Analysis of the Impact of Tax and Fee Cuts on Residents' Consumption Under Blockchain and Big Data

Yin Chang[(✉)]

Shaanxi Normal University, Xi'an, Shaanxi, China
2445795951@qq.com

Abstract. In the past two years, the state has issued many supporting policies on blockchain and big data. At the same time, the significant success of shenzhen blockchain paperless electronic invoice pilot last year makes the advantages of the combination of blockchain and big data technology gradually emerge in the current era. Since the implementation of tax reduction policy, the impact of tax reduction policy on residents' consumption has been concerned by the academic circle. Therefore, based on the technology of block chain and big data, this paper systematically investigates the direct impact of tax reduction and fee reduction on residents' consumption and the indirect transmission mechanism of economic development factors by using the generalized moment estimation method and the multiple intermediary effect model. Research shows that tax and fee cuts have an impact on household consumption through direct, indirect and coverage effects.

Keywords: Blockchain and big data technology · tax and fee cuts · Household consumption level

1 Introduction

At present our country enter the key stage of development, transformation and upgrading of industry needs rapid technology urgently need to be a key breakthrough, grasp the trend of The Times, to speed up the research and development and application of new technology, encourage technological innovation chain significant blocks and big data technology as nearly two years of new key technology, speed up its research and application will bring good news for our country According to incomplete data, by the end of November 2020, more than a dozen provinces, autonomous regions and municipalities, including Zhejiang and Jiangsu, had issued guidelines on the use of blockchain and big data technology, and many provinces had even included blockchain technology in their 13th Five-Year strategic development plans Block chain since 2018, shenzhen electronic invoice after rolled out, you can see the tencent block chain and chain big data platform we have issued a 10 million block electronic invoices, ants block chain has the ground more than 40 scenes, we see the top strong policy support, formal industry chain blocks and big data era, various industries have actively seize the historical opportunity, luck

Strengthen the application research of block chain and big data is conducive to the development of the country, but also conducive to the change of world technology, strengthen block chain and big data technology management in accounting files is conducive to economic development and technological innovation of The Times.

The global economy is struggling under the impact of the epidemic, and domestic real enterprises are making it even worse. To ensure enterprises, stabilize consumption and promote development, China has focused on supply-side structural reform and launched an unprecedented combination of measures to reduce the burden on enterprises. In 2020, China's annual average tax and fee cuts increased from 500 billion yuan to 2.5 trillion yuan. The combination of carry-over tax cuts and new tax cuts slowed tax revenue growth from 25% in 2011 to -2.3% in 2020. Since the implementation of tax reduction policy, the impact of tax reduction policy on residents' consumption has been concerned in the academic circle. Based on the technology of block chain and big data, this paper systematically investigates the direct impact of tax reduction and fee reduction on residents' consumption and the indirect transmission mechanism of economic development factors by using the generalized moment estimation method and the multiple intermediary effect model. Research shows that tax and fee cuts have an impact on household consumption through direct, indirect and coverage effects.

2 Overview of Blockchain Big Data Technology

Decentralization is the most obvious technical advantage of blockchain technology. It does not require a centralized unit or institution as the medium, but realizes a direct point-to-point interaction, making the information interaction mode of efficient and large-scale decentralized agents a reality [5].

Etheric lane can be thought of as a distributed computer, there are a lot of small nodes network, every byte code will run from the node, and then save the results on the piece of key in essence, it can be understood as a programmable free platform, not the default set of operations, such as the currency trading process, can meet the demand of users based on their flexible Settings Through this platform, it can be used for various types of decentralized blockchain applications, including but not limited to cryptocurrencies [1].

Smart contracts are developed by multiple users in a blockchain and can be used for any transaction between users. Smart contracts are essentially an agreement that specifies the rights and obligations of both parties, and developers program these rights and obligations in electronic code containing conditions that trigger the automatic execution of the contract.

Big data access speed for large capacity type High application value as the main characteristics of the data collection, first used in the IT industry, is developing fast for large source dispersion format a variety of data collection and storage, and associated analysis, discover new knowledge to create new value Promote new ability of a new generation of information technology and services business Big data must adopt distributed architecture to carry out distributed data mining for massive data. Therefore, it must rely on distributed processing of cloud computing distributed database and cloud storage virtualization technology. The strategic significance of big data technology lies

in the professional processing of huge meaningful data, which is real-time interactive query efficiency and analysis ability [2].

Block is the smallest unit on the block chain. It mainly stores the transaction information of digital currency and working computing power. Then each node of the computer contests for the right to account first, so as to obtain the reward Results of random events, after success will obtain a correct random hash, namely hash value, can be used as the encryption and verification method of public key, the corresponding information and hash value of each block will be used as the generation condition of hash value of the next block, so as to form a complete traceable chain In the above model, each piece of information recorded in the small book and the time and place of this piece of information are the contents in the block, and each block is completely arranged in chronological order [3].

In this model, everything can be exchanged, or you can even make something out of nothing, as long as everyone acknowledges that you can make what you create circulate but there are two conditions for the existence value of goods, one is the existence of use value, and the other is the existence value. If goods exist infinitely, they will lose their value. In order to prevent forgery, they will be hit with security code, which is hash random number at the beginning of creation. As shown in Fig. 1.

Asymmetric encryption is used to secure the account. The steps of asymmetric encryption are as follows: In the first step, the sender uses SHA256() to process its own character for the first time, resulting in a fixed-length string equivalent to its own character in step two, the sender uses a private key known only to him, encrypts the string length set above, and generates a string called a digital signature, which is sufficient proof of the character's authenticity. The combination of step one and step two generates such an important signature for this small character Step 3: The sender packages a small piece of paper into plaintext, a newly encrypted digital signature, and its public key [6]. Step 4: When the receiver receives these three items, first he processes a simple little text comment SHA256() to get a string, which we call string 2 Released and then the receiver using the sender's public key to decrypt the digital signature and other characters in a string of 1, compare the consistency of the string 1 and 2 can be fully proved, recipients receive little character is a little note from the assignor, in the process
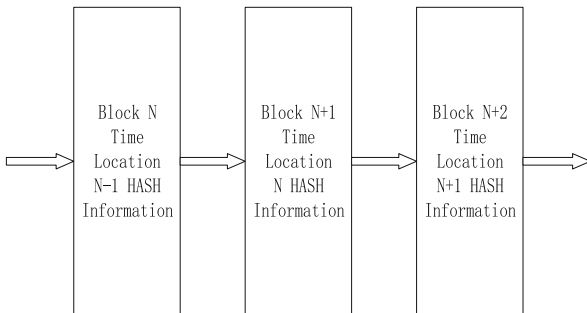

Fig. 1. Blockchain Technology Process.

of transfer not under the interference of others, is actually made up of small characters transfer page editor [4].

The principle of block chain and big data electronic invoice is as follows: all invoice-related nodes such as consumers, merchants, companies and tax bureaus are connected to the same system through distributed ledger technology, and each transaction data completed through online payment is regarded as an invoice; Invoice data generation invoicing, application for invoice reimbursement, receipt of reimbursement and other processes are recorded in the form of time stamp and synchronized to each node in the system in real time, so that transaction is invoicing, invoicing is reimbursement, at the same time, each ring can trace information can't be tampered with data will not be lost.

3   Theoretical Hypothesis and Empirical Analysis

3.1   The Path Analysis of Tax and Fee Cuts Affecting Household Consumption

The continuous and in-depth tax and fee cuts can effectively reduce the cost of enterprises, widen the price range of retail goods, and improve the actual purchasing power of residents. Tax relief can also indirectly increase the disposable income of residents and improve the future expectations of households; Finally, tax relief can enhance enterprises' sense of social responsibility, improve social public basic services, and increase residents' feeling of welfare. In general, the price effect, income effect and welfare effect have obvious positive effects on the improvement of residents' consumption. Based on this, this paper proposes the research hypothesis:

H1: Under the new development pattern, the direct effect of tax and fee cuts on household consumption is positive.

The reduction of tax burden can effectively increase the investment intention of enterprises and promote the stable development of economy. The better expectation of resident enterprises for the future will prompt them to increase the investment in scientific and technological innovation, increase the market labor demand, improve the initial labor remuneration of residents, and then increase the consumption intention and consumption ability of residents. Therefore, according to the above analysis, tax reduction and fee reduction can enhance the quality of economic development factors and improve the macroeconomic environment, and the impact of tax reduction and fee reduction on economic development factors will act on residents' consumption. Based on this, the research hypothesis is proposed:

H2: Under the new development pattern, tax and fee cuts indirectly increase household consumption through factors that positively affect economic development.
H2.1: Under the new development pattern, tax and fee cuts are conducive to economic development.
H2.2: Under the new development pattern, tax and fee cuts help enterprises innovate.
H2.3: Under the new development pattern, tax and fee cuts help create jobs in the market.
H2.4: Under the new development pattern, tax reduction and fee reduction are conducive to improving employee compensation.

3.2   Model Construction and Statistical Analysis

This paper studies the direct impact of tax reduction and fee reduction on household consumption and the existence and intensity of the mediating effect of economic development factors. It is preliminarily inferred that there is a logical connection between tax and fee reduction, economic development factors and residents' consumption level, as shown in Fig. 1.

If there is no mutual influence between multiple intermediary variables and no obvious sequential characteristics, thus it is difficult to form an intermediary chain, the parallel multiple intermediary model can be adopted. In this paper, the parallel multiple intermediary effect model is constructed based on the intermediary effect method proposed by Preacher and Hayes.

$$cons_{it} = \alpha_0 + \alpha L.cons_{it-1} + cjsjf_{it} + \gamma_k \sum_{k=1}^{n} contr_{ikt} + \mu_{it}$$

$$econ_{i1t} = c_1 + \alpha_1 jsjf_{it} + \sum_{k=1}^{n} contr_{ikt} + \delta_{i1t}$$

$$econ_{i2t} = c_2 + \alpha_2 jsjf_{it} + \sum_{k=1}^{n} contr_{ikt} + \delta_{i2t}$$

$$econ_{i3t} = c_3 + \alpha_3 jsjf_{it} + \sum_{k=1}^{n} contr_{ikt} + \delta_{i3t}$$

$$econ_{i4t} = c_4 + \alpha_4 jsjf_{it} + \sum_{k=1}^{n} contr_{ikt} + \delta_{i4t}$$

$cons_{it}$ represents the consumption of residents in year T in province I; $L.cons_{it-1}$ refers to the consumption of residents in the $i - 1$ province in the $t - 1$ year, which belongs to the lag term of the explained variable; $jsjf_{it}$ is the core explanatory variable, indicating the policy intensity of tax and fee reduction. $econ_{i1t}$ represents the situation of the economic development factor in year t in province I, j = 1, 2, 3, 4, respectively corresponding to $contr_{ikt}$ represents a set of control variables in innovation market of economic development enterprises, employment and employee compensation, I represents province I, I = 1, 2, 31; K refers to price level, elderly care infrastructure, population growth, fiscal expenditure, logistics scale, social security and other control variables that affect residents' consumption level; T represents phase T.

In terms of the estimation strategy, the dynamic panel System generalized Moment estimation (System GMM) is selected to avoid the endogenous explanatory variables and intertemporal dynamic endogeneity problems in the model because there may be endogeneity problems between tax and fee reduction and household consumption. The mediation effect model is mainly used to study the influence process and mechanism of independent variables acting on dependent variables indirectly through the mediation variables. Because of the cross-influence among the four mediating variables of

Table 1. Variable definitions.

Var	Mean	Variance	Min	Max
lncos	8.982	0.803	7.382	11.026
lnjsjf	2.470	1.383	0.000	5.298
lngdp	8.927	1.280	4.663	11.615
lnrd	10.405	1.650	3.091	13.341
lnemp	5.852	0.875	2.855	7.598
lnwage	10.338	0.691	8.660	11.890
lnsec	5.697	1.040	1.841	8.161
lninfr	9.211	1.056	5.549	11.445
lnpopu	7.465	0.799	3.219	8.749
rpi	101.204	2.345	95.500	110.560
lnexp	9.247	1.945	4.973	14.335
lnpay	7.264	1.214	3.903	9.759
odr	25.573	7.836	9.640	57.780

employee compensation market, employment, economic development and enterprise innovation, the iterative quasi-irrelevance method (SUR) is selected for regression.

Recently developed methods of mediation analysis have proposed that three similar mechanisms, mediation effect and cover-up effect, can occur when a third variable is added to the relationship between independent and dependent variables into the analysis to be specific, both the mediating effect variable and the confounding effect variable can reduce the total effect between the independent variable and the dependent variable. The difference between the two is that the mediating effect variable is in the causal chain between the independent variable and the dependent variable, while the confounding effect variable is not necessarily a causal relationship between the two. The shielding effect is contrary to the first two effects. After controlling the shielding variable, the acting force of the independent variable on the dependent variable will increase. This study will test the mediating effect test procedure suggested by Wen Zhonglin et al., and see the specific process in this paper.

Large-scale implementation of tax policy in our country of 1999, the tax revenue and tax burden begin to shrink tendency, then cuts into rapid development phase Therefore, this article selects 1999 2020 panel data of 31 provinces in China empirically, the original data mainly comes from China statistical yearbook, the National Bureau of Statistics taian database The missing data of individual years and provinces were obtained by searching the provincial statistical yearbooks of Peking University, the macroeconomic database of China, and the index data were obtained after the calculation of the original data. The specific statistical characteristics are shown in Table 1.

3.3 Analysis of Empirical Results

The regression results of Table 2 show that tax reduction and fee reduction have a significant positive impact on residents' consumption level under the conditions of controlling price level, aging dependency, infrastructure, population growth, fiscal expenditure,

Table 2. Results of regression.

Var	lncos	lnwage	lnemp	lngdp	lnrd
l_lncos	0.870*** (0.033)				
lnJsjf	0.052*** (0.016)	0.136*** (0.021)	0.159*** (0.027)	0.115*** (0.019)	0.371*** (0.044)
rpi	0.081*** (0.002)	0.049*** (0.011)			
odr	0.007*** (0.002)	0.011** (0.006)	−0.021** (0.009)	−0.003 (0.005)	0.034** (0.015)
lnpopu	0.028* (0.016)	−0.065* (0.039)	−0.010 (0.052)		0.347*** (0.086)
lnsec	−0.025** (0.012)	−0.114*** (0.025)			
lnpay			1.212*** (0.060)	0.774*** (0.048)	
lnexp				0.066*** (0.016)	
lninfr				0.348*** (0.024)	1.250*** (0.062)
C	0.212 (0.309)	16.470** (1.116)	−3.987*** (0.527)	−1.034*** (0.245)	−5.998*** (0.843)
Obs	450	201	201	201	201
R^2		0.393	0.818	0.950	0.870

Note: The brackets are t values, where *, ** and *** represent significance levels of 10%, 5% and 1% respective

logistics scale, social security and other factors. Model (1) shows that the overall impact of tax and fee reduction on household consumption is 0.052, which is significant at the statistical level of 1%.

According to the regression results of model (2) and model (5), it can be seen that tax reduction and fee reduction have significant effects on employment economic development and enterprise innovation in the employee compensation market at the statistical level of 1% To be specific, each unit increase in tax and fee reduction will increase employee's salary by about 13.6% (see Model 2), and at the same time increase market employment by 15.9% (see Model 3). Its impact on economic development is about 11.5% (see Model 4), and its impact on enterprise innovation is the highest, about 37.1% (see Model 5), that is, tax reduction The higher the level of fee reduction, the stronger the driving effect on economic development factors, which further proves that tax reduction and fee reduction can indeed stimulate the development of economic factors. The third step is to test the significance of regression coefficient B of economic development factors on resident consumption.

In conclusion, tax and fee cuts have a significant direct effect on household consumption, and hypothesis H1 is confirmed. From the perspective of individual intermediary effect, tax reduction and fee reduction can positively improve household consumption by promoting the economic development of employee compensation and enterprise innovation, assuming that H2.1, H2.3 and H2.4 in H2 can be verified. Market employment in the intermediary variable has a significant indirect effect, which belongs to the masking effect rather than the mediation effect. Hypothesis H2.2 cannot be verified.

4   Conclusions

Blockchain and big data brings us a subversive revolutionary infinite imagination space, which is a kind of transformation of production relations. The transformation is reflected in two aspects. The first is the trust mechanism based on the technical system, which does not need to be endorsed by a third party The second is value transfer, from the previous Internet data transfer, slowly become not only data transfer, and data can also give a certain value, value transfer accounting file management is of great significance in accounting work, we must ensure the integrity and correctness of accounting files Security, and in today's era, the use of blockchain technology to form a three-level management structure can effectively carry out accounting files management, to solve the current problems encountered.

Tax and fee cuts can influence residents' consumption through direct effect, so as to give full play to the price effect of tax and fee cuts In terms of income and welfare effects, tax reduction policies should focus on improving policy intensity to promote high-quality development of tax and fee cuts, reduce production costs of enterprises, accelerate transformation and upgrading of enterprises, encourage enterprises to expand production scale, and better serve household consumption from the supply side. At the same time, high-quality tax and fee cuts can improve residents' relative income, optimize residents' future expectations, and improve enterprises' consumer confidence. At the present stage, the central government can strengthen governments at all levels to attach importance to tax and fee cuts, improve the construction of laws and regulations on tax reduction and fee reduction, and increase tax and fee to improve the quality of tax and fee cuts Although the application situation of blockchain is excellent, it must be implemented in practice if we want to go further. However, due to the characteristics of blockchain technology itself, the implementation of blockchain technology means that many industry models must be adjusted accordingly, which is obviously a huge project from this point of view, the implementation of blockchain in new fields is faster than the implementation of traditional industries, and it is still a long process to use blockchain for accounting file management. Tax reduction and fee reduction can affect household consumption through direct effect, indirect effect and cover effect.

References

1. Christidis K, Devetsikiotis M (2016) Blockchains and smart contracts for the internet of things. IEEE Access 4:2292–2303
2. Iansiti M, Lakhani KR (2017) The truth about blockchain. Harvard Bus Rev 95(1):118–127

3. Kosba A, Miller A, Shi E, Wen Z, Papamanthou C (2016). Hawk: the blockchain model of cryptography and privacy-preserving smart contracts. In: 2016 IEEE symposium on security and privacy (SP). IEEE

4. Tapscott (2016) Blockchain revolution: how the technology behind bitcoin is changing money, business, and the world

5. Vukolić M (2016) The quest for scalable blockchain fabric: proof-of-work vs. BFT replication. In: Camenisch J, Kesdoğan D (eds) Open problems in network security. Springer, Cham, pp 112–125. https://doi.org/10.1007/978-3-319-39028-4_9

6. Yuan Y, Wang FY (2016) Blockchain: the state of the art and future trends. Acta Automatica Sinica