

# Effects of the New Rural Pension Scheme on the Income Distribution in Rural China

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## **Abstract:**

The study estimates the effects of China's New Rural Pension Scheme (NRPS) on income distribution using China Household Income Project 2013 data. The results show that the NRPS has an evident effect on income growth and income dispersion in rural China. Average income in rural China increases, especially among the elderly. The NRPS affects income dispersion in two ways. First, it reduces the income gap between the elderly and the youth by raising the elderly's income. Second, it widens income dispersion through various pension benefits across the 31 provinces. Overall, the narrowing dispersion effect overshadows the widening dispersion effect, leading to reduced income dispersion.

**Keywords:** *New Rural Pension Scheme; Income distribution; Income inequality; Redistribution effects; China*

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## I. INTRODUCTION

The big income inequality is an issue faced by countries throughout the world. In U. S., the Gini coefficient was 0.481 in 2019 denoting the very big income inequality [1]. Similarly, there is large income dispersion in China. Fig 1 presents the Gini Coefficients measuring income dispersion in China during 2003 and 2020. The Gini coefficient in China increased steadily from 2003 to 2008, reaching a peak value of 0.491 in 2008. Thereafter, it declined, falling to 0.462 in 2015—the lowest point in the 2003–2020 period. From 2016, the Gini coefficient began to increase again and reached 0.468 in 2020. Although China has experienced a reduction in income inequality since 2008, its income distribution remains very inequality. The large income inequality attracts researchers' attentions in several disciplines. Labor economists argued that that the technology progress in 20th century led to big wage disparity among workers, which furtherly resulted in the very unequal income distribution in the U.S and other countries [2–5]. The evidence in China also supports the view that the technology progress was one reason explaining the large wage disparity and income inequality [6,7]. Following the wage, the transfer income is the residents' second largest income source in terms of its percentage in rural residents' overall incomes in China. In 2020, the percentages of Urban and Rural residents' transfer incomes in their overall incomes are 18.52% and 21.73%. Therefore, the transfer programs providing urban and rural residents with the transfer incomes in China may play crucial role in affecting their income distribution.

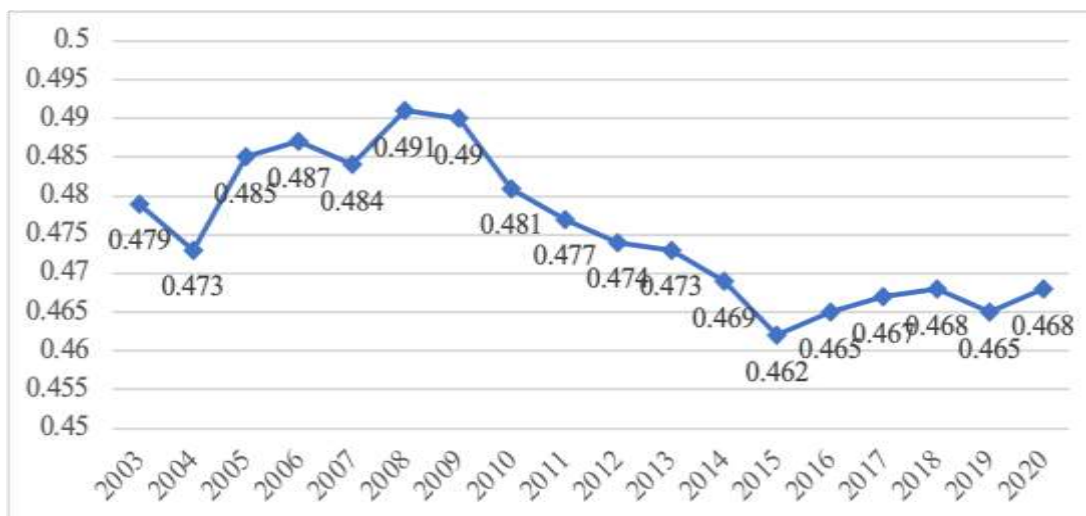


Figure 1: income Gini Coefficient in China from 2003 to 2020

Empirical studies abroad China offered evidence that the transfer program had significant effects in narrowing the income inequality. The income inequality in the U.K. was narrowed by the taxes, cash-transfers, and improvements in the private and state pension systems [8]. Latin American countries also made considerable progress in reducing income inequality through taxation and social transfers [9–11]. The tax policies and transfers in Argentina reduced its Gini coefficient from 0.528 to 0.258 in 2012 when pensions were considered as government transfers [12]. In contrasting, main social transfer program in China, so-called social security, widened the income inequality, instead of narrowed it. He and Hiroshi (2013) investigated the effect of social security reform on income inequality in China’s urban areas and concluded that the transfer through the social security aggravated income inequality in China [13]. Yang (2009) analyzed the adverse effects of social transfers in China by decomposing the Generalized Entropy index and shows that income transfers widen the income gap in rural China [14]. Previous studies on the effects of the transfer program on the income inequality in China are commonly from the perspective of the entire social security system, rather than a specific program, which is hard to estimate the true effects of the specific transfer program on residents’ income distribution, because the true effect would be nullified by other factors. Due to this shortcoming in previous studies on the effects of the transfer program on the income distribution in China, we investigate the true effects of a specific transfer program, New Rural Pension Scheme (NRPS).

The paper is structured as follows: Section 2 in this paper briefly introduce the NRPS as institutional background of this study. Section 3 presents the effects of the NRPS on income distribution by comparing statistics on income distribution pre and post the NRPS, such as the Theil index coefficient. In this section, we use the purchasing power parity index to adjust basic pension benefit and income to remove the influence of price difference across the 31 provinces on income distribution. Section 4 summarizes the results and offer suggestions for further reforms on the NRPS.

## II. INSTITUTIONAL BACKGROUND—THE NEW RURAL PENSION SCHEME

In 2009, a pension scheme, named New Rural Pension Scheme, was started to pilot in rural areas of 320 selected counties, about 10% of all counties in China. The NRPS was aimed to alleviate the hardship of elderly people, particular the disabled. Due to the lack of formal income support institution in rural areas in China at that time, the elderly poverty was widely spreading. The high economic growth in past decades in China provided the establishment of the NRPS with financial feasibility. In past 40 years, China has maintained an annual growth rate as high as 7%, which substantially induced large increasing in government fiscal revenue and rural resident income. The rural resident's per capita disposable income has raised from CNY191 (\$29.38) in 1980 to CNY17131 (\$2635.54) in 2020 [15]. The fast growth in government revenue and rural resident's disposable income made the establishment of the NRPS to be financially feasible. After 2009, the NRPS gradually expanded to the rest counties around China. By the end of 2012, all counties in China had implemented the NRPS [16]. In 2014, the NRPS was merged with the Urban Residents Pension Scheme (URPS) to form the Urban and Rural Residents Pension Scheme (URRPS).

### 2.1 Model of the NRPS

The NRPS was a two-pillars pension scheme: a Pay-As-You-Go (PAYG) pillar and a funded pillar (individual account) (Fig 2). The PAYG pillar distributes the basic pension benefits, national basic pension benefit and additional basic pension benefit, to the old enrolled in the NRPS who is aged 60 years and over. The PAYG pillar is non-contributory and financed by the public finances of central and local governments. The funded pillar is jointly financed by young enrolled below 60 years, their communities, and the government. The young enrolled voluntarily chose a yearly contribution rate in government given rates ranging from CNY100 (\$15.38) to several thousand CNY. Most young enrolled chose the minimum contribution rate, namely CNY100 (\$15.38) to fulfill the requirement of obtaining the basic pension benefit when they were 60 years old [17]. The community had the option to pay contributions for its members who were contributing to the NRPS. Local governments had the obligation to provide subsidies that match the contribution made by the young enrolled. For instance, the amount of the subsidy from the local government for an individual contribution is not less than CNY30 (\$4.60) per year. All contributions from the young enrolled, community, and government were saved in the individual account.

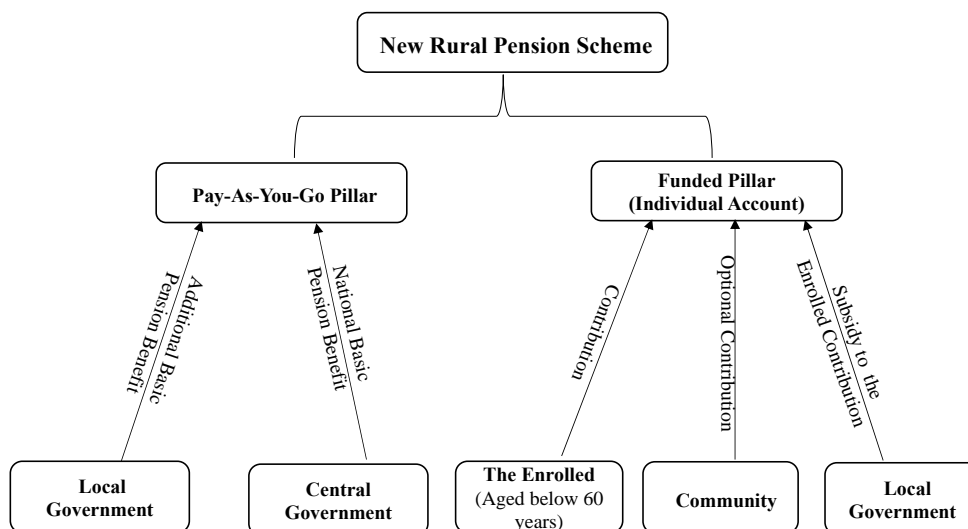


Figure 2: framework of the NRPS

## 2.2 The Pension Benefit of the NRPS

The pension benefit of the NRPS were consist of two parts: the basic pension benefit from the PAYG pillar, and savings and yields in individual account [18]. When the age reaches 60, the enrolled in the NRPS obtain the pension benefit from this scheme if the enrollee’s contribution records were no less than 15 years or the child of the enrollee were enrolled in the NRPS. By the end of 2020, 542.44 million individuals were covered by the URRPS, and 160.68 million had received benefits from this scheme [19]. Since most young enrollee in the NRPS chose the minimum contribution rate as just mentioned, the total savings and yields in the individual account are very limited. As a result, for most old enrollee, their pension benefit is mainly composed of the basic pension benefit from central and local governments in China [17]. Take the average pension benefit in 2016 as an example, it was CNY117 (\$18) per month, of which CNY105 (\$16.15) was the basic pension benefit [20]. As aforementioned, the basic pension benefit has two components: the national basic pension benefit from the central government and the additional basic pension benefit from local governments in China. At the beginning time in 2012, the national basic pension benefit was CNY55 (\$8.46) per month and raised to CNY113 (\$17.38) in 2021 [21]. The additional basic pension benefit distributed by the local governments varies largely over 31 provinces in China. In a few developed provinces, the local governments gave the retiree of the NRPS very generous additional basic pension benefits. In 2021, the Beijing gave the additional basic pension benefit of CNY789 (\$121.38), which is more than 6.89 times of the national basic pension benefit in 2021 [22]. In most less developed provinces, the additional basic pension benefits responsible by the local governments are relatively low, and it maybe just several CNY in some provinces. The varies additional basic pension benefit distributed by local governments in China resulted in the large disparity of the basic pension benefits of the NRPS across 31 provinces in each year from 2012 to 2017 (TABLE I).

**TABLE I. Basic Pension Benefits across Provinces in China from 2012 to 2017 CNY per month**

	2012	2013	2014	2015	2016	2017
BEIJING	357.5	390	430	470	560	610
TIANJIN	180	200	220/235	245	261	261/277
HEBEI	60	60	60/70	75	80	90
SHANXI	55	55	65/70	-	-	-
INNER MONGOLI	55	55	65/70	85	90	110
LIAONING	55	55	55/70	85	85	85
JILIN	55	55	55	75	80	-
HEILONGJIANG	55	55	55/70	70	70	70/80
SHANHAI	370	440	540	645	660/750	750/850
JIANGSU	60	80	90/105	105	115	125
ZHEJIANG	66/80	80	100	120	120	135
ANHUI	55	55	55/70	70	70	70
FUJIAN	55	55	70/85	85	85/100	100
JIANGXI	55	55	55/70	80	80	80
SHANDONG	55/60	60/65	65/75	75/85	85/100	100
HENAN	75	75	75	78	78	80
HUBEI	55	55	55/70	70	70	80
HUNAN	55	55	60/75	75	80	85
GUANGDONG	55	65	65/95	95/100	110	120
GUANGXI	55	55/75	75/90	90	90	90
HAINAN	70/85	85/100	120/135	135/145	-	-
CHONGQING	80	80	80/95	-	-	-
SICHUAN	55	55	60/75	75	-	-
GUIZHOU	55	55	55/70	70	70	70
YUNNAN	60	60	60/75	-	-	-
TIBET	90	105	120/140	140	140	150
SHAANXI	55	55/60	60/75	75	75	150
GANSU	55	60	65/80	85	140	155
QINGHAI	85	85	110	125	140	155
NINGXIA	70	85	115	115	115	120
XINJIANG	55	55	100/115	115	-	-

Notes: (a). Two values of basic pension benefit appear in some province in some year, such as 220/235 in Tianjin in 2014, because there is an adjustment of basic pension benefit in the middle of the year, such as in 1st, July. (b). The basic pension benefit will not change, if no government document shows there is an adjustment to it, such as Shanxi, Chongqing, and Yunnan from 2015 to 2017, Hainan, Sichuan, and Xinjiang in 2016 and 2017.

### 2.3 The Rural Resident's Enrollment in the NRPS

According to the pilot plan issued by the State Council of China, an individual aged 16 years or above in rural China is eligible to participate in the NRPS, provided he or she does not participate in the Urban Employee Pension Scheme (UEPS) or the URPS. TABLE II presents rural residents' enrollments in various pension schemes in China. Most rural residents in China were enrolled in the NRPS, and enrollees in the NRPS accounted for 68.07% of all rural residents by the end of 2013. Following the NRPS, the UEPS and URPS is another two pension schemes enrolled by the rural residents, and they respectively covered 6.14% and 4.01% of rural residents. However, 6,020 rural respondents in CHIP2013 did not participate in any pension scheme, and they account for 19.78% of all respondents. Most unenrolled rural residents were young residents whose age were below 60 accounting for 88.92% of all rural unenrolled in China (Fig 3). Among old rural residents aged 60 and over, about 10.55% are not enrolled in any pension scheme. The NRPS is a very popular program by rural elderly people in China, and most rural elderly participated in this scheme.

**TABLE II. Distribution of Individuals among Different Pension Schemes in Rural China**

PENSION SCHEMES	FREQUENCY	PERCENT (%)	CUM. (%)
UEPS	1870	6.14	6.14
UFEPS	168	0.55	6.7
URPS	1220	4.01	10.7
NRPS	20718	68.07	78.77
ENTERPRISE ANNUITY	107	0.35	79.12
COMMERCIAL PENSION	151	0.49	79.62
OTHER	184	0.6	80.22
NONE	6020	19.78	100
TOTAL	30437	100	

Notes: UFEPS represents the urban flexible employee pension schemes and has merged with the Urban Employee Pension Scheme (UEPS).

Data source: CHIP2013.

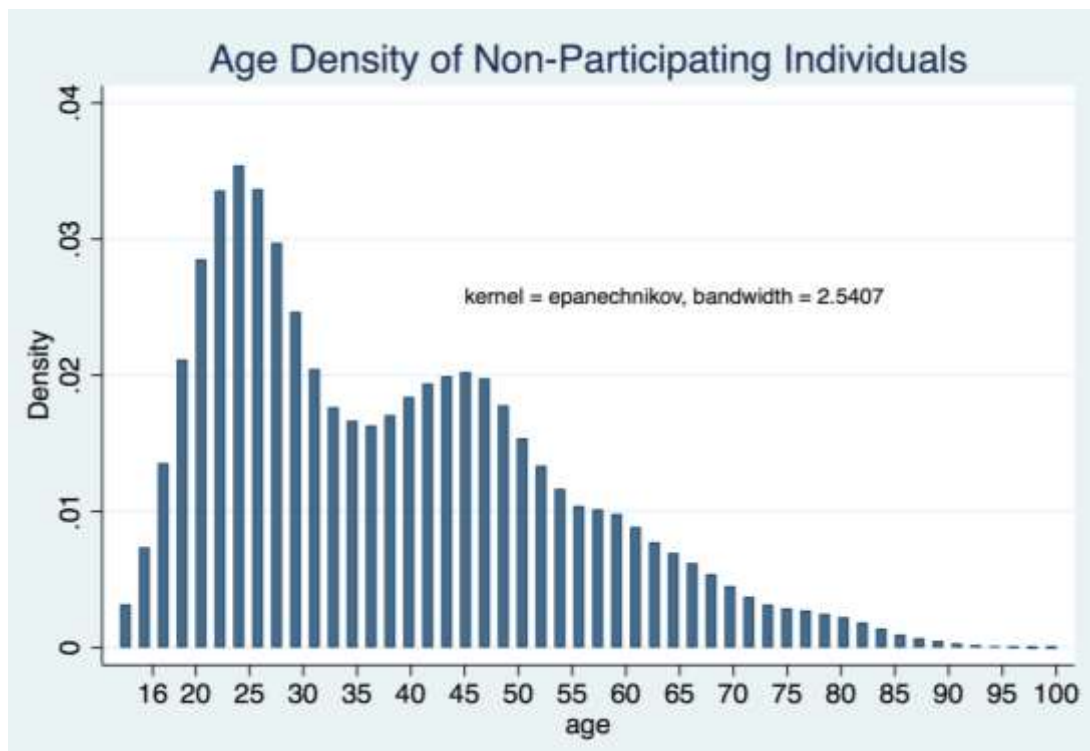


Figure 3: age density of non-participating individuals in rural China

Data source: CLDS2016

### III. EFFECTS OF THE NRPS ON RURAL RESIDENTS' INCOME DISTRIBUTION IN CHINA

#### 3.1 Nominal Income Distribution

As mentioned in section 2, retiree's pension benefit of the NRPS is mainly composed of the basic pension benefit from central and local governments, so the basic pension benefit is the main channel through which the NRPS affects rural residents' income distribution in China. Owing to the availability of national basic pension benefits and provincial basic pension benefits across the 31 provinces, a household's disposable income pre the NRPS can be obtained by subtracting the basic pension benefit from the total household disposable income. For example, if local governments pay only the national basic pension benefit to the elderly, each retiree of the NRPS receive CNY55(\$8.46) every month or CNY660(\$101.54) annually. A household's yearly income pre the transfer income from the NRPS is obtained by subtracting CNY660 (\$101.54) from the household income, when one member of the household obtains the basic pension benefit from the NRPS. When household incomes pre and post the transfer income from the NRPS are available, the effects of the NRPS on the rural residents' income distribution can be analyzed by comparing the statistics of the income distributions pre and post the transfer income, such as the median and Theil index coefficient.

TABLE III presents descriptive statistics of the normal income distributions pre and post the transfer income from the NRPS. First, the NRPS notably raises rural household income. For households with



elderly members enrolled in the NRPS and obtain pension benefit from this scheme, the median income increased from CNY6,689.9 (\$1,029.21) pre to CNY6,999.63 (\$1,076.87) in 2013. For all households, the NRPS raised the median income from CNY8,058.75 (\$1,239.81) to CNY8,186.15 (\$1,259.41). Consequently, the NRPS effectively raised the income of residents in rural areas, particular the old residents. Second, the NRPS has a significant impact on reducing income disparity among rural residents. When the elderly received a basic pension benefit from the NRPS, the Theil index of households with elderly members reduced from 0.143 to 0.134—a reduction of 5.86% (TABLE III). For all households, the Theil index drops from 0.146 to 0.143 when the elderly people receive the basic pension benefit from the NRPS. Apart from the Theil index, other inequality measures also show a decline in the income inequality due to the basic pension benefit of the NRPS. While disparity of the additional pension benefits is considered, the effects of the NRPS in reducing the rural households' income inequality is undermined. If all retirees of the NRPS had received national basic pension benefits, i.e., CNY55 (\$8.46) every month, the Theil index would be 0.143. The Theil index would increase by 0.001 if the pension benefit is upgraded to the various basic pension benefits list in TABLE I in 2013. To summarize, the NRPS shows evident effects on nominal income distribution: it raises rural households' mean income and reduces income inequality.

**TABLE III. Statistics of Nominal Household Per Capita Disposable Income**

		COEFFICIENT OF VARIATION	STANDARD DEVIATION OF LOGS	GINI COEFFICIENT	THEIL INDEX	MEAN(RMB)	MEDIA N(RMB)
ELDERLY	HPDI-BPB	0.872	0.770	0.403	0.143	8641.56	6689.90
	HPDI-NBPB	0.870	0.767	0.402	0.142	8688.81	6742.71
	HPDI	0.844	0.734	0.390	0.134	8959.07	6999.63
	CHANGING (%)	-3.21	-4.68	-3.23	-5.86	3.67	4.63
TOTAL POPULATION	HPDI-BPB	0.906	0.769	0.403	0.146	10337.64	8058.75
	HPDI-NBPB	0.906	0.767	0.403	0.146	10355.77	8080.00
	HPDI	0.896	0.750	0.398	0.143	10459.62	8186.15
	CHANGING (%)	-1.10	-2.47	-1.24	-2.53	1.18	1.58

Notes: HPDI represents the household per capita disposable income (HPDI); HPDI-NBPB is the household per capita disposable income after subtracting the national basic pension benefit (NBPB); and HPDI-BPB is the household per capita disposable income after subtracting the basic pension benefits (BPB) received in different provinces.

Data source: CHIP2013



### 3.2 Real Income Distribution

The NRPS has evident effects on rural residents' normal income distribution in increasing mean income and reducing income disparity; however, these effects may be affected by the differences in prices across the 31 provinces. Owing to the different development levels across 31 provinces in China, the same types of goods and services have different prices in different areas, which results in purchasing power parities in the CNY throughout China, with higher purchasing power in underdeveloped areas than in developed areas. Therefore, residents in underdeveloped areas may enjoy better lives than indicated by their low incomes, in comparison to developed areas. Therefore, the real differences in the basic pension benefits and incomes among the 31 provinces are less than the differences in the nominal basic pension benefits. As the variety in the purchasing power across the 31 provinces plays a significant role in the relationship between the NRPS and income distribution, it needs to transform the nominal basic pension benefits and rural households' incomes into real values using the purchasing power parity index [23]. TABLE IV shows the adjusted basic pension benefits from the NRPS from 2012 to 2017 across the 31 provinces. After adjustment by the purchasing power parity index, the basic pension benefits show increased values in most provinces. For instance, the nominal basic pension benefit in the Hunan province was CNY55 (\$8.46) in 2012 and increased to CNY66 (\$10.15) by the adjustment. By contrast, basic pension benefits in some provinces were reduced when adjusted by purchasing power parity, such as in Guangdong and Tibet. Further, the variance of the adjusted basic pension benefits in the 31 provinces was substantially reduced.

**TABLE IV. Adjusted Basic Pension Benefits in China from 2012 to 2017, in RMB Per Month (Yuan)**

	2012	2013	2014	2015	2016	2017	PPP
BEIJING	358	390	430	470	560	610	1
TIANJIN	202	225	247/264	275	293	293/311	0.89
HEBEI	77	77	77/90	96	103	115	0.78
SHANXI	71	71	84/91				0.77
INNER MONGOLI	67	67	79/85	104	110	134	0.82
LIAONING	68	68	68/86	105	105	105	0.81
JILIN	67	67	67	91	98		0.82
HEILONGJIANG	67	67	67/85	85	85	85/98	0.82
SHANHAI	370	440	540	645	660/750	750/850	1
JIANGSU	65	87	98/114	114	125	136	0.92
ZHEJIANG	67/81	81	101	121	121	136	0.99
ANHUI	66	66	66/84	84	84	84	0.83
FUJIAN	63	63	80/97	97	97/114	114	0.88
JIANGXI	70	70	70/89	101	101	101	0.79
SHANDONG	66/72	72/78	78/90	90/102	102/120	120	0.83

HENAN	96	96	96	100	100	103	0.78
HUBEI	65	65	65/83	83	83	95	0.84
HUNAN	66	66	72/90	90	96	102	0.83
GUANGDONG	54	64	64/94	94/99	109	119	1.01
GUANGXI	66	66/90	90/108	108	108	108	0.83
HAINAN	78/94	94/111	133/150	150/161			0.9
CHONGQING	93	93	93/110				0.86
SICHUAN	64	64	70/87	87			0.86
GUIZHOU	67	67	67/85	85	85	85	0.82
YUNNAN	74	74	75/93				0.81
TIBET	87	102	117/136	136	136	146	1.03
SHAANXI	68	68/74	74/93	93	93	185	0.81
GANSU	71	77	83/103	109	179	199	0.78
QINGHAI	99	99	128	145	163	180	0.86
NINGXIA	83	101	137	137	137	143	0.84
XINJIANG	67	67	122/140	140			0.82

Notes: PPP denotes purchasing power parity and its baseline is Beijing; therefore, goods or services valued at RMB 1 in Beijing have different costs in other provinces in China.

After adjusting basic pension benefits and household disposable income by the purchasing power parity index, the effect of the NRPS in raising the median income increases marginally (TABLE V). The NRPS raises the median by 4.74% for the elderly after the adjustment, which is slightly higher than the 4.63% increasing before the adjustment in TABLE III. Meanwhile, the adjustment also strengthens the effects of the NRPS on reducing income inequality. Although the decrease in the Gini coefficient lessened when the basic pension benefit and income were adjusted by the purchasing power parity index, the other inequality measures had larger declines after the adjustment of the basic pension benefits over 31 provinces. For instance, before the adjustment, 5.86% reduction in the Theil index due to the transfer from the NRPS increased to 5.99% after the adjustment. Therefore, the effects of the NRPS on increasing average income and reducing income inequality are more evident when income and basic pension benefits are considered in real terms.

**Table V. Statistics of Household per Capita Disposable Income in Nominal Terms**

		COEFFICIENT OF VARIATION	STANDARD DEVIATION OF LOGS	GINI COEFFICIENT	THEIL INDEX	MEAN(RMB)	MEDIAN(RMB)
ELDERLY	HPDI-BPB	0.867	0.762	0.398	0.267	10188.91	7974.31
	HPDI-NPB	0.863	0.759	0.397	0.266	10242.92	8009.2

	HPDI	0.838	0.726	0.386	0.251	10566.01	8352.24
	CHANGING (%)	-3.34	-4.72	-3.02	-5.99	3.7	4.74
TOTAL POPULATION	HPDI-BPB	0.903	0.761	0.399	0.271	12264.49	9689.42
	HPDI-NBPB	0.901	0.759	0.398	0.27	12285.3	9709.05
	HPDI	0.891	0.743	0.393	0.264	12409.12	9848.34
	CHANGING (%)	-1.33	-2.37	-1.5	-2.58	1.18	1.64

Notes: HPDI represents the household per capita disposable income (HPDI); HPDI-NBPB is the household per capita disposable income after subtracting the national basic pension benefit (NBPB); and HPDI-BPB is the household per capita disposable income after subtracting the basic pension benefits (BPB) received in different provinces.

Data source: CHIP2013.

Overall, the NRPS has significant effects on increasing income and reducing the income inequality of residents in China's rural areas, especially for the elderly. Adjusting the basic pension benefits and incomes using the purchasing power parity index strengthens these effects of NRPS on income and income inequality. The NRPS has the overall effect of reducing income inequality, but it also widens income inequality due to the large disparity of basic pension benefit over 31 provinces.

#### IV. CONCLUSIONS AND SUGGESTIONS

China began a pilot of the NRPS in 2009, which initially covered only 320 of 2,856 counties. The coverage of the NRPS was gradually expanded after 2009, covering all counties by the end of 2012. The NRPS adopts the two-pillar model. One pillar run in the PAYG model and the other one is in funded model in terms of individual account. The retiree's pension benefits from the NRPS are composed of a basic pension benefit from the first pillar and accumulated savings and yields the individual account. As most enrolled in the NRPS chose the minimum contribution rate, i.e., CNY100 (\$15.38) to fulfill the requirement to obtain the pension benefit from the NRPS, the pension benefit almost solely composed of the basic pension benefit responsible by central and local government in China. As a result, the NRPS mostly affect rural households' income distribution through the basic pension benefit. Although the pension benefit of the NRPS is not too high in most provinces in China, it has significant effects on rural households' income distribution, in normal and real terms. First, the NRPS increased the median of household per capita disposable income by CNY127.4 (\$19.6) and CNY310.03 (\$47.7) for all households and households with elderly members, respectively. Second, the NRPS has a notable effect in reducing income disparity among rural household. On one hand, it reduces income gap between the elderly and the youth by raising elderly people's income; on the other hand, it widens income inequality among the elderly over 31 provinces in China through various basic pension benefits. Overall, the effect of the NRPS in narrowing income inequality overshadows its widening effects on rural households' income distribution, so the net effect being that it reduced rural households' income inequality in China.

This study presents the effects of the NRPS on rural household income distribution, in normal and real terms, in China, showing that the NRPS had a positive effect on increasing income and reducing income inequality. However, this study has some limitations. First, some effects of the NRPS, such as the widening income gap between pension benefit recipients and the elderly not covered by the NRPS, as well as that between pensioners and the youth in the low-income group in rural China, are not accurately estimated. Second, the study assumed that all conditions remain unaffected by basic pension benefits over 31 provinces from the NRPS. However, some conditions may change because of the basic pension benefit. For example, a pension benefit may change the labor supply of the elderly and reduce income originally obtained through the labor market. Therefore, further research is necessary to understand the effect of the NRPS on the labor supply of the elderly. Despite these limitations, the findings of this study could be useful for policymakers in China. Due to the low pension benefit of the NRPS in most provinces the positive effects of the NRPS on rural household's income distribution in raising mean income and reduce income inequality is limited. The annual pension benefit of the NRPS needs to raise to the absolute poverty line, i.e., CNY2300 (\$353.84) in 2010 to enhance the effects of the NRPS in raising rural residents mean income, reducing income inequality and alleviating poverty in rural elderly can be enhanced. Until now, a part of rural residents has not enrolled in any pension scheme due to the 15-years contribution records requirement of the NRPS to obtain the pension benefit. we suggest the NRPS transits to a non-contributory pension scheme to cover all rural residents, particular the poor elderly. The merging of the provincial NRPS to a national scheme is another measure for unifying the basic pension benefits of the NRPS over all province to furtherly reducing the income disparity among rural residents in China.

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