can get 9 units of energy, and the subordinate pig can only get -1 unit of energy. If they press the lever together, the dominant pig gets 4 units of energy and the subordinate pig gets 2 units of energy. If the dominant pig presses the lever, the dominant pig gets 3 units of energy and the subordinate pig gets 5 units of energy. The details are shown in Table 3:

Table 3 Boxed pig game

Piglets / Big pig	Tact Switch	Wait
Tact Switch	（4,2）	（3,5）
Wait	（9，-1）	（0,0）

It can be seen from Table 3 that if the dominant pig and the subordinate pig do not press the lever, the profit of both will be 0, which obviously will not happen. So, they either press the lever at the same time, or one of them does it. From the perspective of the subordinate pig, if it chooses to take the initiative to press the lever, no matter what the dominant pig strategically chooses, the maximum benefit of the subordinate pig is 2 units. Since there will not be a situation where the dominant pig and the subordinate pig wait at the same time, when the subordinate pig chooses to wait, the dominant pig will press the lever and the final profit of the subordinate pig will be 5 units. Therefore, the optimal strategy for the subordinate pig is to wait. From the point of view of the dominant pig, since the profit of the subordinate pig is -1 when they simultaneously press the lever, economically speaking, the situation where the dominant pig chooses to wait will not happen. That is to say, the dominant pig can only choose to press the lever. After the above game analysis, the final choice is the dominant pig to press the lever while the subordinate pig to wait.

3.2 Application of boxed pig game model

The decentralized and peer-to-peer system architecture determines that the node information on the blockchain chain is transparent. Information transparency is the reason why blockchain technology is widely used, which is also a stumbling block that hinders its widespread application in various fields. Since node information and user information on the blockchain can be queried by other node users in real-time, this has led to the disclosure of private information of node users on the blockchain, including customer price information and supplier price information. Given this, the author here uses the theory of the boxed pig game to analyze the strategy choices of node users of different sizes in the same industry on the same blockchain when negotiating prices with customers and suppliers.

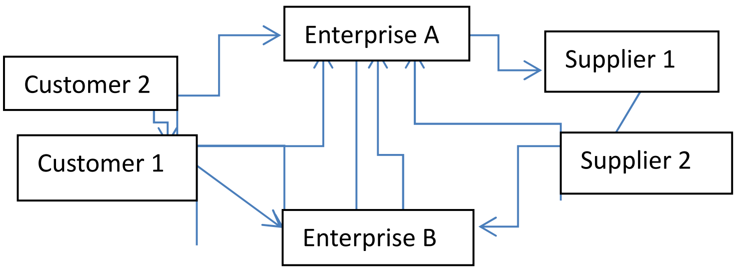

Figure 3 Decentralized and peer-to-peer system architecture

3.2.1 Boxed pig game in price negotiation between enterprises of different sizes in the same industry and customers

(1) Game assumption [3]

A. Assuming that there are only two enterprises A and B in a certain industry, enterprise A is a large company and enterprise B is a small and medium-sized company, where enterprise A and company B are respectively equivalent to the dominant pig and the subordinate pig in the boxed pig game.

B. Enterprises A and B have the same customers, and both can directly negotiate prices with customers. There are two rounds of negotiation at most.

C. Customers determine different prices according to the size of their suppliers.

D. During price negotiation, the cost of each round of negotiation is fixed and can be estimated.

E. The production cost per unit of the finished product is the same.

(2) Game model construction

Large enterprises can provide a stable and high-quality source of goods due to their strong capital and advanced technology, so they can get the best price P_1. Two rounds of negotiation are only needed when there is no price basis. On the contrary, since small and medium-sized enterprises cannot provide stable and high-quality goods, they can only get the lowest price P_2 without a price basis. When there is a price basis, a slightly higher price P_3 can be obtained after negotiation. During price negotiation, the unit product negotiation cost at each stage is the fixed cost C, and the unit production cost of the finished product is M. Assuming that the probability of enterprise A and customer for non-price-based negotiation is p, then the probability of enterprise A and the customer for price-based negotiation is 1-p, the probability of enterprise B and the customer for non-price-based negotiation is r, and the probability of enterprise B and the customer for price-based negotiation is 1-r. The game model shown in the following table can be obtained:

Table 4 Price negotiation game between enterprises A and B and customers

Enterprise B / Enterprise A	Negotiation without price basis（r）	Price based negotiation（1-r）
Negotiation without price basis（p）	（P_1-2C-M，P_2-C-M）	（P_1-2C-M，P_3-C-M）
Price based negotiation （1-p）	（P_1-C-M，P_2-C-M）	（0，0）

(3) Game analysis

Table 4 shows that the expected revenue per unit product of enterprise A is:

$$E_{\text{Enterprise A}}=rp(P_1-2C-M)+(1-r)p(P_1-2C-M)+r(1-p)(P_1-C-M)$$
$$=p(P_1-2C-M)+r(P_1-C-M)-rp(P_1-C-M)$$

Find the derivative of p, $E_{\text{Enterprise A}}'=-r(P_1-C-M)+P_1-2C-M$

From the balance point of the function, $r=(P_1-2C-M)/(P_1-C-M)=1-C/(P_1-C-M)$

From this balance point, it can be seen that the probability of enterprise B's non-price-based negotiation is affected by the optimal price P_1, the negotiated unit fixed cost C, and the unit production cost M. When C and M are constant, the higher P_1 is, the larger the probability that enterprise B will negotiate without a price basis; if P_1 is lower, the probability of enterprise B negotiating without a price basis is smaller. When P_1 and M are constant, the higher C is, the smaller the probability of enterprise B's negotiation without a price basis; if C is lower, the probability of enterprise B's negotiation without a price basis is larger. When P_1 and C are constant, the higher M is, the smaller the probability of enterprise B's negotiation without price basis; if M is lower, the larger the probability of enterprise B's negotiation without price basis.

Table 4 shows that the expected revenue per unit product of enterprise B is:

$$E_{\text{Enterprise B}}=rp(P_2-C-M)+(1-r)p(P_3-C-M)+r(1-p)(P_2-C-M)$$
$$=r(P_2-C-M)-rp(P_3-C-M)+p(P_3-C-M)$$

Find the derivative of r $E_{\text{Enterprise B}}'=-p(P_3-C-M)+P_2-C-M$

From the balance point of the function, $p=(P_2-C-M)/(P_3-C-M)$

From this balance point, it can be seen that the probability of enterprise A's non-price-based negotiation is affected by the optimal price P_2, the second-best price P_3, the negotiated unit fixed cost C, and the unit production cost M. When C and M are constant, the higher P_2 is, the larger the probability that enterprise A will negotiate without a price basis; if P_2 is lower, the probability of enterprise A negotiating without a price basis is smaller. When C and M are constant, the higher P_3 is, the smaller the probability that enterprise A will negotiate without a price basis; if P_3 is lower, the probability of enterprise A negotiating without a price basis is larger. When P_2, P_3 and M are constant, the higher C is, the smaller the probability of enterprise A's negotiation without a price basis; if C is lower, the probability of enterprise A's negotiation without a price basis is larger. When P_2, P_3 and C are constant, the higher M is, the smaller the probability of enterprise A's negotiation without price basis; if M is lower, the larger the probability of enterprise A's negotiation without price basis.

The above analysis shows that, as two enterprises unique to the same industry, enterprise A and enterprise B will consider the final negotiated price, the unit fixed cost of each negotiation, and unit production cost. If the difference between the best price and the lowest price is larger, the two enterprises will be more motivated to negotiate with customers without a price basis. If the difference between the best price and the lowest price is smaller, they will be less motivated to negotiate without a price basis. In addition, the second-best price will also affect the motivation of enterprise A to negotiate without a price basis. If the second-best price is higher, enterprise A will be less motivated to negotiate without a price basis. When the second-best price is close to the best price, enterprise A will completely give up negotiating with customers. When the second-best price is close to the lowest price, enterprise A will actively negotiate with the customer to obtain the most favorable price difference. At the same time, if the fixed cost of the negotiation and the unit production cost is relatively large, both enterprises A and B tend not to negotiate without a price basis. However, while waiting for the negotiated price of the other enterprise, business opportunities may also be lost. This loss is even more serious for a large enterprise A with economies of scale. Consequently, the final game result between the two enterprises must be that enterprise A first negotiates successfully with its customers and concludes the transaction, and the transaction information will be recorded into the node of the blockchain. At this time, enterprise B, as a user of the blockchain node, can directly obtain the price from the transaction information of enterprise A, and conduct price-based negotiations with customers.

3.2.2 Boxed pig game in price negotiation between enterprises of different sizes in the same industry and suppliers

(1) Game assumption

A. Assuming that there are only two enterprises A and B in a certain industry, enterprise A is a large company and enterprise B is a small and medium-sized company, where enterprise A and enterprise B are respectively equivalent to the dominant pig and the subordinate pig in the boxed pig game. Enterprise A has a professional negotiation team with advanced equipment and technology, while enterprise B lags behind enterprise A in terms of technology, equipment, and human resources.

B. Enterprises A and B have the same raw material suppliers, and both can directly negotiate prices with suppliers. There are two rounds of negotiation at most.

C. Raw material suppliers determine different prices according to the size of their suppliers.

D. During price negotiation, the cost of each round of negotiation is fixed and can be estimated.

E. Assume that the finished products of enterprises A and B are the same and the unit prices of finished products are the same.

(2) Game model construction

Enterprise A is a large enterprise in the industry with a stable market and mature technology, which has a stable demand for large purchases of raw materials. As a result, the lowest material purchase price S_1 can be obtained, and two rounds of negotiation are required when there is no price basis. In contrast, small and medium-sized enterprises are not yet able to conduct assembly line production and the demand for raw materials depends on market sales, so the purchase demand and frequency are not fixed. As a result, only the highest material purchase price S_2 can be obtained without a price basis, and the next best price S_3 can be obtained after negotiation if there is a price basis. During price negotiation, the unit product negotiation cost at each stage is the fixed cost D. The selling price of the unit products of enterprises A and B is N. Assuming that the probability of negotiating without a price basis between enterprise A and its supplier is q, the probability of negotiating with a price basis between enterprise A and its customer is 1-q. Assuming that the probability of negotiating without a price basis between enterprise B and the supplier is t, then the probability of negotiating with a price basis between enterprise B and the customer is 1-t. The game model shown in the following table can be obtained:

Table 5 Price negotiation game between enterprises A and B and suppliers

Enterprise B / Enterprise A	Negotiation without price basis（t）	Price based negotiation（1-t）
Negotiation without price basis（q）	（$N-S_1-2D$，$N-S_2-D$）	（$N-S_1-2D$，$N-S_3-D$）
Price based negotiation（1-q）	（$N-S_1-D$，$N-S_2-D$）	（0，0）

(3) Game analysis

Table 5 shows that the expected revenue per unit product of enterprise A is:

$$E_{\text{Enterprise A}}=tq(N-S_1-2D)+(1-t)q(N-S_1-2D)+t(1-q)(N-S_1-D)$$
$$=q(N-S_1-2D)-tq(N-S_1-D)+t(N-S_1-D)$$

Find the derivative of q, $E_{\text{Enterprise A}}'=(N-S_1-2D)-t(N-S_1-D)$

From the balance point of the function, $t=(N-S_1-2D)/(N-S_1-D)$

From this balance point, it can be seen that the probability of enterprise B's non-price-based negotiation with suppliers is affected by the unit product selling price N, the lowest purchase price S1, and the unit product negotiation cost D. When N and D are constant, the higher S_1 is, the larger the probability that enterprise B will negotiate without a price basis; if S_1 is lower, the probability of enterprise B negotiating without a price basis is smaller. When N and S_1 are constant, the higher D is, the smaller the probability of enterprise B's negotiation without a price basis; if D is lower, the probability of enterprise B's negotiation without a price basis is larger. When S_1 and D are constant, the higher N is, the larger the probability of enterprise B's negotiation without price basis; if N is lower, the small the probability of enterprise B's negotiation without price basis.

Table 5 shows that the expected revenue per unit product of enterprise B is:

$$E_{\text{Enterprise B}}=tq(N-S_2-D)+(1-t)q(N-S_3-D)+t(1-q)(N-S_2-D)$$
$$=q(N-S_3-D)-tq(N-S_3-D)+t(N-S_2-D)$$

Find the derivative of t, $E_{\text{Enterprise B}}'=(N-S_2-D)-q(N-S_3-D)$

From the balance point of the function, $q=(N-S_2-D)/(N-S_3-D)$

From this balance point, it can be seen that the probability of enterprise A's non-price-based negotiation is affected by the unit product selling price N, the highest purchase price S_2, the second-best purchase price S_3, and the unit product negotiation cost D. When N and D are constant, the higher S_2 is, the smaller the probability that enterprise A will negotiate without a price basis; if S_2 is lower, the probability of enterprise A negotiating without a price basis is larger. When N and D are constant, the higher S_3 is, the larger the probability that enterprise A will negotiate without a price basis; if S_3 is lower, the probability of enterprise A negotiating without a price basis is smaller. When N, S_2 and S_3 are constant, the higher D is, the smaller the probability of enterprise A's negotiation without a price basis; if D is lower, the probability of enterprise A's negotiation without a price basis is larger. When S_2, S_3 and D are constant, the higher N is, the larger the probability of enterprise A's negotiation without price basis; if N is lower, the smaller the probability of enterprise A's negotiation without price basis.

The above analysis shows that enterprise A and enterprise B will consider the final negotiated price, the unit fixed cost of each negotiation, and unit production cost, when deciding whether to negotiate with suppliers on a non-price basis. If the difference between the best price and the lowest price is larger, the two enterprises will be more motivated to negotiate with customers without a price basis. Otherwise, they will be less motivated. In addition, the second best price will also affect the motivation of enterprise A to negotiate without a price basis. If the second best price is lower, enterprise A will be less motivated to negotiate without a price basis. When the second best price is close to the best price, enterprise A will actively negotiate with suppliers to obtain the most favorable price difference. At the same time, if the fixed cost of each negotiation or the unit production selling price is relatively low, both enterprises A and B tend not to negotiate without a price basis, but to wait for a negotiated price from the other enterprise. However, business opportunities may also be lost while waiting. This loss is even more serious for a large enterprise A with economies of scale. Consequently, the final game result between the two enterprises must be that enterprise A first negotiates successfully with its suppliers and concludes the transaction, and the transaction information will be recorded into the node of the blockchain. At this time, enterprise

B, as a user of the blockchain node, can directly obtain the price from the transaction information of enterprise A, and conduct price-based negotiations with suppliers.

4 Countermeasures to circumvent the behavior of accounting entities under blockchain technology

The integration of blockchain technology solves the problems in the accounting information system, such as data storage, data transmission, and data sharing. However, driven by the benefit of maximizing profits, problems such as the prisoner's dilemma and the boxed pig game mentioned in the previous analysis have appeared. On this basis, the author proposes countermeasures including legal constraints, rewards, and guidance as follows:

1. Supporting legal documents are issued to restrain the enterprise by making every enterprise a node user on the blockchain chain becomes an online enterprise. The transaction information between enterprises is ensured to be recorded into the blockchain nodes promptly to avoid tax evasion between enterprises through private offline transactions.

2. Penalties are increased to avoid collaborative cheating among node users. According to the results of the game analysis of the prisoner's dilemma, the tendency of collaborative cheating among blockchain node users on the same supply chain is that downstream companies have a stronger tendency to cheat than upstream companies. Therefore, relevant departments should intensify the auditing of the transaction information and data of downstream enterprises. When necessary, they can adopt measures including increasing audit samples and changing auditors from time to time to supervise them.

3. The private key and the public key are used to encrypt and protect the node information of the blockchain as necessary. For example, in the process of calculating taxes, each enterprise with transaction records has a public key, and each enterprise has a different public key. Each enterprise its unique public key to pass the transaction information to the tax department. Public keys between enterprises are not interoperable, and tax data is not shared. In the meanwhile, the tax department owns the private key, collects the transaction information of each enterprise through the private key, and uses this as a reference basis to collect taxes.

4. Model enterprises are selected from each industry. Through policy support and setting rewards for outstanding contributions, model enterprises in the same industry are encouraged to take the initiative to negotiate prices with customers and suppliers to support smaller companies. In addition to promoting the coordinated development of the economy, it also avoids losing the opportunity to boost the economy due to the simultaneous choice of waiting, similar to the situation where the dominant pig and the subordinate pig in the boxed pig game.

SOURCE OF THE PROJECT:

(1) Accounting research project of Guangdong Province in 2019-2020: Research on the construction and innovation of accounting information system based on blockchain technology(Project No: 19-20 * 026)

(2) "Quality engineering" construction project of South China Institute of Software Engineering.GU in 2020 (Project No: JPJC202001)

(3) "Research on the game behavior of accounting entities based on blockchain technology" (Project No: ky202031), scientific research, education and teaching research project of South China Institute of Software Engineering.GU in 2020

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