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**The Redistributive Role of Government  
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by

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**TEN**

**The Redistributive Role of Government Social Security Transfers on Inequality in China**

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## **Abstract**

The purpose of this work is to evaluate the redistributive role of government social security transfers on inequality in China. We attempt to answer two questions. First, does inequality of after-transfer income narrow, compared to that of before-transfer income? Second, given the scale and distribution of existing government social security transfers, will a small percentage increase in the transfers narrow or widen the inequality of total income? By employing the methodologies of the Musgrave-Thin (MT) index and decomposition of the Gini coefficient of total income by its sources, we find a positive answer to the first question and a negative answer to the second question. Government social security transfers have a positive role on inequality in the sense that the Gini coefficient of after-transfer income is smaller than that of before-transfer income. However, government social security transfers have a negative role on inequality, as current inequality will go up if there is a universal increase in government social security transfers for all recipients. Of all the components of government social security transfers, formal sector pension benefits and medical expense reimbursements are disequalizing, whereas the *dibao* and rural pension benefits are equalizing.

**Keywords:** China, inequality, social security, taxes, transfers

**JEL Classification:** H23, H55, O23, P35

## **I. Introduction**

Public transfers that households receive through social security schemes are one of the most significant systems to ensure and improve people's livelihood and to promote social fairness and justice. As a major component of government public expenditures in many countries, social security expenditures play a crucial role in narrowing income inequality. A major reason for low inequality in the developed countries, as revealed by international experience, lies in the government redistribution policies rather than market factors. Kristjánsson (2011), in a study of the Gini coefficients based on the three definitions of income in sixteen OECD member states, such as Italy, Luxembourg, and the UK, finds that among the sixteen OECD member states in 2007, the market Gini coefficient was 0.483 whereas the Gini coefficient of disposable income was 0.289. The market Gini coefficient was reduced by 0.193 due to the government redistribution policies, and 80.83 percent of the reduction was due to public transfers, a much higher share than those of the personal income tax and social security contributions of individuals. Studies by Milanovic (1999) and Mahler and Jesuit (2006) on income distributions in several OECD states from 1967 to 2000 also show that government transfers and personal income taxation can lower the income inequality index, with the public transfers playing a key role and contributing to as much as 80 percent of the reduction in income inequality.

The social security schemes in some developing countries also display a significant effect in

narrowing the degree of income inequality. Lustig (2011), in a study of the redistributive role of public transfers in Latin America countries, found that public transfers in Brazil and Mexico also had a strong effect on income redistribution, explaining 75.2 percent of the improvement. Therefore, the experience of both the developed and the developing countries reveal that public transfers, with social security expenditures as their income source, act as a primary government mechanism to improve income redistribution. In addition, research has found that government redistribution policies, rather than market factors, lead to the higher income inequality in China than in the developed countries (Cai and Yue 2016). Thus, to achieve the goal of narrowing income inequality and to realize social fairness and justice, we should focus on the redistributive role of public transfers.

The degree of the redistribution effect of public transfers has much to do with the scale of social security expenditures in government budgets, which are the source of funding for public transfers. In general, most developed countries have a larger scale of social security expenditures than developing countries, which raises the question of whether China's scale of social security expenditures is large or small when compared to that of other countries. The ratio of social security expenditures to GDP is often used for such comparisons. For example, in 1995, the average ratio of social security expenditures to GDP in eight countries, including the UK, Sweden, Finland, Denmark, the United States, Japan, and so on, was 32.2 percent.<sup>1</sup> In addition, the level of social security expenditures measured by this ratio is closely related to economic development. Taking GDP per capita as an indicator of economic development, the higher a

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<sup>1</sup> Based on the OECD.

country's GDP per capita, the higher the ratio of its social security expenditures to GDP. This indicates a positive relationship between social security expenditures and economic development. Figure 10.1 displays the relationship between the ratio of social security expenditures to GDP per capita in 56 countries and regions in 2012. GDP per capita is on a comparable basis in these countries.

[Figure 10.1 about here]

We can see from the figure that there is an obvious positive relation between GDP per capita and the ratio of social security expenditures to GDP, meaning that social security expenditures will increase as GDP per capita increases. A fitted line from the regression is also depicted in the figure and China is located below the fitted line, indicating that social security expenditures in China are below the average, even considering its stage of economic development. The predicted values of the ratio of social security expenditures to GDP based on Chinese per capita GDP calculated from the regression was 10.5 percent, which was high compared to the 7.2 percent in the actual value. This finding is supported by other studies. For example, according to the Caizhengbu shehui baozhangsi ketizu (Ministry of Finance Social Security Task Group) (2007), during the period from 2002 to 2006 China's social-security level remained between 5.41 percent and 5.60 percent, lower than not only the developed countries such as the United States, Germany, or France, but also lower than some developing countries, such as Kazakhstan, Poland, and Hungary, as well as Argentina, Brazil, and Uruguay.

Low social security expenditures in China are one of obstacles to the social security

programs ability to play a strong role in terms of affecting inequality. The focus of the chapter is government social security transfers, not all transfers. Specifically, in our research we include pensions, *dibao*, medical expense reimbursements, and farmer subsidies. Private transfers are not part of our analysis.<sup>2</sup> Given the scale of the government social security transfers, and hence the amount of the public transfers received by households, the degree of the redistributive role of government social security transfers depends on how the transfers are distributed among the households. If they are distributed so that poor people receive more transfers, then the transfers will have a positive role on inequality. The more transfers received by the poor, the greater the role that the transfers will play in terms inequality. However, if the distribution of such transfers is concentrated on wealthier people, the transfers will have a negative role in terms of the income distribution.

To examine the distribution of the public transfers, we must examine the micro data at the household level. This is main purpose of this study. Namely, the objective of this study is to evaluate the redistributive role of public transfers in China by using household-level data.

In measuring the distributive role of government social security transfers in China, we focus on two questions. The answers to these two questions may produce different, opposite, conclusions about the role of public transfers on inequality. The first question is whether after-transfer income, compared to before-transfer income, narrows inequality. The second

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<sup>2</sup> Since the aim of this chapter is to evaluate the redistributive role of government transfers, we do not include private transfers in our analysis. Among the different government social security transfers, we focus on pensions, *dibao*, medical expense reimbursements, and farmer subsidies, since they constitute the largest share of total public transfers.



question is, given the scale and distribution of existing government social security transfers, will marginal increases in each of different transfer programs narrow or widen inequality? We find a positive answer to the first question but a negative answer to the second question. The two answers have clearly different policy implications.

## **II. A Brief Introduction to the Social Security System in China**

Households in China, like households in other countries, receive public transfers from governments mainly through a variety of social security programs. This section provides a brief introduction to the social security system in China to help readers have a better understanding of the redistributive role of the public transfers to be discussed in next section.

Like other countries, while the social security system in China consists of a variety of sub-schemes, the principal elements of the social security system include pension insurance, health insurance, and social relief, which we will introduce below. Some other schemes specific to the rural areas are also introduced.

In China pension insurance contains several complicated elements that are beyond the scope of this study.<sup>3</sup> In the following, we will summarize the most significant feature of the Chinese pension system and focus on those elements that are of relevant to an evaluation of the redistributive role of the public transfers.

A major feature of the pension system in China is its fragmentation. The Chinese pension

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<sup>3</sup> For a full account of the pension system in China, see, for example, Dorfman et al. (2013).

system is fragmented in terms of targeting population groups, financing, levels of benefits, and so on. The principal pension schemes in China include pensions for civil servants and public-sector units (PSUs), the urban employee social insurance pension system, the New Rural Social Pension Scheme (NRSPS), and the Urban Residents Pension Scheme (URPS). After the economic reforms, the first pension insurance was established for enterprise workers in the urban areas in 1997. Prior to this, elderly care services, as well as health care, housing, and many other services for workers had been provided by their work units. The pension insurance was set up with the intention of separating responsibility for elder-care services from the enterprises. The targeted population of the scheme was limited only to only those who worked for enterprises in the urban areas. Self-employed workers, irregular workers, and the non-working population in urban areas were excluded from the pension scheme. At that time, civil servants working for government agencies and workers in PSUs had not joined any of pension schemes but the Urban Residents Pension Scheme (URPS). After the economic reforms they received retirement benefits from government budgets. The NRSPS, which began implementation in late 2009, aimed to achieve full geographic coverage no later than 2013. Participation for this pension program is voluntary, and operational matters are left to local governments. The targeted populations for the rural pension scheme were all residents living in the rural areas, and those self-employed, irregular-working and non-working residents in the urban areas. The pilot initially began in 10 percent of the nationwide counties, with an expectation that all counties in China would be covered by 2013. The URPS, which began in mid-2011, shares almost the same

design as the NRSPS. It aims to ensure a basic level of income support for the unemployed, urban workers without employment contracts, and urban retirees without alternative sources of retirement income. Moreover, the URPS covers only those with local urban *hukou*. Migrant workers from rural or other urban areas are not eligible to participate in their city of residence but only in the area where their *hukou* is registered.

It is clear from the above description that three pension schemes have been established in China in an attempt to cover the entire population. In some sense, the enterprise worker pension and the pension scheme for civil servants and PSU workers are pension schemes for employees working in the formal sectors, whereas the urban-rural resident pension insurance was designed for those working in the informal sector. There have been efforts by governments to integrate the two pension schemes designed for formal-sector workers.

Benefit levels and their variations across different schemes influence the role of the pension benefits on the inequality of total income. Although there is systematic information on the replacement rates of benefit levels of the schemes, scattered evidence reveals huge differences in the pension benefit level across the different pension schemes. The replacement rate for civil servants and PSU workers' benefits was 100 percent in about 2000 but it declined to about 63 percent in 2009, which was the highest pension benefit among all the pension schemes. The replacement rate for enterprise employees was about 70 percent in 2001 but it declined to near 40 percent in 2009, well below that for civil servants and PSU workers.<sup>4</sup> Benefit levels in nominal terms have increased steadily in the urban schemes, but wage replacement rates have been falling

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<sup>4</sup> World Bank and Development Research Center (2013, p. 339).

in recent years. The level of rural pension benefits is the lowest, and it varies among provinces.

Medical insurance is another public social security program in China. The Urban Employee Basic Medical Insurance (UEBMI) has been implemented by the government since 1998, and its participants include employees in either the public or private sectors in the urban areas. Since unemployed urban residents could not be included in UEBMI programs, the Urban Resident Basic Medical Insurance (URBMI) was introduced by the government in 2007, which covers non-workers with urban registrations. In rural areas, the New Cooperative Medical Scheme (NCMS) was implemented in 2003 and covers all residents with rural registrations. To enforce the health-care reforms and reduce the benefit disparities between the urban and rural areas, the Chinese government intended to integrate the URBMI and the NCMS in 2016, which is called the Urban and Rural Resident Basic Medical Insurance (URRBMI) system.

Unlike pension benefits and relief, medical insurance is not a fixed amount of transfers from the government to those eligible, but reimburses medical expenses actually incurred by households. The amounts of the medical-expense reimbursements depend on hospital levels, types of beneficiaries, categories of medicines, and medical health care, but not all the medical expenses can be reimbursed. In addition, participants in medical insurance programs usually must first pay the medical expenses, after which they can receive the reimbursement. It is likely that wealthier people receive most of the medical expense reimbursements, whereas the poor receive fewer reimbursements, as they are less likely to be able to finance their part of moderately large medical expenses and hence they may not be eligible to receive the transfers. This occurs in

our sample, as will be seen in the analysis below.

The minimum living standard guarantee program, called *dibao* in Chinese, for urban residents was experimented with in 1993 in Shanghai and rolled out nationwide in 1997. The rural *dibao* program was experimented with in 2001 and expanded nationwide in 2007. The *dibao* programs are designed to raise the income for poor households up to an income threshold. The *dibao* programs are managed by local governments with some of the funds coming from the central government. There are many problems, such as targeting inefficiencies and income thresholds determined by local governments based on their fiscal capacity and thus low *dibao* payments in impoverished areas.<sup>5</sup> The distribution of *dibao* transfers generally focuses on the poor in the entire income distribution and hence they can help reduce poverty and inequality. This will be verified below.

### **III. Data and Methods**

#### **A. Data**

The household data used in this chapter comes from the household survey of 2013 conducted by China Household Income Project (CHIP). The survey sample contains 62,603 individuals in 18,128 households, including 39,421 people in 10,551 rural households, 20,339 people in 6,866 urban households, as well as 2,843 people in 711 rural migrant households whose *hukous* are registered in the rural areas but who work and live in urban areas. The sample includes the

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<sup>5</sup> See Chen, Ravallion, and Wang. (2006), Gao, Garfinkel, and Zhai (2009) and Golan, Sicular and Umpathi (2014).

fifteen provinces of Beijing, Liaoning, Guangdong, Jiangsu, Shandong, Shanxi, Anhui, Henan, Hubei, Hunan, Chongqing, Sichuan, Yunnan, Gansu, and Xinjiang. In the following calculation, the sample is weighted by the population of three regions, that is, the eastern area, the central area, and the western area, with each region further divided into three population groups: rural, urban, and migrants.

Our definition of disposable income is basically consistent with that of the entire research project, but it excludes in-kind housing subsidies. We divide the transfer income into public transfers from the government and private transfers from individuals. The former includes formal-sector pensions, urban resident pensions, rural resident pensions, *dibao*, medical expense reimbursements, farmer subsidies, and other public transfers that include the social security transfers, which are the focus of this chapter.

## **B. Methods**

This study employs two indexes to evaluate the redistributive effects of public transfers: the Musgrave and Thin (MT) index and a decomposition of the Gini coefficient by income sources. Although these two indexes have been commonly used in the literature for this purpose, most works only use one of them, without noting the differences between them. The two indexes answer different questions regarding an evaluation of the redistributive role of public policy and have different policy implications. Our chapter will further investigate this issue.

The MT index is a tool that was first used by Musgrave and Thin (1948) to evaluate the

redistributive effects of taxes. The index is defined as the difference between the Gini coefficients of before-tax and after-tax income, which is expressed by the following formula:

$$MT = G_X - G_Y \quad (1)$$

$G_X$  and  $G_Y$  respectively represent the Gini coefficient of before- and after-tax income. If the taxes improve income inequality,  $G_Y$  will be less than  $G_X$ , leading to a positive value of the MT index. In contrast, the MT index will be negative if the taxes widen income inequality.

The redistributive role of taxes evaluated by the MT index is closely related to the tax progressivity. Kakwani (1984) establishes a link between the MT index and the tax progressivity index by decomposing the MT index as follows:

$$MT = (C_Y - G_Y) + \frac{t}{1-t}P \quad (2)$$

where  $C_Y$  is the concentration ratio of after-tax income, with before-tax income as sorting variable.  $C_Y - G_Y$  measures the horizontal equity of taxation and takes a value of 0 if taxation does not alter the income rankings of all individuals, that is, the income rankings are the same according to both the pre-tax and the after-tax income. This term will be negative if taxation alters the income ranking of any individual, indicating that the principle of horizontal equity is violated. Normally,  $C_Y$  and  $G_Y$  are not equal but very close, hence  $C_Y - G_Y$  has little influence on the MT index.  $P$  stands for the progressive index of the tax defined as follows:

$$P = C_T - G_x, \quad (3)$$

where  $C_T$  is the concentration ratio of the tax and  $G_x$  represents the Gini coefficient of the pre-tax income.  $P$  not only determines the direction of the MT index but also, combined with

the average tax rate, denoted by  $t$ , determines the extent to which the tax affects the MT index. Assuming  $C_Y - G_Y = 0$ , if  $P > 0$ , meaning that the tax is progressive, then  $MT > 0$  and the tax will reduce inequality and, conversely, if  $P < 0$ , meaning that the tax is regressive, then  $MT < 0$  and the tax will exacerbate inequality. A proportional tax, that is,  $P = 0$ , has no effect on inequality. It is worth noting that the progressivity of the tax,  $P$ , and the average tax rate,  $t$ , can be determined separately, in the sense that one can change  $t$  while keeping  $P$  unchanged and vice versa.

The MT index can be used to evaluate the role of public transfers on inequality (Wang et al. 2016; Chen, Wen, and Ren 2016), as long as the transfers can be treated as negative taxes. In the case of public transfers,  $P < 0$  means that the transfer scheme is progressive. It combines with the negative transfers ratio, that is,  $t < 0$ , to make the Gini of the after-transfer income smaller than that of the before-transfer income.

After introducing the MT index, we move to another methodology to evaluate the redistributive role of public transfers. A decomposition of the Gini coefficient by income sources is another way of looking at the effects of public transfers on income distribution. If the total income of each individual can be divided into the income sources, that is,  $y = \sum_{k=1}^K y_k$ , then the Gini coefficient of the total income can be decomposed as the weighted sum of the concentration ratios of the income sources, with the weights being the shares of the income sources in the total income. The decomposition can be written as the following:

$$G = \sum_{k=1}^K C_k S_k. \quad (4)$$



where  $C_k$  represents the concentration ratio of income source of  $k$ , and  $S_k$  represents the share of the corresponding income source in the total income. A decomposition of the Gini coefficient is, in most cases, used to investigate the determinants of inequality in the total income, that is, how and to what extent each income source contributes to the inequality of the total income. The decomposition also provides information to judge whether a certain income source is an equalizing or a disequalizing factor in terms of the inequality of the total income.

What determines whether a certain income source is equalizing or disequalizing in terms of the inequality of the total income? The answer is found by comparing the size of the concentration ratio of the income source to the Gini of total income. If the concentration ratio of income source  $k$  is smaller than the Gini of total income, that is,  $C_k < G$ , then a small percentage increase in the income source for the entire sample will lead to a decline (depending on the size of  $S_k$ ) in the inequality of the total income, and vice versa. When  $C_k$  equals  $G$ , a small increase in this income source will not change the Gini of the total income.

Lerman and Yitzhaki (1985) develop a formula that accurately measures the direction (whether equalizing or disequalizing) and also the degree to which income sources influence the inequality of total income. The formula is the following:<sup>6</sup>

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<sup>6</sup> This formula differs slightly from that of Lerman and Yitzhaki (1985). The original formula is as follows:

$$\frac{\partial G / \partial e}{G} = S_k \frac{R_k G_k - G}{G},$$

where  $G_k$  denotes the Gini coefficient of income source of  $k$ , and  $R_k$  is a term reflecting the correlation between the total income and its source  $k$ .

$$\frac{\partial G/\partial e}{G} = S_k \frac{C_k - G}{G} \quad (5)$$

where  $\partial e$  indicates a small percentage change in income source  $k$ . It is clear from this formula that the scale of the concentration ratio of income source  $k$ ,  $C_k$ , is relative to the Gini of the total income,  $G$ , determines the direction of the effect of the income source in question on the inequality of the total income. That is, if  $C_k > G$ , then a small percentage change in income source  $k$  will lead to a rise in the Gini of the total income, and vice versa. If  $C_k = G$ , any change in the income source has no impact on the distribution of the total income. It is also clear from the formula that the extent to which a certain income source affects the inequality of the total income depends on two factors: its share in the total income and its concentration ratio. All else being equal, the larger the share and the bigger the concentration ratio, then the income source will have a more significant effect on the inequality of the total income.

It is clear from the above explanations that both methods provide information needed for an evaluation of the redistributive role of public taxes and transfers. The two methods, however, are not the same. First, the Gini decomposition differs from the MT index approach in that it tells us the equalizing/disequalizing impact on the margin of all sources of income, not only that of transfers. Second, and more importantly, the difference between the two methods is anchored by reference to the comparison or starting point. Using transfer income as an example, the MT index uses inequality of before-transfer income as a reference, and it compares the inequality of the after-transfer income with this reference. It attempts to answer the following question: is the inequality after the transfers narrowed, as compared to the inequality before the transfers? If the

inequality of income inclusive of the transfers is lower than that of income exclusive of the transfers, then the transfers play an equalizing role on inequality. In contrast, the Gini decomposition takes the inequality of after-transfer income as the reference or starting point, and attempts to answer the following question: what would the inequality be if there was a small percentage change in a certain income source for all individuals? If the inequality declines in response to a small increase in the income source, then the income source plays an equalizing role on the inequality of the total income. Due to the difference in the reference or starting point, the two methods can reach different, mostly opposite, conclusions about the redistributive role, even for the same policy measures. Again, using public transfers as an example, it is likely that the MT index shows that the inequality of income inclusive of the transfer is smaller than that of income before the transfer, and, at the same time, results from the decomposition indicate that a slight increase in the transfers for all individuals will lead to a rise in current inequality, that is, in the inequality of income inclusive of the transfers. This occurs when the transfers are distributed toward the higher income group in the income distribution based on after-transfer income, but toward the lower income group in the income distribution based on before-transfer income. In other words, if the transfers are distributed too much in favor of the group that is relatively poor according to before-transfer income, then the two methods produce opposite conclusions about the redistributive role of the transfers.

It is important to emphasize that the questions that both methods ask and attempt to answer are equally important but have different policy implications. The MT index attempts the answer

the following question: do public transfers reduce inequality, whereas the question that decomposition approach attempts to answer is the following: given current scale and distribution of the public transfers, how would inequality be affected if a government plans to raise the transfers, say by 1 percent. In some sense, the answer to the question asked by the MT index is obvious, because public transfers are generally designed as an income source for poor people (in terms of income exclusive of the transfers) and, therefore, the transfers should be equalizing. In this case, the usefulness of calculating the MT index is to gauge accurately the extent to which the transfers reduce inequality. In contrast, the answer to the question asked by the Gini decomposition approach is less obvious than that of the MT index approach, at least in the Chinese context. Formal-sector pension benefits have grown by annual rate of over 10 percent for more than the past ten years, and there is a need to continue this trend. A decomposition of the Gini can provide information about whether further increases in formal-sector pension benefits will widen or narrow inequality, so they provide a redistributive evaluation of the need to continue growth. The MT index calculation, however, does not serve this purpose. This will be clear in the following section.

#### **IV. Empirical results**

This section looks at the redistributive role of public transfers as a whole and by their main components, using the two methods described in last section. The focus of this chapter is the

potential differences in the redistributive role of transfers as evaluated by the two approaches, and their different policy implications.

Before presenting the results of calculating the indexes in the two approaches, we report the per capita values of the main types of public transfers (see Table 10.1). As introduced in Section 2 above, there are several different transfers coming from the different social security schemes. In Table 10.1, we list the main transfers separately but we combine the remainder together into one transfer. The independently listed transfers include formal-sector pensions, urban resident pensions, rural resident pensions, *dibao*, medical expense reimbursements, and farmer subsidies. We choose these transfers to list separately based on their regularity, their large share in the total transfers from the government, and their potential importance in the future of the social security program in China, such as the *dibao*. The transfers combined into “other transfers” include other pensions,<sup>7</sup> social relief (other than *dibao*), and so on. One weakness of data related to information on pensions is that the pension benefits received by civil servants and PSU workers and those received by retired enterprises workers are not separately available but are combined in the data on formal-sector pensions. As discussed in Section 2 above, government and PSU retirees receive much higher pension benefits than retirees from urban enterprises, which means that the pensions of civil servants and PSU workers may have a different effect on inequality than the pensions of urban enterprise workers.<sup>8</sup>

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<sup>7</sup> Other pensions include nursing fees for retired people with occupational injuries, pensions received by unguaranteed urban elderly, subsidies for heating expenses, books, newspapers, other aids for difficulties, and so forth.

<sup>8</sup> The pension system for enterprise workers covers all types of urban enterprises, including both state-owned and private enterprises.

[Table 10.1 about here]

As can be seen from Table 10.1, per capita public transfer income per capita for the nation as a whole was 2,898 yuan, and the transfer amounts differed among rural, urban, and migrant households. The public transfers that urban households received were 6,126 yuan in per capita terms, whereas they were only 739 yuan for rural households and 389 yuan for migrants. The transfers that urban households received were 8.3 times those of rural households, and 15.8 times those of migrant households. The per capita income of urban households without public transfers is 2.3 times that of rural households. This ratio rises to 2.7 after the two types of households receive the public transfers. Urban-rural income gaps, sometimes called the urban-rural income divide, is one of the most important sources of inequality in China. The public transfers in fact worsen the urban-rural divide.

Pension benefits are dominant among the public transfers, as they account for nearly 90 percent of the total public transfers for the nation as a whole (the formal-sector pensions, urban resident pensions, and rural resident pensions combined). The proportions differ between the rural and the urban households. In the urban areas the formal-sector pensions and the urban resident pensions, the two pension schemes designed for urban households, account for 94.1 percent of the public transfers. Among the rural households, three pension programs together account for 54.3 percent of the total transfer income received from the governments. Farmer subsidies and other transfers also prove to be a large share of the public transfers for rural households.

In the following, we discuss the redistributive role of public transfers. The role of transfers on inequality depends on their distribution among the different income groups. That is, if the low-income group receives more transfers than the high-income group, then the transfers will help reduce the inequality. Accurate measurements of the redistributive role depend on the calculation of the inequality indexes and their decomposition, as introduced in last section. However, here we use an income quantile technique to present a very intuitive look at the effects of public transfers on inequality. As discussed in the last section, using income as a reference is important. When examining how the transfers are distributed among the income groups, income here as a reference can be income either inclusive or exclusive of the transfers. When income without the transfers is used to make the income quantile, the distribution of the transfers among the different quantiles will provide information similar to that from the MT index, whereas when the income with the transfers is used to create the income quantile, an evaluation from the distribution of the transfers among the quantiles will be similar to the decomposition of the Gini by income sources. In the following we use disposable income per capita with and without public transfers as a reference to create the income quantiles and to examine how the transfers are distributed among the different deciles.

[Table 10.2 about here]

Table 10.2 shows the distribution of the main public social-security transfers among deciles, sorted by the disposable income per capita exclusive of the public transfers. As can be seen from the table, the share of total public transfers received by each decile rises as we move up the

income distribution, even though the rise occurs very clearly only for the first three lowest deciles and it changes very little for the remainder of the deciles. This means that, on average, low-income people receive more public transfers than high-income people, and hence public transfers are progressive. The per capita transfers, for instance, of the lowest decile is above two times that of those of the highest decile. The progressivity of total public transfers indicates the positive role of the transfers on income inequality. As to the components of the public transfers in the table, the shares of *dibao* decline consistently and substantially when moving up the income distribution. Most of the components of the public social-security transfers show a similar trend as the *dibao*. An exception occurs with respect to medical expense reimbursements, with shares varying across the deciles and not revealing any clear trend.

[Table 10.3 about here]

Table 10.3 displays the distribution of public transfers among the deciles sorted by the disposable income per capita including the social-security transfers. Compared with Table 10.2, the table indicates that public transfers are no longer progressive; rather, they have become regressive. The share of each decile in the total public transfers rises consistently as we move up the distribution. The lowest decile, for example, receives only 1.3 percent of the total transfers, against 35.2 percent for the highest decile. This means that the total public transfers per capita of the highest decile is 27.3 times that of the lowest decile. The ratio is bigger than that for the total income, which is 22.1 times.

*Dibao* and farmer subsidies remain progressive, compared to their distribution among the



deciles created according to income exclusive of the transfers. This means that after taking the transfers into account, the two transfers are distributed such that low-income people receive more than high-income people. In contrast, the remainder of the sub-transfers have become regressive, as the shares of these transfers have increased when moving up the income ladder. This situation arises because the transfers move some people from a lower pre-transfer income decile to a higher post-transfer income decile, which causes an “over adjustment”. This is especially the case for pensions as some urban residents might have zero income or very low income before receiving pensions, but with the pensions they are in the high-income deciles. The ratio of the share of the highest decile to that of the lowest decile is 148.2 for formal-sector pension, 56.9 for urban resident pensions, and 15.9 for medical expense reimbursements. Surprisingly, 44.4 percent of the total medical expense reimbursements go to the highest decile.

Although the above discussion based on income quantiles can predict the redistributive role of transfers as a whole and by components, an accurate quantitative evaluation should rely on a calculation of the indexes discussed in the previous section.

[Table 10.4 about here]

Table 10.4 presents the results of calculating the MT indexes for China as a whole and the three population groups, that is, rural residents, urban residents, and migrants. It is clear from the table that the MT indexes are positive both for the country as a whole and for each of the three population groups, thus indicating the equalizing role of public transfers. For the entire country, the Gini coefficients of income without and with transfers are 0.4604 and 0.4364 respectively

and their difference, namely the MT index, is 0.0239, meaning the transfers reduce the Gini by 2.39 percent  $(=(0.4604-0.4364)*100)$ . The transfers have the greatest impact on inequality in the urban areas, with the MT index at 0.0758, and second greatest impact for the rural areas, with the corresponding MT index at 0.0136. The transfers have the least and a minor impact for migrant households, with the Gini coefficient remaining almost unchanged from income without transfers to income with the transfers. The pre-transfer and post-transfer income gaps between urban and rural residents are 13,794 yuan and 19,182 yuan, respectively, which means that the social-security transfers increase the urban-rural income difference by 39.1 percent  $(=(19182-13794)/13794)$ . The urban-rural income ratio increases if it is measured including versus excluding the social-security transfers,<sup>9</sup> indicating that after the adjustment of government transfers, the urban-rural income gap is widening. Therefore, it seems that government social-security transfers play a reverse redistributive role between urban and rural residents, which is consistent with the findings in Wang et al. (2016).<sup>10</sup>

[Table 10.5 about here]

It is evident that the transfers reduce inequality according to the MT index analysis. What will happen, however, if the decomposition of the Gini coefficient is used? Table 10.5 presents the results of conducting a decomposition of the Gini for total income by its components. The

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9 The urban-rural income ratio is 2.3 (24339/10545) if measured excluding the social-security transfers. This ratio becomes 2.7 (30465/11283) if measured including the transfers.

10 The similarity between our research and Wang et al. (2016) is that we both value the redistributive effects of social-security transfers. The differences exist in the range of the research object. Wang et al. (2016)'s micro-analysis focuses on social insurance, mainly urban resident pensions, rural resident pensions, medical insurance, and so forth. Beyond the main types of social insurance, we also examine other types of social-security transfers, such as formal-sector pensions, *dibao*, farmer subsidies, and so on.

marginal effects in the table provide the most important information in terms of the direction and extent to which the public transfers have an impact on inequality. As described in the last section, if the marginal effect of an income source has a negative value, then it is equalizing on the inequality of the total income, in the sense that a small percentage increase in the source for the full sample will lead to a decrease in the Gini of the total income, and hence will reduce the inequality of the total income.

It is clear from the table that the marginal effect of total public transfers is positive, indicating that total public transfers, that is, all public transfers combined, are disequalizing for total disposable income. In other words, if, for some reason, there is a small percentage increase in the total transfers for every individual, the inequality measured by the Gini coefficient will widen rather than narrow. The total transfers consist of different sub-transfers and, therefore, the negative role of the total transfers on inequality comes from the results of the varying roles of the sub-transfers offsetting each other. This indicates a need to look at the effects of each sub-transfer, to determine which ones are equalizing and which ones are disequalizing for the inequality of the total income.

As can be seen from the table, the sub-transfers with equalizing effects include the rural pensions, *dibao*, farmer subsidies, and other transfers. All these transfers are closely related to rural households, which are the low-income group in China. Among the sub-transfers with disequalizing effects on the inequality of the total income are the formal-sector pensions, the urban resident pensions, and the medical expense reimbursements, of which the formal-sector

pensions are the most regressive element, not only among the public transfers but also among all sources of the total income.<sup>11</sup> This point can be verified by a comparison of the concentration ratios between the formal-sector pension benefits and other income sources. It is clear from Table 10.5 that the concentration ratio of formal pension benefits is 0.5992, the highest concentration ratio among all sources of disposable income. It is not only well above the Gini of the total disposable income but also exceeds that of property income, which normally is the most unevenly distributed source in the total income. The formal-sector pensions take the place of property income and become the most disequalizing element among all the income sources in contemporary China.

Looking at the income sources other than the public transfers in the table, the two income sources with an equalizing role are business income and private transfer income. The former mainly consists of income from agricultural activities received by rural households, which are the low-income group in China. The latter is dominant due to remittances to their rural homes sent from migrants working in the urban areas.

## **V. Conclusions**

The literature shows that redistributive policies such as public transfers and personal income taxes play a key role in reducing inequality created by market forces, and the role played by

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<sup>11</sup> Yang et al. (2017) reports that in urban areas, pensions consistently helped to narrow the economic distance over the years. They analyze the situation in the urban areas, whereas our estimates show the redistributive effects of pensions in the entire country.

public transfers is much larger than that played by personal income taxes. This study attempts to evaluate the role that public transfers play for inequality in China by employing the CHIP 2013 household survey data.

Most of the existing works in this field so far have employed the MT index for this purpose, which compares the Gini coefficient of before-transfer income with the Gini of after-transfer income, and with almost no exception finds that the public transfers play a role in reducing inequality.

This study, however, considers different issues to evaluate the redistributive role of public transfers. We acknowledge the importance of an evaluation by the MT index, but argue that the questions that need to be answered to evaluate the redistributive roles of government policies are not only whether or not the inequality of after-transfer income is lower than the inequality after the households received the transfers from the government, but also whether the inequality increases or decreases if there is a universal growth in the public transfers, both the total and its components, given the distribution of the existing transfers. The latter question is more important in some cases. For instance, there is a strong need for regular growth in the formal-sector pension benefits in China. One question we need to answer in response to this need is whether inequality will increase or decrease if the government decides to make, say, a 5 percent increase in the formal-sector pension benefits for all targeted beneficiaries of the scheme?

The goal of this work is to answer two questions in relation to an evaluation of the redistributive role of public transfer on inequality in China. The first question is: does inequality

of before-transfer income narrow, compared to that of after-transfer income? The second question is: will a small percentage increase in transfers narrow or widen inequality in China, given the scale and distribution of the existing public transfers? To answer to these questions, two methods are chosen, the MT index for the former question and the decomposition of the Gini coefficient of the total income by its sources for the latter question. By calculating the MT index, we find that public transfers have a positive role on the income distribution, both for China as a whole and for each of the three population groups: rural residents, urban residents, and migrants. This is in line with what most existing works have found both in China and in other countries regarding the role of public transfers.

In answering the second question, however, we reach a different conclusion about the redistributive role of public transfers. The total public transfers have a disequalizing role for the inequality of income inclusive of the transfers, in the sense that if there is a universal (percentage) increase in the total public transfers for all recipients, inequality will go up. The total public transfers are comprised of different transfer schemes and the negative role of the total transfers, evaluated by the decomposition of the Gini by income sources, is the result of the redistributive effects of different transfers offsetting each other. We also examine the role of each of the components of the total public transfers and find mixed results for the different components of the public transfers. *Dibao*, the rural pension benefits, farmer subsidies, and other transfers play an equalizing role on total disposable income, indicating that increases in these transfer schemes will lead to a narrowing of the inequality of the total income. In contrast, the formal-sector

pension benefits, the urban resident pension benefits, and the medical expense reimbursements are disequalizing elements for total income. An increase in these transfers will lead to a widening of the overall inequality in China. Surprisingly, among all the sources of total income, the formal-sector pension benefits are the most disequalizing component, even more so than property income.

The implications from the results of the decomposition are clear. More government spending should go to *dibao*, the rural pension benefits schemes, and subsidies to the farmers in order to further reduce the income disparities in China. Increases in the formal-sector pension benefits will exacerbate income inequality. Even though there is a strong demand for regular growth in the formal-sector pension scheme from vested interest groups, this cannot be justified in terms of equality and equity. In addition, the current medical insurance schemes need to be reformed such that a greater part of the medical expenses for the poor are financed by medical insurance that is more accessible to the poor.

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**Table 10.1. Per capita amounts of public transfers**

	Nation	Rural	Urban	Migrants
(Absolute values, unit: Yuan)				
Formal sector pension	2,369	249	5,406	317
Urban resident pensions	168	46	357	10
Rural resident pensions	61	106	27	8
<i>Dibao</i>	32	31	42	2
Medical expense reimbursement	110	82	173	17
Farmer subsidies	58	118	6	8
Other transfers	100	107	115	27
Total	2,898	739	6,126	389
(Shares, unit: %)				
Formal sector pensions	81.7	33.7	88.2	81.5
Urban resident pensions	5.8	6.2	5.8	2.6
Rural resident pensions	2.1	14.3	0.4	2.1
<i>Dibao</i>	1.1	4.2	0.7	0.5
Medical expense reimbursement	3.8	11.1	2.8	4.4
Farmer subsidies	2.0	16.0	0.1	2.1
Other public transfers	3.5	14.5	1.9	6.9
Total	100.0	100.0	100.0	100.0

*Notes:* Other public transfers include other old-age pensions, social assistance and subsidies, excluding *dibao*, living allowances, and the cash value of in-kind goods and services received from the government or organizations.

**Table 10.2. Distribution of the main public transfers among deciles sorted by disposable income exclusive of the public transfers**

Decile	Disposable income	Total transfers	Formal sector pension	Urban resident pension	Rural resident pension	<i>Dibao</i>	Medical expense reimbursement	Farmer subsidies	Other Transfers
1	1.0	18.4	19.5	9.7	13.6	28.9	11.5	15.4	14.8
2	2.6	11.1	10.8	10.8	11.9	19.0	10.0	17.8	13.0
3	3.8	9.4	8.6	12.4	12.6	11.3	15.6	16.1	10.4
4	5.0	9.8	9.6	12.0	8.8	12.1	9.0	13.6	8.8
5	6.4	9.8	9.4	12.1	15.9	9.9	8.7	12.6	10.5
6	8.1	7.9	7.6	11.3	10.2	6.9	5.6	9.4	10.6
7	10.2	8.8	8.7	9.8	7.6	5.5	11.2	6.5	8.1
8	13.0	7.6	7.9	5.0	8.8	4.8	6.2	4.4	8.6
9	17.6	8.2	8.2	10.9	6.3	1.4	11.5	2.2	7.4
10	32.4	9.1	9.7	6.1	4.5	0.1	10.8	2.1	7.9
Sum	100.1	100.1	100	100.1	100.2	99.9	100.1	100.1	100.1

*Notes:* People are sorted into the ten decile groups according to disposable income per capita, excluding social security transfers. The sum of the income proportions in each column does not exactly equal 100 percent because of rounding.

**Table 10.3. Distribution of the main public transfers among deciles sorted by disposable income inclusive of public transfers**

Decile	Disposable income	Total transfers	Formal sector pension	Urban resident pension	Rural resident pension	<i>Dibao</i>	Medical expense reimbursement	Farmer subsidies	Other Transfers
1	1.4	1.3	0.3	0.4	8.6	20.2	2.8	16.8	6.2
2	2.9	1.7	0.5	1.4	10.3	18.9	4.1	16.2	8.5
3	4.0	2.2	1.1	1.8	11.0	12.0	4.5	16.9	9.9
4	5.3	2.9	2.0	2.6	10.2	14.1	5.2	14.3	9.2
5	6.7	4.9	4.2	5.8	10.5	10.9	6.5	12.8	8.0
6	8.4	6.7	6.3	8.2	11.6	7.6	5.6	9.5	10.2
7	10.4	10.1	10.0	12.9	11.4	8.6	7.1	5.2	12.2
8	13.1	14.8	15.5	18.7	11.9	4.6	6.9	4.8	12.3
9	17.2	20.3	21.7	24.4	7.8	2.4	13.0	1.6	10.8
10	30.7	35.2	38.5	23.9	6.7	0.6	44.4	1.9	12.8
Sum	100.1	100.1	100.1	100.1	100	99.9	100.1	100	100.1

*Notes:* People are sorted into the ten decile groups according to disposable income per capita including social security transfers. The sum of the income proportions in each column does not exactly equal 100 percent because of rounding.

**Table 10.4. Gini coefficients of disposable income with and without public transfers**

	Gini of income per capita			Per capita income (Yuan)	
	Exclusive of transfers	Inclusive of transfers	Difference	Exclusive of transfers	Inclusive of the transfers
	(a)	(b)	(c)=(a)-(b))	(d)	(e)
Nation	0.4604	0.4364	0.0239	17,640	20,537
Rural	0.4099	0.3963	0.0136	10,545	11,283
Urban	0.4274	0.3516	0.0758	24,339	30,465
Migrants	0.3545	0.3508	0.0037	21,435	21,824

*Notes:* Social protection fees and personal income tax have been deducted from disposable income.

**Table 10.5. Decomposition of the Gini of disposable income by its sources**

Sources of total income	Proportion in total income	Concentration ratio or Gini*	Contributed share of Gini of total income**	Marginal effects
Wage income	0.5565	0.4816	0.6139	0.0575
Business income	0.1524	0.2620	0.0915	-0.0609
Property income	0.0354	0.5585	0.0453	0.0099
Imputed rents	0.1270	0.4607	0.1340	0.0070
Public transfers	0.1411	0.5288	0.1709	0.0298
Formal sector pension	0.1154	0.5992	0.1584	0.0430
Urban resident pensions	0.0082	0.4891	0.0092	0.0010
Rural resident pensions	0.0029	-0.0275	-0.0002	-0.0031
<i>Dibao</i>	0.0016	-0.3497	-0.0012	-0.0028
Medical expense reimbursement	0.0054	0.4666	0.0057	0.0004
Farmer subsidies	0.0028	-0.3281	-0.0021	-0.0049
Other transfers	0.0048	0.1007	0.0011	-0.0037
Private transfers	0.0325	-0.1327	-0.0099	-0.0424
Tax and social security fees	-0.0449	0.4449	-0.0457	-0.0009
Disposable income	1.0000	0.4364	1.0000	-

*Notes:*

\*Except for the Gini coefficient of the disposable income, all other figures in this column are the concentration ratios.

\*\*Equal to column one times column two.

**Figure 10.1. The relationship between GDP per capita and the ratio of social security expenditures to GDP (2012)**

