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Working Paper

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

IZA Discussion Papers, No. 16719

Provided in Cooperation with:

IZA – Institute of Labor Economics

Suggested Citation: Wan, Haiyuan; Gustafsson, Björn Anders; Wang, Yingfei (2024) : Convergence of Inequality Dimensions in China: Income, Consumption, and Wealth from 1988 to 2018, IZA Discussion Papers, No. 16719, Institute of Labor Economics (IZA), Bonn

This Version is available at:

<https://hdl.handle.net/10419/282846>

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ISSN: 2365-9793

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ABSTRACT

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

Using household data from 1988 to 2018, we confirm that the increase in income inequality in China has come to a halt in recent years but show that inequality in wealth and consumption continues to increase. We report a clear convergence of inequality across the different dimensions of income, consumption, and wealth. Households at the top of one dimension are increasingly located at the top of the other two dimensions. The mechanisms for such convergence across dimensions are analysed, and the savings rate links income and consumption, while capital accumulation is the central mechanism linking income and wealth. In addition, the wealth and income structure contribute to intensifying the convergence trend. We argue that the relatively high level of inequality in China may continue since income, consumption and wealth are increasingly reinforcing each other.

JEL Classification: D31, I31, P52

Keywords: economic inequality, savings rate, property income, return rate of capital, convergence mechanism

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* We are grateful to John Knight for his helpful comments on an earlier version, to helpful referees and to participants at research meetings in Oxford University, Beijing Normal University and IZA for discussions. We also thank the China Institute for Income Distribution, Beijing Normal University for sharing the data of China Household Income Project (CHIP) used in this paper. The views expressed herein are those of the authors and do not necessarily reflect the views of the related organizations.

1. Introduction

In the context of the increasing social conflicts brought about by the global inequality in recent years, it is critical to explore the trend of inequality. In China, income inequality rapidly increased in the 1980s and some years thereafter (Sicular et al., 2007). However, the indicators of income inequality measurement and research results have been disputed since approximately 2009, with different findings leading to various policy propositions. For many observers and policy-makers, the basic trend of income inequality is difficult to consider. The National Bureau of Statistics (NBS) reports that household income inequality has gradually decreased, as the Gini coefficient is stated to have decreased from 0.490 in 2009 to 0.467 in 2020 (NBS, 2021). In contrast, Yang and Yang (2015) state that the downtrend is so minimal that they are hesitant to state that income inequality in China has experienced a reverse trend.

In past years, China's income and wealth often deviated from each other in the sense that many top-income individuals were not rich in wealth, and those rich in wealth were unlikely to be at the top of the income distribution. However, since the end of the 1980s, dimensions of inequality have tended to converge. Consequently, society faces the risk of declining social mobility. Additionally, consumption inequality and wealth inequality can dramatically influence the Chinese economy and society, effects that are separate from the influence that works through income. Here, we show that during the period studied, 1988 to 2018, three dimensions of inequality (income, wealth, and consumption) tended to converge. Thus, considerably more in 2018 than in 1988, people with higher incomes also exhibited greater consumption and wealth.

There is often a circular positive feedback mechanism between income inequality and wealth inequality. Those with higher incomes are able to accumulate more wealth, which in turn generates increased property income. Increased income inequality also leads to increased consumption inequality, which increases gaps in human capital accumulation, which in turn results in greater inequality in capabilities. With resources increasingly concentrated in a well-off economic minority, social mobility is likely to decline and thereby become a major challenge to common property in China (Wan and Knight, 2023).

In this paper, data from the China Household Income Project (CHIP) are analysed for the five years of 1988, 1995, 2002, 2013 and 2018 to study how inequality in income, wealth and consumption has changed over the years. We consider the three variables both separately and in combination for members of the same household.

Efforts to study how income, consumption and wealth are interlinked within the same household level can be found regarding high-income countries. The expert group from Eurostat and the OECD (Organization for Economic Cooperation and Development) recently produced a report discussing the challenges of producing joint income, consumption, and wealth estimates; see Balestra and Oehler (2023). The report is also

the first attempt to develop comparable experimental statistics relating to the joint distribution of income, consumption, and wealth for the EU and beyond. Their efforts relate to the single year 2015 and are based on matching information from different sources for each country.

Our study is inspired by Fisher et al. (2022), who investigated the development of inequality as it appeared in one, two and three dimensions in the United States from 1989 to 2016. This study differs in design from Balestra and Oehler (2023) by having a time dimension. Fisher et al. (2022) covered almost the same period as our study. Therefore, later in the paper, developments in China are also compared with those in the United States. The data analysed for China here have the advantage of measuring all three dimensions (income, wealth and consumption) for the same households, a property not present in the data examined by Fisher et al. (2022) nor the data used by Balestra and Oehler (2023). More importantly, we present the linkage mechanism between income and consumption using the savings rate and show that capital accumulation is the central mechanism linking income and wealth. In addition to the mechanisms of the saving rate or return rate of capital, the wealth and income structure helps intensify the convergence trend. Therefore, we argue that the relatively high level of inequality in China may continue after the period studied in this paper.

The rest of the paper is organized as follows: The next section reviews the literature on inequality in China, Section 3 presents the data. Section 4 reports the results for each of the three dimensions taken separately. In Section 5, consumption and income are linked, and in Section 6, wealth and income are linked. Section 7 discusses the linking results within the same household for all three variables: income, consumption and wealth. Section 8 compares developments of China with those in the United States. Finally, Section 9 summarizes the paper.

2. Literature

2.1. Disputes over Inequality Trends

The extent and development of inequality in China are hot topics in policy-making and research. There are many dimensions of inequality. The gap in income between rural and urban areas is large. In addition, many people with rural *hukou* (residence permits) living in urban areas have lower incomes than those with urban *hukou*. There are substantial differences in average income between the most developed eastern region and the central and western regions. Wages in China vary by ownership of the work unit, level of education, gender and sometimes ethnicity. There is also the issue of to what extent income inequality is due to inequality of opportunities or to individual choices.¹

¹For a recent introduction to empirical studies on inequality in China along those dimensions see Cai et al. (2023).

Much of the recent literature is focused on how overall income inequality in China has changed, which is the topic of this paper. Official statistics published by the National Bureau of Statistics indicate that after the introduction of economic reforms and opening up, income inequality at the household level increased profoundly for several years until approximately 2008. There is now a large body of literature aiming to describe and understand the reasons for this development. Many studies decompose income and wealth inequality from a source perspective. For example, Kanbur et al. (2021) find that wage inequality is the most important source of long-run changes in income inequality, and Knight et al. (2022) report the great importance of net housing in its share of wealth and in its contribution to wealth inequality. In explaining changes in income and wealth inequality in China, several studies have pointed to the important role of government policies in economic transition and institutional reform (Zucman, 2019; Kanbur et al., 2021).

Zhang (2021) reviews the literature summarizing the sources of long-term changes in income inequality in China, noting that structural changes in the skills of the labour force, rising returns to education, relaxation of urban and rural migration policies, trade liberalization, skill-biased technological progress, and changes in ownership and market structure have all contributed. The same author concludes that income inequality caused by monopolistic behaviour undermines equality of opportunity and can lead to persistent income inequality across generations. The capital-labour ratio has long been seen as an important indicator of equity in income distribution, but research by Ranaldi and Milanović (2022) suggests that compositional inequality and interpersonal inequality do not always move in the same direction. Therefore, changes in the capital-labour ratio do not explain the changes in income inequality in China.

There is no consensus on how overall income inequality in China has changed since ca. 2009. One view based on official statistical reporting, such as by the National Bureau of Statistics (2022), is that income distribution in China has recently become less unequal. This is because the increase in agricultural product prices and the implementation of favourable policies for farmers, who are concentrated at the bottom of the income distribution, in recent years have led to an increase in farmers' income. A more powerful redistribution policy for the poor has also contributed to reducing income inequality. Support for this view is that the Gini coefficient, as reported by the National Bureau of Statistics, gradually declined from its highest point in 2008.

The second view holds that overall income inequality continues to be high (Luo et al., 2020). According to this view, institutional obstacles that lead to income gaps have not been removed and, in some cases, have even been strengthened. Moreover, the rise in agricultural product prices and rural subsidy policies are both short-term and volatile and consequently have a moderate impact on overall income inequality. There are also measurement problems. For example, Yang and Yang (2015) believe that the trend of recorded income inequality decreased due to sampling error. Consequently, it is too

early to conclude that the Gini coefficient for household income has entered a downwards trajectory. In addition, there are theoretical arguments: Kanbur et al. (2021) link the decrease in income inequality with the Lewis turning point and the Kuznets turning point, they argue that the plateauing of the Gini coefficient has not yet become a full-blown decline, and there are also short-term variations. Cai (2012) believes that the trend of inequality depends on future economic and social policies, especially the combination of economic growth performance, inflation and income redistribution policies.

Some observers stress other problems with data quality. One important theme is that inequality assessments typically miss the top incomes of the distribution (Atkinson et al., 2011; Burkhauser et al., 2012). In the Chinese context, Piketty et al. (2019) attempt to correct for this problem by combining tax data on high-income individuals with household surveys. Doing so shows that the recorded turnaround of increased income inequality in China in 2008, is partly reflecting data limitations. However, in reality, income inequality did not decrease. Those authors also provide estimates of wealth inequality by combining wealth surveys with data from the annual *hurun* wealth rankings. They find that “true” wealth inequality increased sharply after correcting the income of top earners. Relatedly, Li et al. (2020) and Wan and Yu (2023) find that the Gini coefficient of income inequality obtained when combining the top income data and household survey data is much higher than that of using only the survey data.

However, wealth inequality is generally more underestimated than income inequality, while inequality in consumption should be less underestimated. When valuing the importance of underreporting at the top of the income distribution, one must remember that if underreporting at the top of distribution does not change considerably across different years, this will not change judgements of how wealth inequality is changing (Knight et al., 2022).

It can thus be concluded that there is no consensus on how income inequality in China has changed since ca. 2009. There is thus ample room for further study of recent changes in this area.

2.2. Inequality Measurements and Their Divergence

There are different ways to approach the trend of economic inequality, broadly defined, in China. One is using summary measures computed for disposable income. Indices that have been used include the Gini index, MLD and the Theil index. Another approach is to study the development of intergenerational mobility or persistence (Gong et al., 2012). A related approach is investigating to what extent observed inequality is due to inequality in opportunities (Yang et al. 2021). A third way, and the one taken here, is to observe the different economic inequality dimensions of income, consumption and wealth for members of the same households.

There are obviously different indicators for judging changes in an income distribution, including the growth rate of residents' income, the ratio of the highest and lowest 10 percent of incomes, the ratio of property and wage income, the proportion of labour income, the Gini coefficient, and income mobility (Li and Wan, 2015; Zhao et al., 2017; Yang and Lian, 2015). There are also the aspects of wage, income, consumption and wealth. In the past, most indicators for China showed a similar development, so assessments of the development trend of inequality were relatively simple. However, since approximately 2009, different indicators have shown rather different trends. Therefore, these assessments have become controversial.

According to the National Bureau of Statistics, the Gini coefficient of household income inequality in China dropped from 2009 (NBS, 2022). However, according to the National Development and Reform Commission (2015, pp.98), "From the perspective of the ratio between the highest and lowest 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, due to the rapid growth of property income, the share of property income to disposable income increased rapidly from 1.9 percent in 2002 to 8.4 percent in 2018 (NBS, 2019).² Furthermore, the gaps in property income among different groups of people in China are substantial and show an increasing trend. Importantly, with the continuous increase in the proportion of property-based income, there is a clear mutually reinforcing tendency for the correlation between income inequality and wealth inequality.

Furthermore, judging from indicators such as income mobility and intergenerational correlation, inequality in China has increased in recent years. Persons in low-income households are less likely to join the high-income group, or otherwise expressed income mobility is declining. For example, Yang and Lian (2015) find that the impact of family income status on offspring's income status increased significantly in 2012 compared with in 2008. This indicates that the upper class of society in China has become more closed, and the opportunities for persons born in the lower class to move upwards have decreased.

To summarize, available evidence indicates that although the Gini coefficient of household income according to official sources has recently tended to narrow, it cannot simply be assumed that inequality in Chinese society has and will continue to decrease.

2.3. Inequality Changes with Different Dimensions

Economic inequality at the household level can be assessed by studying the development of economic variables other than income. One is household consumption, which in China's case is analysed by, for example, Qiao (2013) and Gradin and Wu

²Since the National Bureau of Statistics first published the income of the subitems for 1998, the data can only be updated to this year at the earliest. To match with our data, in the text we cite the value for 2002.

(2020). Another example is that many studies indicate that the wage gap in China is increasing, which is linked to increased return on education in the labour market (Xing et al., 2021). At the same time, during certain periods, the gap in consumption across households is narrowing in urban China (for a recent study, see Xia et al., 2020).

Although the official data indicate that income inequality has not recently increased in China or has even decreased, assessments of inequality of household wealth provide a very different picture; see, for example, Li and Wan (2015). More recently, studies find that wealth inequality at the household level shows a sharp upwards trend from 2002 to 2013 (Knight et al., 2022). The changes in wealth inequality from 2013 to 2018 were also towards increased inequality, although they were not as rapid as those between 2002 and 2013 (Wan and Knight, 2023).

This paper differs from those surveyed above as its focus is on changes in inequality by different dimensions for members of the same households. In most cases, income inequality, consumption inequality and wealth inequality are closely correlated with each other. However, over the past few decades, China's wealth inequality has grown much faster than its income inequality. The Gini coefficient of wealth rose from 0.54 in 2002 to 0.74 in 2012, a rise of 20 percentage points during less than a decade (Li and Wan, 2015). Significantly, wealth inequality is a cumulative result of long-term income inequality and is also an important contributor to future income inequality. In particular, the proportion of property income in China of total income has, as stated above, continued to increase in recent years. Property income inequality is most often significantly higher than overall income inequality. Therefore, the contribution of property income inequality to overall income inequality has also increased in China, thus intensifying the correlation between income inequality and wealth inequality (Xie and Jin, 2014; Xie and Zhou, 2014).

Unlike those reported in the literature, all three indicators in this study are observed in the same household. In this paper, we ask whether there are 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 has tried to answer this question for China. Fisher et al. (2022) are pioneers in studying the development of inequality in the United States from 1989 to 2016, analysing the three dimensions of income, consumption and wealth both separately and jointly. They find that examining all three dimensions simultaneously gives a different picture than viewing them separately: The increase in US inequality is larger than if focusing on only one dimension. Is this also the case for China?

3. Data and Variables

3.1. Data Source

Data from the China Household Income Project (CHIP) for 1988, 1995, 2002, 2013 and 2018 are used in this study. Those data were drawn as subsamples from surveys regularly conducted by the National Bureau of Statistics to produce official statistics in China. As rural and urban areas have long differed greatly, different samplings were taken in the two regions. Survey instruments also differed between the regions.

Compared with other micro data in China that are available to researchers, CHIP data cover a much longer period. They contain a detailed definition of income that is in line with international standards. CHIP surveys use similarly-phrased questions and similar sampling methods in different years. From this, it follows that information on income, consumption and wealth has a high degree of comparability across years. Of 31 Chinese mainland province-level units, the samples making up the CHIP were drawn from fewer such units. Our work sample contains 81929, 56418, 63136, 62101, and 69411 individuals from 1988, 1995, 2002, 2013 and 2018, respectively.

CHIP data have two components: One was obtained from questionnaires that were designed by researchers and collected information on demographic characteristics, socioeconomic activities of household members and attitudes. The second component of CHIP data is information on income, consumption and wealth. Such variables were aggregated from the diary information collected repeatedly by NBS enumerators who regularly visited the sampled households. Because the CHIP data are a subsample of the NBS samples and the two collect income information from the same sources, there is unsurprisingly large agreement in the picture of income, consumption and wealth reported between the CHIP data and what can be derived from NBS publications. Additionally, sample probabilities were not exactly the same in all the provinces covered by the CHIP, so sample weights were used.

3.2. Variable Definition

Our preferred measure of income in this paper is disposable household income per capita, i.e., the disposable income for a household divided by its number of members without equivalent weighting.³ This is comparable to the definition adopted by the NBS (Sicular et al., 2020). The definition of income in the CHIP includes the value of agricultural products and other goods produced and consumed by households. Such components were very important for rural households in the beginning of the period studied and have since become relatively unimportant.

Income includes wages, business income, property income and net transfers. The latter include net private transfers from households and transfers minus taxes from the

³We also investigated the sensitivity of the results if using the equivalent weighting and found that our results are robust; see Table A3 in the supplementary material. Similarly, if considering differences in regional living cost and purchasing power factors, results on the trend of inequality are also not affected. Similar sensitivity tests can be found in Sicular et al. (2020).

government. Income as defined here can include various types of subsidies, such as food subsidies through the coupon system and housing subsidies. Those components were important in 1988 but have since become virtually irrelevant. The definition of disposable household income used in this study does not include imputed rent from owner-occupied housing.⁴ Income is one of the most important indicators in this paper, and the income definition used by the NBS was applied. Income, consumption and wealth were all analysed at the individual level. This means that we applied the same value to all household members, and as usual in this kind of literature, inequality within a household is not considered.

Consumption is measured per capita at the household level. It has 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 of households sampled throughout the measurement year and regularly checked by enumerators.

Wealth has seven components: net housing, financial assets, productive fixed assets, durable consumer goods, other assets, non-housing debt, and the user value of land for rural households in terms of cultivation rights. Net housing value is calculated as housing value minus housing loan. Net financial assets include spot cash, demand deposits, time deposits, endowment insurance, government bonds, other bonds, stocks, funds, futures, money lent (excluding business loans), and other financial assets. Furthermore, non-housing debt, fixed productive assets and consumer durability are considered. The latter includes the subcomponents of the estimated market value of household movable properties and the subcomponent of the value of consumer durables. The value of using land was also considered. Because 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 Zhao and Ding (2008), we assume that 25 percent of net agricultural income comes from land and that the return rate of land is 8 percent. Therefore, land value is obtained from net household agricultural income times 25/8. Other assets are assets not included in any other components.

Negative values are allowed for the variables of income and wealth but not for consumption. Since household income is expressed in nominal local currency units, all values are 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 the NBS. Spatial purchase power parity differences across China are not considered.

⁴ In order to be comparable to definitions used by NBS and in the literature on China, we do not include the component imputed rent of owner-occupied housing although available in CHIP data.

The top values in all three distributions are most likely underestimated for all the years studied. From this, it follows that our estimates of inequality, in all dimensions for all years studied, are most likely underestimated. However, the situation must differ when assessing changes across time if the rate of underestimation can be assumed to be more or less the same for different years. On this see Wan and Knight (2023), who argue that there were similar rates of underestimation of wealth in 2013 and 2018. In our view, there are no well-based reasons to assume that the rate of underestimation has changed too much over time in any of the three dimensions. From this, it follows that the existence of underestimation at the top of the distributions should not affect assessments of how inequality has changed (Knight et al., 2022).

4. Levels and Inequality in Each of Three Dimensions

In this section, we report how levels and inequality developed in China from 1988 to 2018 when assessed in one dimension at a time. These results can also be confirmed by results from studies using other surveys; see Xie & Zhou (2014) with the China Family Panel Survey, and Qiao (2013) with the China Health and Nutrition Survey.

Figure 1 reports annual growth rates by deciles computed for the entire period from 1988 to 2018 for the three variables of income, consumption and wealth. Several comments can be made. First, growth was impressive over these three decades. During this period, median consumption grew by 6 percent annually, while median income grew by 7 percent. The growth of median wealth was the fastest, at 11 percent annually. For each variable, growth was slowest at the lowest end of the distribution and fastest at the top.

We can thus conclude from Figure 1 that Chinese households in 2018 were much better off than those in 1988 according to all three variables. China's open-door policy brought the high-speed development of capital and labour markets and led to rapid growth in income, consumption and wealth of households with different economic statuses. We can also conclude that household wealth increased the fastest over those three decades. Furthermore, China's economic distributions has become increasingly unequal along with its economic miracle over the past 40 years: Wealth inequality has risen the fastest, and inequality in income has grown somewhat faster than inequality in consumption.

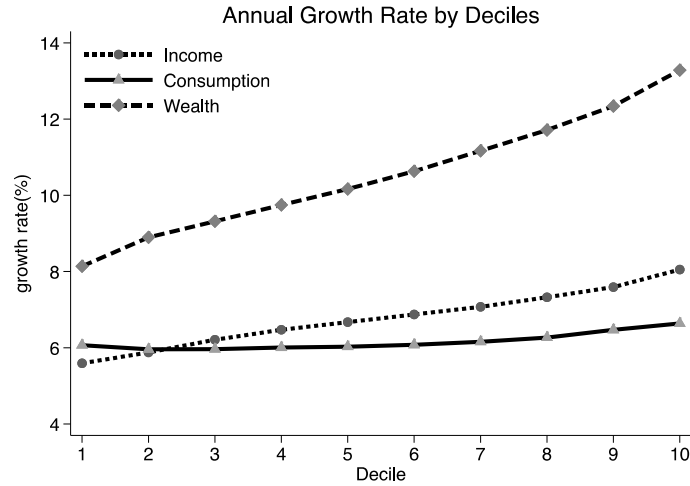


Figure 1: Annual growth rate by deciles, 1988–2018

Sources: Authors' estimates from the China Household Income Project. All the tables and figures below have the same sources.

Moreover, developments were far from uniform during the three decades that we can observe in the data. This becomes visible when studying subperiods for the three variables. Table 1 reports, in the upper half, annual growth rates for each of four subperiods and for the entire period from 1988 to 2018. The lower half reports selected decile ratios and thus provides an indication of how inequality has changed.

Table 1: Growth and inequality measured by income, consumption and wealth

		Panel A: Average annual growth rate for income, consumption, and wealth (1988–2018)					
%		1988-1995	1995-2002	2002-2013	2013-2018	2002-2018	1988-2018
Income	10th Centile	2.1	5.4	6.9	8.8	7.5	5.7
	25th Centile	1.5	5.9	8.8	8.3	8.7	6.3
	50th Centile	2.4	6.7	10.2	7.1	9.2	7.0
	75th Centile	4.6	7.7	10.1	6.5	9.0	7.6
	95th Centile	8.0	8.9	9.9	7.0	9.0	8.8
Consumption	10th Centile	6.0	3.8	7.3	7.5	7.4	6.2
	25th Centile	3.9	3.7	8.6	7.6	8.3	6.2
	50th Centile	3.0	3.9	9.5	7.0	8.7	6.2
	75th Centile	4.0	5.4	8.8	6.7	8.1	6.5
	95th Centile	3.5	8.0	7.9	8.5	8.1	7.0
Wealth	10th Centile	11.6	4.2	8.9	6.1	8.1	7.9
	25th Centile	12.7	5.5	10.5	8.3	9.8	9.4
	50th Centile	13.7	7.0	12.4	8.7	11.3	10.8
	75th Centile	15.0	9.7	13.9	9.8	12.6	12.5
	95th Centile	18.1	13.7	15.5	11.0	14.1	14.9
		Panel B: Centile 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	
	75/50 ratio	1.5	1.7	1.8	1.8	1.8	
	50/25 ratio	1.5	1.6	1.7	2.0	1.9	
	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	
	75/50 ratio	1.6	1.7	1.9	1.7	1.7	

	50/25 ratio	1.6	1.5	1.6	1.7	1.7
	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
	75/50 ratio	1.5	1.6	1.9	2.2	2.3
	50/25 ratio	1.5	1.6	1.8	2.1	2.2
	50/10 ratio	2.3	2.6	3.1	4.4	5.0

Several conclusions can be drawn from the tables. First, income inequality as wealth inequality increased dramatically between 1988 and 1995. For example, while at the 10th centile income grew by 2.1 percent per annum and at 2.4 percent at the median, the corresponding growth at the 95th centile reached 8.0 percent per annum. Thus, during this period, income growth very clearly favoured those who were better off. In the early 1980s, people's productivity and income levels in China were generally low. With the progress of reform and opening-up, some seized the opportunity to significantly increase their income levels. Although the living standards of people at the bottom of society also improved with economic growth, their benefits at the early stage of reform were in percentage terms much smaller than those of people with high incomes. Consequently, the gap in income growth between the high- and low-income groups was most pronounced during this period.

Furthermore, Table 1 notes that household wealth grew even faster than income and had a profile that particularly benefitted the richer. The table shows that annual growth of wealth between 1988 and 1995 at the 10th centile reached 11.6 percent and at the median 13.7 percent, while at the 95th centile, growth was very high at 18.1 percent per annum. Prior to the reforms, the wealth level of the Chinese people was generally low, and the progress of reforms facilitated an increase in the quality of life. Remarkably, when we observe how consumption developed at different points in the distribution, we cannot see much of a pattern for the period studied. At the beginning of the reform and opening-up period, although some groups achieved high income growth, under the influence of traditional Chinese values, people were more willing to save after having met basic needs.

Examining the period 1995 to 2002, a pattern similar to that for the previous period is again visible for the variables of income and wealth: Growth was most rapid at the top of the distribution. However, income differences in growth rates across the distribution were not as large as previously. A difference from the previous period was that income growth at the lower part of the income distribution was now more rapid. The introduction of market-oriented reforms in 1992 led to a diversification of income opportunities for all segments of the population. This resulted in faster income growth for low-income groups than in the previous period. However, the growth in household wealth was lower than during the preceding period at all points of the distribution. In 1995, people had already accumulated some wealth, compared with virtually none at the start of the reforms. Different from the previous subperiod, consumption now grew the fastest at the top of its distribution.

From 2002 to 2013, the lower part of the income distribution still tended to grow more slowly than the upper half. However, this tendency was weaker than during the preceding two periods. While income inequality increased, the speed at which it did so increased much more slowly than during the previous two periods. In contrast, the pattern of faster increase at the top of distribution than elsewhere was more profound for the variable of household wealth. The rapid growth of the housing market and the increase in housing wealth during this period led to increases in not only wealth level for all households but also wealth inequality (Knight et al., 2022). Looking at consumption during this period, it is also difficult to find a clear pattern for how increases varied by centiles.

From 2013 to 2018, income increased somewhat faster at the bottom of its distribution than in the upper half. There was a decreasing trend for income inequality. Household wealth, however, did not develop similarly. The increases in wealth continued to be largest at the top of the distribution. Again, there is not much of a pattern for how consumption by centiles increased.

Finally, returning to the entire period from 1988 to 2018, we see that for income, different average annual growth rates for the deciles as the growth rate of high percentiles were higher than that of low percentiles. Wealth inequality grew during these 30 years, while for consumption inequality, the growth rates of different percentiles did not much differ. The average annual growth rate of consumption for the median and below percentile was 6.2 percent, that of the 75th percentile was slightly higher at 6.5 percent, and the growth rate of the 95th percentile was 7 percent.

Table 2: Indicators of inequality in each of the three dimensions in China

		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

We now examine how development in each of the three dimensions appears in relation to the numerical values of inequality indices. There were clearly great changes in income inequality between 1988 and 1995, and the Gini coefficient increased from 0.30 to 0.38. Thereafter, income inequality increased less dramatically. Between 2002 and 2013, the Gini for income increased, but not more than from 0.42 to 0.44 and only marginally to 0.45 in 2018. The MLD index, which places the most emphasis on the lower part of the distribution, actually shows a slightly lower value for income inequality in 2018 than in 2013. We can thus conclude that this is consistent with what is reported in the literature: The largest increase in Chinese income inequality took

place during the first years of the reform process. After approximately 2013, income inequality changed little and perhaps shrank slightly.

What supplementary information on inequality in single dimensions was obtained from studying inequality indices for wealth or consumption? Comparing the development of wealth inequality with that of inequality in income unsurprisingly reveals a more pronounced trend towards increased inequality. Since 2002, the Gini for the distribution of wealth has been considerably higher than that for income. The wealth shares at the top of the distribution have tended to be approximately twice as high as the shares of income and consumption (see Figure 1). While the Gini for income increased modestly between 2002 and 2013 (from 0.42 to 0.44), the Gini for wealth increased rapidly (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.

The changes in consumption inequality have been similar. There were increases in consumption inequality during the first part of the period studied but not thereafter. However, the increase in the Gini coefficient for consumption between 1988 and 2002 (from 0.38 to 0.41) was not as large as the increase in the Gini coefficient for income (from 0.30 to 0.42), and the increase took place after 1995, not after 1988.

Figure 2 depicts the inequality trend by using quintile share. The trends in inequality shown by the quintile shares are consistent with those shown by the indices in Tables 1 and 2. Comparing the income share of different quintiles in Figure 2 (left), the share received by the bottom quintile decreased in the long run, and the share of the top quintile shows an increasing trend. This means that an increasing proportion of income was accumulated among high-income households. Consumption inequality shows a similar trend to income inequality. Although the share of top-quintile consumption decreased slightly from 2002 to 2013, it still exceeded 40 percent. The wealth proportions received by quintiles predictably show the same trend as the Gini coefficient. The top quintile gained larger shares, while the four lower quintiles lost shares; this occurred more rapidly than the changes for income and consumption.

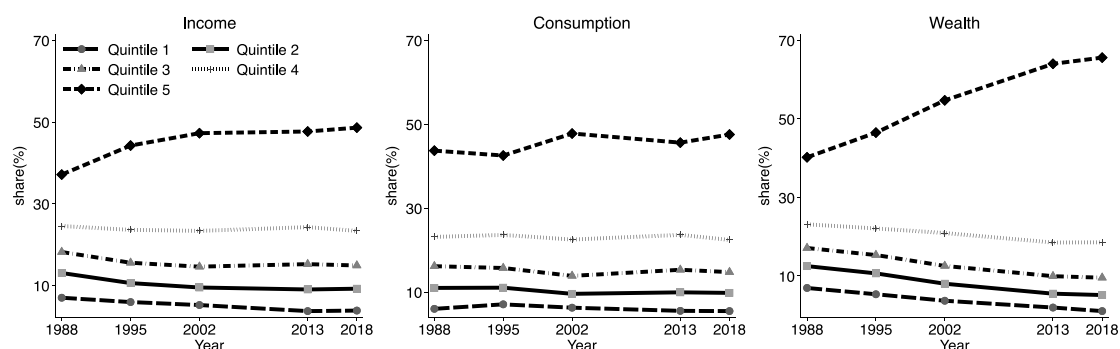


Figure 2: Single-dimension inequality using quintiles from 1988 to 2018

Notes: Figure 2 left shows the share of income earned by the five quintiles of the income distribution. The middle panel shows the share of consumption by the five quintiles of the consumption distribution. The right panel shows the share of wealth held by the five quintiles of the wealth distribution.

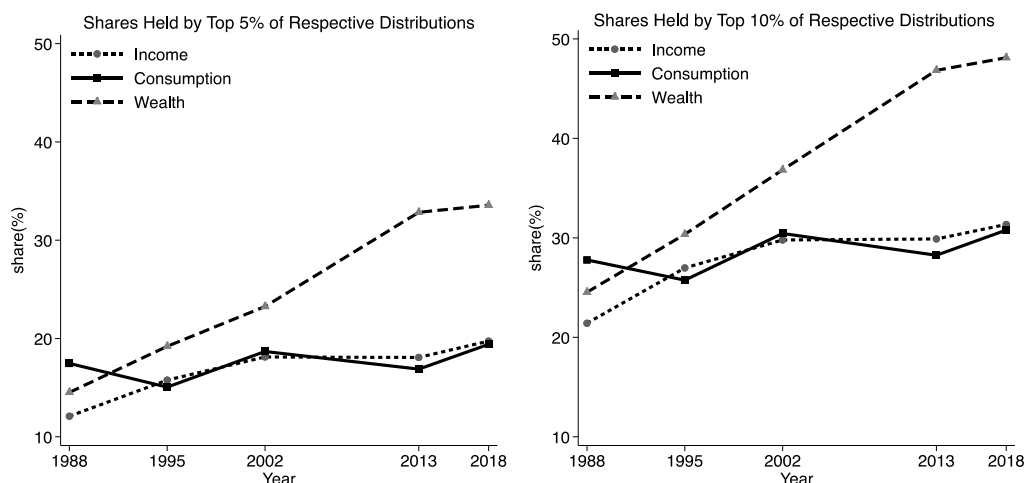


Figure 3: Shares held by the top 5% and top 10% of single distributions in China

Notes: Figure 3 left shows the share of income/consumption/wealth held by the top 5 percent of the income/consumption/wealth distribution. Figure 3 right shows the share of income/consumption/wealth held by the top 10 percent of the income/consumption/wealth distribution.

Figure 3 shows the inequality changes of three variables from another perspective over 30 years. It depicts the proportion accrued to the top five and top ten percent in each of the three distributions from 1988 to 2018. Income inequality and wealth inequality have increased markedly since the beginning of the market reform process. The share of income held by the top 5 percent has increased substantially in recent decades, from approximately 12 percent in 1988 to almost 20 percent in 2018, and the share of wealth shows a much more dramatic rise, from approximately 15 percent in 1988 to over 30 percent in 2018. Consumption inequality appears to show a slight rise in the long term. The share of consumption held by the top 5 percent increased from approximately 15 percent in 1988 to 19 percent in 2018. Thus, we see that income, consumption and wealth inequality all increased over this period, but the upwards trend in wealth inequality was most pronounced.

5. Linking Income and Consumption

This section focuses on the relationship between income and consumption and the convergence between these variables. Income is the most commonly used indicator for measuring inequality in economic well-being for households in China, whereas consumption is often the preferred measure of economic welfare in developing countries. For a household, consumption typically develops more smoothly and is less affected than income by particular events. In addition, compared to income, consumption may be less likely to be underestimated for a particular household.

Information on income and consumption is combined in Figure 3, and the top five percent is shown, as indicated by one variable in the overall samples, sorted by income. Then, the percentages of households in the top five percent of the other variable are calculated. In the case of perfect overlap, the top five percent would contain the same households. The same exercise is also performed for the top one percent.

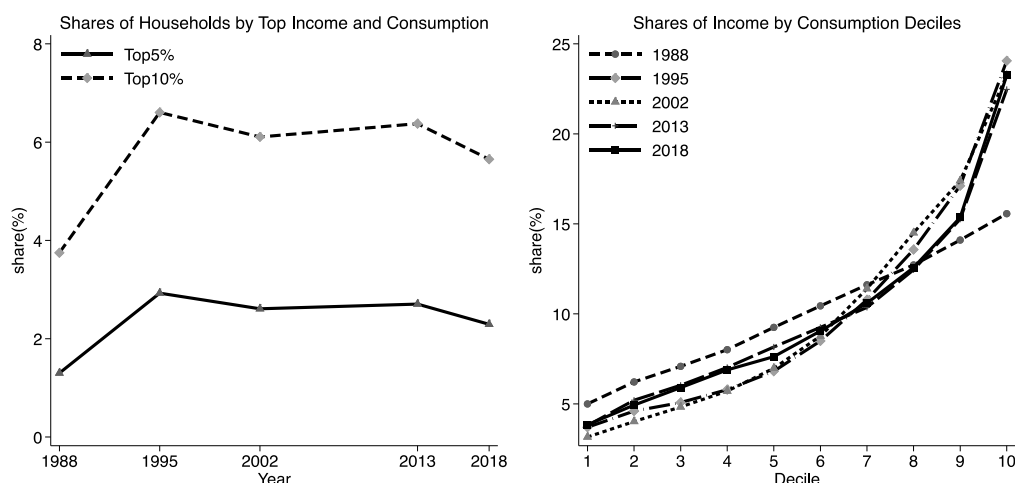


Figure 4: Two-dimensional inequality using income and consumption, 1988–2018

Notes: The left panel shows the share of households in the top 5 and 10 percent of both income and consumption. The right panel shows the share of income held by consumption deciles.

Figure 4, left panel, shows the results of this exercise. The overlap between being located at the top of the distribution of income and the distribution of consumption increased from 1988 to 1995. Between 1995 and 2013, there was almost no change, and between 2013 and 2018, a small decrease took place. It can be concluded that income and consumption showed convergence at the household level during the entire thirty years. However, the figure shows a different direction of change between 2013 and 2018, as the cross-share between top income and consumption slightly declined.⁵ Figure 4 right depicts income shares held by consumption deciles. The shares of income increased with increasing consumption in each year, showing the positive relationship between income and consumption.

⁵ Kanbur et al. (2021) highlight the role of e-commerce in explaining this divergence.

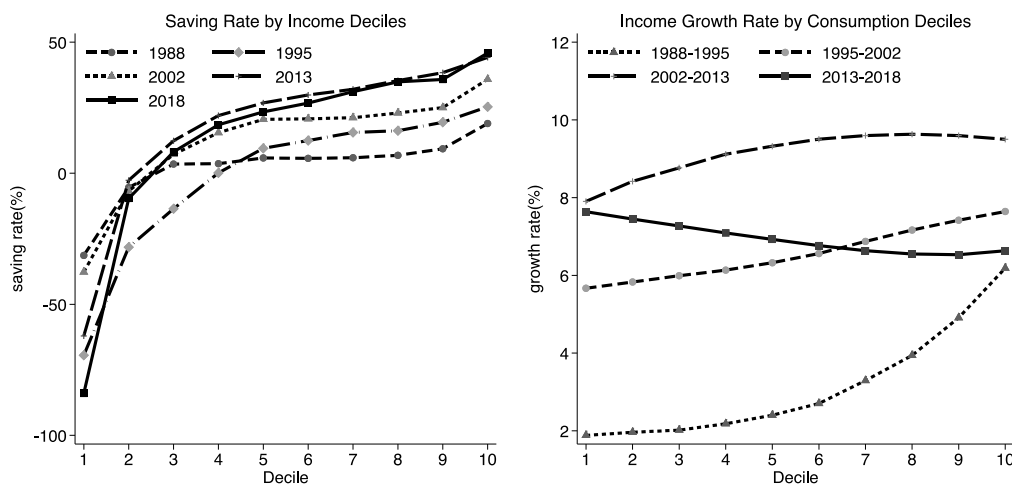


Figure 5: Linkage mechanism between income and consumption, 1988–2018

Notes: The left panel shows the savings rate of each income decile. The right panel shows the income growth rate by consumption deciles.

Significantly, income and consumption are linked in Figure 5, showing both the savings rate and income growth rate by consumption deciles. The left part of Figure 5 shows the savings rate for each income decile. Again, the savings rate is an important variable in the relationship between income and consumption. Here, individuals are divided into income deciles, and the savings rate of each decile and year is computed. We report, as expected, a positive relationship between income and the savings rate. The savings rate was strongly negative for the first decile and each year studied but positive for deciles three and higher. Comparing across different years, we can observe that the savings rate has increased until 2013 for each decile.

The income growth rate is an important indicator of the relationship between income and consumption. In Figure 5 right, the income growth rate for each income decile in each year is computed by income deciles for the different periods. The growth rate of the income in high-consumption deciles exceeded that of the low- and high-consumption deciles in all the periods except 2013 to 2018.⁶ However, the situation reversed between 2013 and 2018.

6. Overlap between Distributions of Income and Wealth

Subtracting the variable consumption from the variable income leads by definition to savings, a variable that adds to the stock of wealth. Higher income combined with a higher savings rate during one period contributes to wealth accumulation. Subsequent

⁶ Beginning in 2012, China's unprecedented poverty reduction campaign has greatly increased transfer income received by low-income groups, and more than tens of millions of people have successfully lifted themselves out of poverty as it is officially defined. This has contributed to the faster income growth rate among low-income groups than among other income groups.

periods see increased income inequality and wealth inequality. In the next period, the return on household wealth also generates property income. Therefore, there can be a cumulative relationship between income and wealth. Because income is a flow variable, whereas wealth is a stock variable, the return on wealth by levels of income is added to the analysis.

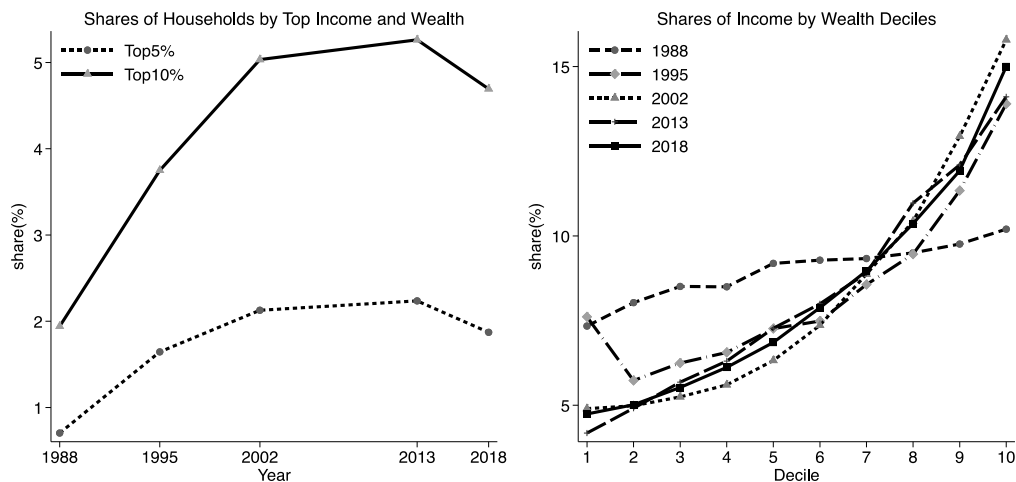


Figure 6: Two-dimensional inequality between income and wealth, 1988–2018

Notes: The left panel shows the share of households in both income and wealth in the top 5 and 10 percent. The right panel shows the share of income held by wealth deciles.

The analysis now focuses on the relationship between income and wealth. Figure 6 left shows the share of households that are found both in the income and wealth top five percent and the similar overlaps of the top ten percent. The picture shows an increasingly strong association for the period 1988 to 2013; thereafter, a slow decrease occurred. One possible explanation for this phenomenon is that the Chinese government has introduced a series of policies to curb the rapid rise in housing prices (Wan and Knight, 2023). Figure 6 right shows income shares by wealth deciles. The shares of income are much higher among higher wealth deciles except the bottom group. Due to the rapid accumulation of wealth, income and wealth have become more closely positively correlated over time.

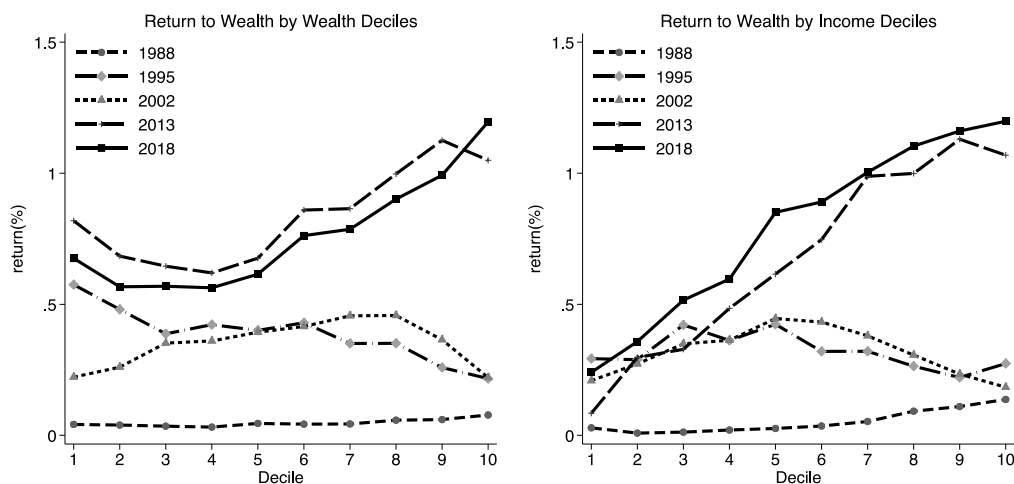


Figure 7: Return on wealth by wealth and income deciles in China

Notes: The left panel shows the proportion of property income in the wealth-by-wealth decile. The right panel shows the proportion of property income in the wealth-by-wealth decile.

Figure 7 shows an important linkage mechanism connecting income and wealth. As above, the return on wealth is defined as the amount of property income received by a decile divided by the amount of wealth received by the same decile. Wealth, of course, has the ability to create future income, and that ability strengthens with time. Figure 7 left shows the return on wealth-by-wealth by deciles, and Figure 7 right shows the return on wealth by income deciles. We report that until 2002, there was little positive relationship, but a strong link becomes visible thereafter: The higher the decile of income is, the higher the rate of return on wealth is. Taken separately, this mechanism will increase income inequality in the future.

The trends of return on wealth by wealth and by income deciles are the same: There is a strong convergence between income and wealth. In the past, household income could be low, and wealth could be high (or vice versa), but this is no longer the case. People who have high incomes tend to also have high wealth. Wealth accumulates more rapidly, creating more property income, which in turn contributes to increased income and wealth inequality.

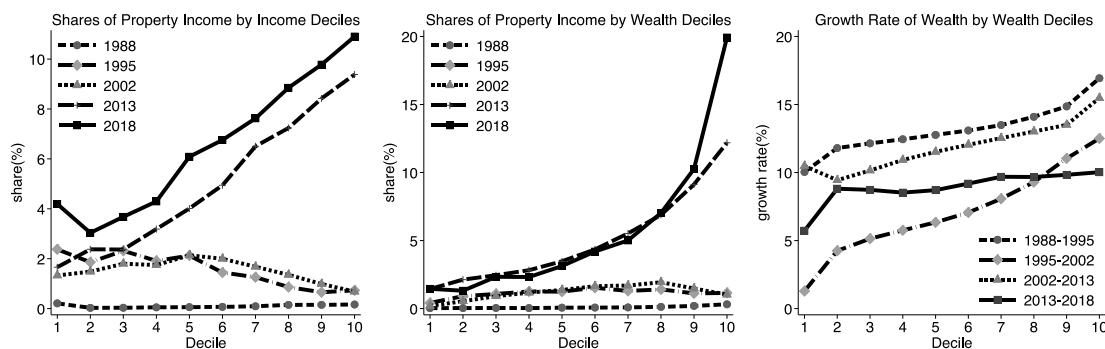


Figure 8: Inequality convergence between income and wealth, 1988–2018

Notes: Figure 8 left shows the property income share of income held by income deciles. The middle panel shows the share of property income by wealth deciles. The right panel shows the growth rate of wealth-by-wealth deciles.

Figure 8 left and middle shows the share of property income of total income by income and wealth deciles. When wealth holdings accumulate, property income becomes a more important source of household income, generating an increase in future income inequality. Most importantly, the wealth of high-income earners is generally passed on to the next generation through gifts and bequests, which taken separately reduce the intergenerational mobility of wealth. A more unequal wealth distribution leads to unequal property income, which in turn becomes an important factor driving income inequality.

Figure 8 left divides income into deciles and computes the share of property income in each decile, whereas Figure 8 middle shows the property income share of income held by wealth deciles. The two figures show a strong positive relation between property income share and income and wealth in 2013 and 2018 but not previously. Thus, people with higher incomes and wealth tend to have more property income, which somewhat reflects that more wealth is accumulated among wealthy people. The property shares of the top *income* decile in 2018 exceeded 10 percent, and this figure was nearly 20 percent in the top *wealth* decile in 2018. Figure 8 right depicts the wealth growth rate by wealth decile. It is shown that the rich see a faster percentage increase in wealth. This relationship was particularly clear for the period 1995 to 2002.

From the material presented in this section, it can be concluded that China has seen a convergence of income and wealth, which is consistent with the view presented by Piketty et al. (2019).

7. Convergence of Inequality Dimensions within the Same Households

This section analyses income, consumption and wealth together for the same households using the methodology of Fisher et al. (2022). As stronger links were established between each pair of variables during the period from 1988 to 2018, we also expect to find stronger links when studying the three dimensions for the same household.

In Table 3 Panel A, the pairwise relationships among log income, log consumption and log wealth are shown using correlation coefficients. All three correlation coefficients were comparably low in 1988 but higher in 1995. In addition, the correlation between log income and log wealth as the correlation between log consumption and log wealth increased profoundly from 1995 to 2013. However, none of the correlation coefficients increased between 2013 and 2018.

Table 3: Correlation and regression coefficients for income, consumption and wealth

Year	Panel A: Correlation coefficients			Panel B: Regression coefficients dep. var.: Consumption		
	Income and consumption	Income and wealth	Consumption and wealth	Model 1 Income	Model 2 Income Wealth	
1988	0.519***	0.168***	0.198***	0.344*** (0.034)	0.299*** (0.034)	0.189*** (0.031)
1995	0.725***	0.370***	0.279***	0.373*** (0.003)	0.368*** (0.003)	0.006*** (0.003)
2002	0.797***	0.546***	0.525***	0.484*** (0.002)	0.456*** (0.003)	0.047*** (0.002)
2013	0.735***	0.603***	0.673***	0.446*** (0.002)	0.361*** (0.002)	0.163*** (0.002)
2018	0.702***	0.595***	0.615***	0.448*** (0.003)	0.349*** (0.003)	0.154*** (0.002)

Notes: All the variables in this table are logarithms. The regression coefficients of each year represent a separate regression. The estimated models also include control variables (age, gender, education, household size, marital status, employment status and province of household head). Standard error is reported in parentheses. *** p < 0.01.

Table 3 Panel B shows in Model 1 the regression relationship between, on the one hand, consumption and, on the other hand, income and wealth when including control variables, and estimated using OLS.⁷ We see that there is a tendency of the regression coefficient of income to increase between 1995 and 2002. This is consistent with the results of an increase in the savings rate of Chinese residents during this period. Figure 5 presents the same picture.⁸ Comparing estimates for Model 1 and Model 2, we find that when wealth is added to the regression, the coefficients of income decrease in 2013 and 2018. Looking at the estimates of Model 2, we find that the wealth coefficient increased from 1995 to 2013. As the amount of wealth that a household possessed is related to its saving during previous periods, we can conclude that the savings channel has increased in importance when households make decisions on consumption.

⁷ Control variables are age, gender, education, household size, marital status, employment status and province of household head.

⁸ The trend of the savings rate calculated by CHIP data is consistent with that published by the National Bureau of Statistics. Since the NBS first published the data related to savings in 2000, to correspond to the period of the CHIP data, we focus on changes since 2002.

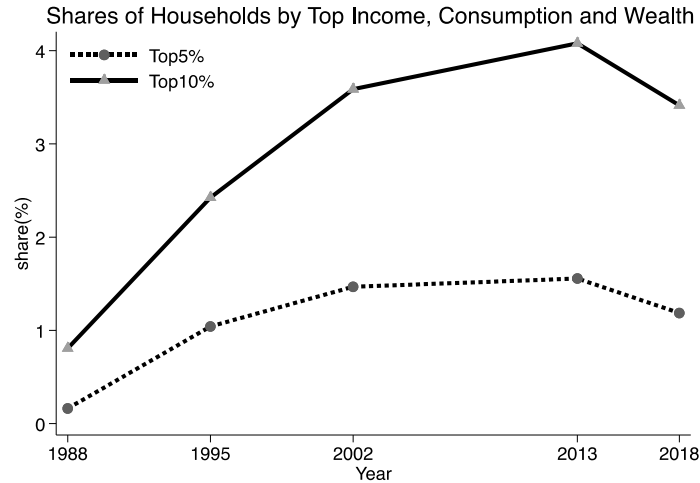


Figure 9: Shares of top households by three dimensions for the same household

Notes: The panel shows the share of households belonging to the top 5(10) percent in income consumption and wealth groups simultaneously.

Figure 9 presents a basic picture of three-dimensional inequality in China. It shows the shares of households in the top five and ten percent of all three distributions of income, consumption and wealth. The shares received by the top five and ten percent increased until 2013. Less than 4 percent of households belong to the top quintile of all three dimensions, which is much less than in the US, Norway and the United Kingdom (Balestra and Oehler, 2023). However, multidimensional inequality in China has increased faster than one-dimensional inequality due to an increasing overlap of households at the top of the distribution of multiple dimensions. The important conclusion is that inequality in China is significantly higher when using a comprehensive measure than when using a one-dimensional indicator. The changes in the three dimensions have reinforced each other during the period studied. Economic inequality, as represented by the income dimension, showed a decreasing trend between 2013 and 2018.⁹ However, multidimensional inequality significantly increased in the long run, with income consumption and wealth converging.

At the end of the 1980s, a majority of China's population lived in rural areas. There, self-sufficient agriculture dominated, and the distribution of wealth was fairly equal. In the urban parts of China, high proportions of adults were employed in state-owned enterprises, collective enterprises or government institutions. After finishing school, workers were allocated to their work units, where they typically remained during their entire work lives. In those work units, they received a meagre wage but were also compensated by housing with very low rents, consumer goods, social services, and

⁹One possible reason for the decline in the share of the three variable is that the role of the linking mechanisms, such as capital returns, weakened because of housing market restrictions from 2013 (Wan and Knight, 2023).

social insurance benefits. China's urban areas were effectively separated from the rural areas by the *hukou* system, in which all persons were registered as rural or urban.

However, during the period studied here, economic life in China changed enormously as the economy grew rapidly. Economic reform meant that markets for products and production factors were introduced. These changes also contributed to increased wage inequality and to unemployment. The housing market also emerged in urban areas. Consequently, a majority of urban households became homeowners, as their rural counterparts had always been. These changes, together with rapidly increasing housing prices and the high savings rates of China's households, have led to rapid increases in inequality in private wealth, which in turn has affected income and consumption inequality. Most importantly, these changes indicate that the households at the top of one of the three distributions tend to be at the top of the other two distributions as well.

8. Inequality Convergence in Comparison with U.S.

In this section, we compare the development of inequality in China and the US. We do this because we are studying the largest developing and the largest developed economies. We cover almost the same period in the two countries. Furthermore, we use the same methods as the study on the US by Fisher et al. (2022). Both studies focus on inequality in three dimensions—income, consumption and wealth—at the household level, with similar definitions of these indicators.¹⁰ However, our study uses observations on the same household's income, consumption and wealth. Unlike Fisher et al. (2022), we did not have to match different kinds of data, which is an advantage.

Substantial differences can be expected between China and the United States for several reasons. China's economic situation after the 1980s was very different from that of the United States. While China started off as a low-income country and today has reached the ranks of upper middle-income countries, the United States has been a high-income country for many years. China started from a planned economy and moved towards a market economy, although one with a large state sector. This is different from the US economy during the period studied. China also went from having most of its population living in rural areas to become more urbanized. This rapid urbanization initially took place despite restrictions on geographical mobility, but it has lessened in small and mid-sized cities. In contrast, the United States has long been a country characterized by high spatial mobility of households.

Ultimately, then, there are many reasons why the size and development of economic inequality in China and the United States can be expected to differ. However, several similarities do exist and are reported below. At the median and evaluated over the entire

¹⁰However, definitions and fieldwork were not identical in the data obtained for China and U.S. As a result, cross-country comparability for the same period is imperfect.

period from 1988 to 2018 using CHIP data, household income per capita in China increased by 7 percent per annum, consumption per capita increased by 9 percent per annum and household wealth per capita increased even more, by 11 percent per annum. The corresponding growth rates (between 1989 and 2016) for the United States were 3, 2 and 3 percent per annum.

Looking at the share of the top five percent and at the numerical values of inequality indices, China's inequality was considerably larger in 2018 than in 1988. This is true if development is assessed by examining income, consumption or wealth. These trends are similar to what occurred in the United States. However, starting from a lower level than in the US, wealth inequality in China increased rapidly but was still much lower in 2018 than in the US (see Figure 10). An important part of this picture is that fewer households in China than in the United States had no or negative wealth.

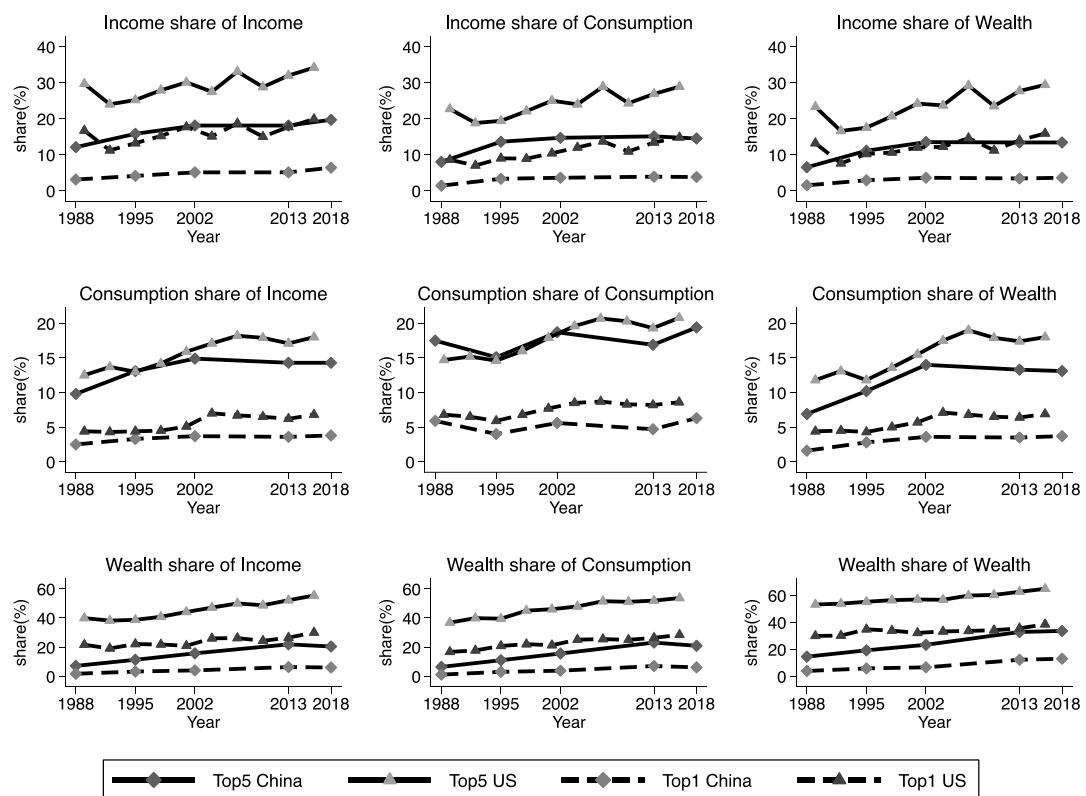


Figure 10: Top 5 percent shares in one and two dimensions in China and the United States

Notes: 1) The top three panels show the share of income held by the top 5% income, consumption and wealth in China and in the US. The other two panels show similar results but use the share of consumption or the share of wealth. *Source:* Authors' computations from the China Household Income Project and Fisher et al. (2022).

Looking at one dimension separately (the main diagonal figures), Figure 10 shows upwards trends according to all three variables in both countries. In a given year, with few exceptions, inequality was larger in the United States than in China. However, the difference in inequality between the countries varied by variable. It was largest for wealth and smallest for consumption, with income in the middle position.

In several cases, the figures off the diagonal reveal a clear tendency of increased curves. This indicates that the top five in one dimension were increasingly in a favourable position in the other dimension. This was generally true for the US and in regard to China for the first part of the period studied. Furthermore, the proportions of a variable received by the top five percent were smaller in China than in the United States in regard to income as well as wealth. However, the consumption share accruing to the top five percent in China was not always lower than in the US. These results relate to the top five percent across two dimensions. What is the picture for China and the US when looking at proportions that accrued in the fifth quintile in three dimensions? The answer is provided in Figure 11, which illustrates that an important cross-country difference is that the curves for China were considerably lower than those for the US in all three cases.

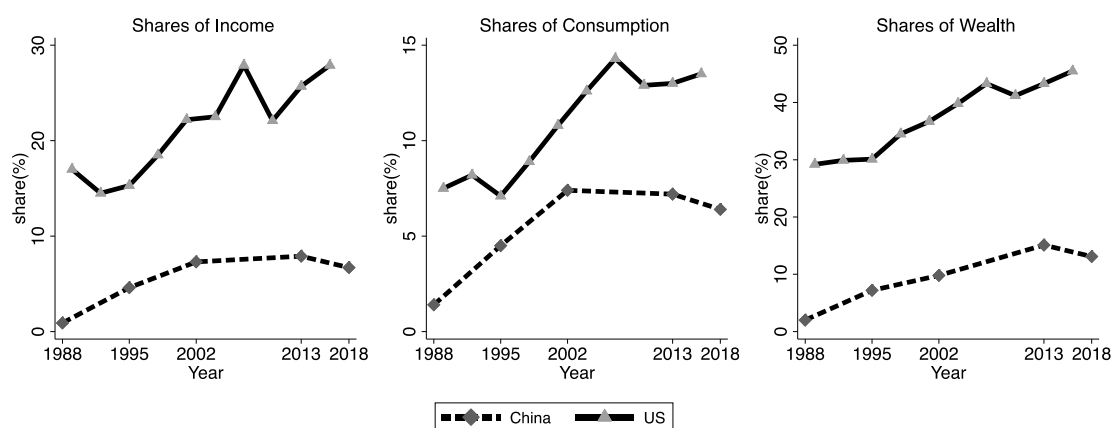


Figure 11: Top 5 percent shares in three dimensions in China and the United States

Notes: 1) The left panel shows the share of income held by those in the top 5 percent of both consumption and wealth. The other two panels show similar results but use the share of consumption or the share of wealth. *Source:* Authors' computations from the China Household Income Project and Fisher et al. (2022).

Most probably an important reason for the cross-country difference is that fewer households in China than in the United States had no or negative wealth. One probable reason for this difference is that many young adults in the US have taken large loans in the formal credit market to, for example, buy a home, while this behaviour is probably much less widespread in China. In other words, the level of financial intermediation remains lower in China than in the US. This difference in the development of the financial markets between the two countries is therefore likely an important reason for the cross-country difference reported in Figure 11. In the United States, public wealth has long been declining and even fallen to negative numbers.

Another possible reason why wealth is less concentrated in China is that the country still has a large share of stated-owned units. Moreover, farmland in China is not privately owned and cannot be freely sold and bought. Rural households in China own user rights to land, which has no counterpart in the US.

9. Conclusion

Overall economic inequality at the household level can be assessed by studying the development of inequality in income, consumption and wealth. Assessments can be made by observing one variable at a time but also by considering what households experience according to two or three of those variables. Analysis of these components together can yield important insights and deepen our understanding of the distribution of economic well-being. In this paper, data from the China Household Income Project (CHIP) for 1988, 1995, 2002, 2013 and 2018 were used to study how inequality in the three dimensions has developed in China both separately and in combination. Furthermore, we studied mechanisms that link different inequality dimensions. We argue that inequality in China may continue to increase after the period under study because of the existence of mutually reinforcing forces. A comparison is also made with the United States using results from Fisher et al. (2022).

We show that looking at each of the three dimensions in China separately, the increase in shares received by the top of the distribution of consumption as well as in income predominantly took 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. An important result is that despite the rapid increase, wealth inequality was considerably lower at the end of the period in China than in the United States.

Our analysis also shows a remarkable increase in the share of wealth owned by the top ten percent of income earners in China between 1988 and 2013. While the top ten percent of income-earner households owned 20 percent of the total wealth in 1988, the corresponding share exceeded half of the total income in 2013. As owners of large household wealth, China's top income earners are now situated to receive greater capital income in the future. In this way, a dynamic element in income determination has been introduced, while this mechanism was previously insignificant.

We report that China's overall inequality has increased since 1988. Furthermore, income, consumption and wealth show trends of convergence across households. Wealth inequality and income inequality are mutually reinforcing. It is true that China's urban/rural segmentation decreased after the financial crisis, resulting in downwards pressure on the Gini coefficient for inequality. Undoubtedly, this development deserves more attention in contemporary research on changes in China's inequality. However, it is shown here that the trend of inequality continues to increase if one uses multidimensional indicators. This change cannot be captured by, for example, the Gini coefficient of the income distribution.

Recently, China's high-income earners have become large savers, and those savings will bring high income in the future. In this way, tendencies of increased inequality in

the labour market spill over to increased wealth inequality, which in turn is predicted to increase property income, a component concentrated at the top of the income distribution. Furthermore, in China recently, the return rate of wealth has tended to be higher for households at the top of the income distribution. From studying income, consumption and wealth for the same household, we conclude that those in the top of the income distribution have large advantages in the other two dimensions. This is markedly different from conditions at the beginning of the studied period.

Generally, this exercise has revealed many dimensions of inequality. By observing more than one such dimension, an observer has a fuller view of how society is structured and how it changes. Our data for China have shown that household income and household wealth were only weakly correlated in the past; for example, people with high income did not have much wealth. This might have to do with the particular character of the Chinese economy as observable until the mid-1990s. However, this has no longer been the case for some time, as households at the top of one dimension are increasingly located at the top of the other two dimensions. From this, we argue that intergenerational mobility in China threatens to decline. Furthermore, the generally high inequality in China may also continue since income, consumption and wealth are increasingly reinforcing each other.

Policy-makers evaluating the development of inequality in China usually focus on changes in the Gini coefficient of disposable income. However, one can argue that inequality should be assessed more broadly. It is better to monitor how inequality in income, consumption and wealth is changing and how those three variables are interrelated within the same household. Doing so shows that inequality in China increased from 1988 to 2018. Our research also provides insights for policymaking in other developing countries. Policymakers can break the vicious circle and aim at the source of inequality formation, particularly through mutual expansion mechanisms such as housing price restrictions. In particular, efforts must be made to control the high inequality originating from the savings rate in combination with the extra high rate of return from wealth.

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Appendix

Table A1: Data to accompany Figure 1

Decile	Income	Consumption	Wealth
1	5.6	6.1	8.1
2	5.9	6.0	8.9
3	6.2	6.0	9.3
4	6.5	6.0	9.7
5	6.7	6.0	10.2
6	6.9	6.1	10.6
7	7.1	6.2	11.2
8	7.3	6.3	11.7
9	7.6	6.5	12.3
10	8.1	6.6	13.3

Sources: Authors estimates from the China Household Income Project, and it is the same for all of the tables and figures below.

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

Table A3: Per Capita and Growth of Unadjusted for Income, Consumption and Wealth

Panel A: Per capita of unadjusted for income, consumption and wealth							
		1988	1995	2002	2013	2018	
Income		2992	4333	7008	16718	25614	
Consumption		2871	3799	5377	11736	18039	
Wealth		5872	16159	30386	128558	213332	
Panel B: Annual growth rate of unadjusted income, consumption and wealth							
%		1988-1995	1995-2002	2002-2013	2013-2018	2002-2018	1988-2018
Income	10th Centile	2.9	4.6	5.4	9.9	5.4	2.9
	25th Centile	2.5	5.0	6.9	9.5	5.8	2.5
	50th Centile	3.5	5.7	7.9	9.3	6.6	3.5
	75th Centile	5.4	7.0	8.4	8.2	7.3	5.4
	95th Centile	8.1	8.8	8.8	8.3	8.6	8.1
Consumption	10th Centile	6.7	3.2	6.5	8.1	6.0	6.7
	25th Centile	4.7	3.1	7.2	8.6	5.9	4.7
	50th Centile	4.1	3.0	7.7	8.8	5.9	4.1
	75th Centile	4.7	4.6	7.4	8.1	6.2	4.7

Wealth	95th Centile	3.7	7.1	7.5	9.2	6.8	3.7
	10th Centile	10.4	4.0	10.0	4.2	7.7	10.4
	25th Centile	12.6	5.0	10.2	7.9	9.1	12.6
	50th Centile	13.9	6.4	11.3	9.0	10.3	13.9
	75th Centile	15.4	8.9	12.5	10.8	12.0	15.4
	95th Centile	18.2	12.8	14.8	12.0	14.6	18.2

Table A4: Data to accompany Figure 3

Figure 3 left: shares held by top 5% of respective distributions in China			
	Income	Consumption	Wealth
1988	12.09	17.46	14.51
1995	15.77	15.05	19.21
2002	18.12	18.68	23.26
2013	18.08	16.89	32.84
2018	19.73	19.42	33.56
Figure 3 right: shares held by top 10% of respective distributions in China			
	income	consumption	wealth
1988	21.42	27.78	24.53
1995	26.97	25.75	30.36
2002	29.79	30.45	36.84
2013	29.89	28.25	46.84
2018	31.35	30.78	48.11

Table A5: Data to accompany Figure 4 left

	top5%	top10%
1988	1.3	3.7
1995	2.9	6.6
2002	2.6	6.1
2013	2.7	6.4
2018	2.3	5.7

Table A6: Data to accompany Figure 4 right

decile	1988	1995	2002	2013	2018
1	5.0	3.7	3.2	3.8	3.8
2	6.2	4.6	4.0	5.2	4.9
3	7.1	5.1	4.8	6.0	5.9
4	8.0	5.8	5.7	7.0	6.9
5	9.3	6.8	7.0	8.2	7.6
6	10.4	8.5	8.8	9.2	9.0
7	11.6	10.8	11.4	10.4	10.6
8	12.7	13.6	14.5	12.4	12.6
9	14.1	17.1	17.4	15.3	15.4
10	15.6	24.1	23.2	22.5	23.3

Table A7: Data to accompany Figure 5 left

decile	1988	1995	2002	2013	2018
1	-31.3	-69.5	-37.7	-62.1	-84.0
2	-5.4	-28.2	-6.8	-2.7	-9.6
3	3.5	-13.6	7.2	12.4	8.2
4	3.7	0.1	15.5	22.0	18.5
5	5.8	9.5	20.6	26.8	23.4

6	5.7	12.5	20.8	29.9	26.8
7	5.9	15.6	21.2	32.1	31.1
8	6.8	16.2	23.0	35.4	34.9
9	9.3	19.4	25.0	38.4	35.8
10	19.0	25.3	35.8	44.2	45.9

Table A8: Data to accompany Figure 5 right

decile	1988-1995	1995-2002	2002-2013	2013-2018
1	1.9	5.7	7.9	7.6
2	2.0	5.8	8.4	7.4
3	2.0	6.0	8.8	7.3
4	2.2	6.1	9.1	7.1
5	2.4	6.3	9.3	6.9
6	2.7	6.6	9.5	6.8
7	3.3	6.9	9.6	6.6
8	3.9	7.2	9.6	6.6
9	4.9	7.4	9.6	6.5
10	6.2	7.6	9.5	6.6

Table A9: Data to accompany Figure 6 left

	top5%	top10%
1988	0.7	1.9
1995	1.6	3.7
2002	2.1	5
2013	2.2	5.3
2018	1.9	4.7

Table A10: Data to accompany Figure 6 right

decile	1988	1995	2002	2013	2018
1	7.7	10.9	8.1	4.8	6.4
2	8.7	6.7	5.5	5.3	5.4
3	9.4	6.6	5.7	6.3	6.0
4	9.4	7.0	6.2	6.9	6.7
5	10.2	8.2	7.0	8.2	7.6
6	10.3	8.3	8.4	9.1	9.0
7	10.4	9.5	10.2	10.7	10.3
8	10.7	11.0	12.5	12.8	11.8
9	11.0	13.2	15.5	14.6	14.7
10	12.2	18.6	20.9	21.4	22.0

Table A11: Data to accompany Figure 7 left

decile	1988	1995	2002	2013	2018
1	0.04	0.57	0.22	0.82	0.68
2	0.04	0.48	0.26	0.68	0.57
3	0.04	0.39	0.35	0.65	0.57
4	0.03	0.42	0.36	0.62	0.56
5	0.05	0.40	0.39	0.68	0.61
6	0.04	0.43	0.42	0.86	0.76
7	0.04	0.35	0.46	0.86	0.79
8	0.06	0.35	0.46	1.00	0.90
9	0.06	0.26	0.36	1.13	0.99
10	0.08	0.22	0.22	1.05	1.20

Table A12: Data to accompany Figure 7 right

decile	1988	1995	2002	2013	2018
1	0.03	0.29	0.21	0.08	0.24
2	0.01	0.29	0.27	0.3	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

Table A13: Data to accompany Figure 8 left

decile	1988	1995	2002	2013	2018
1	0.21	2.38	1.33	1.66	4.19
2	0.03	1.86	1.48	2.38	3.04
3	0.04	2.32	1.8	2.37	3.68
4	0.05	1.91	1.75	3.19	4.29
5	0.06	2.12	2.14	4.01	6.09
6	0.07	1.45	2	4.94	6.76
7	0.09	1.26	1.68	6.5	7.62
8	0.15	0.86	1.36	7.24	8.85
9	0.15	0.66	0.99	8.42	9.78
10	0.16	0.73	0.68	9.38	10.91

Table A14: Data to accompany Figure 8 middle

decile	1988	1995	2002	2013	2018
1	0.04	0.42	0.2	1.44	1.45
2	0.04	0.92	0.54	2.13	1.32
3	0.05	1.08	0.91	2.45	2.34
4	0.04	1.26	1.18	2.82	2.32
5	0.07	1.25	1.37	3.48	3.13
6	0.08	1.53	1.65	4.35	4.2
7	0.09	1.3	1.7	5.53	5.01
8	0.13	1.41	1.94	6.88	7.03
9	0.2	1.12	1.48	9.12	10.26
10	0.32	1.16	1.03	12.19	19.92

Table A15: Data to accompany Figure 8 right

decile	1988-1995	1995-2002	2002-2013	2013-2018
1	10.04	1.29	10.49	5.73
2	11.80	4.25	9.44	8.81
3	12.14	5.14	10.15	8.73
4	12.45	5.75	10.92	8.53
5	12.77	6.34	11.52	8.70
6	13.09	7.06	12.04	9.19
7	13.49	8.08	12.53	9.69
8	14.10	9.29	13.02	9.67
9	14.86	11.04	13.50	9.83
10	16.93	12.50	15.48	10.02

Table A16: Data to accompany Figure 9

share of households	1988	1995	2002	2013	2018
top 5%	0.2	1.0	1.5	1.6	1.2
top 10%	0.8	2.4	3.6	4.1	3.4

Table A17: Data to accompany Figure 10 of China

		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
		1988	1995	2002	2013	2018
income share of:	income top 1%	3.1	4.1	5.1	5.1	6.4
	consumption top 1%	1.4	3.3	3.6	3.9	3.8
	wealth top 1%	1.5	2.9	3.6	3.4	3.6
consumption share of:	income top 1%	2.5	3.3	3.7	3.6	3.8
	consumption top 1%	5.9	4	5.6	4.7	6.3
	wealth top 1%	1.6	2.8	3.6	3.5	3.7
wealth share of:	income top 1%	1.7	3.2	4	6.3	6
	consumption top 1%	1.1	3	3.8	7	6.1
	wealth top 1%	3.9	5.8	6.6	12.2	13

Table A18: Data to accompany Figure 10 of the US

		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
		1989	1992	1995	1998	2001	2004	2007	2010	2013	2016
income share of:	income top 1%	16.7	11.2	13.2	15.2	17.7	15.1	18.7	15.0	17.7	19.9
	consumption top 1%	8.6	7.0	9.0	8.9	10.4	12.0	13.7	10.9	13.4	14.8
	wealth top 1%	13.2	7.6	10.2	10.6	12.0	12.2	14.6	11.2	14.0	15.9
consumption share of:	income top 1%	4.4	4.3	4.4	4.5	5.1	7.0	6.7	6.5	6.2	6.8
	consumption top 1%	6.8	6.5	5.9	6.8	7.7	8.5	8.7	8.3	8.2	8.6
	wealth top 1%	4.4	4.5	4.3	5.0	5.7	7.1	6.8	6.5	6.4	6.9
wealth share of:	income top 1%	21.6	19.1	22.1	21.8	20.9	26.0	26.2	24.3	26.5	30.0

consumption top 1%	16.7	17.7	20.8	22.0	21.3	25.1	25.5	25.0	26.4	28.4
wealth top 1%	29.9	30.1	34.8	33.8	32.1	33.2	33.6	34.1	35.5	38.5

Sources: China Household Income Project, USA shares comes from Fisher et al. (2022).

Table A19: Data to accompany Figure 11

	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 Household Income Project, USA shares comes from Fisher et al. (2022).

Table A20: Pairwise correlation coefficients for income, consumption and wealth

	income and consumption	income and wealth	consumption and wealth
urban			
1988	0.221***	0.142***	0.183***
1995	0.761***	0.369***	0.355***
2002	0.770***	0.559***	0.500***
2013	0.744***	0.569***	0.623***
2018	0.631***	0.522***	0.523***
rural			
1988	0.573***	0.344***	0.321***
1995	0.501***	0.792***	0.595***
2002	0.668***	0.680***	0.577***
2013	0.642***	0.458***	0.502***
2018	0.310***	0.308***	0.269***

Notes: All correlation coefficients are statistically significant at least at the 1 percent level.