

Pension insurance and factor income distribution: Based on experimental evidence of China's New Rural Pension Scheme

Abstract: This paper takes the “China's New Rural Pension Scheme” (NRPS) pilot policy launched by the State Council in 2009 as a quasi-natural experiment. Based on the coverage of the pension insurance reform pilot, it employs a generalized difference-in-differences model (DID) to examine the impact of the NRPS reform on the share of labor income in China. The study finds that the NRPS reform has significantly increased the share of labor income, mitigating the negative impact of the promotion of pension insurance on the share of labor income. Mechanistically, this is mainly achieved by increasing social security expenditure and reducing the share of capital income. The effect of the NRPS reform in enhancing the share of labor income is more pronounced in impoverished areas and regions with smaller urban-rural income disparities.

1 Introduction

According to the seventh census in 2020, the proportion of people aged 60 and above and 65 and above in the total population is 18.7% and 13.5%, respectively. Due to the continuous low fertility rate and the continuous extension of life expectancy, China has entered a period of rapid aging, the "demographic dividend" gradually disappeared, and the supply constraint of labor force has been enhanced. How to actively cope with the aging population and solve the increasingly severe problem of residents' pension is an important strategic challenge for China's long-term development (Chen, 2016; He & Wang, 2024). According to the existing research, the aging society means that the scale of social labor supply shrinks, the savings rate of residents increases, causes the increase of the total capital, and affects the change rate of capital-labor supply. In the case of capital-labor substitution, population aging will increase the degree of capital intensification in the total social output, resulting in a decline in the share of labor income. Therefore, the result of aging is to increase the share of capital income and reduce the share of labor income, which will exacerbate the imbalance of factor income distribution in China (Yao & Lu, 2024; Tang & Lan, 2022). Under the current situation, the distribution structure of factor income in China has gradually tilted towards capital, which has aroused extensive attention of the academic circle. Many scholars have conducted a large number of studies on the determining mechanism of factor income distribution and its influencing factors (Zhou et al., 2010; Luo et al., 2012; Wang et al., 2018). The decline of labor income share has attracted much attention because it is an important factor that induces the structural imbalance of income distribution and determines the basic pattern of social final income distribution to a large extent (Daudey et al., 2007; Guo et al., 2012; Chen et al., 2018). Generally speaking, the income of the low-income group mainly comes from labor, while the income of the high-income group mainly comes from capital. Therefore, the decline in the share of labor income in national income means that low-income groups occupy less and less social wealth, and the gap between the rich and the poor will be further widened. At present, the Chinese economy has entered a stage of high-quality development, and we need to pay more attention to the inclusive and inclusive nature of development. From this perspective, continuously increasing the proportion of labor remuneration in factor income distribution and gradually forming a reasonable and orderly income distribution pattern is not only an inherent requirement for promoting high-quality economic development, but also an inevitable measure to achieve the strategic goal of common prosperity.

In response to the new situation of an aging society, The State Council issued the "Guiding Opinions on Carrying out the Pilot Project of New Rural Pension Scheme"(NRPS) in September 2009. In accordance with the principle of combining basic pension and individual account pension, the payment method of individual contribution, collective subsidy and government subsidy is implemented, and the basic pension is fully subsidized by the central or local governments. Farmers can receive a basic pension of at least 55 yuan per month when they reach the age of 60, and their benefits are gradually raised in accordance with the principle of gradual progress. With the strong support of governments at all levels, NRPS has been gradually and orderly promoted throughout the country, with more than 232 billion yuan of central financial funds invested within three years (Zhan et al., 2014). Existing studies have shown that the implementation of NRPS has played a positive role in improving farmers' income, reducing poverty, promoting household consumption, and enhancing life satisfaction (Zhang et al., 2014). However, there is still no research on the impact of this policy on the distribution structure of factor income in China. Riekhoff(2018) proposed that the pension security system has the effect of income redistribution. Guo(2011) discussed the impact of tax as a means of income redistribution on the distribution structure of factor income, and believed that different taxes would have an impact on the factor income of labor and capital respectively. Can the endowment insurance system, which also has redistributive utility, also deal with the inequality of factor income distribution to a certain extent, and improve the pattern of factor income distribution in our country, boost consumption, and expand domestic demand while alleviating the aging crisis?

Taking the pilot policy of NRPS carried out by The State Council in 2009 as a natural experiment, based on the coverage of the pilot reform of old-age insurance, this paper uses the difference-in-difference model (DID) to investigate the impact of NRPS reform on the income share of labor factors in China. It is found that the reform of NRPS has significantly improved the share of labor factor income in China, suppressed the negative impact of pension insurance promotion on the share of labor factor income, and foreign direct investment is conducive to improving the share of labor factor income in China. Heterogeneity test shows that the NRPS reform has a stronger impact on labor factor income in poor areas and areas with small urban-rural gap.

2 Literature review and institutional background

2.1 Related literature of pension insurance system

At present, the main ways of supporting people in China are divided into three ways: individual supporting people, children supporting people and social security supporting

people. The pension security resources studied by foreign scholars generally refer to the pension insurance or pension, which realizes the important goal of eliminating poverty and inequality through the redistribution of social income (Riekhoff, 2018). Based on the actuarial analysis method, Wang et al. (2014) pointed out that the pension security resource allocation system with the separation of urban and rural areas in China has a reverse income redistribution effect. As for the explanation of the above phenomenon, Li(2014) pointed out that, on the one hand, urban employees (high-income groups) already have relatively complete security through participation in social insurance and receive financial subsidies from the government for their own pensions. On the other hand, rural residents (lower-income groups) do not enjoy the same social pension insurance, which further aggravates the income gap between urban and rural residents. Zhang(2019) found that the basic pension insurance system for employees has a weak positive income redistribution effect on the whole. Although the IRR of participants with low contribution base is slightly higher than that of employees with medium and high contribution base, their IRR is greatly reduced due to their relatively short life expectancy.

2.2 Relevant literature on factor income distribution

Labor income share is a hot topic in academic circles and an important window to study income distribution, and the causes of its change have been widely concerned by scholars.

The financing constraints and cost changes brought by the system often affect the labor-capital investment decisions of enterprises. Using industry-level data, Zhang et al. (2016) found that the minimum wage and labor protection system in terms of employment and dismissal will increase the cost of hiring or adjusting labor for enterprises, and thus have an impact on the capital-labor ratio. This effect exists significantly in developing countries and middle-income countries, and has a greater impact on industries with a relatively high proportion of low-skilled labor. Financing constraints will also affect the investment and labor employment decisions of enterprises, and then affect the capital and labor input decisions of enterprises, and the cash flow, leverage ratio and loan interest rate of enterprises will interact with each other (Spaliara, 2009).

In order to regulate factor income share disparities, the tax system is regarded as one of the important tools and is widely used globally. Among them, indirect tax may affect labor factor income through tax burden distribution. Because indirect taxes do not directly affect business owners, the corporate sector has a distinct advantage in the VAT

reform process, with lower tax increases than the household sector, regardless of how the VAT rate is adjusted (Picos-Sanchez & Thomas, 2015). Smart & Bird(2009) based on Canada's retail tax reform to levy value-added tax, found that this tax reform significantly increased investment in machinery and equipment in pilot areas, at least in the short term. Benzartie & Carloni (2019) found that after the VAT reform of the catering industry in France, business owners received a 55% tax reduction dividend, and practitioners, consumers and raw material suppliers shared the rest. Peng(2022) found that the policy of "replacing business tax with value-added tax" significantly weakened the labor income share, and the tax design of capital factor bias deduction was the direct cause of the weakening of the labor income share.

2.3 Pension insurance and labor income share

In theory, as a social insurance jointly paid by enterprises and employees, pension insurance increases the employment cost of employees to a certain extent. If enterprises can only transfer part of the cost to employees, it will lead to an increase in the total cost of hiring labor, which will lead to a decrease in labor demand, and the substitution effect is significantly present in enterprises with high labor intensity or small scale (Tang & Feng, 2019). Using Colombian data, Kugler & Kugler(2009) found that the increase of social insurance costs would lead to a decline in the probability of formal employment, and this effect was more obvious in the manufacturing industry. Kodama & Yokayama(2015) uses the data of Japanese micro-enterprises and finds that when the social insurance fee is increased, enterprises will reduce the number of employees and increase the average working time of each employee as measures to cope with the rising labor cost. The pension subsidized by the state and enterprises is a part of residents' income, and the pension insurance system in our country has certain welfare attributes, which is not a complete social insurance. Generally speaking, China's pension insurance contributions are jointly borne by the state, society and individuals, which increases the future security while reducing the current cash flow of individuals. In the process of the implementation and reform of pension insurance, there is not only the investment behavior of enterprises and employees, but also the income redistribution behavior of the government. Truly make the majority of residents have something to rely on.

Although the pension security system as a tax burden may reduce the share of labor income, the reform of China's pension system has always been aimed at ensuring the life of the largest number of people in the old age, which is different from social insurance in general. At present, there are few literatures on the relationship between

the reform of China's pension security system and labor income share.

2.4 Institutional background of New Rural Pension Scheme

In September 2009, The State Council issued the Guiding Opinions on the Pilot Project of NRPS, which launched the nationwide pilot project of a new type of rural social endowment insurance. In accordance with the principle of combining basic pension and personal account pension, the payment method of individual contribution, collective subsidy and government subsidy is implemented. The basic pension is fully subsidized by the central or local governments, and farmers can receive a basic pension of at least 55 yuan per month when they are 60 years old, and their benefits are gradually raised in accordance with the principle of gradual progress. The basic principles of NRPS are "ensuring basic, wide coverage, flexibility and sustainability". It has achieved greater coverage of rural residents and higher state and government subsidies. Generally speaking, China's pension insurance contributions are jointly borne by the state, society and individuals, which not only reduces the current cash flow of individuals, but also increases the future security and the employment cost of enterprises. Therefore, the coverage of pension insurance may change the investment cost of labor-capital, thereby changing the investment tendency of enterprises and increasing their preference for capital. Reduce labor's factor income share.

3 Modeling construction

3.1 Sources of data

Table 1 Descriptive statistics of variables

Variable	N	Mean	SD	Min	Max
labor	248	0.497	0.0750	0.320	0.720
capital	248	0.668	0.227	0.347	1.626
ins cover	248	0.205	0.119	0.0280	0.641
ins fee	248	0.279	0.0810	0.0800	0.478
ins pay	248	0.224	0.0770	0.0700	0.506
males	248	0.511	0.00900	0.486	0.543
edu	245	5.442	5.388	0.851	37.37
lneco	248	10.29	0.518	8.959	11.58
industry	248	1.076	0.583	0.527	4.136
revenue	248	0.107	0.0310	0.0570	0.225
fdi	248	0.0380	0.0710	0	0.615
open	248	0.331	0.379	0.0410	1.670
loans	248	1.170	0.395	0.551	2.438
engel	248	0.387	0.0690	0.249	0.559
gap	248	0.356	0.0620	0.222	0.540

This paper collected panel data of 31 provincial-level administrative regions (excluding Hong Kong, Macao and Taiwan) from 2007 to 2014, in which labor compensation and operating surplus came from input-output tables published by provincial statistics bureaus across the country. Operating surplus refers to the balance of the added value created by an enterprise after deducting the remuneration of laborers, net production tax and depreciation of fixed assets. It is equivalent to the company's operating profit plus production subsidies, but to deduct the expenses of wages and benefits from the profits. Labor remuneration refers to the total income obtained by employees, including the sum of in-hand wage income and pension insurance. The pilot data comes from the NRPS government-issued documents. Other data came from the National Bureau of Statistics. Descriptive statistics of all variables are shown in Table 1.

3.2 Modeling

$$Labor_{it} = \alpha + \beta Cover_{it} * Post_{it} + \sum X\gamma + u_i + \delta_t + \varepsilon_{it} \dots \dots \dots (1)$$

$Labor_{it}$ represents the labor income share of the i^{th} province in the t^{th} period. $Cover_{it}$ represents the policy intensity of NRPS. $Post_{it}$ represents whether the area is a pilot area. X represents control variables. δ_t represents the time control effect. β indicates whether the policy is effective, that is, the actual disposal effect of NRPS. Since the NRPS pilot program covered 22 provinces in 2009 and was basically promoted throughout China in 2012, which violates the requirement that DID models need control groups, this paper adopts the generalized DID model. In generalized DID model, the policy impact intensity varies from province to province. The start time is different and the fixed effects of individuals and time are controlled. The coverage rate of endowment insurance is used as the proxy variable of policy intensity.

3.3 Variables selection

Labor income share: The labor income share is measured by choosing the proportion of labor compensation to gross regional production in input-out table.

Policy intensity: the old-age insurance coverage rate, that is, the number of insured people divided by permanent population, is used as the proxy variable of policy intensity.

Policy implementation variable: In order to accurately identify $Post_{it}$ variable, this paper takes the lag of one period of the issuance time of NRPS government documents of the national provincial governments as the starting node of the policy. The pilot time of different provinces in the country is different, so if the i^{th} region has started the pilot in the t^{th} phase, then $Post_{it}=1$ and vice versa =0.

Both economic indicators and the quality of local labor may have an impact on the labor income share, so the following variables are controlled: (1) Capital income share: represented by the proportion of operating surplus to gross regional production; (2) Social security expenditure: the proportion of social security and employment expenditure in gross regional production of fiscal expenditure is expressed; ③ Male ratio: expressed by the proportion of local males in the resident population; (4) Human capital: the number of college graduates or above per 100 people is expressed; (5) Economic level: logarithmic representation of gross regional product; ⑥ Industrial structure: expressed by the proportion of tertiary industry in gross regional production; (7) Fiscal revenue: expressed by the proportion of regional government fiscal revenue to gross regional production; Foreign direct investment: expressed by the proportion of foreign direct investment to gross regional production; Financial market: measured by the ratio of financial deposits and loans to gross regional production.

4 Empirical analysis

4.1 Basic regression

The regression results are shown in Table 2. Regression (1) is an uncontrolled variable; regression (2) adds labor force characteristics, including male ratio and human capital level; regression (3) adds regional economic characteristics such as economic level and industrial structure. In the three regressions, the cross-multiplication coefficient is positive at the significance level of 1%, and the coverage coefficient of pension insurance is significantly negative, indicating that in the promotion process of China's pension insurance, the labor cost may be increased, and the labor factor income share is reduced, while NRPS reform inhibits the negative effect of pension insurance on the labor factor income share. Both regressions control for fixed effects by province and year, excluding the effects of time trends and provincial characteristics.

Table 2 Regression results of the policy impact of NRPS reform on labor income share

	(1)	(2)	(3)
	Labor	Labor	Labor
Post	0.134*** (0.044)	0.155*** (0.044)	0.145*** (0.030)
Cover	-0.333*** (0.097)	-0.432*** (0.131)	-0.390** (0.181)
Males		-0.097 (0.353)	0.101 (0.299)
Education		0.003 (0.002)	0.001 (0.001)
Economy			-0.000 (0.000)
Industry			0.025 (0.026)
Revenue			0.847** (0.364)
FDI			0.131* (0.068)
Credit			-0.002 (0.023)
Constant	0.476*** (0.017)	0.534*** (0.179)	0.341** (0.155)
Province	√	√	√
Year	√	√	√
Observations	248	245	245

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

4.2 Mechanism analysis

Table 3 Regression results of the policy impact mechanism of NRPS reform on labor income share

	(1) Subsidy	(2) Capital
Post	0.021* (0.011)	-0.189* (0.108)
Cover	0.085* (0.043)	-0.619* (0.352)
Education	-0.000 (0.000)	0.007 (0.005)
Economy	-0.000 (0.000)	-0.000* (0.000)
Industry	0.000 (0.005)	-0.051 (0.093)
Revenue	0.172* (0.100)	1.902* (1.027)
Credit	-0.005 (0.007)	0.286 (0.177)
Males		-1.260 (0.854)
Constant	0.006 (0.013)	1.018** (0.412)
Province	√	√
Year	√	√
Observations	245	245

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 3 shows the test of the influence mechanism of the NRPS reform on the labor income share. The promotion of traditional pension insurance increases labor costs, changes the return rate of labor-capital investment, and then reduces the share of labor income. NRPS increases the compensation level of the national and local governments for workers, which may be the main mechanism for the reform of NRPS to increase the share of labor income. Therefore, social security expenditure is taken as the proxy variable of the compensation level of workers in the pension insurance by the government. Regression (1) shows that after controlling the urban economic variables, the reform of NRPS significantly increases the government's social security expenditure by about 2.1%. It shows that the improvement of the labor income share of NRPS reform really depends on the income enhancement effect of social welfare subsidies on

the working group.

NRPS does not reform the contribution ratio of enterprises, so it will not change the return on labor and capital income, and will not increase the share of capital income. The impact of the NRPS is used to return the share of capital income. In regression (2), the coefficient of NRPS variable is significantly not positive, indicating that the reform of NRPS doesn't increased the cost of labor relative to capital. It did not increase the proportion of capital invested by firms.

4.3 Heterogeneity analysis

In this section, Engel coefficient and urban-rural income gap are used as grouping variables. The Engel coefficient is measured by the proportion of the per capita food consumption expenditure of rural residents in the total per capita household expenditure, and the urban-rural income gap is measured by the ratio of the per capita disposable income of rural residents and urban residents. Both groups were divided by the median, with provinces above the median as one group and others as one group.

The heterogeneity test results of Engel coefficient are shown in Table 4a. Regression (1) and (2) indicate that NRPS is more significant in areas with higher Engel coefficient in rural areas. Table 4b shows the heterogeneity test results of the urban-rural income gap. Regression (3) and (4) show that NRPS has a stronger positive impact on the labor income share in areas with more equal urban-rural income.

Table 4a Results of heterogeneity test of Engel coefficient

	(1)	(2)
	Rich	Poor
Post	0.054 (0.036)	0.134* (0.080)
Cover	-0.070 (0.093)	-0.394*** (0.143)
Males	0.056 (0.582)	0.530 (0.406)
Education	-0.003 (0.002)	-0.004 (0.004)
Economy	0.033 (0.031)	0.052 (0.037)
Industry	0.069 (0.462)	0.732 (0.650)
Revenue	0.533 (0.550)	0.191 (0.119)
FDI	0.005 (0.030)	0.025 (0.032)
Credit	0.356 (0.297)	0.086 (0.207)
Province	√	√
Year	√	√
Observations	124	121

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 4b Results of heterogeneity test of urban-rural income gap

	(3)	(4)
	Equality	Inequality
Post	0.246** (0.112)	0.057** (0.023)
Cover	-0.572** (0.242)	-0.322*** (0.119)
Males	-1.207** (0.479)	0.325 (0.270)
Education	0.006 (0.006)	0.000 (0.001)
Economy	0.057 (0.051)	0.029 (0.018)
Industry	0.632 (0.908)	0.294 (0.450)
Revenue	-0.010 (0.092)	1.206* (0.637)
FDI	-0.022 (0.037)	0.015 (0.046)
Credit	1.017*** (0.222)	0.188 (0.144)
Province	√	√
Year	√	√
Observations	121	124

5 Robustness test

5.1 Parallel trend test

An important condition for evaluating the validity of the conclusion by multiple difference method is that the treatment group and the control group satisfy the common trend hypothesis before the policy change. In order to prove that the basic results obtained in Table 1 are not caused by different trends, the average effects in model (1) are decomposed into event variables of different years. The model design is as follows:

$$Labor_{it} = \alpha + \beta Cover_{it} * D_{Lit} + \sum X \gamma + u_i + \delta_t + \varepsilon_{it} \dots \dots \dots (2)$$

Since this paper is a multi-period did model, D_{Lit} represents the difference between the current year and the pilot year, when the difference is L, $D_{Lit}=1$, and $D_{Lit}=0$ for other periods.

Based on model (2), the event variables before the pilot can observe the common trend of policies, and the event variables after the reform can identify the dynamic effects of policies. Figure 1 shows that before the reform, the event variables in different years were not significant, which means that there was no systematic difference in the

labor income share between pilot and non-pilot areas before the pilot. With the implementation of the policy, the model coefficient changes from negative to positive and continues to increase, indicating that NRPS reform policy may have a trend of increasing labor income share.

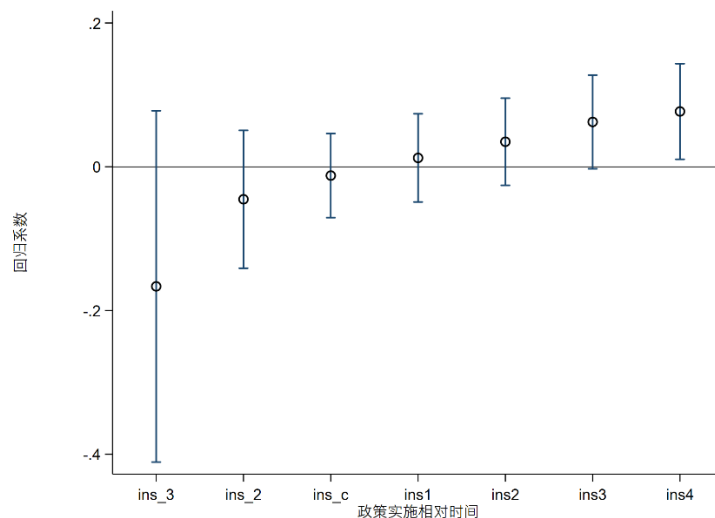


Figure 1 Parallel trend test

6 Conclusion

Based on the quasi-natural experiment of NRPS, this paper constructs a generalized DID model to empirically test the impact of China's pension insurance reform on labor income share. Research shows that the coverage of pension insurance reduces the share of labor factor income. The reform of NRPS has suppressed the negative effect of pension insurance on the income share of labor factors. In terms of impact mechanism, the NRPS reform significantly increased the government's social security expenditure, with an increase level of about 2.1%, indicating that the increase in the share of labor income of the new rural insurance reform mainly depended on the effect of social welfare subsidies on the income of workers. At the same time, the reform of NRPS did not increase labor costs, so the share of capital income did not rise significantly. In the heterogeneity analysis, this paper finds that the positive effect of NRPS on the labor income share is better in poor rural areas and areas with more equal urban and rural income. Finally, the conclusion passes the robustness test.

Based on the research conclusions of this paper, the following policy suggestions are put forward: First, we should accelerate the integration of urban and rural old-age

security systems, expand the coverage of old-age security systems, so as to increase the distribution share of labor factors, so as to cope with the unequal trend of factor income distribution structure in China toward capital, and gradually form a reasonable and orderly income distribution pattern. Second, attention should be paid to the welfare of low-income groups, and efforts should be made to promote the reform of the pension insurance system in poor areas. The pension insurance system can give the working people in poor areas a stronger security role, promote the realization of everyone's old age, old age support, and reduce the gap between the rich and the poor. Third, we should design a labor-biased pension insurance policy and constantly improve the factor income share mechanism. For example, try to open up the deduction chain between pension insurance and tax price, so as to encourage enterprises to pay pension insurance for employees, increase the bias to the latter in the choice of capital-labor investment, and improve the share of labor factors.

7 Reference

- [1] Benzarti Y, Carloni D. Who really benefits from consumption tax cuts? Evidence from a large VAT reform in France[J]. *American economic journal: economic policy*, 2019, 11(1): 38-63.
- [2] Chen D, Chen S. The relative price of capital and labor, elasticity of substitution and labor income share [J]. *World Economy*,2018,41(12):73-97.
- [3] Chen W. China's Population Ageing from an International Perspective[J]. *Journal of Peking University(Philosophy and Social Sciences)*, 2016,53(06):82-92.
- [4] Daudey E, García-Peñalosa C. The personal and the factor distributions of income in a cross-section of countries[J]. *The Journal of Development Studies*, 2007, 43(5): 812-829.
- [5] Guo Q, Lv B. On the impact of factor income distribution on resident income distribution[J]. *Social Sciences in China*,2012(12):46-62+207. (in Chinese)
- [6] Guo Q, Lv B. On the impact of tax on factor income distribution[J]. *Economic Research Journal*,2011,46(06):16-30.
- [7] He W, Wang Z. Constructing social support system for aging society: connotation, principle and path[J]. *Academic Research*, 2024(03):96-104.
- [8] Li S, Feng J. The Economic effect of Social endowment Insurance system for urban and rural residents: Simulation analysis based on multi-stage generation overlap model[J]. *Economic Review*,2014(03):3-15. (in Chinese)
- [9] Luo C, Chen L. Will financing constraints lead to a decline in the labor share? An empirical study based on the data of Chinese enterprises provided by the World Bank [J]. *Financial Research*,2012(03):29-42.
- [10] Peng F, Xu W, Wu H. Indirect tax reduction and labor income share: evidence from the policy of "replacing business Tax with VAT"[J]. *Economics (Quarterly Journal)*, 2002,22(06):2021-2040.
- [11] Picos-Sánchez F, Thomas A. A Revenue-neutral Shift from SSC to VAT: Analysis of the Distributional Impact for 12 EU—OECD Countries[J]. *FinanzArchiv/Public Finance Analysis*, 2015: 278-298.
- [12] Riekhoff A J, Järnefelt N. Retirement trajectories and income redistribution through the pension system in Finland[J]. *Social Forces*, 2018, 97(1): 27-54.
- [13] Smart M, Bird R M. The impact on investment of replacing a retail sales tax with a value-added tax: Evidence from Canadian experience[J]. *National Tax Journal*, 2009, 62(4): 591-609.
- [14] Spaliara M E. Do financial factors affect the capital–labour ratio? Evidence from UK firm-level data[J]. *Journal of banking & finance*, 2009, 33(10): 1932-1947.
- [15] Tang J, Feng J. The impact of Social insurance contributions on the capital-labor ratio of enterprises: A case study of the change of provincial pension insurance collection institutions in the early 21st century.[J] *Economic Research Journal*,2019,54(11):87-101.
- [16] Tang Y, Lan G. Study on the influence of population aging and technological progress bias on labor income share[J]. *Journal of University of Electronic Science and Technology of China (Social Sciences Edition)*,2022,24(05):9-17.

- [17] Wang H, Wang R. How does the system of segregated pension security widen the income gap? Analysis path based on actuarial model and Gini coefficient decomposition[J]. Journal of East China University of Science and Technology (Social Science Edition),2014,29(06):98-108. (in Chinese)
- [18] Wang L, Yuan L. Biased technological progress, industrial structure change and factor income distribution pattern in China[J]. Economic Research,2018,53(11):115-131.
- [19] Yao Y, Lv Z. The influence of population aging on factor income distribution: theoretical and empirical evidence[J]. Scientific Research on Ageing, 2024,12(03):11-25.
- [20] Zhang C, Chen B. Can "Public pension system" substitutes "family mutual insurance"?[J]. Economic Research Journal,2014,49(11):102-115.
- [21] Zhang C, John G, Zhao Y. Effect evaluation of New Rural Social endowment Insurance policy: Income, poverty, consumption, subjective welfare and labor supply[J]. Economics Quarterly Review,2015,14(01):203-230.
- [22] Zhang J, Zheng W, Zhai F. Do financing constraints affect firms' capital-labor ratio? Empirical evidence from China[J]. Economic Journal (Quarterly Review),2016,15(03):1029-1056.
- [23] Zhang X, Song H, Wu B. Income, life expectancy and income redistribution effect of social pension insurance[J]. Statistical Research,2019,36(03):78-87. (in Chinese)
- [24] Zhou M, Xiao W, Yao XG. Firm heterogeneity, ownership structure and labor income share[J]. Management World, 2010(10):24-33.