

Convergence of Inequality Dimensions in China: Income, Consumption and Wealth from 1988 to 2018

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Abstract: Economic inequality can focus at income but also taking into consideration dimensions of consumption and wealth. Using data from China Household Income Project during 1988-2018, we confirm that inequality in China have increased at all the dimensions income, consumption and wealth separately. In particular, there is a clear convergence of inequality dimensions, as households at the top of one dimension tend to increasingly be at the top of other two dimensions, which is similar to what has been shown for the United States. Thus, we conclude a general increasing trend of inequality though at a slowing speed, as there is an apparent convergence and also mutual reinforcement of different inequality dimensions.

Keywords: Economic Inequality; Saving rate; Property income, Return rate of capital

I. Introduction

In the context of increasing social conflicts brought about by the new round of global inequality in recent years, exploring trend of inequality in China is of great significance. Income inequality has experienced a rapid and stable increasing trend since the 1980s in China (Sicular et.al, 2007). However, there have been several disputes over the indicators of income inequality measurement and research results since 2009, different findings lead to various social policy propositions. To clarify the basic trend of China's income inequality is very important. The National Bureau of Statistics (NBS) believes that the resident's income inequality has gradually decreased, Gini coefficient has decreased from 0.491 in 2008 to 0.462 in 2015. However, Yang and Yang (2015) believed that the downtrend is so minimal that it cannot behalf the income inequality of China has experienced a reverse trend. So it is important to explore the real trend of inequality.

In past years, China's income and wealth has often deviated from each other in the sense that many top income individuals were not rich in wealth, and those rich in wealth were not likely to be the top of the income distribution. However since the end of the 80s, the dimensions of inequality have trend to convergence. As consequence society faces risk of declined social mobility as the income rich individual more than previously owns advantages, also in terms of consumption and wealth. It should also be mentioned that consumption inequality and wealth inequality can have deep influence on Chinese economy and society which are separated from the influence that works through income. Here we will show that during the period studied, 1988 to 2018, the three dimensions of inequality have tended to convergence. Thus in 2018, stronger than in 1988 people with higher incomes have also larger consumption and wealth.

There is a circular positive feedback mechanism between income inequality and wealth inequality, with higher earners being able to accumulate more wealth, which in turn generates an increased amount of property income. Increased income inequality also leads to increased consumption inequality which tends to lead to increased gaps in human capital accumulation which in turn result in increased inequality in capabilities. With more and more resources are concentrated to a minority, social mobility is likely to decline and thereby become a big challenge to common property in China.

In this paper we analyze data from the China Household Income Survey (CHIP) for the six years 1988, 1995, 2002, 2007, 2013 and 2018 to study how inequality in income, wealth and consumption has changed over the years. This we do not only for each of the three variables separately, but also considering for each household two as well as three dimensions.

Our study is inspired by Fisher et al (2022) who investigated the development of inequality as it appears in one, two and three dimensions in the United States from 1989 to 2016. As we study almost the same period in the later part of the paper we can also

compare the development in China with the one in the United States. Pay attention to that the data we analyze for China have the advantage of measuring all three dimensions (income, wealth and consumption) for the same households, a property not present in the data analyzed by Fisher et al (2022).

The rest of the paper is laid out as follows: In the next section we comment on the literature while in Section 3 we present the data we work with. Section 4 report results for each of the three dimensions taken separately. In Section 5 we link consumption and income and in Section 6 wealth and consumption. Section 7 is about linking results for all three variables income, consumption and wealth. It is also in this section we compare the development for China with the one in United States. Finally in Section 8 we summarize the paper.

II. Literature

A. Disputes over inequality trends

The development of inequality in China is a hot topic, in policymaking and well as in research. Much of the academic literature is focused on how income inequality has changed. Official statistics published by National Bureau of Statistics indicate that after introduction of economic reforms and opening up income inequality at the household level increased profoundly for several years until around 2008. There is now a large academic literature aiming to describe and understand the reasons for the development. Recent contributions include Piketty et al (2019), Sicular et al (2020), Kanbur et al (2021) to mention just three. Zheng (2021) provides an up to date survey of the literature.

There has been a clear divergence on the income inequality trend in China since 2007. The first point of view, such as the National Bureau of Statistics (2012), believes that the current income gap in China is shrinking. The increase in agricultural prices and the implementation of favorable policies for farmers in the past five years have led to an increase in farmers' income, more powerful redistribution policy also effectively improved income distribution. The Gini coefficient has gradually declined from the highest point since 2008, and the income gap is gradually decreasing.

The second view holds that income inequality is still running at a high level (Li et al., 2013; Luo et al., 2020). They think the institutional obstacles that affect income gap have not been removed, and even tend to strengthen in some areas. Moreover, the rise in agricultural prices and rural subsidy policies are both short-term and volatile, their impact on overall income inequality also is moderate. It is not convincing to judge the narrowing trend of income gap based on these measures alone.

However, Cai (2012) believes that the trend of income inequality depends on future economic and social policies, especially the combination of economic growth performance, inflation and income redistribution policies. From the perspective of international comparison, the populist economic policies of Latin American countries only focus on growth, while ignoring inflation, fiscal deficit risks, and external constraints, so after all, they have not been able to help income distribution in the slightest. Therefore, this view holds that the trend of income inequality is not clear, it depends on the future economic and social policy mix. The current research has thus not reached an agreement on the trend of income inequality.

B. Measurements for inequality and their divergence

There are three main ways to approach the trend of inequality in China. One way is using different measurement methods, such as the often used indicator of Gini index, the literature also employs inequality index like Theil, CV, Kakwani, Mehran or other entropy measures (Démurger et al., 2006). Another way on judging the trend of inequality in the future is the changes in intergenerational mobility or persistence (Gong et al., 2012). A third way to give justification of the inequality trend is observe different dimensions of inequality. Apart of the variable of wage or income, consumption, occupation or wealth are also the frequently mentioned indicators (Li and Wan, 2015; Zhao et al., 2017).

There are different indicators for judging changes in income distribution, including the growth rate of residents' income, the ratio of high and low 10% income, the ratio of property and wage income, the proportion of labor income, Gini coefficient, income mobility, etc. (Li and Wan, 2015; Zhao et al., 2017; Yang et al., 2015), involving the aspects wage inequality, income inequality and wealth inequality. In the past, most indicators showed a consistent development trend, so the judgment on the development trend of income distribution is relatively simple. However, since 2009, these indicators have shown very different trends and thus the judgment of the development trend of income distribution has become controversial.

Regarding the Gini coefficient indicator of household income inequality, it has dropped from 0.491 in 2008 to 0.462 in 2015. However, according to the analysis of the National Development and Reform Commission (2015), "From the perspective of the ratio between high and low income groups of rural residents, the level of income inequality in China has continued to increase from 7.51 in 2010 to 8.43 in 2015." In addition, from the perspective of property and wage income ratio, due to the rapid growth of residents' property stock, property income has increased rapidly. The proportion of national property income has also increased from 2.3% in 2009 to 7.9% in 2015 (NBS, 2016). The ratio of property-based income to wage-based income in China has continued to increase, and the gap of property income between different groups of people is large, and it is showing a trend of continuous expansion." With the continuous increase in the

proportion of property-based income in recent years, the correlation between income inequality and wealth inequality is further strengthened.

In addition, judging from indicators such as income mobility and intergenerational correlation, income inequality in China has also expanded to a certain extent in recent years. Low-income groups are less likely to join the high-income group, and thus income mobility is declining. Yang and Lian (2015) find that the impact of family income status on offspring's income status increased significantly in 2010 and 2012 compared with 2008, and the intergenerational correlation coefficient of residents' income increased from 0.46 in 2009 to 0.52 in 2013 (and in 2015 of 0.51). This shows that the upper class of society has become more closed, and the opportunities for the lower class to move upwards are decreasing.

On the whole, available evidence indicate that although the Gini coefficient of income tends to narrow, it cannot simply be assumed that the distribution gap will continue to decrease.

C. Inequality changes with different indicators

However, economic inequality at the household level can be assessed by studying the development of also economic variables other than income. One is household consumption, which in the case of China has been analyzed by for example Qiao (2013) and Gradin and Wu (2020), the latter in comparison with India. Another variable central to inequality assessments is household wealth, for China it has been studied by for example Li and Wan (2015) and Knight et al (2022).

Income inequality, consumption inequality and wealth inequality are correlated closely with each other. Over the past few decades, China's wealth inequality has grown much faster than income inequality. The Gini coefficient of wealth also rose from 0.54 in 2002 to 0.74 in 2012, a rise of 20 percentage points in less than a decade (Li and Wan, 2015). Wealth inequality is actually a cumulative result of long-term income inequality and a major cause of future income inequality. In particular, the proportion of property income has continued to increase in recent years, and the property income inequality is generally significantly higher than that of the overall income inequality, so the contribution rate of property income inequality to the overall income inequality is also increasing. The correlation between income inequality and wealth inequality is increasing (Xie and Jin, 2014; Xie and Zhou, 2014).

Different from the previous mechanical and simple observation of different horizontal indicators, we observed three indicators at the same household level. In this paper, we want to ask what are the similarities and differences in the development of economic inequality in China from the end of the 1980s to the second half of the 2010s when inequality is measured in one, two or three dimensions separately as well as jointly? No

previous study we are aware of has tried to answer this question. However, Fisher et al (2022) were the pioneers to study the development of inequality in the United States from 1989 to 2016 that analyses all three dimensions income, consumption and wealth separately as well as jointly. Those authors find that inspecting all those three dimensions simultaneously gives a different picture than viewing the three dimensions separately: The increase in US inequality is larger than if focusing on one dimension only.

III. Data and Variables

A. Data source

We use data from China Household Income Project (CHIP) for the years 1988, 1995, 2002, 2013 and 2018. Those data were drawn as subsamples from surveys National Bureau of Statistics have regularly conducted for producing official statistics of PRC. As rural and urban areas have been very different for long different sampling was made in the two regions. Therefore survey instruments also differed between those two regions.

Compared with most other micro data in China available to researchers CHIP data covers a longer period. It contains a detailed definition of income that is in line with international standards. CHIP Survey made different years use similar phrased questions and use similar sampling methods. From this follows that information on income, consumption and wealth have high degree of comparability across different years. Out of Chinas 31 province level units the samples making up CHIP were drawn from a smaller number of such units. Our work sample contains 81 929, 56 418, 63 136, 89 481, 62 101, 69 411 individuals from the 1988, 1995, 2002, 2013 and 2018 respectively.

CHIP data consist of two components: One was obtained from questionnaires that were designed by researchers and collected information on demographic characteristics, socio-economic activities of household members and also attitudes. The second component of CHIP data is information on income and on consumption. Such variables were aggregated from the diary information collected repeatedly by enumerators who regularly visited the households sampled. Being subsample of the NBS samples and collecting income information from the same sources there are unsurprisingly large agreement between the picture of income and consumption reported from CHIP data and what can be derived from NBS publications. It also should be understood that sample probabilities were not the same in all provinces covered by CHIP, so use of sample weights are motivated. In this paper we use such that have been developed by members of the CHIP team.

B. Variables definition

Our preferred measure of income is disposable household income per capita, i.e., the disposable household income for a household divided by its number of members without equivalent weighting. This is comparable to the definition adopted by NBS. (Sicular et al., 2020) The definition of income in CHIP includes the value of agriculture products and other goods produced and consumed by the households. Such components were of very large importance for rural households in the beginning of the period studied and has thereafter gradually become relatively unimportant.

Income also includes wages, business income, property income and net transfers. The latter include net private transfers from households and transfers minus taxes from the government. Pay attention to that income as consumption include various types of subsidies such as food subsidies through the coupon system and housing subsidies. Those components were important in 1988 but have thereafter lost almost all of its importance. The definition of disposable household income used in this study does not include imputed rent from owner-occupied housing.¹ Income is one of the most important indicators in our paper, and we apply the income definition of NBS. We analyze income, consumption and wealth at the individual level. This means we apply the same value to all household members and as is usual in this kind of literature do not consider inequality within a household.

Consumption is here measured per capita at the household level. It is made up of eight components: food, alcohol and tobacco, clothing, household equipment and services, health care, transport and communication, education, culture and entertainment, housing, and miscellaneous goods and services. The information was collected from records households sampled held through the measurement year, and was regularly checked by enumerators.

Wealth is in our data measured as the sum of seven components: net housing; financial assets; productive fixed assets; durable consumer goods; other assets; non-housing debt; and the user value of land a household has cultivation rights to. A more detailed description of each of the wealth components is the following: *Net housing value* is calculated as housing value minus housing loan. *Net financial assets* include (based on separate questions in the questioner) spot cash, demand deposits, time deposits, endowment insurance, government bonds, other bonds, stocks, funds, futures, money lent (not including business loans), and other financial assets. We also consider *non-housing debt, fixed productive assets and consumer durables*. The latter includes the subcomponents the estimated market value of household ‘movable properties’ and the subcomponent the value of consumer durables. We also include *rural land value*. In view of the fact that rural houses are mostly used by residents themselves and there are almost no market transactions the variable household net agricultural income, is used to calculate rural land value. Following earlier research we assume that 25 percent of

¹ Attempts to value imputed rent of housing for China are often based on the value of housing with in this study is one component of wealth.

net agricultural income comes from land and the return rate of land was 8 percent. (Zhao and Ding, 2008) Therefore, we obtain land value from net household agricultural income times 25/8. *Other assets*, which are not included in any other components.

We allow negative values for the variables income and wealth, but not for consumption. Since household income is expressed in nominal local currency units, all values have been deflated to allow for meaningful comparisons over the study period. The three variables income per capita, consumption per capita and wealth per capita are thus all expressed in constant 2018 prices by using the consumer price indices compiled by NBS. We do not consider spatial differences across China in consumer prices.

IV. Inequality in each of three dimensions

In this section we report how inequality in China 1988 to 2018 has developed when assessed in one dimension at a time.

In Table 1 we report the development of inequality in China according to our data and assumptions for each of the three dimensions taking separately and measured by the numerical values of inequality indices. Table 2 supplements this description by reporting centile ratios for each of the three variables and Table 3 report how the numerical value of each of the three variables changed between each pair of years along selected positions of the distributions. Figure 1 show the proportion accrued to the top five percent each of the three distributions from 1988 to 2018. Figure 2 show for the same years' relative shares for quintiles according to each of the three variables.

Table 1 Gini Coefficient and Theil Indexes of Inequality in China 1988 to 2018

		1988	1995	2002	2013	2018
Gini	Income	0.304	0.381	0.419	0.440	0.446
	Consumption	0.377	0.355	0.411	0.400	0.417
	Wealth	0.330	0.405	0.496	0.603	0.627
Theil	Income	0.149	0.236	0.293	0.315	0.336
	Consumption	0.246	0.205	0.290	0.265	0.305
	Wealth	0.178	0.277	0.426	0.692	0.719

MLD	Income	0.176	0.250	0.304	0.373	0.363
	Consumption	0.246	0.207	0.276	0.276	0.296
	Wealth	0.191	0.279	0.447	0.697	0.727

Sources: Authors estimates from the Chinese Household Income Project.

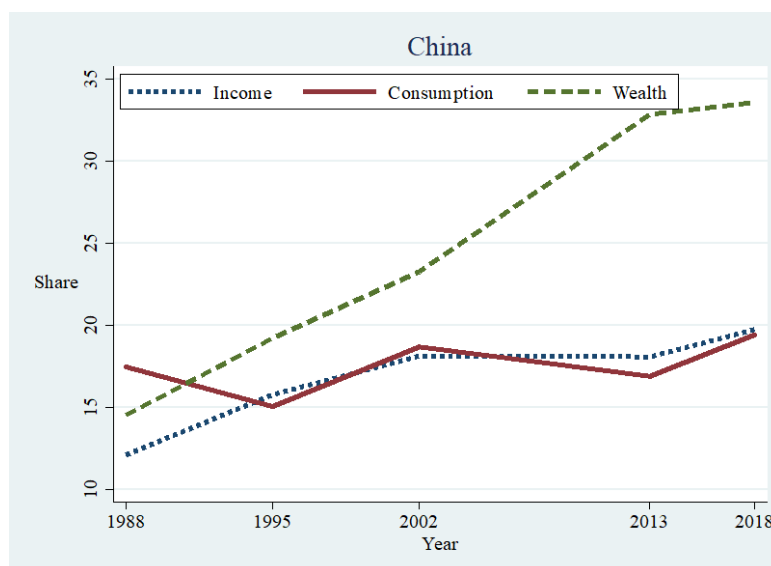


Figure 1 Shares Held by Top 5% of Respective Distributions²

Sources: Chinese Household Income Project.

Several observations can be made from what those tables and figures show. First, seen over the entire period 1988 to 2018 and at the median consumption grew by 6 percent annually, while income grew by 7 percent. The growth of wealth was the fastest; 11 percent annually. At all points in the distributions and for all periods there was positive growth. In this sense we have a situation with growth without losers.

However, not all were gaining equally much. Income growth at the bottom for the distribution of income between years 1988 and 1995 was not more than 2 percent per annum, while for the same period growth at the 95th centile was as high as 8 percent per annum. As a consequence between 1988 and 1995 income inequality increased rapidly. For example the 95/50 ratio increased from 2.2 to 3.2 and the Gini moved from 0.30 to 0.38. During the same period there was little difference in growth between the middle and the top of the income distribution.

Moving to the situation in 2002 we see that income inequality had continued to increase. However, the increase in the Gini (from 0.38 to 0.42) was less rapid than between 1988 and 1995. The increase in the Gini between 2002 and in 2013 was even smaller (from 0.42 to 0.44). Those changes in income inequality agree with what is reported in the literature which says that the largest increase in Chinese income inequality took place

² Information reported in all figures of the paper is documented in the Appendix of the paper.

during the first years of the reform process. After around 2013 income inequality changed little or, as discussed above, perhaps toward becoming lesser.³

What supplementary information on inequality in single dimensions do we get from studying consumption or wealth? The story of changes in consumption inequality is broadly similar when it comes to changes. There were increases in consumption inequality during the first part of the period studied but not thereafter. However, the increase in the Gini between 1988 and 2002 (from 0.38 to 0.41) was not as large as the increase in the Gini for income (from 0.30 to 0.42) and the increase took place after 1995, not after 1988.

When comparing the development of income inequality with the development of inequality in distribution of wealth we find in the latter a much more pronounced trend toward increased inequality. The Gini for the distribution of wealth has since 1988 been higher than the Gini for income. While the Gini for income increased modestly between 2002 and 2013 (from 0.42 to 0.44), the Gini for wealth increased very rapid (0.50 to 0.63) between the same two years. However, similar to the development of income inequality there was little change in wealth inequality from 2013 to 2018.

Table 2 Centiles ratio for Income, Consumption, and Wealth (1988–2018)

		1988	1995	2002	2013	2018
Income	95/50 Ratio	2.2	3.2	3.7	3.6	3.6
	50/10 Ratio	2.4	2.5	2.7	3.7	3.4
Consumption	95/50 Ratio	2.9	3.0	4.0	3.4	3.6
	50/10 Ratio	2.6	2.1	2.1	2.7	2.6
Wealth	95/50 Ratio	2.6	3.4	5.3	7.1	7.9
	50/10 Ratio	2.3	2.6	3.1	4.4	5

Sources: Chinese Household Income Project.

Table 3 Annual Growth Rates at the 10th, 50th, and 95th centiles

%		1988-1995	1995-2002	2002-2013	2013-2018	1988-2018	2002-2018
Income	10th Centile	2.1	5.4	6.9	8.8	5.7	7.5
	50th Centile	2.4	6.7	10.2	7.1	7.0	9.2
	95th Centile	8.0	8.9	9.9	7.0	8.8	9.0
Consumption	10th Centile	6.0	3.8	7.3	7.5	6.2	7.4
	50th Centile	3.0	3.9	9.5	7.0	6.2	8.7
	95th Centile	3.5	8.0	7.9	8.5	7.0	8.1
Wealth	10th Centile	11.6	4.2	8.9	6.1	7.9	8.1
	50th Centile	13.7	7.0	12.4	8.7	10.8	11.3
	95th Centile	18.1	13.7	15.5	11.0	14.9	14.1

Sources: China shares come from Chinese Household Income Project.

³ The different inequality indices we apply give different pictures on how income inequality changed between 2013 and 2018.

Figure 2 depicts the inequality trend by using quintile share. Comparing the income share of different quintiles from Figure 2 (left), we can see that the share bottom quintile is decreasing in the long run. On the contrast, the share of top quintile shows an increasing trend. That means more and more social income is accumulated among high-income individuals, income inequality seems more severe. Consumption shows a similar trend with income. Although the share of top quintile slightly decreased from 2002 to 2013, the share still surpassed 40%. The wealth inequality showed by quintiles reflects the same trend the Gini coefficient shows. The top quintile gained more shares while the four lower quintiles lost more shares, the trend is more obvious that of income and consumption shows.

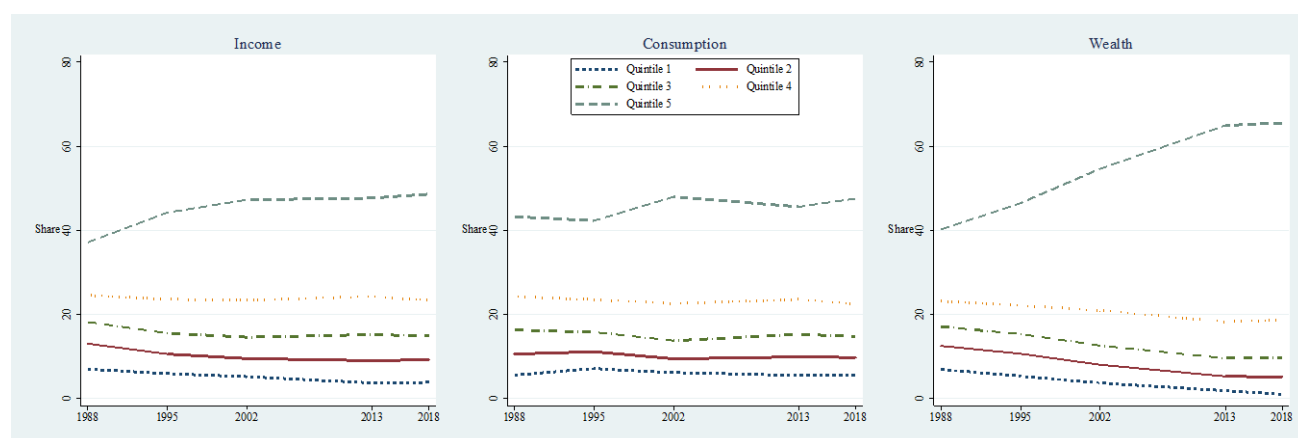


Figure 2 Inequality Using Quintiles

Sources: Chinese Household Income Project.

V. Linking income and consumption

In this section, we focus on the relationship between income and consumption, and explore the convergence between those two variables by inspecting the savings rate. Income is the most used indicator for measuring inequality in economic well-being inequality for China, whereas consumption is often the preferred measure of economic welfare in several developing countries. For a household it's consumption typically develop more smoothly and is less affected than income by particular events, In addition, compared to income, consumption is frequently less likely to be underestimated for a particular household.

In this section of the paper, we combine information on income and consumption. We take the top 5% as indicated by one variable in the overall samples, sorted by income. Thereafter, we calculate the percentage of individuals in the top 5 percent of the other variable. In case of a perfect overlap the 5 percent would contains the same individuals. We do the same exercise also for the top one percent and the top ten percent.

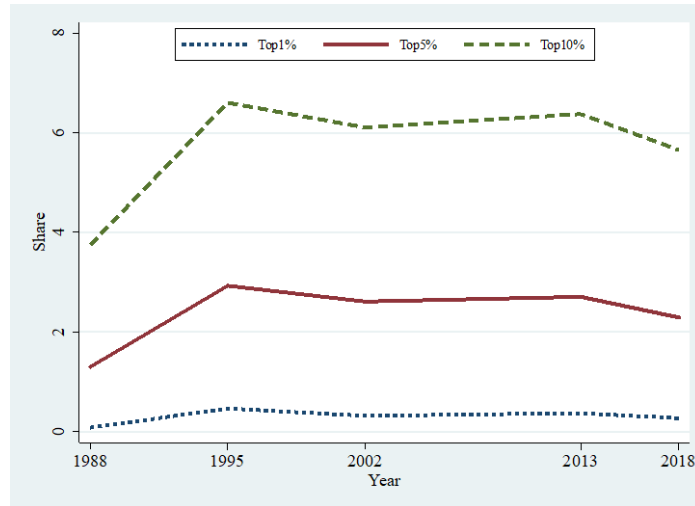


Figure 3 Shares held by Top households, 1988-2018

Sources: Chinese Household Income Project.

Figure 3 shows the results of this exercise. We see that the overlap between being located in the top of the distribution of income and the distribution of consumption increased from 1988 to 1995 for the top five and ten percent. Between 1995 and 2013 there is almost no change, but thereafter a small change took place. The share of individuals that both belongs to the top income and top consumption increased a substantially during the entire period studied, that is the individuals with high income tend to spend more. Income and consumption showed a convergence in the thirty years. However, the figure shows a distinct trend between the year of 2013 and 2018, the cross-share between top income and consumption slightly declined..

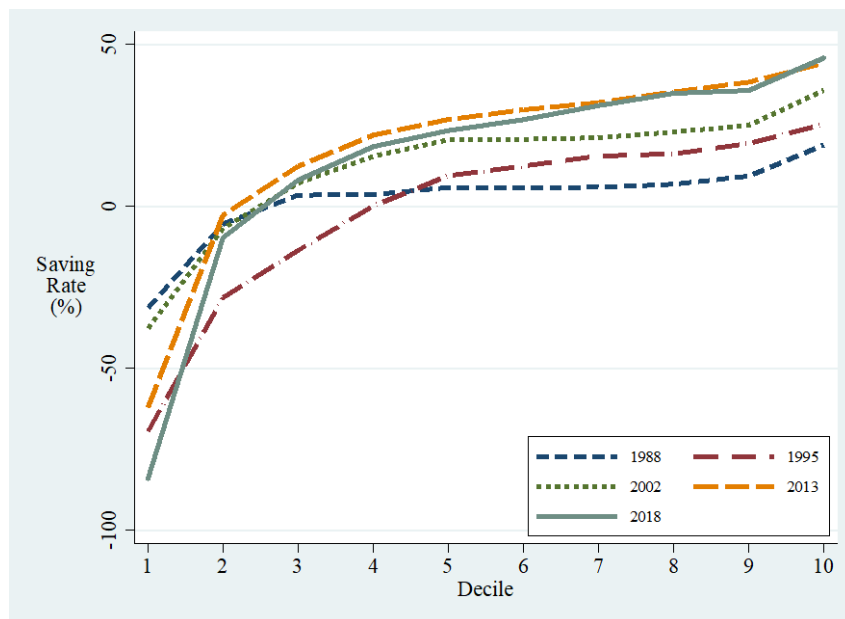


Figure 4 Saving Rate by Income deciles 1988 to 2018

Sources: Chinese Household Income Project.

In Figure 4, we show the savings rate for each income decile. The saving rate is an important indicator when describing the relationship between income and consumption. Here we have divide income into deciles, and computed the savings rate of each decile. We report, as expected, a positive relationship between income and the savings rate. Notice that the savings rate is strongly negative for the first decile and each year studied while positive for deciles three and higher. Compare to different years, we can see that the saving rate has increased for each decile. There is also a tendency of the savings rate for a fixed decile to increase over time. This brings us to the analysis in the next section about the relationship between income and wealth.

VI. Convergence between distributions of income and wealth

As stated above subtracting the variable consumption from the variable income leads by definition to savings a variable that adds to the stock of wealth. Remember that in the future the return of wealth also generates property income. Therefore, there can be a cumulative relationship between income and wealth.

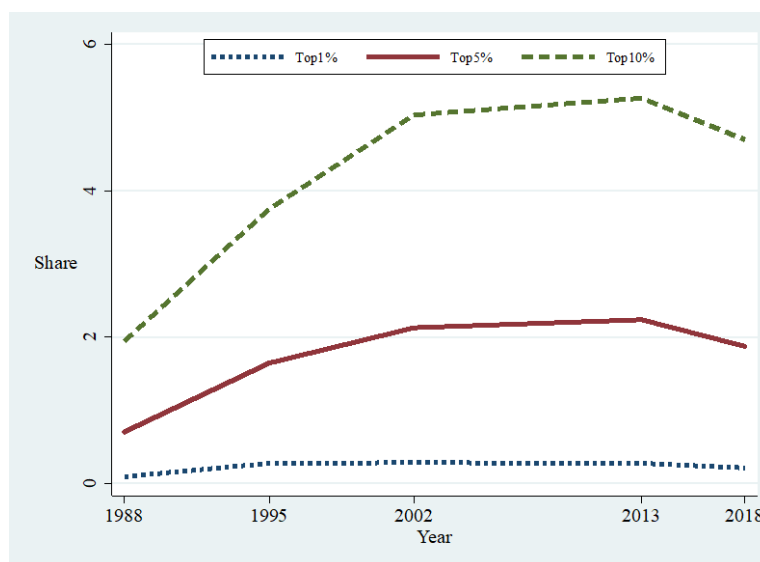


Figure 5 Wealth Shares Held by Top percentages of Income, 1988-2018

Sources: Chinese Household Income Project.

We focus our analysis on the relationship between income and wealth in Figure 5. It shows for the top 5 and top 10 of the income distribution an increasingly strong association with household wealth for the period 1988 to 2013, and thereafter a slow decrease. In contrast there are not much of changes between the association between the wealth share and the income share for the top one percent.

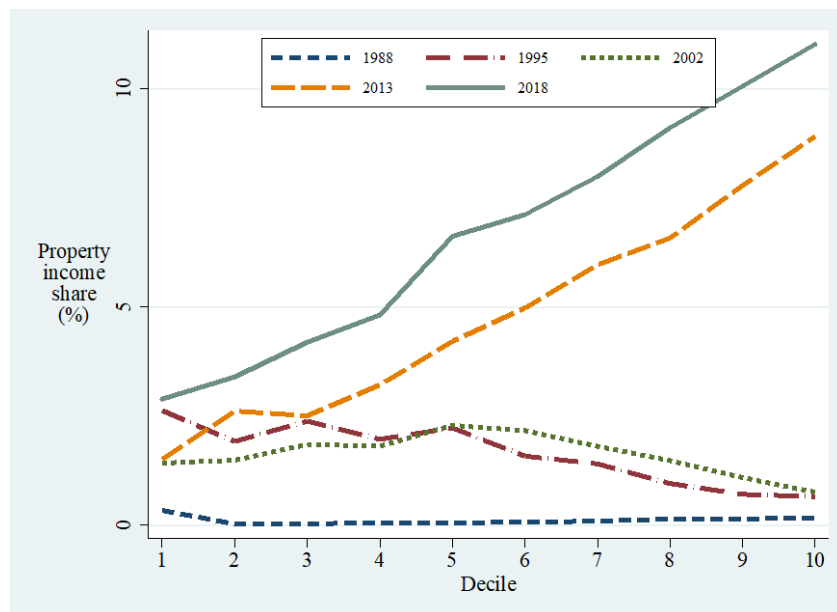


Figure 6 Share of Property Income by Income Deciles, 1988-2018

Sources: Chinese Household Income Project.

Figure 6 shows the share of property income of total income. When wealth holdings accumulate, property income will become a more important source of income, and then the income gap will be solidified. In particular, the wealth of the high-income class is passed on to the next generation through asset gifts and bequests, which reduces the intergenerational mobility of wealth. The direct consequence of unequal wealth distribution is unequal property income, which in turn becomes an important factor driving income inequality.

Here we divide income into deciles, and compute the share of property income in each decile. Figure 6 shows a strong positive relation between property share and income in the years of 2013 and 2018. People who have higher income tend to have more property income share, which to some extent reflects the more wealth is accumulated among wealthy people. The property share of top income decile in 2018 has even exceeded 10 percent.

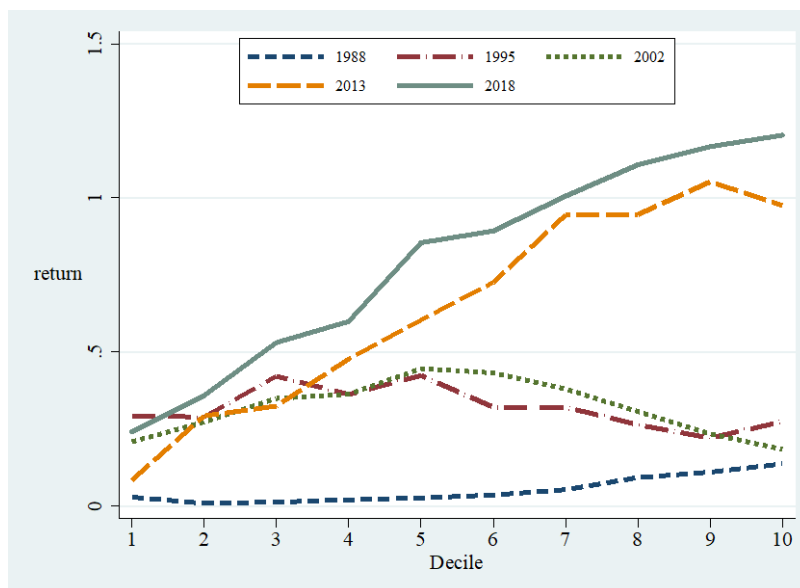


Figure 7 Return to wealth by deciles of wealth 1988–2018

Sources: Chinese Household Income Project.

In Figure 7 we look at the relationship between household wealth and property income. We define the return to wealth as the property income divide by wealth, which behalf the ability of wealth to create new income. The more return is, the more powerful ability for wealth to create the new wealth. We find that while until 2002 there was not much of a positive relationship, but thereafter a strong such is visible: The higher the decile of wealth, the higher is the rate of return to wealth.

Combining Figure 5 to Figure 7, we can see that though there is a slow decline of wealth shares held by top income earners from 2013 to 2018, income wealth and property income shares are closely positive correlation with each other in each year.

VII. Convergence of inequality dimensions and a comparison with U.S.

In this section, we analyze income, consumption and wealth together for the same households using the methodology of Fisher et al (2022). As we above have established stronger links during the period 1988 to 2018 between each pair of variables we also expect to find stronger links when studying three dimensions. We expect to find substantial differences between China and the United States for several reasons.

The economic history of China after the end of the 80s is very different from its counterpart in the United States during the same years. While China started off from being a low income country and today has reached the rank of middle income, United States for many years have been a high income country. China started from a planned economy and moved towards a market economy, although one with a large state sector.

China also changed from a country with most of its population living in rural locations to become much more urbanized. This rapid urbanization took first place despite restrictions for geographical mobility but those have lessened in small and middle sized cities. In contrast United States is since long a country characterized by large spatial mobility of households. Taken together all those facts in conjecture with others mean that there are many reasons why the size and development of economic inequality in China and United State can be expected to differ from each other. However, despite this we will report several similarities between the two countries when it comes to levels and development of economic inequality.

We have shown that at the median, and evaluated over the entire period 1988 to 2018, did household income per capita in China increase by 7 percent per annum, that consumption per capital increased by 9 percent per annum and the increase in household wealth per capita was even larger, 11 percent per annum. This can be compared to the corresponding growth rates (between 1989 and 2016) for the United States were 3, 2 and 3 percent per annum.

We report that looking at the share of the top 5 percent and at the numerical values of inequality indexes China's inequality had moved to become considerably more unequal in 2018 than in 1988. This is true if the development is assessed by inspecting income, consumption or wealth. Those trends are similar to what had occurred in the United States. However, starting from a much low level than in the US wealth inequality in China increased rapidly but was in 2018 still much lower than in US. An important part of this picture is that much fewer households in China than in the United States have no or negative wealth.

Table 4 Correlation coefficients for income, consumption and wealth

	Income and Consumption	Income and Wealth	Consumption and Wealth
1988	0.490	0.208	0.169
1995	0.796	0.489	0.427
2002	0.770	0.658	0.638
2013	0.799	0.591	0.637
2018	0.644	0.526	0.523

Sources: Chinese Household Income Project.

Table 4 shows the pairwise relationships using correlation coefficients for income, consumption and wealth. All correlation coefficients were comparably low in 1988 but particularly the correlation between income and consumption had increased rapidly in 1995. The correlation between income and wealth and the one between consumption

and wealth also increased from 1995 to 2002. There is a tendency of all correlation coefficients to decrease from 2013 to 2018.

Table 5 Relationship between consumption, income and wealth

Year	Intercept and sd	Coefficient for income and standard error	Coefficient for wealth and its standard error	R2	F	Number of observations
1988	636.354*** (16.793)	0.664*** (0.004)	0.043*** (0.002)	0.245	13264	81929
1995	871.670*** (11.334)	0.636*** (0.002)	0.009*** (0.001)	0.636	49317	56418
2002	943.045*** (18.184)	0.498*** (0.003)	0.032*** (0.000)	0.623	52210	63136
2013	3803.707*** (36.788)	0.405*** (0.002)	0.011*** (0.000)	0.679	65761	62101
2018	7393.757*** (72.287)	0.339*** (0.002)	0.011*** (0.000)	0.462	29781	69411

Sources: Chinese Household Income Project.

Table 5 gives the relationship between on one hand consumption and on the other hand income and wealth as estimated using OLS. A first comment is that R^2 was low in 1988 but had increased rapidly in 1995 and stayed at approximately the same level until 2018, but had decreased visibly in 2018. However, also see that the coefficient for income is well below 1, and there is a clear tendency of the coefficient being lower in the ore recent surveys. Further we see that for all years is the coefficient for wealth positive and statistically significant.

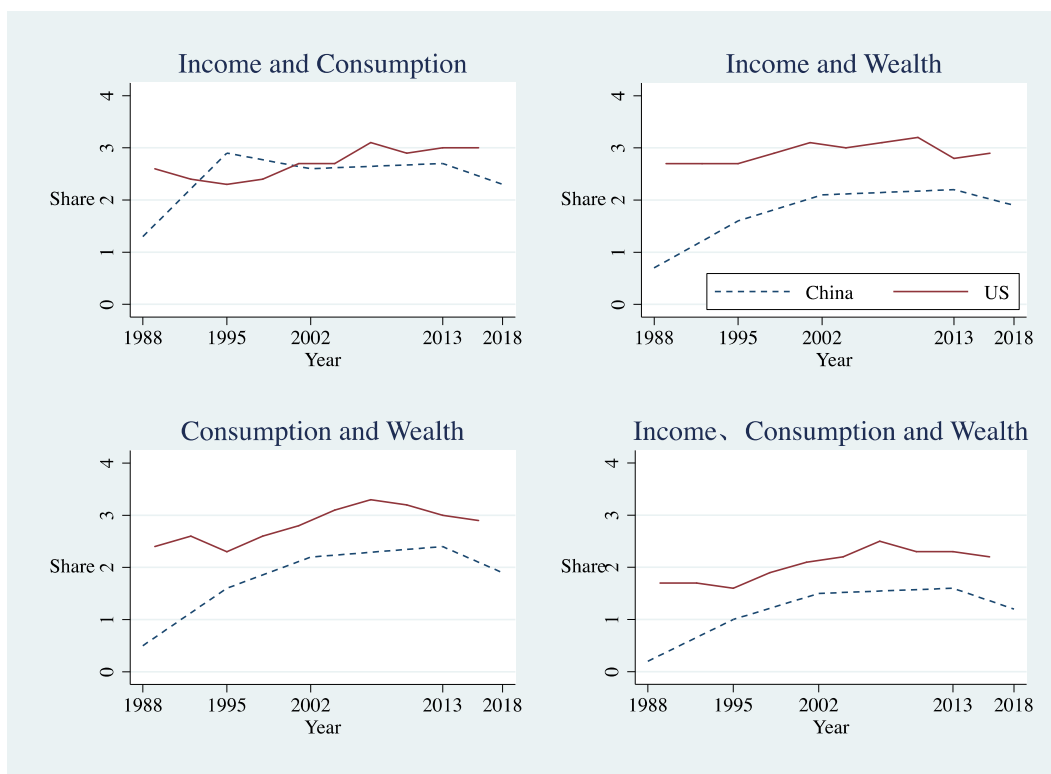


Figure 8 Share of Top 5 percent with two and Three Measures

Sources: Chinese Household Income Project.

At the end of the 80s China was a country in which a majority of the population lived in its rural locations. There self-sufficient agriculture dominated and the distribution of wealth, was fairly equal. In the urban part of China very high proportions of adults were employed in State Owned, Collective Enterprises or Government Institutions. After ending education workers were allocated to their work units where they typically remained during the entire work life. At those work unit workers were compensated by a meager wage but also by having access to housing paying only very low rents, to consumption goods, social services, and social insurance benefits which could be picked up after having completed a work life. The urban part of China was effectively separated from the rural part by the hukou system in which all persons were registered as rural or urban.

However, during the period here studied economic life in China Changed enormously as the economic grew very rapid. Economic reform meant that markets for products and production factors were introduced. Changes have also contributed to increased wage inequality and also to open unemployment surface. The organization of housing has also been changed in China's urban areas. As consequence a majority of urban households, like the rural counterparts always has become home owners. Those changes, together with rapidly increasing housing prices and the high saving ratios of China's households have, as we will see, led to rapidly increases in inequality in private wealth.

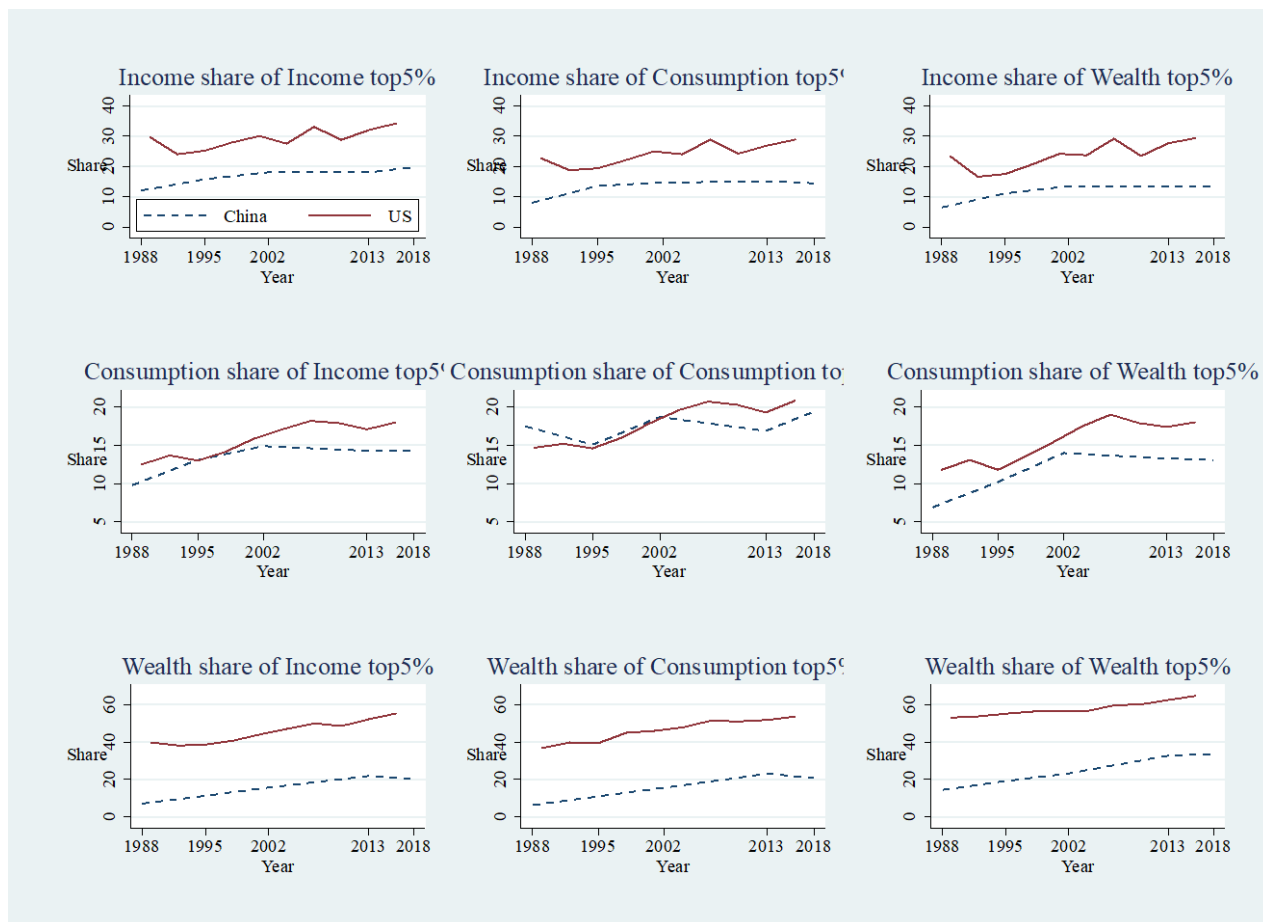


Figure 8 Top 5 percent Shares in One and Two-Dimensions in China and the United States

Sources: Chinese Household Income Project and Fisher et al. (2020).

We start by comparing the development of inequality in China and the US by looking at top 5 percentage shares in one and two dimensions (Figure 8), thereafter making the same exercise but for quintiles one, three and five (Figure 9) and finally we look at all the three dimensions Income, Consumption and Wealth (Figure 10).

Our first comments will thus relate to what Figure 8 shows. First looking at one dimension separately (the main diagonal figures), we find upward trends according for all three variables in both countries. In a given year is, with a few exceptions, inequality larger in the United States than in China. However, the difference in inequality between countries varies by variable. It is largest for wealth, smallest for consumption with income in the middle position.

Looking at figures off the diagonal we can in several cases detect a clear tendency of increased curves. This indicates that the top five in one dimension are increasingly in a favorable position also in the other dimension. This is generally true for US, and for China for the first part of the period studied. Furthermore, the proportions received by the top five percent are smaller in China than in the United States when it comes to income as well as wealth. However, the consumption share accruing to the top five percent in China is not always lower than its counterpart in US. Those results relate to

the top five percent. How does the picture for China look like when looking at proportions that have accrued to first, third and fifth quintile? The answer is provided in Figure 9.

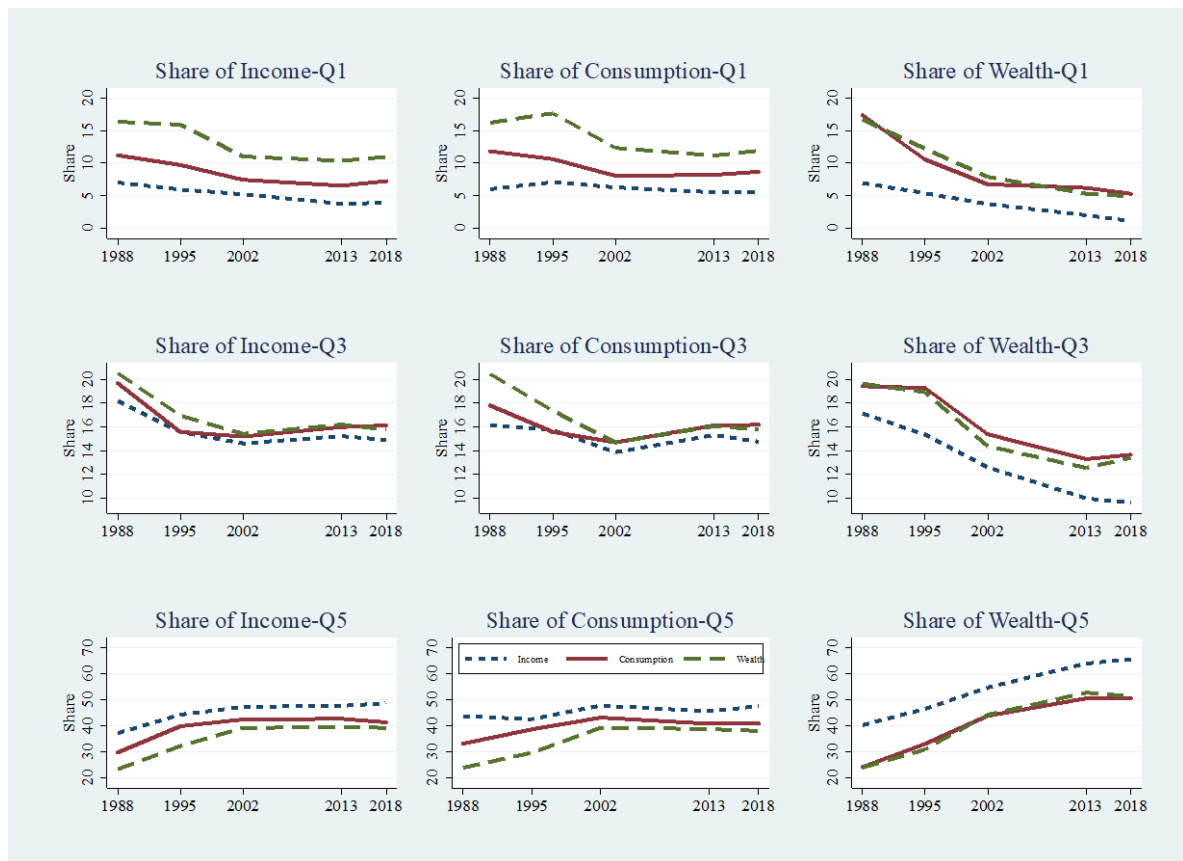


Figure 9 Shares by Quintile (Q1, Q3 and Q5) in Two Dimensions (1988–2018)

Sources: Chinese Household Income Project.

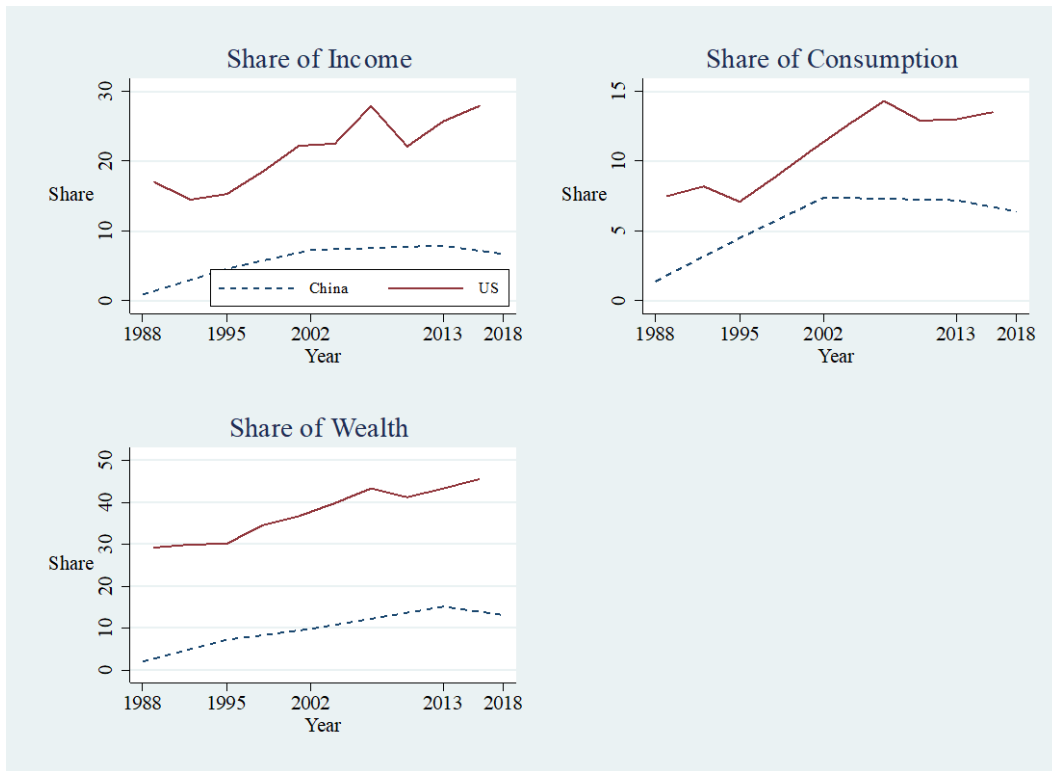


Figure 10 Top 5 percent Shares in Three-Dimensions in China and USA

Sources: Chinese Household Income Project.

Figure 10 shows three-dimensions inequality in China and USA. Take the figure of income (Upper to the left) for example. It shows the share of income held by those in the top 5 percent of consumption as well as wealth. We can see that the pattern of increase in the share of income (between 1988 and 2018) was similar to the increase in the share of consumption in the share of wealth. An important cross country difference is that the curves for China are in all three cases considerably lower than the one for US. Although the top 5 percent in China increased its position in all three dimensions from 1988 to 2013 it is not as privileged compared to the rest of the Chinese population as its counterpart in US in relation to the rest of the population in the US.

VIII. Conclusion

Economic inequality at the household level can be assessed by studying the development of inequality in income, in consumption and in wealth. Assessments can be made by observing one variable at a time but also taking into consideration how households face according to two or three of those variables. In this paper we use the China Household Income Project for 1988, 1995, 2002, 2013 and 2018 to study how inequality in each of the three dimensions separately and in combinations have developed. We have also made comparison to what has been recently reported for the United States during almost an identical period by Fisher et al (2022).

Looking at each of the three dimensions separately we confirmed that the increase in shares received in China by the top in the distribution of consumption as in income predominately had taken place during the first half of the period studied. In contrast wealth inequality continued to increase between each pair of years, although the increase between 2013 and 2018 was small. Despite the rapidly increase in wealth inequality was at the end of the period wealth inequality in China considerably lower than its counterpart in the United States. One aspect of the high wealth inequality in United States this is that in this country is the proportion households having no positive wealth considerably larger than in China.

Our analysis show highly remarkable increase in the share of wealth owned by the top 10 percent of income earners in China from 1988 to 2013. Thus while the top 10 percent of wage earner household owned 20 percent of total wealth in 1988 the corresponding share had reached to more than half of total income in 2013. Being owners of large household wealth Chinas top income earners are thus in a position of receiving larger capital income in the future. In this way a dynamic element in income determination been has introduced while previously it was of little importance.

China's inequality has consistently increased since 1988, while income, consumption and wealth show the trend of convergence. After the financial crisis, China's urban/rural segmentation has decreased, resulting in a downward movement of Gini coefficient of income inequality. However, the trend of inequality is still increasing if one uses multidimensional indicators. This cannot be captured by the Gini coefficient of the income distribution. For the saving rate, it helps the higher decile to expand the inequality in perspective of labor market. And also for the share of property income in the capital market, it helps to expand the inequality if linking income and wealth. Furthermore, for the return rate of wealth, the higher decile also has a larger return rate, which will also quickly enlarge the inequality. Most importantly, on the basis of the income, consumption and wealth at the same household, then we can conclude that the high income families have advantages in all aspects at the same time.

At a general level this exercise has illustrated there are many dimensions of inequality. By observing more than one the observer will have a fuller view of how the society is changing. In the Chinese case, in the past household income and household wealth were not strongly correlated as often people with high income did not have much wealth, and people with high income often had little wealth. However, this is no longer the case and from this follows that one can predict that intergenerational mobility in China threatens to decline, and the general trend of inequality increases though it grows at a slowing speed, as the economic distribution will be dominated by the convergence and also mutual reinforcement of inequality in the future.

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Appendix

Table A1 Data to Accompany Figure 1

	CN			USA		
	income	consumption	wealth	income	consumption	wealth
1988	12.1	17.5	14.5			
1989				29.7	14.7	53.2
1992				24	15.2	53.8
1995	15.8	15.1	19.2	25.2	14.6	55.2
1998				27.9	16	56.4
2001				30.1	17.9	56.9
2002	18.1	18.7	23.3			
2004				27.5	19.6	56.7
2007				33.1	20.7	59.8
2010				28.8	20.3	60.3
2013	18.1	16.9	32.8	32	19.3	62.6
2016				34.2	20.8	64.8
2018	19.7	19.4	33.6			

Sources: China shares come from Chinese Household Income Project and USA shares come from Fisher et al (2022).

Table A2 Data to Accompany Figure 2

	Q1	Q2	Q3	Q4	Q5
Income					
1988	7.0	13.1	18.2	24.6	37.2
1995	6.0	10.6	15.6	23.6	44.3
2002	5.2	9.5	14.6	23.4	47.3
2013	3.7	9.0	15.2	24.3	47.7
2018	3.9	9.2	14.9	23.4	48.6
Consumption					
1988	6.0	11.0	16.2	23.1	43.7
1995	7.1	11.0	15.7	23.6	42.5
2002	6.3	9.6	13.9	22.5	47.8
2013	5.5	9.9	15.3	23.6	45.6
2018	5.5	9.8	14.8	22.4	47.6
Wealth					
1988	7.0	12.5	17.1	23.2	40.2
1995	5.4	10.7	15.4	22.1	46.5
2002	3.7	8.0	12.6	20.9	54.7
2013	2.0	5.5	10.0	18.5	64.0
2018	1.1	5.2	9.6	18.6	65.6

Sources:Chinese Household Income Project.

Table A3 Data to Accompany Figure 3

	Top1%	Top5%	Top10%
1988	0.1	1.3	3.7
1995	0.5	2.9	6.6
2002	0.3	2.6	6.1
2013	0.4	2.7	6.4
2018	0.3	2.3	5.7

Sources:Chinese Household Income Project.

Table A4 Data to Accompany Figure 4

decile	1988	1995	2002	2013	2018
1	-10.4	-42.3	-26.1	-51.3	-77.4
2	1.7	-20.4	-3.9	-1.4	-8.6
3	2.3	-6.2	8.7	12.8	8.2
4	5.7	5.2	16.4	22.3	19
5	5	9.2	21.2	27.1	23
6	5.7	13.9	20.9	29.9	26.9
7	6.7	15.3	20.9	31.9	31.2
8	7.4	16.6	22.9	35.3	35
9	9.7	19.9	25.5	38.6	35.8
10	19.2	25.6	35.8	44.2	45.9

Sources:Chinese Household Income Project.

Table A5 Data to Accompany Figure 5

	Top1%	Top5%	Top10%
1988	0.1	0.7	1.9
1995	0.3	1.6	3.7
2002	0.3	2.1	5
2013	0.3	2.2	5.3
2018	0.2	1.9	4.7

Sources:Chinese Household Income Project.

Table A6 Data to Accompany Figure 6

decile	1988	1995	2002	2013	2018
1	0.34	2.63	1.42	1.51	2.89
2	0.03	1.92	1.49	2.62	3.4
3	0.04	2.39	1.85	2.51	4.19
4	0.05	1.97	1.81	3.22	4.82
5	0.06	2.23	2.29	4.21	6.62
6	0.07	1.58	2.17	4.97	7.11
7	0.09	1.41	1.81	5.97	7.99
8	0.15	0.96	1.48	6.58	9.11
9	0.15	0.71	1.09	7.78	10.06
10	0.17	0.66	0.75	8.91	11.02

Sources:Chinese Household Income Project.

Table A7 Data to Accompany Figure 7

decile	1988	1995	2002	2013	2018
1	0.03	0.29	0.21	0.08	0.24
2	0.01	0.29	0.27	0.30	0.36
3	0.01	0.42	0.35	0.33	0.52
4	0.02	0.36	0.36	0.48	0.60
5	0.03	0.42	0.45	0.62	0.85
6	0.04	0.32	0.43	0.75	0.89
7	0.05	0.32	0.38	0.99	1.00
8	0.09	0.26	0.31	1.00	1.10
9	0.11	0.22	0.23	1.13	1.16
10	0.14	0.27	0.18	1.07	1.20

Sources:Chinese Household Income Project.

Table A8 Data to Accompany Figure 8

CN				USA			
I and C	I and W	C and W	I、C and W	I and C	I and W	C and W	I、C and W

1988	1.3	0.7	0.5	0.2				
1989					2.6	2.7	2.4	1.7
1992					2.4	2.7	2.6	1.7
1995	2.9	1.6	1.6	1	2.3	2.7	2.3	1.6
1998					2.4	2.9	2.6	1.9
2001					2.7	3.1	2.8	2.1
2002	2.6	2.1	2.2	1.5				
2004					2.7	3	3.1	2.2
2007					3.1	3.1	3.3	2.5
2010					2.9	3.2	3.2	2.3
2013	2.7	2.2	2.4	1.6	3	2.8	3	2.3
2016					3	2.9	2.9	2.2
2018	2.3	1.9	1.9	1.2				

Sources: China shares come from Chinese Household Income Project and USA shares come from Fisher et al (2022)

Table A9 Data to Accompany Figure 9

	CN				
	1988	1995	2002	2013	2018
Income Share of:					
Income Top 5%	12.1	15.8	18.1	18.1	19.7
Consumption Top 5%	8.0	13.6	14.7	15.1	14.5
Wealth Top 5%	6.5	11.1	13.5	13.4	13.4
Consumption Share of:					
Income Top 5%	9.8	13.1	14.9	14.3	14.3
Consumption Top 5%	17.5	15.1	18.7	16.9	19.4
Wealth Top 5%	6.9	10.2	14.0	13.3	13.1
Wealth Share of:					
Income Top 5%	7.1	11.3	15.7	21.9	20.4
Consumption Top 5%	6.4	11.0	15.6	23.1	20.9
Wealth Top 5%	14.5	19.2	23.3	32.8	33.6

	USA									
	1989	1992	1995	1998	2001	2004	2007	2010	2013	2016
Income Share of:										
Income Top 5%	29.7	24	25.2	27.9	30.1	27.5	33.1	28.8	32	34.2
Consumption Top 5%	22.7	18.8	19.4	22.1	25	24	28.9	24.3	26.9	28.9
Wealth Top 5%	23.3	16.6	17.5	20.7	24.2	23.7	29.2	23.5	27.7	29.4
Consumption Share of:										
Income Top 5%	12.5	13.7	13	14.2	15.9	17.1	18.2	17.9	17.1	18
Consumption Top 5%	14.7	15.2	14.6	16	17.9	19.6	20.7	20.3	19.3	20.8
Wealth Top 5%	11.8	13.1	11.8	13.6	15.5	17.5	19	17.9	17.4	18
Wealth Share of:										
Income Top 5%	39.9	38.2	38.7	40.8	44.1	47.1	50	48.7	52.2	55.4
Consumption Top 5%	36.8	39.9	39.5	45	46	47.9	51.5	51.1	51.9	53.7
Wealth Top 5%	53.2	53.8	55.2	56.4	56.9	56.7	59.8	60.3	62.6	64.8

Sources: China shares come from Chinese Household Income Project and USA shares come from Fisher et al (2022).

Table A10 Data to Accompany Figure 10

	CN			USA		
	income	consumption	wealth	income	consumption	wealth
1988	0.9	1.4	2.0			
1989				17	7.5	29.2
1992				14.5	8.2	29.9
1995	4.6	4.5	7.2	15.3	7.1	30.1
1998				18.5	8.9	34.5
2001				22.2	10.8	36.7
2002	7.3	7.4	9.8			
2004				22.5	12.6	39.8
2007				27.9	14.3	43.3
2010				22.1	12.9	41.2
2013	7.9	7.2	15.1	25.7	13	43.3
2016				27.9	13.5	45.5
2018	6.7	6.4	13.1			

Sources: China shares come from Chinese Household Income Project and USA shares come from Fisher et al (2021).

Table 2 Income, Consumption, and Wealth at the 10th, 50th, and 95th centiles (1988–2018)

	1988	1995	2002	2013	2018
Income					
10th Centile	1125	1300	1874	3917	5976
50th Centile	2719	3204	5033	14615	20554
95th Centile	6022	10337	18770	53202	74631
95/50 Ratio	2.2	3.2	3.7	3.6	3.6
50/10 Ratio	2.4	2.5	2.7	3.7	3.4
Consumption					
10th Centile	888	1338	1735	3782	5441
50th Centile	2313	2845	3709	10102	14180
95th Centile	6794	8655	14787	34225	51379
95/50 Ratio	2.9	3.0	4.0	3.4	3.6
50/10 Ratio	2.6	2.1	2.1	2.7	2.6
Wealth					
10th Centile	2210	4764	6343	16274	21892
50th Centile	5023	12315	19768	71626	108912
95th Centile	13224	42366	104154	510046	857731
95/50 Ratio	2.6	3.4	5.3	7.1	7.9
50/10 Ratio	2.3	2.6	3.1	4.4	5.0

Sources: Chinese Household Income Project.

Table 3 Growth Rate at the 10th, 50th, and 95th centiles in China and USA (% per year)

China					
	1988-1995	1995-2002	2002-2013	2013-2018	1988-2018
Income					
10th Centile	2.1	5.4	6.9	8.8	5.7
50th Centile	2.4	6.7	10.2	7.1	7
95th Centile	8	8.9	9.9	7	8.8
Consumption					
10th Centile	19.4	3.6	7.5	7.5	9.2
50th Centile	14.6	3.8	9.6	7	8.9
95th Centile	14.6	8.2	7.9	8.5	9.6
Wealth					
10th Centile	11.6	4.2	9	5.9	7.9
50th Centile	13.7	7	12.6	8.3	10.8
95th Centile	18.1	13.7	16.6	8.7	14.9
USA					
	1989-1995	1995-2001	2001-2013	2013-2016	1989-2016
Income					
10th Centile	2.00	7.78	2.78	3.09	3.73
50th Centile	2.33	5.09	1.97	4.32	3.00
95th Centile	0.47	7.25	2.94	4.22	3.46
Consumption					
10th Centile	2.94	3.26	2.01	1.09	2.39
50th Centile	2.47	3.41	1.87	2.73	2.44
95th Centile	1.50	4.99	2.11	5.32	2.96
Wealth					
10th Centile		12.25		-21.66	
50th Centile	3.55	6.95	-0.53	6.21	2.74
95th Centile	-0.13	11.43	3.03	8.45	4.71

Sources: China shares come from Chinese Household Income Project and USA shares come from Fisher et al (2022).

Table 4 Mean Income, Consumption, and Wealth for Top 5 Percent of Various Distributions

	Income	Consumption	Wealth	
Income				Wealth and Consumption
1988	7246	4802	3906	5128
1995	13057	11249	9196	12175
2002	25239	20396	18744	23322
2013	70353	58662	52181	64289
2018	109819	80794	74540	97389
growth(%)	1416	1583	1808	1799
Consumption				Wealth and Income

1988	5646	10034	3976	5590
1995	9543	10975	7463	9930
2002	16168	20268	15237	18961
2013	37910	44942	35354	42947
2018	55526	75278	50687	65793
growth(%)	883	650	1175	1077
Wealth				Income and Consumption
1988	8326	7565	17054	9012
1995	36230	35571	61836	39465
2002	99614	98920	147183	118373
2013	637101	672237	957472	813978
2018	945120	970672	1555185	1320445
growth(%)	11251	12731	9019	14552

Sources: Chinese Household Income Project.