COMPONENT ONE

Redistributive Effects of Tax and Social Security System in China

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November 2018

Redistributive Effects of

Tax and Social Security System in China

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Abstract

This report examines the redistributive effects of China's tax system and transfer payment system. It estimates the results of the changes in income gap caused by direct taxes such as personal income tax, indirect taxes such as VAT and consumption tax, and social security contributions. It also estimates the effects of various social security benefits on narrowing the income inequality. The results of this report show that personal income tax has a certain role in narrowing the income gap, but its impact is very limited due to the limited population covered by tax and its low proportion in tax revenue; while indirect taxes have the role of widening the income gap, and social security contributions also have the role of widening the income gap. The combined role of tax and social security payment is to widen the income inequality. The results of this report also show that pension-based social security benefits and transfer payments play a role in regulating income distribution, but they are unbalanced between urban and rural areas, and play a greater role in urban than rural areas. If China compares with European countries, the redistribution effect of tax and social security welfare system is obviously low. Therefore, China needs to further reform its tax system and social security system in order to improve its redistributive function.

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1. Redistributive effect of Tax system in China

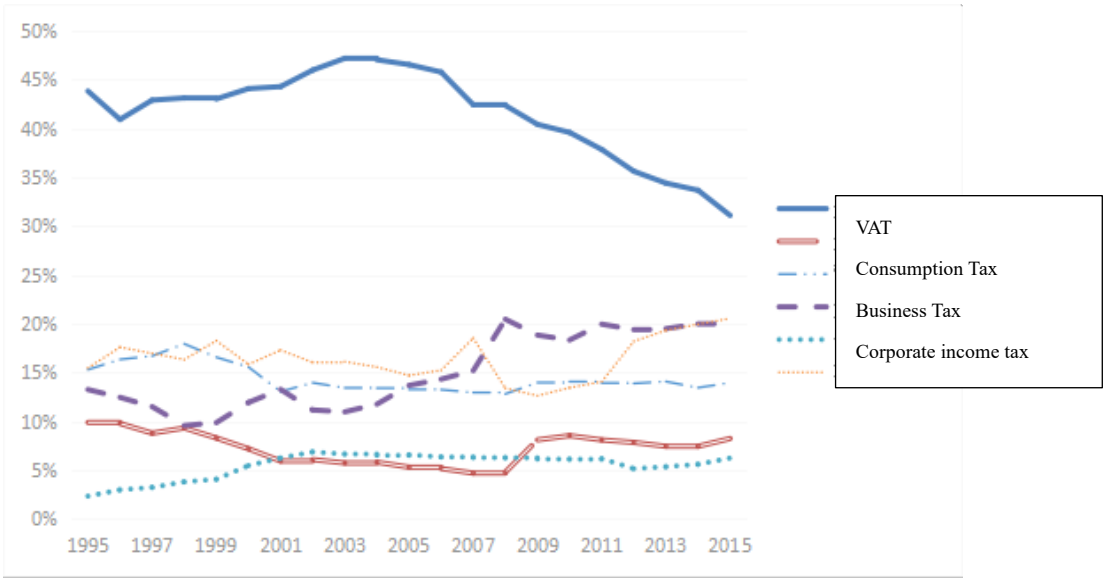
1.1 Tax system in China

The purposes of the tax system, as is well known, is to raise revenue to fund government services, to encourage or discourage certain types of behavior, to correct market imperfection, and the most important role that taxes play is, to change the distribution of income or wealth. On one hand, some public services such as free medical care, education, affordable housing and housing subsidies have a positive effect on regulating the distribution of income. On the other hand, in a progressive tax system, tax system can help to decreases income disparities by addressing information on distributions of tax burdens and of post-tax and pre-tax incomes.

In general, the tax system can affect income re-distribution through two ways, one is the tax transfer scheme, that is, imposing taxes upon high-income group while increasing subsidies to the low-income group. Another way is to levy taxes on the goods purchased by high-income consumers while providing subsidies for some goods purchased by low-income consumers.

China's current tax system was put in place after the tax reform in 1994 to meet the requirements of social and economic development. Since the beginning of 21st century, the Chinese government has made a series of adjustments and improvements to the tax system, which have guaranteed the government's revenue stream and contributed to the country's rapid economic growth. Since 2014, a new wave of tax reform is underway. However, as far as the tax system in China is concerned, it is seriously unbalanced, showing that the revenue of indirect taxes takes fairly large proportion of total tax revenue, while the proportion of direct taxes is much smaller. Recent estimates show that the ratio of direct taxes and indirect tax in China is generally “four and six”, that is, direct taxes accounts for 40% of total tax revenue while the proportion of indirect taxes is around 60%. Between January 2017 and August 2017, indirect tax revenue such as a value-added tax, consumption tax, and business tax accounted for 65% of total tax revenue, while the proportion of direct tax to total revenue was only 35%, of which personal income tax accounted for only 25.3%.

Figure 1 - Share of different kinds of taxes in total tax revenue 1995-2015

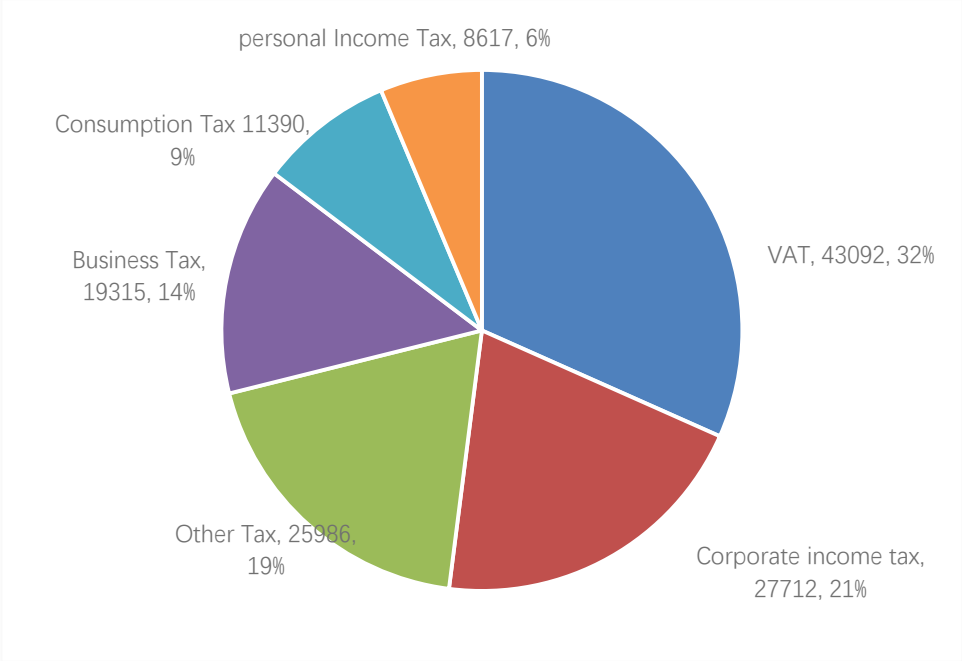


Source: China Statistical Yearbook, China Tax Yearbook, China Financial Yearbook

Among the 18 kinds of taxes in China, a value-added tax (VAT), business tax, consumption tax, corporate income tax, and personal income tax are the major component of total tax revenue. Figure 1 shows changes in the shares of different kinds of taxes in total tax revenue. For example, although the share of VAT has declined significantly since 2003, it still is the largest component of total tax revenue in China. By contact, during this period. The share of consumption tax and business tax are quite stable, which account for 7% and 14% of total tax revenue, respectively. In terms of business income tax, it shows that the share of business income tax has experienced an increase over 1995-2015, reaching 20% in 2015. However, as far as the personal income tax is concerned, during this period, the share of personal income tax is at a very low level, accounting for only 5% of total tax revenue.

China's value-added tax revenue came to 4.31 trillion yuan in 2015, accounting for 32% of total tax revenue. Business income tax was 2.77 trillion yuan, and the share of business income tax in total tax revenue was around 20% in 2015. Moreover, consumption tax and personal income tax accounted for 8% and 6% of total tax revenue respectively, and the share of other taxes was around 19% (Figure 2).

Figure 2 - Tax system in China: 2015



Source: China Tax Annual Report 2015

1.2 International comparison: China VS developed countries

The experience of developed countries shows that with the development of economy, the roles that social security system and tax system play in the redistribution of income has become more obviously important. With the function of the redistributive policies has been payed more and more attention, developed countries undertake different reforms in tax system. The major difference in tax system between developed countries and China can be summarized as follows.

1. Personal income tax in developed countries turns out to be progressive, and the share of personal income tax in total tax revenue is quite large. However, in China, personal income tax are not very progressive, and its role in income distribution is very limited.

As is well appreciated, personal income tax can be used to raise government revenue, to fund government services, and to reduce income inequality. Therefore, if the share of personal income tax in total tax revenue is at a low level, it will then play a small role in reducing inequality. More specifically, the share of personal income tax in total tax revenue in most developed countries is

much higher than that in in China. In 2015, personal income tax accounted for 40.8% of total tax revenue in the US, 27.9% in the UK and 18.9% in France. In OECD countries, the share of personal income tax was 24% in 2014. By contrast, personal income tax only accounted for 5% of total tax revenue in China.

On the other hand, most developed countries have a progressive personal income tax system, indicating that that high-income group pay more taxes, and it plays an important role in narrowing the income gap (Richard and Eric,2005). However, as far as China is concerned, although the personal income tax has a certain progressive effect, due to their small proportion in total tax revenue, the effect of personal income tax on income distribution is very limited.

2. The direct taxes in developed countries includes not only personal income tax, but also property tax and estate tax. By contrast, Chinese direct tax mainly refers to taxes imposed upon a person.

In many developed countries, the major component of the tax system is direct taxes. In 2012, the ratio between direct and indirect taxes was 82.2:17.8 in the US, 81.3:18.7 in Japan, 69.6:30.4 in France, 66.7:33.3 in the UK, and 56.8:44.2 in OECD countries (2009). However, in China, as shown in Figure 1, the ration between direct and indirect taxes was only around 35:65, indicating a much lower share of direct taxes in total tax revenue.

On the other hand, taxes can help to change the distribution of wealth, through property taxes imposed on real estate and the estate tax on inheritance. In many developed countries, property taxes and estate taxes are important sources of total tax revenue. For instance, in OECD countries, property taxes account for 6% of total tax revenue. In theory, no doubly, taxes levied on real estate have a function of redistribution of household wealth, and it also plays an obvious role in retraining house prices. However, in China, the property tax has not come into effect yet.

3. The redistributive effect of Tax System is much larger in developed countries

Comparing the distribution of post-tax and pretax incomes, we can measure the redistributive

effect of the tax system. Estimates show that with the function of personal income taxes, the Gini coefficient of post-tax income in OECD countries decreases around 0.03(Adam et al., 1999). Based on China Household Income Project 2013, our findings show that personal income tax plays a role in narrowing the income gap, but its role is very limited, making the Gini coefficient of the pretax income decreased only 0.0013. It should be mentioned that the larger redistributive effect of personal income tax system in OECD countries is largely driven by the decreasing tax burden among the low-income group, which can also be learned to further reform the current tax system in China.

1.3 Methodology and data

1.3.1 Methodology

To estimate the redistributive effect of the tax system, we employ two indicators in this paper.

First, The effective tax rate. The effective tax rate refers to the ratio of total tax burden to the total household income, where the total income is household pre-tax income. That is,

The Effective Tax Rate = total tax burden / total household income before tax

It should be noted that due to the limit of the data, we only consider three types of indirect taxes in this paper: a value-added tax, consumption tax and business tax. Indirect taxes are calculated by multiplying the statutory tax rate by the tax base, while the tax base is measured by the consumption of a specific good (See the following Table for consumption tax rates)[1]. In addition, we take personal income taxes into analysis.

Goods	Consumption Tax Rate(%)
Tobacco	45%
Wine	15%
Vehicle	5%
Cultural and entertainment services	2%
Housekeeping services	5%

[1] A VAT is a direct consumption tax, which can have positive welfare effects particularly if basic goods are excluded. In China, the VAT rate is 17%.

Second, MT Index.

We mainly focus on the changes in the income distribution before and after the tax system implemented. The redistributed income here, refers to post-tax income. The specification is as follows:

$$MT\ Index = Gini\ coefficient\ of\ pretax\ income - Gini\ coefficient\ of\ post\text{-}tax\ income \quad (1)$$

Hence, as shown in the specification, Gini coefficient is used to measure the income gap before and after taxes, and the difference between the Gini of market income and the Gini of disposable income can be seen as the redistributive effect of the tax system in China. Clearly, if MT is positive, it indicates that the tax system helps to narrow the income gap, whereas if M is negative, it shows that the tax system expands income inequality.

1.3.2 Data

To estimate the effect of the tax system in China on the national income inequality, we use two datasets in this paper. The first dataset comes from the China Household Income Project conducted by the China Institute of Income Distribution, with the reference year of 2013 (CHIP 2013). The households surveyed were drawn from the sampling framework of the regular household survey annually conducted by the National Bureau of Statistics of China (Luo and Li, 2016). The field survey includes detailed information about the demographic characteristics, the household structure and employment, while the information about items of income and expenditure is provided directly from the NBS's regular survey. The survey covers 12 provinces and 2 province-level municipalities in China, which contain around 10000 rural households, 8000 urban households and 760 migrant households. After cleaning outlier on the individual data, the final size of the sample is 9,195 rural households and 6,467 urban households, with 26,444 rural individuals and 15,240 urban individuals.

The second dataset employed in this paper is the China Family Panel Survey (CFPS) organized by the Institute of Social Science Survey (ISSS) of Peking University, with the

reference year of 2012 and 2016. CFPS covers approximately 16000 households from 25 provinces and provincial-level municipalities. The information of household incomes and expenditures is collected by interviewing households, and the way is to ask the respondents to recall their production and business activities and corresponding incomes and expenditures. Outlying the data on taxes and income reduce our samples to 15,408 rural individuals and 6,480 urban individuals in 2012, and 9,886 rural individuals and 10,546 urban individuals in 2016.

1.4 The impact of Direct and Indirect Taxes on Income Redistribution

According to the formula (2), we estimate the redistributive effect of the tax system in China. Based on CHIP2013, Table 1 shows the effect of direct and indirect taxes on income distribution.

First, as shown in the table, the effect of indirect taxes, especially a value-added tax, have a greater impact on income, indicating that after deducting indirect taxes, there is a sharp decline in household income. By contrast, the effect of personal income taxes on household income is relatively smaller. More specifically, with the function of indirect taxes and personal income tax, the average income per capita in 2013 decreased from 20,277yuan to 17,563yuan. Indirect taxes, especially VAT and consumption tax, have more obvious effects on income distribution. Second, it seems that the redistributive effect of the tax system is more obvious in rural areas. After the tax system implementation, the redistributed income decreased by 15 percentage points for rural residents. By contrast, in urban areas, the effect of redistribution of the tax system is a litter smaller, which makes the redistributed income decrease by 12.77%.

Table 1 - Redistributive effects of Chinese Tax System in China, 2013

	CHIP 2013		
	Rural	Urban	Total samples
Pre-tax income	10,367	30,464	20,277
-Consumption Tax	10,104	30,071	19,949
-VAT	9,107	27,340	18,097
- Business Tax	10,322	30,215	20,131
- Personal Income Tax	10,365	30,341	20,215

Post-tax income	8,798	26,574	17,563

Source: Authors' computation using CHIP2013 Data.

Table 2 presents the effective tax rate in 2013, with respect to urban areas, rural areas and China as a whole. In general, the effective tax rate is around 16.33 in 2013, indicating that the share of indirect taxes and personal income tax accounted for 16.33% of household pre-tax income. Among all the taxes, the average ratio of VAT on income in China as a whole is around 13.34%, followed by consumption tax (2.33%) and business tax, whereas the tax burden of personal income tax is the smallest, accounting for only 0.10% of total household pre-tax income. On the other hand, in average, the rural households' tax burden is higher than that of urban households, showing that the average ratio of tax on household pre-tax income in rural and urban areas is 18.93% and 13.35%, respectively.

Table 2 - The average ratio of taxes on income, 2013

	Rural	Urban	Total Samples
VAT	15.33	10.75	13.34
Consumption Tax	3.15	4.17	2.33
Business Tax	0.44	0.85	0.56
Personal Income Tax	0.01	0.14	0.10
Total	18.93	13.35	16.33

Source: Authors' computation using CHIP2013 Data.

Table 3 shows the distribution of the effective tax rates across household pre-tax income decile groups, ordered from the poorest 10 percent to the richest 10 percent. As shown in the table, in general, China's indirect taxation is regressive, showing that indirect taxes represented higher of the household income of those in the lower income decile. That is, for households from the highest income decile, the share of indirect taxes in total household income is the lowest, whereas for households belonged to the lowest decile, the corresponding share is the largest. Given that the indirect tax system in China is taxes levied on household consumption, thus it is not surprising that indirect taxation in China is regressive (Yue et al., 2014).

In 2013, personal income tax represented less than 0.01 percent of the household income of those in the lowest income decile, 0.05 percent in the sixth decile, and 0.50 percent in the highest decile. In other words, the findings indicate that direct taxation in China is progressive and can help

to narrow the income gap. However, as Yue et al.(2011) argued, the lower average rate of tax eventually weakened redistributive role of the personal income tax.

Table 3 - The average ratio of taxes on different income groups, 2013

Income group	VAT	Consumption Tax	Business Tax	Personal Income Tax
The lowest income group	23.78	4.12	0.55	0.00
2	16.13	2.74	0.43	0.02
3	14.49	2.66	0.48	0.01
4	13.54	2.30	0.50	0.02
5	12.55	2.20	0.53	0.03
6	12.00	2.19	0.56	0.05
7	11.44	2.07	0.52	0.05
8	10.79	2.01	0.56	0.08
9	10.53	1.82	0.68	0.19
The highest income group	9.25	1.38	0.79	0.50
Total	13.34	2.33	0.56	0.10

Source: Authors' computation using CHIP2013 Data.

Taken into consideration that the effects of tax system are different in rural and urban areas, Table 4 reports the differences of distribution of the effective tax rates across household pre-tax income decile groups, for urban and rural households, respectively. Several findings stand out: First, whether it is in urban areas or rural areas, the indirect tax system is regressive, implying that the tax burdens for households in the lowest decile are much higher than for the highest income decile. Second, it is clear that both a value-added tax and consumption tax are regressive, whether in rural areas or in urban areas. However, for urban households, the business tax burden of households in the lowest decile is much lower than those in the highest decile, indicating that consumption tax is progressive in urban areas. In addition, personal income tax system is progressive in urban China, namely the higher income, pay more, which can then help to reduce income inequality. Third, the results show that the regressive nature of the indirect taxation is more obvious in rural areas. We find that the indirect tax burden for households in the lowest decile are 3.30 times higher than for the highest income decile, whereas the corresponding ratio is only 1.79 times for urban households.

Table 4 - The average ratio of taxes on different income groups in rural and urban areas, 2013

	Urban	**Rural**

Income group	VAT	Consumption Tax	Business Tax	Personal Income Tax	VAT	Consumption Tax	Business Tax	Personal Income Tax
The lowest	16.36	2.14	0.42	0.00	30.95	6.03	0.68	0.00
2	12.55	1.56	0.43	0.04	19.53	3.87	0.44	0.00
3	11.92	1.74	0.52	0.02	16.94	3.55	0.44	0.00
4	11.58	1.53	0.60	0.04	15.40	3.04	0.41	0.00
5	11.09	1.54	0.67	0.06	13.97	2.83	0.40	0.00
6	10.57	1.47	0.71	0.11	13.37	2.88	0.42	0.00
7	10.39	1.43	0.67	0.09	12.46	2.70	0.38	0.00
8	9.90	1.38	0.74	0.16	11.68	2.64	0.39	0.01
9	10.16	1.31	0.92	0.38	10.89	2.32	0.44	0.01
The highest	9.11	0.89	1.11	0.93	9.38	1.88	0.45	0.05
Total	11.30	1.48	0.69	0.19	15.33	3.15	0.44	0.01

Source: Authors' computation using CHIP2013 Data.

Table 5 presents the results of redistributive effects of direct and indirect taxes on income distribution, on the basis of the MT index shown in equation 2. It shows that the pre-tax income inequality in China measured by Gini coefficient is around 0.46 in 2013, while the Gini coefficient of post-tax income inequality is 0.47. Thus, it indicates that with the function of tax system in China, the Gini coefficient increased by 3.1 percentage points. That is, it shows that the tax system in China has an effect of expanding the income gap. Specifically, both VAT and consumption tax play a role in expanding income inequality, making the Gini coefficient of the pre-tax income increased by 2.66% and 0.73%, respectively. In line with our findings above, since VAT and consumption tax are regressive in China, they have effects of expanding income inequality. By contrast, business tax and personal income tax both play a role in narrowing the income gap, but their roles are very limited, making the Gini coefficient of the pre-tax income decreased only 0.22% and 0.29%, respectively.

Table 5 - Redistributive effects of Chinese Tax System, 2013

	Gini Coefficient	Change in Gini	Chang in Gini （%）
Pre-tax income	0.45540		
-Consumption Tax	0.45873	0.00333	0.73
-VAT	0.46750	0.01210	2.66
- Business Tax	0.45441	-0.00099	-0.22
- Personal Income Tax	0.45407	-0.00133	-0.29
Post-tax income	0.46954	0.01414	3.10

Source: Authors' computation using CHIP2013 Data.

Table 6 shows the different effects of various taxes on income distribution in urban and rural areas respectively. On one hand, our findings show after direct and indirect taxes, the Gini coefficient of rural household pre-tax income gap narrowed by 7.19%, whereas the direct and indirect taxes make the Gini coefficient of pre-tax income gap between the urban residents decreased by 2.31%. It indicates that the tax system has a larger effect on expanding the income gap in rural areas. Second, among the taxes, VAT has a more obvious effect on expanding income inequality, whether in rural areas or urban areas. Personal income tax, as mentioned before, are certainly progressive in China, and help to narrow the income gap, especially in urban areas.

Table 6 - Redistributive effects of Chinese Tax System in rural and urban areas, 2013

	Urban			Rural		
	Gini	Change in Gini	Chang in Gini (%)	Gini	Change in Gini	Chang in Gini (%)
Pre-tax income	0.35038			0.39495		
-Consumption Tax	0.35205	0.00167	0.48	0.39887	0.00392	0.99
-VAT	0.35899	0.00861	2.46	0.41707	0.02212	5.60
- Business Tax	0.34933	-0.00105	-0.30	0.39494	-0.00001	0.00
- Personal Income Tax	0.34854	-0.00184	-0.53	0.39485	-0.00010	-0.03
Post-tax income	0.35848	0.00810	2.31	0.42333	0.02838	7.19

Source: Authors' computation using CHIP2013 Data.

On the basis of CHIP2013, the results above show that, China's indirect taxation is regressive and have an effect of expanding the income gap. Personal income tax is certainly progressive and help to narrow the income gap, although its role in narrowing the income gap is very limited. Our findings further prove evidence that indirect tax has a larger effect of expanding income inequality in rural China. We then use CFPS2012 and CFPS2016 to further estimate the redistributive effect of taxation in China.[2]

To better understand the nature of the tax burden in China, households are divided into deciles according to their pre-tax income. By comparing the average tax rates for each decile of households, we can see that VAT is certainly regressive across the 2 years. By contrast,

[2] It should be noted that since CFPS2012 and CFPS2016 do not include information on personal income tax, thus we do not estimate the redistributive effect of personal income tax in this section.

consumption tax has a progressive effect, however, since the share of consumption tax in household income is quite small, its role in narrowing the income gap is also limited.

Table 7 - The average ratio of taxes on different income groups, 2012 and 2016

	2012			2016		
Income group	VAT	Consumption Tax	Business Tax	VAT	Consumption Tax	Business Tax
1	48.59	0.07	0.79	38.96	0.06	0.50
2	32.52	0.16	0.45	26.75	0.14	0.44
3	26.34	0.10	0.56	23.81	0.18	0.40
4	20.89	0.28	0.39	21.43	0.20	0.37
5	19.47	0.34	0.42	18.59	0.29	0.38
6	15.26	0.27	0.34	17.23	0.30	0.40
7	13.35	0.21	0.31	16.91	0.34	0.39
8	12.75	0.24	0.33	15.81	0.29	0.51
9	11.01	0.33	0.34	14.61	0.31	0.62
10	10.18	0.52	0.40	12.50	0.41	0.67
Total	20.79	0.25	0.43	21.04	0.25	0.47

Source: Authors' computation using CFPS2012 and CFPS2016 Data.

Table 8 shows the redistribute effect of the tax system in China, using CFPS2012 and CFPS2016. With the function of indirect taxes, the Gini coefficient of household income decreased from 0.489 to 0.53 in 2012, indicating that the effect of taxation make the Gini coefficient of pre-tax income increased by 7.43 percentage points. In 2016, after the function of indirect taxes, the Gini coefficient of pre-tax income increased by 6.33%. Similar to the findings based on CHIP2013, due to the regressive nature of indirect taxes in China, it plays a role in expanding the income gap.

VAT has the largest effect on expanding income inequality, showing that it makes the Gini coefficient of pre-tax income increased by 7.16% and 6.21% in 2012 and 2016, respectively. Moreover, although consumption tax and business tax are progressive, they have very limited effects on narrowing the income gap.

Table 8 - Redistributive effects of Chinese Tax System in China, 2012 and 2016

	2012			2016		
	Gini	Change in Gini	Chang in Gini (%)	Gini	Change in Gini	Chang in Gini (%)

Pre-tax income	0.48880			0.52461		
-Consumption Tax	0.48836	-0.00044	-0.09	0.52445	-0.00016	-0.03
-VAT	0.52382	0.03502	7.16	0.55719	0.03258	6.21
- Business Tax	0.48854	-0.00026	-0.05	0.52407	-0.00054	-0.10
Post-tax income	0.5251	0.03630	7.43	0.55781	0.03320	6.33

Source: Authors' computation using CFPS2012 and CFPS2016 Data.

Table 9 and Table 10 further present the different effects of indirect taxation in China on income distribution in rural and urban areas. In general, the effect of indirect taxes on expanding income inequality is more obvious in urban areas in 2012. In 2016, with the function of indirect taxes, the Gini coefficient of pre-tax income experience a larger increase in rural areas than that in urban areas.

Table 9 - Redistributive effects of Chinese Tax System in urban areas, 2012 and 2016

	2012 Urban			2016 Urban		
	Gini	Change in Gini	Chang in Gini (%)	Gini	Change in Gini	Chang in Gini (%)
Pre-tax income	0.44970			0.50492		
-Consumption Tax	0.44934	-0.00036	-0.08	0.50483	-0.00009	-0.02
-VAT	0.49370	0.04400	9.78	0.53583	0.03091	6.12
- Business Tax	0.44946	-0.00024	-0.05	0.50424	-0.00068	-0.13
Post-tax income	0.49618	0.04648	10.34	0.53648	0.03156	6.25

Source: Authors' computation using CFPS2012 and CFPS2016 Data.

Table 10 - Redistributive effects of Chinese Tax System in rural areas, 2012 and 2016

	2012Rural			2016Rural		
	Gini	Change in Gini	Chang in Gini (%)	Gini	Change in Gini	Chang in Gini (%)
Pre-tax income	0.48040			0.51140		
-Consumption Tax	0.48013	-0.00027	-0.06	0.51118	-0.00022	-0.04
-VAT	0.51826	0.03786	7.88	0.55140	0.04000	7.82
- Business Tax	0.48070	0.00030	0.06	0.51152	0.00012	0.02
Post-tax income	0.51953	0.03913	8.15	0.55265	0.04125	8.07

Source: Authors' computation using CFPS2012 and CFPS2016 Data.

In line with previous studies (Yue et al., 2014), we find that indirect taxation in China is certainly regressive, and have an effect on expanding the income gap. Personal income tax is progressive, however, the role it plays in narrowing the income gap is very limited.

Furthermore, we also provide evidence that the regressive nature of indirect taxes is more obvious in rural areas, indicating that indirect taxes has a larger effect in expanding income inequality in rural China.

2. Redistributive effects of social security system in China

2.1 Social Security System in China

The social security system is believed to have an important function of income redistribution in economic literature and its role has been studied intensively. In theory, social security system plays a role of income re-distribution through two ways, one is to pay (contribution) to the social security and welfare programs, another one is the public transfer income received by households. Social security contributions, if higher income group pay more, then it is progressive, and thus has an effect on narrowing the income gap. Public transfer income is reflected in a variety of social security and welfare, and low-income families will get more transfer income, thus it also helps to narrow the income gap. The experience of developed countries shows that the social security system in the redistribution of income has become more obviously important, becoming one of the means of income redistribution with the tax system. In this section, we discuss the redistribution effect of social security system in China.

2.2 International comparation

As a developing country, China's social security system has a short history. The system and mechanism are still in the process of continuous reform and improvement. Thus, compared with European countries, the function of redistribution of the Chinese social security remains weak.

(1). The proportion of spending on social security program is much higher in developed countries than in China (40% vs 12%)

Recent estimates show that the proportion of spending on social security program is over 30% in western countries, and in some OECD countries, the share of spending on social security program in public expenditure is over 45%. However, in China, the proportion of social security spending in government expenditure is only 10%-12%. Consequently, differences in social security spending will affect the redistributive effects of social security system.

(2). The current social security system in developed countries has already covered the whole population

There is no doubt that the greater the coverage of the social security system, the more conducive to narrowing the income gap. In addition, low coverage means that a group of the population is excluded from the system, resulting in an opportunity inequality and thus weakening the distributive effect of the system.

In developed countries, especially some European countries, social security and social welfare system has a hundred years of history, and form a complete set of policy system. Moreover, the current social security system in developed countries has already covered the whole population, and it has a positive effect on reducing inequality, alleviating poverty and stabilizing society.

In China, it has initially established a social security and welfare system covering the whole population, especially the pension and health care system covering the whole population. However, since the current social security system is fragmented, the system implements different systems for people with different employment status within a city, lack of cohesion and coordination between different groups. Consequently, the social security benefits of different groups of people have a huge difference, and even played a role in the expanding income inequality.

(3). The social security system plays an important role in reducing the income gap in developed countries, whereas its redistributive effect is much smaller in China

In most European countries, after the adjustment of social security and welfare system, the income gap has decreased significantly. In contrast, the redistributive effect of social security system in China is very limited, only making the Gini coefficient of market income dropped by 13%. Moreover, the fragmentation of the pension system leads to higher pension benefits for civil servants while less for the low-income population or workers in informal sectors, which adversely affect its redistribution effect.

(4). Differences in the pension system

The pension system is believed to have an important function of income redistribution in economic literature and its role has been studied intensively. The system, as the core of the social security system, provides the income guarantee for the retirees.

In developed countries, the equalization level of the pension system is high, resulting in a significant decline the inequality of income distribution. However, due to the difference in urban and rural pension system, the pension system has effects on income redistribution mainly in urban areas, and almost no impact in rural areas. Furthermore, pension distribution is not equal, retirees from different work units receive significantly different pension, and the pension is more distributed to a small number of high-income retirees. That is, the high income group benefits more from the pension system than the low-income group. Therefore, the system has negative impact on income distribution. In addition, the difference in pension income provided by variant pension systems leads to the vertical imbalance in its distribution, which will also increase the income gap and is not conducive to the development of social fairness and the establishment of a harmonious society.

(5). Differences in its redistributive effects

The experience of developed countries shows that social security and welfare program have a significant effect on reducing income inequality. For instance, after the adjustment o=of social security system, the Gini coefficient of market income in fell by 20% in the US. In Sweden, the redistributive effect of social security system is more obvious, making the income

gap of the Gini coefficient decreased by 48% (1995). It should be noted that in most developed countries, the redistributive effect of social security system is much larger than that of the tax system (Jesuit & Mahler, 2004). For example, in European countries, almost 80% of the decline in income inequality is driven by the social security system.

In China, although the social security and welfare system has a positive impact on narrowing the income gap, but the impact is not very significant. Based on China Income Project 2013, our finding shows that with the function of social security system, the Gini coefficient of income decreased from 0.52 to 0.45, indicating that the Gini coefficient of market income declined by only 13%.

2.2 The redistributive effect of social security system in China

The method used in this section is that first the market income inequality is estimated, and then the redistribution effects of the different social security programs (pension, medical care, housing, subsistence allowances and other income transfers) are estimated using the following formula:

Disposable income = market income - contributions + transfer income (3)

Hence, Gini coefficient is used to measure the income gap, respectively, the calculation of market income distribution (usually referred to as the primary distribution), after deducting contributions, plus transfer income. The difference between the Gini of market income and the Gini of disposable income is seen as a redistribution effect.

Table 11 shows the redistributive effects of social security system in China. As a starting point, with the function of the social security system, the average income per capita in 2013 increased from 15,998 yuan to 19,512 yuan. That is, the income level improved after the implement of social security and welfare program. It also indicates market income inequality in China measured by Gini coefficient is about 0.52 in 2013, while the Gini coefficient of redistributed income inequality is 0.45. Thus, with the function of fees and transfer payments,

the Gini coefficient of the national income inequality decreased by 13 percentage points. In other words, the Gini coefficient of the market income gap, after the social security policies, fell down by 13.15%.

Moreover, as shown in the table, the redistributive effect of the social security system is more obvious in urban areas. After the adjustment of social security and welfare program, the redistributed income decreased by around 22 percentage points in urban areas. By contrast, in rural areas, the effect of redistribution of the social security system is much smaller, which just makes the Gini coefficient of market income gap of rural residents fell by 16.56%.

Table 11 - Redistributive effects of the social security system in China， 2013

	Market income		Redistributed income		
	Market value （Yuan）	Gini	Market value （Yuan）	Gini	Change in Gini （%）
Total sample	15998	0.52140	19512	0.45285	-13.15
Rural	8651	0.47358	10124	0.39517	-16.56
Urban	23550	0.44879	29163	0.35017	-21.97

Source: Authors' computation using CHIP2013 Data.

Table 12 reports the redistributive effects of social security fees and transfer incomes attached to households. First, social security contributions play a role in expanding the income gap, and the redistribution of social security fees makes the Gini coefficient of market income gap increased by 0.04%. The reason lies in that low-wage workers pay as the same contribution as the higher wage/income earners. Second, it is clear that public transfer incomes have the effect of narrowing income inequality, making the Gini coefficient of market income decreased by 7.91%. Furthermore, we should pay more attention to the role of redistribution of private transfer income. In 2013, the private transfer income made the market income gap of the Gini coefficient decreased by 13.15%.

Table 12 - Redistributive effects of the contributions and transfers in China, 2013

	Gini	Change in Gini	Change in Gini （%）
Market income	0.52140		
- Contributions	0.52160	0.00020	0.04
+ Public transfer income	0.48018	-0.04122	-7.91
+ Private transfer income	0.45285	-0.06855	-13.15

=Redistributed income	0.45285		

Source: Authors' computation using CHIP2013 Data.

As shown in Table 13, pension insurance and unemployment insurance, have a weak role in narrowing the income gap. However, medical insurance and other fees, are expanding income inequality, making the market income gap increased by 0.13% and 0.01%, respectively.

In addition, among the public transfers, all of them have the effect of narrowing income inequality, but the size of the effects is different from one to another. For instance, pension income has a more obvious redistribution effect, and with the function of pension benefits, the market income gap narrows by nearly 6.5%. Social relief can be seen as a social welfare programs, and it also help to narrow the income inequality. Finally, it is quite clear that rural medical reimbursement also has an effect in narrowing the income inequality, resulting in decline in the Gini coefficient of income inequality by 0.51%. Because the medical reimbursement is mainly obtained by the rural residents, thus it has a positive effect on narrowing the income gap between urban and rural areas.

Table 13 - Redistributive effects of social security system in China, 2013

	Market value (Yuan)	Gini	Change in Gini	Change in Gini (%)
Market Income	15998	0.52140		
Contributions	**15295**	**0.52160**	**0.00020**	**0.04**
- Pension	15524	0.52090	-0.00050	-0.10
- Medical insurance	15815	0.52209	0.00069	0.13
- Unemployment insurance	15970	0.52111	-0.00029	-0.06
- Other contribution	15978	0.52145	0.00005	0.01
+ Public transfers	18772	0.48018	-0.04122	-7.91
+ Pension income	19162	0.48758	-0.03382	-6.49
+ Social Subsidy	16060	0.51823	-0.00317	-0.61
+ in-kind subsidy	16034	0.52022	-0.00118	-0.23
+ Rural medical reimbursement	16126	0.51874	-0.00266	-0.51
+ Other subsidy	16084	0.51777	-0.00363	-0.70
+ Private transfers	**16738**	**0.48822**	**-0.03318**	**-6.36**
Redistributed income	19512	0.45285	-0.06855	-13.15

Source: Authors' computation using CHIP2013 Data.

We further estimate the different effects of various social security fees and social security

transfers on income distribution in urban and rural areas respectively. As reported in Table 14, generally, the redistributive effect of the social security system is more obvious in urban areas. The redistribution of fees and transfers makes the Gini coefficient of urban residents' income gap decreased by around 22 percentage points, whereas it only makes the Gini coefficient of rural residents' income gap declined by 17%. Moreover, whether in urban areas or in rural areas, social security contributions have an effect on expanding the income gap. By contrast, transfer income plays an important role in reducing the income gap.

On the other hand, the redistributive effect of pension benefits is more obvious in urban areas. After the pension system implementation, the Gini coefficient of income inequality fell 20% in urban areas. However, the effect of redistribution of the pension system is much smaller in rural areas, which just makes the Gini coefficient of income gap of rural residents decreased by 2%. Although China has made significant progress in the development of the new pension system for rural residents, the pension system development in rural areas is still lagging behind. Therefore, the role of income redistribution that the pension system play is very limited in rural areas.

Furthermore, the findings in Table 14 reveals a larger effect of redistribution of private transfer income of rural residents, resulting in the market income gap between the rural residents of the Gini coefficient decreased by around 13%. Our estimates show the major component of private transfers in rural households is remittances send back by rural migration. Of course, the redistribution of private transfer income and the public transfer income has a strong alternative. That is to say, the increase in the transfer of public income will be squeezed out of private transfer income.

Table 14 - Redistributive Effects of Social Security system in Urban/ Rural China, 2013

	Urban			Rural		
	Gini	Change in Gini	Change in Gini (%)	Gini	Change in Gini	Change in Gini (%)
Market Income	0.44879			0.47358		
Contributions	0.45187	0.00308	0.69	0.47674	0.00316	0.67
- Pension	0.45080	0.00201	0.45	0.47405	0.00047	0.10

- Medical insurance	0.44950	0.00071	0.16	0.47604	0.00246	0.52
- Unemployment insurance	0.44864	-0.00015	-0.03	0.47351	-0.00007	-0.01
- Other contribution	0.44890	0.00011	0.02	0.47371	0.00013	0.03
+ Public transfers	0.35932	-0.08947	-19.94	0.45200	-0.02158	-4.56
+ Pension income	0.35943	-0.08936	-19.91	0.46402	-0.00956	-2.02
+ Social Subsidy	0.44633	-0.00246	-0.55	0.46882	-0.00476	-1.01
+ in-kind subsidy	0.44796	-0.00083	-0.18	0.47196	-0.00162	-0.34
+ Rural medical reimbursement	0.44616	-0.00263	-0.59	0.47083	-0.00275	-0.58
+ Other subsidy	0.44812	-0.00067	-0.15	0.46692	-0.00666	-1.41
+ Private transfers	0.43435	-0.01444	-3.22	0.41208	-0.06150	-12.99
Redistributed income	0.35017	-0.09862	-21.97	0.39517	-0.07841	-16.56

Source: Authors' computation using CHIP2013 Data.

Based on CFPS2012 and CFPS2016, Table 15 reports the effects of redistribution of social security and welfare program in China. Regarding public transfer income, the CFPS2012 survey sample only contain information on the total pension benefits of the family members, social subsidies, land acquisition subsidies, demolition subsidies and social donation, whereas the CFPS2016 only contains information on the total pension benefits of the family members, social subsidies, and social donation. As far as private transfer income is concerned, the CFPS2012 survey contains information on remittances and other private transfers, while CFPS2016 only contains private transfer income from relatives or other people.

Table 15 reflects the retributive effects of social security system in 2012 and 2016. It indicates that with the function of social security contributions and transfers, household income improves, whether in 2012 or in 2016. Our results further prove evidence of the positive effect of social security system on income distribution. In 2012, after the adjustment of social security system, the Gini coefficient of market income decreased by about 3%. In 2016, with the function of social security and welfare program, the Gini coefficient decreased from 0.59 to 0.52, indicating the income gap between the Gini coefficient fell by 11%.

Table 15 - Redistributive effects of the social security system in China，2012 and 2016 (CFPS)

	2012	2016

	Market value (Yuan)	Gini	Change in Gini (%)	Market value (Yuan)	Gini	Change in Gini (%)
Market income	10644	0.50194		21728	0.58972	
- Contributions	10620	0.50172	-0.04	21704	0.58979	0.01
+ Public transfer income	11294	0.50042	-0.30	24649	0.53541	-9.21
+ Private transfer income	12131	0.48778	-2.82	25391	0.52463	-11.04
=Redistributed income	12131	0.48778	-2.82	25391	0.52463	-11.04

Source: Authors' computation using CFPS2012 and CFPS2016 Data.

Similar to the findings based on CHIP2013, the effect of redistribution of social security system is more obvious in rural areas,

Table 16 - Redistributive effects of the social security system in Urban/Rural China，2012 and 2016 (CFPS)

	2012 Urban			2016 Urban		
	Market value (Yuan)	Gini	Change in Gini (%)	Market value (Yuan)	Gini	Change in Gini (%)
Market income	15906	0.45749		26406	0.58798	
- Contributions	15851	0.45742	-0.02	26370	0.58813	0.03
+ Public transfer income	16663	0.45166	-1.27	30942	0.51176	-12.96
+ Private transfer income	17439	0.44873	-1.91	31890	0.50499	-14.11
=Redistributed income	17439	0.44873	-1.91	31890	0.50499	-14.11
	2012 Rural			2016 Rural		
	Market value (Yuan)	Gini	Change in Gini (%)	Market value (Yuan)	Gini	Change in Gini (%)
Market income	8300	0.49127		16738	0.56752	
- Contributions	8291	0.49124	-0.01	16727	0.56757	0.01
+ Public transfer income	8902	0.49350	0.45	17936	0.52959	-6.68
+ Private transfer income	9767	0.47972	-2.35	18457	0.51142	-9.89
=Redistributed income	9767	0.47972	-2.35	18457	0.51142	-9.89

Source: Authors' computation using CFPS2012 and CFPS2016 Data.

3. Evaluation of the Redistributive effect of the Personal Income Tax Reform in 2018：Simulation analysis

On 19 June 2018, during the third session of the Thirteenth National People's Congress of the People's Republic of China ("PRC"), the Minister of Finance outlined the proposed amendments to PRC Individual Income Tax ("IIT") rules. On 31 August 2018, the Standing

Committee of the National People's Congress approved the amendments to the Individual Income Tax (IIT) Law. The changes generally will become effective on 1 January 2019, although some measures, such as the increased standard deduction and new tax brackets for salaries and wages, will be effective on 1 October 2018. As is well known, the amendment raises the minimum threshold for personal income tax from 3,500 yuan per month to 5,000 yuan, or 60,000 yuan per year. In addition, the tax rates will be revised based on the existing rates applicable to salary and wages, i.e. widening the tax brackets with applicable tax rate of 3%, 10%, and 20%; narrowing the 25% tax bracket, and meanwhile maintaining the tax brackets for three higher levels at 30%, 35% and 45% unchanged.

According to a recent report written by the China Institute for Income Distribution[3], the amendment will lead to a rapid decline in the average tax rate. Moreover, with the increase in the minimum threshold for personal income tax, the amendment will also result in a significant drop in the proportion of taxpayers. For instance, recent estimates show that the share of taxpayers in individuals with positive income is 38.9% under the current tax system. However, the amendment makes the share of taxpayers decreased significantly to 20.9%.

Based on CHIP2013, we employ simulation analysis of tax reform in the section and focus on changes in the redistributive effects of tax system. The simulation method is as follows: First, assuming that all the other conditions in the labor market remain unchanged, on the basis of the actual growth rate of wages in 2013-2018, we calculate wages in 2018. Second, on the basis of the ratio of personal income taxes on income in the survey, we then simulate the disposable income in 2018. Third, according to the current monthly standard deduction, which is RMB3500, and assuming that all the employees are taxed at various tax rates according to the tax rate table in which they fall, we evaluate their disposable incomes in 2018. Finally, according to the revised monthly standard deduction, which is RMB5000, and assuming that all the employees are taxed at various rates according to the tax rate table in which they fall, we then calculate their disposable incomes in 2018.

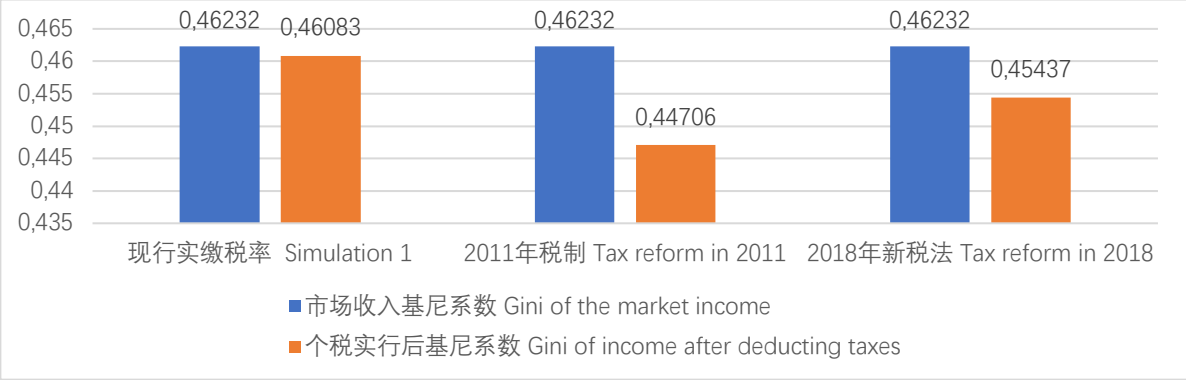
[3] For more details, see https://mp.weixin.qq.com/s/HIFaqvDCio0VFIvLf16ZnA.

Under these assumptions, we estimate the effects of redistribution of personal income tax in China. The changes can be seen from Figure 3.

First of all, based on the current income tax rate in the survey sample, the Gini coefficient of pre-tax income is 0.4623, and the Gini coefficient of post-tax income is 0.4608, indicating that personal income tax makes the income inequality decreased only 0.32 percentage points. Secondly, assuming that all the employees are taxed at various tax rates according to the tax rate table in which they fall, the Gini coefficient before and after personal income tax decreased from 0.4623 to 0.4608. That is to see, after the adjustment of personal income tax, the pre-tax income gap narrowed by nearly 3.3%. Thirdly, on the basis of the amendment, the Gini coefficient of post-tax income decreases to 0.4544. In other words, the effect of the personal tax reform makes the pre-tax income inequality measured by the Gini coefficient decreased by 1.72%.

To a certain extent, it seems that the rise of the minimum threshold for personal income tax will reduce the redistribute effect of personal income tax on income distribution. It should be noted that the major problem of the tax system do not lie in the minimum threshold for personal income tax. And the major reason underlying the decline in the effect of personal income tax is **the serious horizonal inequality in the tax system**. More specifically, the sources of household income are becoming more and more diversified in the last 30 years. However, for low-income and middle-income group, as the major source of income, the share of wage income in total income is relatively higher than that in high-income group. Therefore, under current tax system, the personal income tax rate of middle-income group is much higher than that of high-income group, and this is an important factor underlying the limited redistributive effect of personal income tax.

Figure 3 – Redistributive effects of tax reform



4. Overall effects of taxes and public transfers

To sum up, our findings show that social security system and personal income tax system play an important and positive role in reducing inequality, alleviating poverty and stabilizing society in China.

The purposes of the tax system are to raise revenue to fund government services, to encourage or discourage certain types of behavior, to correct market imperfection, and to change the distribution of income or wealth. Based on household survey in 2013, we find that indirect taxation in China is certainly regressive. That is, the tax burden of people with low incomes are much higher than those with higher incomes. Thus, the tax system in China has an effect on expanding the income gap, making the Gini coefficient of household income increased by about 3.17%. Among all the indirect taxes, due to the higher tax burden, VAT has a more obvious effect on expanding income inequality. On the other hand, personal income tax is progressive. However, the role it plays in narrowing the income gap is very limited.

The social security system has a positive effect on alleviating poverty, stabilizing society, and income redistribution. Our findings further show that with the function of social security and welfare program, the Gini coefficient of market income decrease by about 13 percentage points. Some social security contributions, such as medical insurance, on one hand, are regressive and has a role in expanding the income gap. Public transfers, on the other hand, have a significant effect on narrowing the income gap, making the income inequality measured by Gini coefficient declined by 8%. Among all the public transfers, pension benefits has a more

obvious effect on income distribution. Finally, private transfer income has a significant effect on narrowing the income gap. After the adjustment of private transfer income, the Gini coefficient of market income decrease by 6%.

Table 17 - Redistributive effects of tax and social security system in China

	Change in Gini	Change in Gini（%）
Tax system		
1. Indirect Taxation		
-Consumption Tax	0.00333	0.73
-VAT	0.01210	2.66
- Business Tax	-0.00099	-0.22
2. Direct Taxation		
- Personal income tax	-0.00133	-0.29
Social Security System		
3. Contributions		
- Pension Insurance	-0.00050	-0.10
- Medical Insurance	0.00069	0.13
- Unemployment Insurance	-0.00029	-0.06
- Other contributions	0.00005	0.01
4. Transfer Income		
+ Pension benefits	-0.03382	-6.49
+ Social subsidy	-0.00317	-0.61
+ In-kind subsidy	-0.00118	-0.23
+ Rural medical reimbursement	-0.00266	-0.51
+ Other subsidy	-0.00363	-0.70
+ Private transfer income	-0.03318	-6.36

Source: Authors' computation using CHIP2013 Data.

Wide ranging reforms in China have led to high levels of economic growth but this has resulted in increasing income inequality and discrimination. At the current stage of development, a major objective of the national redistributive policies should be to reduce income inequality. However, we find that the redistributive effect of the tax system in China is very limited, and indirect taxes has an effect on expanding income inequality. Meanwhile, because the fragmentation of the social security system still exists, the effect of social security

system on income distribution is also very limited.

5. Conclusions and reform suggestions

The experience of developed countries shows that with the development of economy, redistributive policies play a significant role in reducing the income gap. This paper focuses on the redistributive effects of tax and social security system in China, and has the following major conclusions:

First, indirect tax system in China is regressive, while personal income tax is progressive. Therefore, indirect taxes has an effect of expanding the national income inequality, whereas personal income tax helps to narrow the income gap. However, since the share of personal income tax in total tax revenue is relatively smaller, the role it plays in narrowing the income gap is very limited. In particular, the results show that the regressive nature of the indirect taxation is more obvious in rural areas, indicating that indirect taxes has a larger effect in expanding income inequality in rural China.

Second, social security and welfare program help to narrow the income gap in China. Our findings prove evidence that a variety of social security and welfare programs with public transfer income has a positive effect on narrowing the income gap, which is mainly derived from the redistributive effect of pension insurance system. By contrast, some social security contribution plays a role in increasing the income gap.

Compared with other developed countries, the function of redistribution of social security system and tax system in China remains weak. The paper provides the following suggestions for further reform of social security and tax system in China. First of all, further reform the personal income tax system to increase its role in income re-distribution. Secondly, increase the sources(sorts) and proportion of direct taxes. In theory, direct taxes has a more obvious effect on income distribution, whereas the main objective of indirect taxes is to reduce the regressive nature of the tax system. Compared with other developed countries, the share of direct taxes in total tax revenue is relatively smaller. Therefore, the government should

further increase the proportion of direct taxes and establish a more equitable tax system to reduce income inequality. Thirdly, reform the existing fragmentation of the social security system, and establish a unified national social security system as soon as possible, and reduce the differences in social security benefits for different groups of people. In addition, further improve the coverage, and achieve the goal of equally protecting all the disadvantaged people. Finally, increase the progressive effect of social security contribution. That is, the social security contribution needs to increase the progressivity of payment and the payment must be linked to their income level.

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