

# The micro-utility of government digital consumption coupons and its policy implications: Empirical test from Zhengzhou during the epidemic

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**Abstract:** *This study takes digital consumption coupons, a new way for the government to stimulate consumption, as the starting point, takes the issuance of digital consumption coupons in Zhengzhou city as a case, collects data through a questionnaire survey, and empirically explores the micro-utility and influencing factors of government digital consumption coupons under the new development pattern by using structural equation model. The study found that government digital consumption coupons have a positive effect on stimulating consumption through their economic value, easy availability, and publicity effectiveness; The using limitation of digital consumption coupons has an inhibitory effect on stimulating consumption. Considering this case, the continuous expansion of domestic demand should still be supported by stable income, assisted by the government's transfer payment to residents, guided by the supply of high-quality products and services, and smooth the domestic cycle.*

**Keywords:** *New development pattern; Digital coupons; Expanding domestic demand; Zhengzhou city*

## 1. Introduction

The 21st century is in the midst of unprecedented changes in a century, and the turbulent international situation and sudden public health events have made the world economy ups and downs. Unlike the trade policy of "two ends at home, big in and big out" implemented during the period of reform and opening up to the international financial crisis in 2008, China has gradually shifted its focus from the external economic cycle to the domestic economic cycle in recent years, and the construction of a new development pattern of "domestic cycle as the main body and domestic and international double cycles promoting each other" as a major strategic decision in the new period must be accelerated.

As the strategic basis for building a new development pattern, the strategy of expanding domestic demand is conducive to better meeting the needs of the people for a better life, giving full play to the advantages of super large scale market, effectively promoting a virtuous circle of economy, and effectively responding to external risks and challenges with their own stable Development (Huang Qunhui and Yang Yaowu, 2023).<sup>[1]</sup> However, under the continuous impact of the COVID-19 epidemic, the demand side of China's economy has been severely impacted in the past three years, and the downward pressure on the economy has increased sharply. At the same time, with the intensification of the global economic recession and the sharp reduction of demand for products and services in the international market, the Chinese government must carry out accurate and rapid macroeconomic regulation and control to revitalize household consumption and guide economic recovery. The digital consumption voucher policy has become one of the powerful means for the government to boost consumption during the epidemic.

A digital consumption certificate is an electronic certificate, which can be consumed at designated businesses, which belongs to a way to stimulate consumption. The implementation of its policy can help consumers reduce economic pressure, reduce the consumption threshold, and guide consumption upgrading. Digital consumption coupons are essentially the transfer payment of the government to residents' consumption, which can directly increase residents' disposable income, and then drive consumption and investment through a multiplier effect (Liu Shangxi et al., 2021).<sup>[2]</sup> As one of the government's tools to stimulate demand, consumer coupons are not new. Consumer coupons can be traced back to the food stamp assistance program in the United States in 1939. The U.S. government achieves the dual goals of public welfare assistance and dealing with economic shocks by granting food subsidies to the poor and guiding consumption. Up to now, a large number of scholars have paid attention to and

studied consumer coupons. Scholars have different opinions on the research of domestic digital consumption coupons: Lin Yifu, Shen Yan, and Sunang (2020)<sup>[3]</sup> use the double difference method, triple difference method, and synthetic control method to measure the consumption coupons issued by governments around China since March 2020. They believe that in areas with high proportion of tertiary industry, consumption coupons have significantly increased transaction activity, and consumption can be increased in consumption coupons aimed at low-income people; Ye Jianhua (2009)<sup>[4]</sup> believes that the long-term effect of consumer coupons must be supported by fiscal policy, otherwise the long-term effect will weaken, and the effect of consumer coupons through "multiplier effect" is also different due to different target industrial chains; Sun kejing and Tang tingyue (2022)<sup>[5]</sup> analyzed the overall policy effect of consumer coupons and the impact characteristics of directional issuance based on multi period dual difference model, triple difference model and synthetic control method, and found that the policy of digital consumer coupons has a significant positive effect on boosting retail consumption, but the policy effect of digital consumer coupons has lagged behind, which is related to the level of digital government construction and people's consumption preferences in cities.

At present, academic research mostly focuses on the macro policy benefits of digital consumption coupons, but there are few academic studies to verify the positive effect of government digital consumption coupons on stimulating consumption and boosting the economy through individual analysis of the economy and society. This study takes the issuance of digital consumption coupons during the epidemic period in Zhengzhou City, Henan Province, as a research case, based on the questionnaire survey sample in Zhengzhou City in February 2023, and empirically explores the micro-utility and influencing factors of government digital consumption coupons through structural equation model from a micro perspective. The innovations of this study are as follows: first, through the study of the micro-utility impact of government digital consumption coupons, this paper explores the effect of digital consumption coupons on boosting consumption from the perspective of consumers; Second, through cases, based on the research results, this paper considers how to continuously stimulate domestic demand after the epidemic, and puts forward thoughts and suggestions on how to stimulate the vitality of the demand side, coordinate high-quality supply with it, and then smooth the domestic cycle.

## **2. Research on the micro-utility impact of government digital consumption coupons**

The concept of the micro-utility of digital consumption coupons is more abstract. This study studies the micro-utility of digital consumption coupons from several of the most prominent main characteristics of digital consumption coupons and explores the impact mechanism of the utility of digital consumption coupons from four dimensions: economic value, using limitation, easy availability, and publicity effectiveness.

### **2.1. Economic value analysis of government digital consumption coupons**

The economic value of consumer coupons refers to the economic utility of consumer coupons to consumers. This study crystallizes the abstract concept of the economic value of consumer coupons into the face value of consumer coupons and the full reduction ratio of consumer coupons. Some scholars believe that there is a positive correlation between the face value of consumer coupons and the frequency of consumer purchases (Wang Xia et al., 2012).<sup>[6]</sup> In addition, the higher the face value of consumer coupons, the stronger the willingness of consumers to write off (Song Ruimin and Zhu Lihui, 2021).<sup>[7]</sup>

The full reduction ratio of consumer coupons can be understood in disguised form as the discount intensity, that is, the ratio between the face value of consumer coupons and the minimum amount that can be used. When the full reduction ratio of consumer coupons is greater, it means that the use of consumer coupons will be more cost-effective. In addition, it is proposed to introduce "willingness to use" as an intermediary variable between "economic value" and "micro-utility of consumer coupons" to explain that in addition to economic value directly affecting micro-utility, willingness to use plays a partial intermediary role between the two. In this regard, the first set of hypotheses of this study are put forward:

**H1:** There is a positive correlation between the economic value and micro-utility of government digital consumption coupons; There is a positive correlation between consumers' willingness to use digital consumption coupons and micro-utility; Willingness to use plays a partial intermediary role between economic value and micro-utility.

## ***2.2. Restrictive analysis on write-off of government digital consumption coupons***

Using limitations refers to the restrictions on the use of digital consumer coupons, including the concepts of time, place, user, and amount of use. Although consumer coupons can reduce the economic cost of citizens, using limitations, as a negative restrictive factor, will also increase the intangible cost of time and energy. Some scholars pointed out that, Specific write-off areas and limited service life will affect the write-off ratio of consumer coupons (Li Boshuo, 2020).<sup>[8]</sup> In addition, it is proposed to introduce "willingness to use" as an intermediary variable between "using limitation" and "micro-utility of consumer coupons" to explain that in addition to the direct impact of using limitation on micro-utility, willingness to use plays a partial intermediary role between the two. Therefore, the second set of assumptions of this study are put forward:

**H2:** There is a positive correlation between the using limitation of government digital consumption coupons and micro-utility; There is a positive correlation between consumers' willingness to use digital consumption coupons and micro-utility; Willingness to use plays a partial intermediary role between using limitations and micro-utility.

## ***2.3. Analysis of the Access convenience of government digital consumption coupons***

The convenience of receiving digital consumption coupons also has a great impact on citizens' consumption experience, and its convenience is mainly determined by two indicators: distribution channel and distribution time. At present, the distribution channels of digital consumption coupons mainly include online distribution. Some scholars have found that cumbersome collection methods will restrict the collection and use of digital consumption coupons for specific groups of people, such as the elderly (Zhang Mengxia and Jiang Guohai, 2021).<sup>[9]</sup> In addition, the specific ways and mechanisms of receiving through different e-commerce platforms are also different, and the scientificity and rationality of the distribution channels and receiving methods will directly affect the enthusiasm and convenience of users, thus affecting their perception of the utility of consumer coupons. Accordingly, the third hypothesis of this study is put forward:

**H3:** There is a positive correlation between the Access convenience of government digital consumption coupons and their micro-utility.

## ***2.4. Analysis of the publicity effectiveness of government digital consumption coupons***

The publicity method and timeliness of government digital consumption coupons can significantly affect consumers' behavior in receiving and using consumption coupons. At present, the publicity methods of consumer coupons mainly include social media such as WeChat and Weibo, e-commerce platforms such as Alipay, government platforms, or official media, and timely publicity of the distribution information of consumer coupons can also actively guide consumers to receive consumer coupons. Accordingly, the fourth hypothesis of this study is put forward:

**H4:** There is a positive correlation between the publicity effectiveness of government digital consumption coupons and their micro-utility.

## **3. Model building and sample collection**

### ***3.1. Model building***

Through the analysis of the mechanism of the micro-utility of government digital consumption coupons, the conceptual model of the micro-utility of Zhengzhou government digital consumption coupons (Figure 1) is constructed according to the hypothesis. The model is a structural equation model with causality, including 6 potential variables and 15 observed variables. Among the six potential variables, there is an endogenous latent variable, that is, the micro-utility of digital consumer coupons, while the five exogenous latent variables are economic value, using limitation, easy availability, publicity effectiveness, and willingness to use. Among them, willingness to use as an intermediary variable makes economic value, and using limitations indirectly affects the micro-utility of consumers through willingness to use.

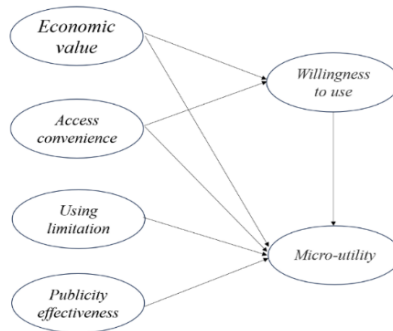


Figure 1: Schematic diagram of micro-utility model of digital consumption coupons.1

## 3.2. Questionnaire survey

### 3.2.1. Questionnaire design

Through the method of literature, this questionnaire draws lessons from the index system constructed by Yu Ying et al. (2021)<sup>[10]</sup> in the "Economic-value" dimension of consumer coupons, Zhou Lifeng (2020)<sup>[11]</sup> in the "Using limitation", "Publicity effectiveness", "Access convenience" and "Micro-utility" dimensions of consumer coupons, and Wang Xia et al. (2012)<sup>[12]</sup> in the "Willingness to use" dimension of consumer coupons. The observation variables are modified according to the actual situation. Through simple interviews with family members, friends, and social personnel at all levels, this study selected 12 observation variables that may affect consumers' perception of the micro-utility of digital consumer coupons, namely: the face value of digital consumer coupons, the proportion of full reduction of consumer coupons, restrictions on places of use, service life, applicable fields, distribution channels, collection methods, distribution quantity, effectiveness of consumer coupons publicity, timeliness of publicity, possibility of write off and possibility of collection. The utility of digital consumption coupons is evaluated from three aspects, namely, whether consumption coupons improve purchasing power, whether to buy more and more expensive goods, and whether to improve household consumption choices. All observation variables are divided into six levels, namely, economic value, using limitation, easy availability, publicity effectiveness, willingness to use, and micro-utility, which are used as potential variables of the model. For the quantification of all indicators, the Likert 5 scale method is selected.

To make the six selected latent variables manifest, the observable variable operation is carried out on them respectively. Because of the economic value of consumption coupons, we intuitively select "The face value of consumption coupons" and "The full reduction ratio of consumption coupons" for observation. This question is intuitive and easy to understand as a questionnaire and fits the public. Similarly, because of the using limitation, "The use place of consumption coupons", "The use period of consumption coupons" and "The application field of consumption coupons" are selected as questions, and respondents are invited to express their satisfaction degree. For ease of receiving, "Distribution channels of consumption coupons", "Ways of receiving consumption coupons" and "Quantity of consumption coupons" were selected to invite respondents to make comments. In terms of publicity effectiveness, "Are you satisfied with the publicity method of consumption coupons" and "Are you satisfied with the timeliness of publicity of consumption coupons" are selected to collect the attitudes of respondents; For the variable of willingness to use consumption coupons, we select "Whether you are willing to receive consumption coupons" and "Whether you are willing to cancel after receiving the coupons" to observe consumers' attitudes. Finally, for the endogenous latent variable of "Micro-utility of consumption coupons," three questions are also designed as observation variables: "Does the consumption voucher increase your purchasing power," "Does the consumption voucher make you try to buy more and more expensive goods or services," and "Does the consumption voucher improve your family's consumption choice?"

### 3.2.2. Distribution and collection of questionnaires

The main reason is that Zhengzhou is the core city of the Central Plains, with a relatively developed economy, a large population a high consumption capacity, and a large span of income levels. It can observe the impact of the same short-term stimulus policy on different groups of people. In addition, Zhengzhou also issued consumer coupons relatively early during the epidemic period, and the policy is more mature.

The questionnaire was released on major social media from February 17, 2023, to March 19, 2023,

with a period of 30 days. Social media such as WeChat group and circle of friends diffusion, City Post Bar, and Weibo are mainly selected to ensure the diversity of interviewees' characteristics.

The survey was conducted in two stages. A total of 60 valid questionnaires were collected in the initial pre-survey, and the reliability of 60 questionnaires in the pre-survey stage was tested by SPS 27. The p-value of Bartlett's ball test of the overall scale was less than 0.01, and the KMO statistical value was 0.845, indicating that the data variables collected in the pre-survey were highly correlated and suitable for further factor analysis. Then the reliability statistical test was carried out on the latent variables of six dimensions, and the Cronbach coefficient (Cronbach's  $\alpha$ ) of six dimensions was obtained. All remained between 0.85 and 0.93, indicating that the reliability was ideal.

A total of 432 questionnaires were collected within 30 days, 15 invalid questionnaires were removed, and 417 valid questionnaires were collected. The effective rate of the questionnaire was 96.5%, which met the statistical requirements of the structural equation model (SEM) method in the number of samples. In the effective questionnaire, the age group is mainly 19-45 years respondents, and the monthly salary is mainly between 2000-10000 yuan. Reliability test of the questionnaire: the Cronbach coefficient is calculated as shown in Table 1:

Table 1: Reliability test of the scale.1

Concept	Number of measurements	Cronbach's $\alpha$
Economic value	2	0.887
Using limitations	3	0.899
Access convenience	3	0.903
Publicity effectiveness	2	0.868
Willingness to use	2	0.864
Micro-utility	3	0.897

The Cronbach coefficient of the six dimensions of the questionnaire was calculated for the internal consistency test, and the value was close to 0.9, indicating that the reliability of the questionnaire data was ideal.

The validity of 417 valid samples was analyzed by KMO and Bartlett's ball test. The specific results showed that the KMO value was 0.863, and the significance level of 0.000 was less than 0.001, as shown in Table 2:

Table 2: KMO and Bartlett's ball inspection.2

KMO and Bartlett test		
KMO sampling appropriateness quantity		.863
Bartley Special sphericity test	Approximate chi-square	4305.040
	Degree of freedom	105
	Significance	.000

## 4. Hypothesis testing and analysis

### 4.1. Mediating effect test

Because this study intends to introduce willingness to use as an intermediary variable, the establishment of an intermediary effect is the key to the establishment of the model, so we need to test the intermediary effect first.

Willingness to use" plays the role of the third variable in the two paths of "micro-utility of economic value" and "Micro-utility of using limitation", or that is to say, the influence of "Economic value" and "Using limitation" on "Micro-utility" can be observed from the direct effect, and more importantly, explained through the intermediary effect of "willingness to use".

The bootstrap method is used to test the mediating effect, sampling 2000 times, and the 95% confidence interval of the effect is estimated by the deviation correction method. If the confidence interval of the test result does not contain 0, it is statistically significant, that is, the mediating effect exists. The specific analysis values are shown in Table 3.

Table 3: Intermediary effect test.3

Hypothesis	Intermediary path	Indirect effect coefficient	Bilateral test P-value	95% Confidence interval		Mediating effect
				Lower bound	Upper bound	
H1	Economic value→ Willingness to use →Micro-utility	0.039	0.002	0.046	0.204	support
H2	Using limitation→ Willingness to use→Micro-utility	0.041	0.002	0.213	-0.046	support

The empirical results show that at the 95% probability level, the confidence intervals of hypothesis H1 and hypothesis H2 are (0.046 to 0.204) and (- 0.213 to - 0.046), respectively, so it can be judged that the mediating effect of "willingness to use" in hypothesis H1 and hypothesis H2 is valid, and some mediating effects are significant.

4.2. Model fit test

On the premise that the intermediary effect is established and the reliability and validity are guaranteed, the fitting test of the micro-utility model of consumer coupons is carried out. Table 4 shows that:

( $\chi^2/df=5.006$ , GFI=0.880, RMSEA=0.098, NFI=0.905, IFI=0.922, CFI=0.922, AIC=489.531)

Table 4: Model fit index.2

Fitting index	Absolute fitting index			Relative fitting index		Information Index	
	$\chi^2/df$	GFI	RMSEA	NFI	IFI	CFI	AIC
Ideal value	1 ~ 3	>0.90	<0.08	>0.90	>0.90	>0.90	-
Hypothetical model	5.006	0.880	0.098	0.905	0.922	0.922	489.531
Saturation model	0	1	0	1	1	1	42
Independent model	52.252	0.517	0.351	0	-	0	795.777

According to the reference value, although the chi-square difference (NFI) between the hypothetical model and the independent model and the noncentral difference (CFI) between the hypothetical model and the independent model meets the requirements of the ideal value, the hypothetical model is not ideal for data fitting, and 2/D does not reach the ideal value of 3. In addition, the fit index GFI is small, indicating that the model can explain the low proportion of observed data; The failure of the RMSEA value to meet the standard shows that the gap between the theoretical model and the saturated model is slightly larger. To sum up, it is necessary to further revise the model.

To optimize the fitting index of the model, the model is modified through the modification index (MI) provided in the Amos program as a reference. According to the MI index, if we add "Economic value↔ Using limitation", "Using limitation↔ Access convenience", "Access convenience↔ Publicity effectiveness", "Economic value↔ Publicity effectiveness" and "Using limitation↔ Publicity effectiveness", we can significantly reduce the chi-square value of the model. In theory, this is due to the correlation between several pairs of latent variable relations, while previous models ignore the covariance between variables. The fitting data after model correction are shown in Table 5.

Table 5: Fit index with modified model.4

Fitting index	Absolute fitting index			Relative fitting index		Information Index	
	$\chi^2/df$	GFI	RMSEA	NFI	IFI	CFI	AIC
Ideal value	1-3	>0.90	<0.08	>0.90	>0.90	>0.90	-
Hypothetical model	5.006	0.880	0.098	0.905	0.922	0.922	489.531
Saturation model	0	1	0	1	1	1	42
Independent model	52.252	0.517	0.351	0	0	0	795.777
Modified model	2.876	0.939	0.067	0.949	0.966	0.966	240

### 4.3. Path coefficient analysis and test

The path coefficient between latent variables reveals the impact of various factors on micro-utility. As can be seen from Table 6 the critical ratio of path coefficient between economic value, willingness to use, using limitation, easy availability, publicity effectiveness, and micro-utility is between - 7.328 and 7.354, which is significant at the level of 0.001. Only the p-value of write-off restrictive micro-utility is 0.005, but it still has a good level of significance; The path coefficient of each standardization is significantly not 0, so the above five exogenous latent variables are the key factors affecting the endogenous latent variable of micro-utility. Among them, economic value has the greatest impact on willingness to use and using limitations on willingness to use, with a total path coefficient of 0.39 and - 0.39, respectively, followed by the impact of willingness to use on micro-utility, the impact of Access convenience on micro-utility and the impact of economic value on micro-utility.

To sum up, the hypothesis test is valid, in which the stronger the limitation, the lower the micro-utility of consumers, as shown in Table 6.

Table 6: Analysis of path coefficient.5

Path relationship	Standardized path coefficient	Standard error	Critical ratio	P
Economic value → Willingness to use	0.39	0.047	7.354	***
Economic value → Micro-utility	0.23	0.045	4.380	***
Using limitation → Willingness to use	-0.39	0.049	-7.328	***
Willingness to use → Micro-utility	0.30	0.057	5.331	***
Using the limitation → Micro-utility	-0.15	0.048	-2.789	**
Access convenience → Micro-utility	0.25	0.040	5.635	***
Publicity effectiveness → Micro-utility	0.16	0.041	3.583	***

Note: \*\*\* means that the significance level is less than 0.001, \*\* means that the significance level is less than 0.005

## 5. Conclusions and Policy Implications

### 5.1. Research conclusion

Through the case study of the issuance of digital consumption coupons by the Zhengzhou municipal government, this study empirically tests the micro-utility of government digital consumption coupons and explores the main factors affecting their utility. It is found that:

First, the economic value of government digital consumption coupons can positively improve the micro-utility of consumers, and the economic value mainly affects the micro-utility of consumers by affecting their willingness to use. Economic value factors account for a large proportion of consumers' overall micro-utility perception, and most consumers pay more attention to the face value of consumer coupons and the full reduction ratio of consumer coupons.

Secondly, the limitation of government digital consumption coupons will reduce the micro-utility of consumers for government digital consumption coupons and mainly affect the micro-utility of consumers by affecting their willingness to use them. A considerable number of consumers believe that the applicable areas of consumer coupons can not meet their diversified needs, and the willingness to receive and write off consumer coupons is not strong.

Thirdly, the Access convenience of government digital consumption coupons can positively improve the micro-utility of consumers. If the simpler the way of receiving digital consumption coupons, the wider the scope of users involved in the distribution platform, or the more quantity distributed, the easier it is for consumers to participate in the activities, and then the easier it is to improve the level of economic utility.

Fourthly, the publicity effectiveness of government digital consumption coupons can positively improve the micro-utility of consumers. Timely, effective, and comprehensive policy publicity can help

consumers participate in digital coupon activities.

## 5.2. Policy implications

The COVID-19 epidemic is a thing of the past. Inspired by the case of digital consumption coupons, we should focus more on how to formulate policies to expand domestic demand under normal circumstances and build a perfect domestic demand system to smooth the domestic cycle.

First of all, the remarkable effect of the digital consumption voucher policy shows that the government's transfer payment means to residents can be used as a booster to stimulate domestic demand. Through different policies, the government can effectively improve the consumption propensity of residents by increasing the income and purchasing power of individuals or families. To achieve such policy objectives, the first is to improve the social security system and mechanism, improve the coverage of social insurance benefits, provide different subsidy programs for different groups of people, and increase the consumption budget; Second, the specific design of transfer payment schemes can vary from person to person. For example, for low-income groups, subsidies for necessities of life can be issued, focusing on providing subsidies for major consumption projects to ensure people's livelihood. For middle-and high-income groups, subsidies can be provided for high-quality diversified consumption projects to encourage consumption.

Secondly, supply and demand are the two wheels of the car, which must form a virtuous circle of demand generating supply, supply guiding demand, and normalization of domestic demand must be done to improve the quality of supply. For example, in catering, accommodation, leisure, and entertainment industries with great consumption potential, we should cultivate new consumption modes and strive to create products or service supplies that can meet personalized, novel, and high-quality needs; In addition, to continuously optimize the industrial structure, the tertiary industry currently accounts for a low proportion in China's economic structure, and there is still huge room for development. At the same time, the tertiary industry has huge demand creation potential, so we should speed up the cultivation of new industries to meet the diversified consumption needs of residents.

Thirdly, traditional policy implementation methods can be combined with big data Internet. Government digital consumption coupons are issued online, received online, and canceled electronically, which greatly improves the participation of the policy. At the same time, the efficient information flow of the Internet expands the scope of policy publicity and improves the timeliness of the policy. In addition, big data can track and analyze the data to generate data in geographical, time, or industry units, to improve policy design in the later period.

Finally, although digital consumption coupons have certain policy effects in the short term, they only belong to the short-term consumption stimulus policy and still lack an effective connection with the long-term goal of expanding domestic demand. Therefore, to achieve a long-term mechanism for expanding consumption, we must build a virtuous circle of demand side supported by stable income. Income is the source of people's livelihood, only when citizens are guaranteed by stable income, consumption will be more confident and expectations will be more optimistic. Therefore, stable employment is a prerequisite for expanding domestic demand, unblocking employment channels, opening up employment blockages, promoting the circulation of talent at home and abroad, and promoting the flow of talent at home and abroad. In addition, for the main force of absorbing employment, especially private enterprises, we should increase tax reduction and fee reduction, give abundant living space, improve our resilience and anti-risk ability, and provide strong support for consolidating stock employment and absorbing new employment.

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