

## Capital Accumulation, Private Property, and Rising Inequality in China, 1978–2015<sup>†</sup>

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*We combine national accounts, surveys, and new tax data to study the accumulation and distribution of income and wealth in China from 1978 to 2015. The national wealth-income ratio increased from 350 percent in 1978 to 700 percent in 2015, while the share of public property in national wealth declined from 70 percent to 30 percent. We provide sharp upward revision of official inequality estimates. The top 10 percent income share rose from 27 percent to 41 percent between 1978 and 2015; the bottom 50 percent share dropped from 27 percent to 15 percent. China's inequality levels used to be close to Nordic countries and are now approaching US levels. (JEL D31, E01, E23, O11, P24, P26, P36)*

Between 1978 and 2015, China has moved from a poor, underdeveloped country to the world's leading emerging economy. Despite the decline in its share of world population, China's share of world GDP increased from less than 3 percent in 1978 to 20 percent in 2015 (panel A of Figure 1). According to official statistics, real per adult national income was multiplied by more than 8, from €120 a month in 1978 (expressed in 2015 euros) to more than €1,000 in 2015 (panel B).<sup>1</sup>

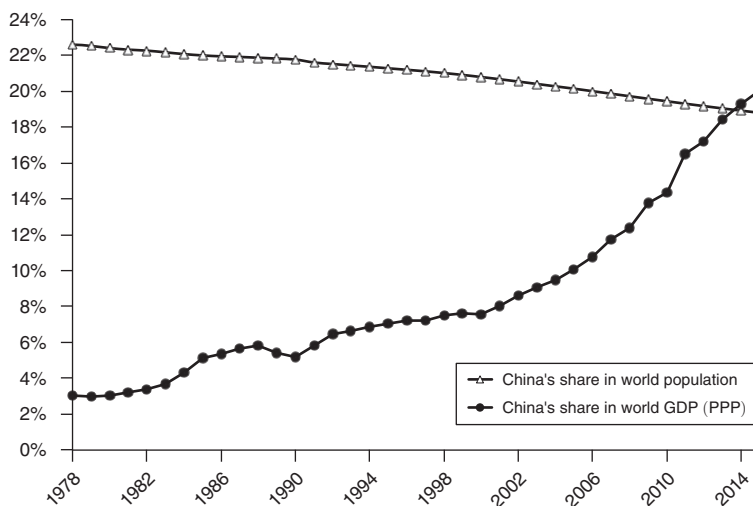
Unfortunately, relatively little is known about how the distribution of income and wealth within China has changed over this critical period. We do not have consistent estimates of the extent to which the different income and wealth groups have benefited (or not) from the enormous Chinese macroeconomic growth. The household surveys used to study distributional issues in China suffer from massive under-reporting, particularly at the top of the distribution, and are typically not consistent with the data sources that are used to measure macroeconomic growth (namely, national accounts). This is an issue of tremendous importance not only for China and its future development path, but also for the rest of the world and the social sustainability of globalization.

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<sup>1</sup>Annual per adult national income rose from less than 6,500 yuans in 1978 to over 57,800 yuans in 2015, i.e., from about 1,400 euros in 1978 to about 12,500 euros in 2015 (these amounts are expressed in 2015 yuans and euros using the latest purchasing power parity (PPP) estimates).

Panel A. China's share in world population and GDP, 1978–2015



Panel B. The rise of per adult real national income, 1978–2015 (2015 yuans)

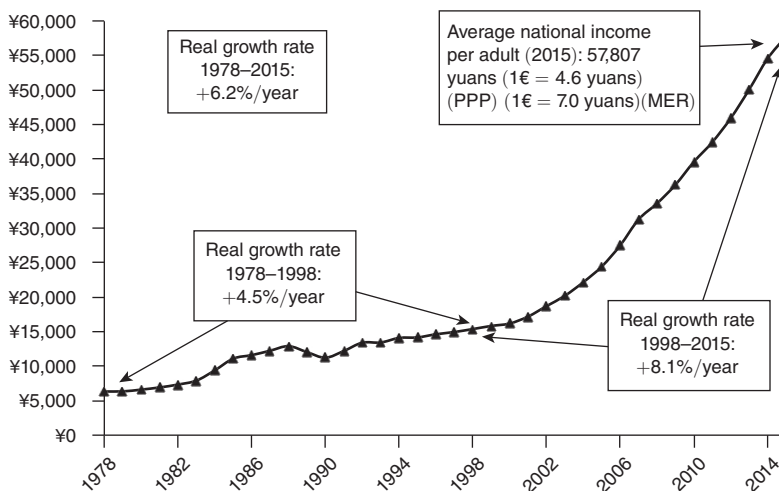


FIGURE 1

Notes: National income divided by adult population. National income = GDP – capital depreciation + net foreign income.

In this paper, we combine and confront several data sources (national accounts, surveys, wealth rankings, and tax data, including recently released income tax data covering high earners) to provide consistent series on the accumulation and distribution of income and wealth in China over the 1978–2015 period. We make two main contributions.

First, we combine official and non-official sources to provide the first systematic estimates of the level and structure of China’s national wealth since the beginning of the market reform process. We find that the ratio of national wealth to national income has increased from 350 percent in 1978 to 700 percent in 2015. This increase

can be explained by a combination of high saving rates and a gradual rise in relative asset prices, partly reflecting changes in the legal system of property. The share of public property in national wealth has declined from 70 percent in 1978 to 30 percent in 2015. More than 95 percent of the housing stock is now owned by private households, as compared to 50 percent in 1978. Chinese corporations, however, are still predominantly publicly owned: close to 60 percent of Chinese equities belong to the government (with a small but significant rebound since 2009), 30 percent to private Chinese owners, and 10 percent to foreigners.

In brief: China has moved a long way toward private property between 1978 and 2015, but its property regime is still markedly different than in other parts of the world. China has ceased to be communist, but is not entirely capitalist; it should rather be viewed as a mixed economy with strong public ownership. The share of public property in China today (30 percent) is higher than in the West during the mixed economy regime of the post-World War II decades (around 15 to 25 percent), although not hugely so. And while the share of public property in national wealth has declined to 0 percent or less in Western countries (with public debt exceeding public assets in the United States, Britain, Japan, and Italy today), the public share in China seems to have strengthened since the 2008 financial crisis. These findings are not completely unexpected, but we feel it is important to be able to put numbers on these evolutions. By constructing comparable series on the structure of national wealth, we can better analyze the diversity of property structures over time and across countries.

Our second contribution is to combine recently released tax data on high-income individuals with household surveys and national accounts to provide new estimates of income inequality. To our knowledge, it is the first time that tax data on high earners are used to estimate income inequality in China.<sup>2</sup> An income tax has been in place since 1980, but until recently no detailed tax statistics were available, so that scholars had to rely on information self-reported in household surveys. In 2006, the Chinese tax administration started to release data on the number of high-income individuals (with annual taxable income above 120,000 yuans) and their incomes. We stress at the outset that these data are imperfect: our revised estimates might well underestimate inequality, and our top income shares should probably be viewed as lower bounds. What is interesting, however, is that even these lower bounds are already a lot larger than official survey-based estimates. For recent years, we find top 10 percent income shares around 41 percent of total national income (versus 31 percent in surveys), and top 1 percent income shares around 14 percent (versus 6.6 percent in surveys).

In effect, China's inequality level used to be less than Europe's in the late 1970s, close to the most egalitarian Nordic countries, while it is now approaching US levels. Despite this rise, inequality in China remains significantly lower than in the United States today. The bottom 50 percent earns about 15 percent of total income in China versus 12 percent in the United States and 22 percent in France. For the time being, China's development model appears to be more egalitarian than that of the United

<sup>2</sup>Previous work on income inequality in China was almost entirely based upon household surveys. See, e.g., Piketty and Qian (2009); Benjamin, Brandt, and Giles (2005); Benjamin et al. (2008); Chi, Li, and Yu (2011); Chi (2012); Gustafsson, Li, and Sicular (2008); Gustafsson et al. (2008); Khan and Riskin (2008, 2005); Knight, Li, and Wan (2016); Knight (2014); Li, Sato, and Sicular (2013); Xie et al. (2015, 2013).

States, and less than Europe's. China's inequality seems to have stabilized in recent years, as the largest increase took place between the mid-1980s and the mid-2000s.

We also provide estimates of wealth inequality for the 1995–2016 period by combining wealth surveys with data from the annual Hurun wealth rankings that cover the wealthiest Chinese households. Consistent with the trend for income inequality, wealth concentration seems to have sharply increased too. The Chinese top 10 percent wealth share (67 percent in 2015) is getting close to that of the United States (72 percent) and is much higher than in a country like France (50 percent).

Although our new series on income and wealth in China are more homogeneous and comparable than previous attempts, we stress that they still have the potential to be further improved as new data sources become available and better methods are designed. All the series presented in this paper are available online on the World Inequality Database (<http://WID.world>); updated series will be posted there. Our paper is part of a broader international project aimed at producing distributional national accounts. The objective is to combine national accounts, surveys, and tax data in a systematic manner to produce inequality series that can be used to compare inequality across countries in a consistent way, in the same manner as GDP can be used to compare the macro performances of countries today.<sup>3</sup>

The rest of this paper is organized as follows. In Section I we describe our main data sources, concepts, and methodology. Section II presents our results on the evolution of aggregate wealth-income ratios. In Section III we present our results on the evolution of income and wealth inequality, which we compare to other countries. Section IV provides concluding comments. This paper is supplemented by an extensive online Appendix that includes links to all our raw data sources, computer codes, and additional robustness checks.<sup>4</sup>

## I. Data Sources, Concepts and Methodology

This paper relies on five types of data sources: national income and wealth macro accounts, household income surveys, income tax data, household wealth surveys, and wealth rankings. We start by describing the macro data sources, and then proceed with distributional data. Our concepts and methods generally follow those described in the Distributional National Accounts guidelines used for the World Inequality Database (Alvaredo et al. 2016). In this section, we focus on the main conceptual issues; complete methodological details are provided in the online Appendix.

### A. National Income and Wealth Series

We first provide consistent macro series for national income, national wealth, and their components from 1978 to 2015. To establish these series, we follow the UN System of National Accounts (SNA 2008) conceptual framework and the definitions used by Piketty and Zucman (2014).

<sup>3</sup>Piketty, Saez, and Zucman (2018) construct distributional national accounts for the United States, and Garbinti, Goupille-Lebret, and Piketty (2018) for France.

<sup>4</sup>Available through the online Appendix.

*Basic Conceptual Framework.*—National income  $Y_t$  is defined in the standard manner as GDP minus capital depreciation plus net foreign income. Private wealth  $W_t$  is defined as the total value of assets owned by households and non-profit institutions, net of debts.<sup>5</sup>

Following the SNA, assets include all the non-financial (i.e., real) assets, such as housing, land, buildings, machines, etc.; and financial assets, including pensions funds, over which ownership rights can be enforced and that provide economic benefits to their owners. Pay-as-you-go Social Security pension wealth is excluded, just like all other claims on future government expenditures and transfers. Durable goods owned by households, such as cars and furniture, are excluded from wealth as well. Non-financial assets are the only “real” assets, in the sense that financial assets and liabilities balance each other at the world level and do not contribute to global net wealth. As a rule, all assets and liabilities are valued at their prevailing market prices. Corporations are included in private wealth through the market value of equities owned by households. Unquoted shares are typically valued based on observed market prices for comparable, publicly traded companies.

We similarly define public (or government) wealth  $W_{gt}$  as the net wealth of public administrations and government agencies. In available balance sheets, public non-financial assets, like administrative buildings, schools, and hospitals, are valued by cumulating past investment flows and upgrading them using observed real estate prices. We define market-value national wealth  $W_{nt}$  as the sum of private and public wealth:  $W_{nt} = W_t + W_{gt}$ . National wealth can also be decomposed into domestic capital and net foreign assets:  $W_{nt} = K_t + NFA_t$ . Domestic capital  $K_t$  can in turn be decomposed as the sum of agricultural land, housing, and other domestic capital.

While these definitions are standard, two remarks are in order when applying them to China. First, the notions of private and public property do not have the same meaning in China as in developed capitalist countries. The private property of agricultural land (and other agricultural equipment and assets) is relatively unsecure in China. Individual owners have land use rights that can be transmitted to their children as long as they stay in the countryside (more precisely, as long they keep their rural Hukou), but lose all rights to the land if they move permanently to the cities (their land is then returned to the local government and allocated to other individuals).<sup>6</sup> The rights of private owners have gradually increased over time, as both land use and transmission rights were gradually extended in the 1980s and 1990s. To reflect this development, we assume that the public property share in agricultural land gradually declined from 70 percent in 1978 to 40 percent in 2015. We also show how our results would be

<sup>5</sup>At this stage, Chinese data sources do not allow to decompose private wealth into personal wealth (households) and non-profit wealth (non-profit institutions, usually a relatively small part of private wealth), so we only provide series for aggregate private wealth (personal plus non-profit).

<sup>6</sup>There are two type of Hukou (residence registrations): agriculture Hukou (in rural China) and non-agriculture Hukou (in urban China). People with agriculture Hukou from rural China can keep their agriculture Hukou even when they are working in the cities, and in this way they are still entitled to their lands. They can also choose to change their Hukou to a non-agriculture Hukou (city Hukou), provided they are working in the city and satisfy the requirements of the Hukou change process (for example, having worked more than a certain number of years in the city), which give them access to various other rights (access to certain schools and public services for their family, etc.). After they change their Hukou, they lose their lands in their village. Because the price of land has increased quickly in the last 20 years, agriculture Hukou has become more valuable, and some migrant city workers prefer to keep their agriculture Hukou, even if it restricts their access to other rights. It is almost impossible to change Hukou from non-agriculture to agriculture.

affected if we used other private-public splitting rules (see Section II). As we shall see, this has a relatively limited impact on our main findings.

Second, corporations cannot be valued at their prevailing market price when no stock market exists, which was the case between 1949 and 1990. An alternative measure of the wealth of corporations is the value of corporate assets (net of non-equity liabilities), the corporations' book value. By definition, corporations' book and market values are the same when Tobin's  $Q$ , the ratio between market and book values is equal to 1. Chinese Tobin's  $Q$  ratios display some variation after 1993; they fall, for instance, after the 2008 crisis. But overall, they appear to be close to 1. Therefore, before 1993, when no estimates of the market value of Chinese corporate equities exist, we compute the value of Chinese corporations by assuming that Tobin's  $Q$  is equal to 1. In the online Appendix, we also report series of national wealth where corporations are valued at their book value instead of market prices throughout the 1978–2016 period, what we call book-value national wealth.<sup>7</sup> Because Tobin's  $Q$  is close to 1 after 1993, book- and market-value national wealth are similar. In the rest of the paper we focus on market-value series.

*Data Sources for China's National Income and Wealth.*—There exists a relatively long tradition of national accounts in China.<sup>8</sup> For the recent period, we use official national accounts that comply with the latest international guidelines. Before 1992, Chinese national accounts were based on the Material Planning System. We have homogenized these data by using the same concepts and definitions as in the most recent official accounts.<sup>9</sup> The basic sources for income and output are *China Statistical Yearbook* and *Compendium of Statistics*, available since 1949 (e.g. NBS, 2007, 2010, 2014). These sources allow us to provide annual series of national income and its components over the 1978–2015 period.

There is debate about whether and by how much official Chinese statistics overstate income growth. Young (2003) makes systematic downward corrections to Chinese growth by re-estimating the GDP deflator using official statistics. We follow his methodology and replicate his corrections. All the real values we report in our paper (for both wealth and income) use this revised GDP deflator. In addition, we slightly increase the level of GDP by imputing positive housing rental income in GDP, which is not currently done in the official Chinese accounts. After these corrections, our real GDP growth rate lies in between the official GDP growth rate and the conservative estimate of Maddison and Wu (2008); it is closer to Maddison and Wu's.<sup>10</sup>

As for national wealth, there exists an early attempt by Chow (1993) to document capital formation in China. Chow, however, does not provide a complete balance sheet.

<sup>7</sup>That is, we define book-value national wealth  $W_{bt}$  as the sum of market-value national wealth and residual corporate wealth:  $W_{bt} = W_{mt} + W_{ct} = W_t + W_{gt} + W_{ct}$ . Residual corporate wealth  $W_{ct}$  is the difference between the book-value of corporations and their market value (the value of their equities). By definition,  $W_{ct}$  is equal to 0 when Tobin's  $Q$  is equal to 1.

<sup>8</sup>The first estimation of China's national income was made by Wu Baosan (1947), who provides estimates of national income for the 1930s with detailed sectoral breakdown. Liu-Yeh (1965) estimates national income for the 1933–1959 period and Rawski (1989) for the 1913–1945 period. Since we begin our series in 1978 we do not use this work.

<sup>9</sup>See online Appendix Section A.

<sup>10</sup>See online Appendix Section A21 for a thorough discussion of this issue. See also Holz (2014) for a discussion of the quality of China's GDP statistics and alternative corrections.



One cannot fully study the division between public and private property, the role of asset prices, and the importance of land using his series. We rely instead on official and non-official independent estimates of China's balance sheets. The National Bureau of Statistics (NBS) has compiled national balance sheets since 1997, but the data have not been published so far (Shi 2011). Official series on the stock of fixed assets, however, are available. In addition to these official series, several recent studies attempt to construct the national balance sheet of China. The most detailed attempts are Ma, Zhang, and Li (2012); Cao et al. (2012); and Li, Zhang, and Chang (2013, 2015).

We start with Ma, Zhang, and Li (2012); Li, Zhang, and Chang (2013, 2015); and the official fixed asset estimates, and apply adjustments to ensure homogeneity and comparability with developed countries' balance sheets. Data sources before 1993 are relatively limited, so we choose to begin our annual series in 1993, and we provide two separate estimates for 1978 and 1985. We include new estimates for the value of agricultural land and housing for 1978, 1985, and 1993–2015, and we adjust the value of agricultural land to take into account the semi-private nature of rural assets. All computations and adjustments made to the raw national balance sheet data are discussed in detail in online Appendix Section A1.

### B. *Series on Income and Wealth Distribution*

*Income Distribution Series.*—We construct our income distribution series in three steps: (i) we start with household income surveys; (ii) we correct these surveys using tax data on high-income individuals; (iii) we use national accounts and wealth data to impute tax-exempt capital income. All corresponding computer code is provided online, and complete methodological details and extensive robustness checks are discussed in online Appendix Section B.

**Step 1:** We start with the large, nationally representative household surveys conducted each year in rural and urban areas by China's Statistical Bureau (CSB).<sup>11</sup> Despite numerous attempts we have not been able to access the micro-files from these surveys, but CSB publishes tabulations using many income brackets and income categories (wages, pension and other replacement income, business, and capital income). We use all the annual tabulations from 1978 to 2015 for both the rural and the urban surveys.<sup>12</sup>

Using the generalized Pareto interpolation techniques of Blanchet, Fournier, and Piketty (2017), we estimate the full distribution of income separately for rural China, urban China, and China as a whole. Generalized Pareto interpolation allows

<sup>11</sup>In both the rural and the urban surveys, the sample size has varied from less than 10,000 households in early years (e.g., 8,715 households in the 1981 Urban Household Survey (UHS) and 6,095 households in the 1978 Rural Household Survey (RHS)) to above 60,000 households in recent years (e.g., 65,981 households in the 2012 UHS and 73,750 households in the 2012 RHS). Since 2013, China's Statistical Bureau has combined the UHS and RHS into an Integrated Household Survey. The total sample size in this survey is around 160,000 (66,000 urban households and 74,000 rural households). For details, see NBS (1988, 1994, 2005, 2014, 2015).

<sup>12</sup>Note that these surveys have been conducted by CSB since the early 1950s (with an interruption during the cultural revolution, between 1965 and 1976), and that the 1950–1978 tabulations could also be used using the same methods. The data suggest that income inequality during the 1950s–1970s (as measured by these surveys) was relatively stable at very low levels (close to the levels that we observe in 1978, which are indeed extremely low by historical and international standards).

us to recover the full income distribution based on income tabulations without parametric assumptions. We refer to Blanchet, Fournier, and Piketty (2017) for detailed tests of the reliability of this interpolation technique, which vastly dominates standard interpolation tools used in the literature. We express the distributions in terms of generalized percentiles (or  $g$ -percentiles). There are 127  $g$ -percentiles: 99 for the bottom 99 percentiles, 9 for the bottom 9 tenth-of-percentiles of the top percentile, 9 for the bottom 9 one-hundredth-of-percentiles of the top tenth-of-percentile, and 10 for the 10 one-thousandth-of-percentile of the top one-hundredth-of-percentile.

The survey income concept we use is pre-tax, post-replacement income. Pension income (and other replacement income such as unemployment insurance) is included in income, while pension contributions (and other social contributions financing replacement income flows) are deducted.<sup>13</sup> The unit of observation is the adult individual, with income equally split between household members. That is, we are interested in the distribution of per-adult income and divide household income by the number of adults in each household.<sup>14</sup>

**Step 2:** We then correct the top of the distribution of survey income by using income tax data. A progressive income tax has been in place since 1980. Until recently, the Chinese tax administration did not release detailed income tax statistics: the only information available was the aggregate income tax revenue, sometimes with a breakdown by income sources, but not by income bracket. Absent better data, Piketty and Qian (2009) used household surveys and the income tax law to simulate theoretical income tax revenues, and found that simulated revenues were smaller than observed revenues, suggesting that top incomes are under-reported in surveys, in line with what is usually found in other countries.<sup>15</sup>

In 2006, the Chinese tax administration issued a circular requiring all taxpayers with individual taxable income above 120,000 yuans to file a special declaration, and it started to release the number of such taxpayers and their taxable incomes.<sup>16</sup>

<sup>13</sup>This is similar to the pre-tax national concept defined in Alvaredo et al. (2016) (and stands in contrast to pre-tax factor income, which treats pension and other replacement income on a contribution basis rather than a distribution basis), except of course that survey data miss important components of national income, especially among top income earners, hence the corrections described below. We can measure pre-tax income in the survey data because household income is broken down by type of income before 2013. Since 2013, the integrated household survey yearbook only reports disposable income, which we use as a proxy for pre-tax income.

<sup>14</sup>This is the same equal-split adult concept as that used in distributional national accounts series recently constructed for the United States (Piketty, Saez, and Zucman 2018) and France (Garbinti, Goupille-Lebret, and Piketty 2018), except that the equal-split operation is done at the household level in China rather than at the tax-unit level (married couples) in the United States and France. This implies that we probably somewhat underestimate inequality in China as compared to the United States and France (i.e., we impose more intra-household redistribution than for the United States and France). Note also that the raw household survey tabulations that we use are based on per-capita household income (total income divided by the number of adults and children), which we correct by assuming the same adults/children ratio for all brackets. If high earners have fewer children than average, we slightly underestimate inequality. Finally, note also that the top decile household income shares reported by Piketty and Qian (2009) for China over the 1986–2003 period do not control at all for household size, which explains why they are significantly higher (2–3 points) than the (uncorrected) top decile household income shares reported here (which are based upon per adult income).

<sup>15</sup> See also Xu and Yue (2013), who combine urban household surveys, tax legislation, and aggregate tax revenues to simulate the redistributive impact of China's income tax.

<sup>16</sup>Per the circular, taxable income is defined the sum of wage income, business income, and taxable capital income, minus deductions (which can be estimated to represent on average about 20 percent of pre-deduction fiscal income, so that the taxable income threshold of 120,000 yuans corresponds to a fiscal income threshold of about 150,000 yuans). China's income tax is a three-part system, in the sense that wage income, business income, and capital income are taxed separately (wage income is taxed at progressive rates going from 0 percent to 45 percent; business income



These new statistics on high earners were released annually at the national level from 2006 to 2010, but the publication was interrupted in 2011. The circular, however, still applies today, and for income years 2011 to 2015 publication of the data continued at the provincial level (sometime with additional information on taxpayers with incomes above 500,000 and 1 million yuans). We collected these provincial tabulations, which together provide useful information about top incomes, even though not all provinces have been covered since 2011. Taxpayers reporting over 120,000 yuans in taxable income represent roughly the top 0.5 percent of the urban adult population between 2006 and 2010 (less than 0.4 percent in 2006, over 0.6 percent in 2010).<sup>17</sup>

Although the fiscal data are imperfect (and should probably be seen as providing a lower bound for actual inequality, as discussed below), the interesting point is that the fiscal incomes reported by this group (roughly the top 0.5 percent) are already substantially larger than the levels observed for the top 0.5 percent in the urban household survey. During the 2006–2010 period, fiscal incomes are 1.3 to 1.6 larger than survey incomes if we look at the quantile function  $q(p)$  (i.e., the income threshold  $q(p)$  corresponding to percentile  $p = 0.995$ ) and 2.5 to 3 times larger if we look at the upper incomes  $y(p)$  (i.e., the average income  $y(p)$  above percentile  $p = 0.995$ ). Top incomes are massively underestimated in surveys.<sup>18</sup>

Our benchmark correction is based on the following assumptions: the survey data are reliable below percentile  $p_1 = 0.8$ , the fiscal data are reliable above  $p_2 = 0.995$ , and the quantile ratio upgrade factor  $f(p)$  rises piecewise-linearly from  $f(p_1) = 1$  to the observed fiscal/survey ratio  $f(p_2)$  between  $p_1$  and  $p_2$ , so as to generate a smooth and convex Pareto curve (see Blanchet, Fournier, and Piketty 2017). We then apply generalized Pareto interpolation techniques to the corrected tabulations to obtain the full distribution of fiscal income among equal-split adults in urban and rural China, by generalized percentiles, each year from 1978 to 2015.<sup>19</sup> We also provide several variants based on different piecewise-linear profiles for the upgrade factor between  $f(p_1)$  and  $f(p_2)$ . As shown in online Appendix B1, the impact on the results is limited.<sup>20</sup>

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at progressive rates from 0 percent to 35 percent; capital income at a flat rate of usually 20 percent), so that total taxable income does not usually need to be declared, except in the context of the 2006 circular. The objective of the circular was to improve tax collection and to fight corruption.

<sup>17</sup>The absolute number of high-income taxpayers rises from about 1.6 million in 2006 to 3.1 million in 2010. We compare this number to the total urban population (rather than the total Chinese population) because rural incomes are much lower than urban incomes (hence much less likely to meet the 120,000 yuans threshold), and because agricultural income is entirely exempt from the income tax, which in effect should be viewed as an urban income tax.

<sup>18</sup>In particular, the inverted Pareto coefficient  $b(p) = y(p)/q(p)$  is as low as 1.5 or less in the survey, as opposed to 2.5–3 or more in the tax data.

<sup>19</sup>In the absence of any other information, we choose to apply the average profile of upgrade factors  $f(p)$  between  $p_1 = 0.9$  and  $p_2 = 0.995$  estimated for the 2006–2010 period to all years of the period 1978–2005. This assumption is further justified by the absence of any clear trend in the observed/simulated income tax revenue ratios computed by Piketty and Qian (2009) over the 1986–2003 period. We also choose to apply this same average profile of upgrade factors for all years of the period 2011–2015, as available provincial data on high-income taxpayers suggest that there is no clear trend in the magnitude of the downward bias in the survey. Online Appendix Section B1 presents and discusses several robustness checks and alternative assumptions and specifications.

<sup>20</sup>The Chinese high-income tax data are entirely based upon individual incomes. This corresponds to equal-split income (in the sense of US or French tax data) only if we assume that all high-income taxpayers are either single or married to other high-income taxpayers, which strictly speaking cannot be true. This implies that our estimates tend to overestimate inequality as compared to the equal-split benchmark, and to underestimate inequality as compared to the individualistic benchmark (where each spouse is assigned his or her own income). If we obtain

**Step 3:** Finally, we correct our fiscal income series to take tax-exempt capital income into account and to estimate the distribution of total pre-tax national income. Important components of capital income are missing from fiscal income data, even absent any tax evasion. First and most important, the undistributed profits of private corporations are not included in the income subject to tax in China (nor in most other countries). It is important to correct for this, because the extent to which private shareholders choose to accumulate wealth in the form of undistributed profits (as opposed to dividends and shares buybacks) may well vary over time and across countries (e.g., due to changing tax incentives), which might introduce biases in inequality statistics. The other main form of tax-exempt capital income is owner-occupied housing rents. We proceed as follows.

First, using the national accounts we estimate the evolution of total non-fiscal capital income  $y_{nf}$ , which we define as the private share of undistributed profits and other tax-exempt capital income (including imputed housing rents) accruing to Chinese households. We find that  $y_{nf}$  gradually rises from less than 5 percent of per adult national income to as much as 15 percent over the 1978–2015 period (with a peak in 2007 and a decline to about 11–12 percent in recent years), largely due to the rise of private corporate ownership and private housing. In contrast, total fiscal income  $y_f$  (i.e., total income subject to the income tax, before any deduction) represents approximately 70 percent of national income throughout the 1978–2015 period.<sup>21</sup> To estimate the distribution of personal income  $y_p = y_f + y_{nf}$ , we need to make an assumption about the distribution of  $y_{nf}$  and the correlation between  $y_f$  and  $y_{nf}$ . We assume that  $y_{nf}$  follows the same distribution as wealth, which we estimate by applying generalized Pareto interpolation techniques to household wealth surveys and wealth rankings (see Section IB).<sup>22</sup> As for the correlation structure between  $y_f$  and  $y_{nf}$ , on the basis of estimates obtained in countries with adequate micro-files (namely, the United States and France; see Blanchet, Fournier, and Piketty 2017), we use the family of Gumbel copulas with Gumbel parameter  $\theta = 2$ .<sup>23</sup>

Last, we apply a proportional upgrade factor to transform the distribution of personal income  $y_p = y_f + y_{nf}$  into the distribution of national income  $y$ . By construction this has no impact on income shares. The goal of this normalization is to ensure that total individual incomes add up to national income, so as to make income levels comparable across countries.<sup>24</sup>

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access to micro-level Chinese tax data, we will be able to refine this analysis and compute separate equal-split and individualistic series.

<sup>21</sup> See online Appendix Section B. In effect, we break down national income  $y$  as  $y = y_f + y_{nf} + y_g$ , with  $y_g$  = government net capital income (including the government's share of undistributed profits) + indirect taxes (net production taxes) received by the government.

<sup>22</sup> The distribution of corporate equity is more concentrated than the distribution of wealth in general, so this assumption may lead us to under-estimate the concentration of non-fiscal income  $y_{nf}$ . Note also that we do not have complete annual estimates for the distribution of wealth (see below), so for missing years we use linear interpolations. Given that the aggregate value of  $y_{nf}$  is small as compared to  $y_f$ , the total impact of these simplifying assumptions on the distribution of  $y_p = y_f + y_{nf}$  is relatively small, as we show in robustness checks and alternative series presented in online Appendix Section B1.

<sup>23</sup> A Gumbel parameter  $\theta = 1$  corresponds to perfect independence, and  $\theta = +\infty$  to perfect correlation. In online Appendix Section B1, we show that assuming Gumbel parameters in the 2–5 range has only a small impact on our final series (see, in particular, Appendix Figures B8e to B8h).

<sup>24</sup> Note that  $y_g$  ( $= y - y_p$ ) equals government net capital income (including the government share of undistributed profits) plus indirect taxes (net production taxes) received by the government. We have no reason to allocate  $y_g$  in a nonproportional manner, so we adopt this distribution-neutral strategy.

To summarize, our inequality series have two main strengths: they incorporate tax return data, which are critical to capture high earners accurately; and they distribute 100 percent of China's national income, which is key to make consistent comparisons of inequality. The main limitation of our series is that they are potentially affected by tax evasion, a problem not specific to China. Tax evasion can bias our estimates in several directions. For instance, we may underestimate top shares because we do not incorporate the assets hidden abroad by wealthy Chinese residents. On the other hand, we may underestimate the share of income earned by the middle class if a lot of unincorporated business income is not properly reported.<sup>25</sup> Evidence from other countries suggests that, if anything, tax evasion is likely to lead us to underestimate inequality (Alstadsæter, Johannesen, and Zucman 2017a,b). But more research is needed on the size and distribution of tax evasion in the specific Chinese context.

*Wealth Distribution Series.*—To measure the evolution of wealth inequality, we use the China Household Income Project (CHIP) household wealth surveys conducted in 1995 (Riskin, Zhao, and Li 1995) and 2002 (Li 2002), and the China Family Panel Study (CFPS) household wealth surveys conducted in 2010 (Xie et al. 2010) and 2012 (Xie et al. 2012).<sup>26</sup> We have access to the micro-files of these surveys. They show a substantial rise in wealth concentration over time.<sup>27</sup> Since it is always a challenge to reach out to wealthy individuals, surveys likely underestimate top wealth levels. We therefore combine the wealth surveys with the annual Hurun rankings of China's wealthiest households covering the 2001–2016 period.

Specifically, we assume that the survey microdata are reliable up to the ninetieth percentile of the wealth distribution and that the Hurun data are reliable above the 99.999th percentile. For percentile  $p = 0.9$ , we upgrade the wealth reported in surveys by a factor of 1.5.<sup>28</sup> We then apply generalized Pareto-interpolation techniques to obtain a full, smooth wealth density consistent with all the quantiles observed in the surveys (up to  $p = 0.9$ ), the  $p = 0.99999$  observed in the Hurun data, and the assumed value for  $p = 0.9$ .

<sup>25</sup> In China, agricultural business income is legally tax-exempt, so there is no tax evasion there.

<sup>26</sup> CHIP surveys were also conducted in 2008 and 2013, but these two survey years raise difficulties, so we do not use them (the 2008 survey had problems with the sampling process and is considered not to be nationally representative, and the 2013 survey has no information on housing values).

<sup>27</sup> Previous work on Chinese wealth inequality includes Gan et al. (2013); Li and Wan (2015); Xie and Jin (2015); Knight, Li, and Wan (2016); Tan, Zeng, and Zhu (2017). By comparing the CHIP 2002 survey and the CFPS 2010 survey, Li and Wan (2015) find that the top 10 percent wealth share rose from 39 percent to 64 percent. Knight, Li, and Wan (2016), using the CHIP 2002 and 2013 surveys, find that the top 10 percent wealth share rose from 37 percent to 48 percent from 2002 to 2013. Using the CFPS 2012 survey and the Hurun rich list, Xie and Jin (2015) find that the top 10 percent wealth share is 62 percent in 2012 and the top 1 percent wealth share is 35 percent. Similarly, Tan, Zeng, and Zhu (2017) use the 2011 China Household Finance Survey (CHFS) and find a top 10 percent wealth share of 64 percent.

<sup>28</sup> In our benchmark series, we upgrade the wealth of the ninetieth percentile (as reported in the CHIP or CFPS survey) by a factor of 1.5 following Li and Wan (2015) and Xie and Jin (2015), who use the CFPS for 2012 and correct it to better account for the top of the distribution. Our top 10 percent wealth share matches the top 10 percent share reported by Li and Wan (2015) and Xie and Jin (2015). In the online Appendix, we consider a wide range of scenarios where we make the upgrade factor vary from 1 to 2. Upgrade ratios greater than 2 are impossible, as they would imply a total amount of wealth in the survey higher than in the national accounts; see online Appendix Figures B12a and B12b. For plausible values of the upgrade factor, the result on our top 10 percent wealth share is second order.

## II. The Rise of Wealth-Income Ratios and Private Property in China

In this section, we present our main results on the evolution of aggregate wealth from 1978 to 2015.

### A. *The Evolution of Wealth-Income Ratios and Public Property*

We start with the general evolution of the level and structure of national wealth. The Chinese national wealth to national income ratio has increased from 350 percent in 1978 to 500 percent in 1993 and over 700 percent in 2015 (panel A of Figure 2). Agricultural land used to account for almost one-half of total wealth in 1978; it now accounts for less than one-tenth. By contrast, housing and other domestic capital (buildings, equipment, machinery, patents, etc., used by corporations, public administrations, and households) have increased enormously, both in shares and in levels. Net foreign assets have significantly added to national wealth since the mid-2000s.

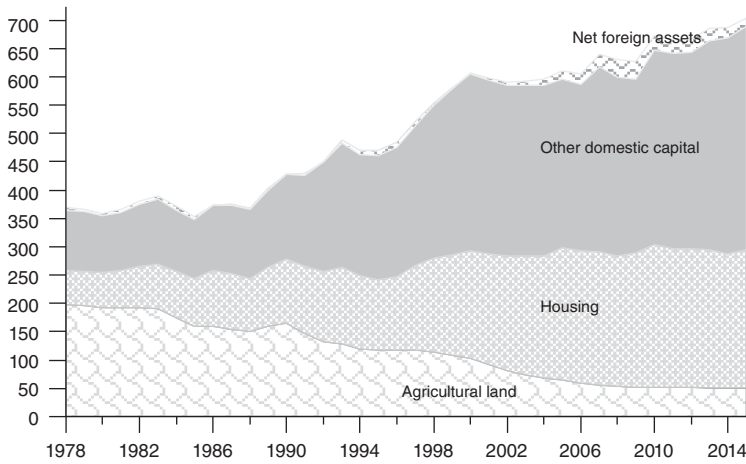
The most spectacular evolution involves the division of national wealth into private and public wealth (panel B of Figure 2). Private wealth was relatively small in 1978 (about 100 percent of national income), and now represents over 450 percent of national income. Public wealth, by contrast, has remained roughly stable around 250 percent of national income. As a result, while in 1978 about 70 percent of national wealth was public and 30 percent private, in 2015 the proportions are reversed: 30 percent of national wealth is public and 70 percent private. China used to be a communist country and is now a mixed economy.

The privatization process was particularly extensive for housing: 95 percent of the housing stock is now privately owned versus 50 percent in 1978 (panel A of Figure 3). For other domestic capital, the public share has declined but it is still about 50 percent. Private ownership of domestic equities (traded and non-traded) was negligible in 1978 (about 5 percent) and reaches about 30 percent in 2015. This is a large rise, but it means that the government remains the owner of about 60 percent of Chinese domestic equities (while foreigners own the remaining 10 percent). The fraction of Chinese equities that is publicly owned dropped substantially until 2006 but seems to have stabilized since then (panel B of Figure 3).<sup>29</sup>

The ratio of private wealth to national income is now similar in China and in Western countries: 450–500 percent in China in 2015, versus 500 percent in the United States and 550–600 percent in Britain and France (online Appendix Figure A6). The major difference is that public wealth has become small, or even negative, in Western countries, while it remains substantial in China (online Appendix Figure A7).

<sup>29</sup>Our estimate of government wealth is close to the one obtained by Li, Zhang, and Chang (2013, 2015). Another way to assess the role of the public sector is to study the government revenue flow, including the income from property controlled by the government (distributed and undistributed profits and other capital income flows). Naughton (2017) finds that public revenue increased from 16 percent of national income in 1997 to 41 percent in 2015. Following Naughton (2017), in the online Appendix we estimate public revenue for the period from 1992 to 2015. We find the same rising trend of public revenue as Naughton (2017), although we obtain slightly different levels due to different definitions of public revenue. For a detailed comparison, see online Appendix Section A24. Huang (2008) estimates private/public shares for industrial firms and finds a public share of 62 percent in 2001 and 49 percent in 2005, consistent with our findings (which rely on other data source).

Panel A. The structure of national wealth in China, 1978–2015 (% national income)



Panel B. Public versus private property in China, 1978–2015 (% national income)

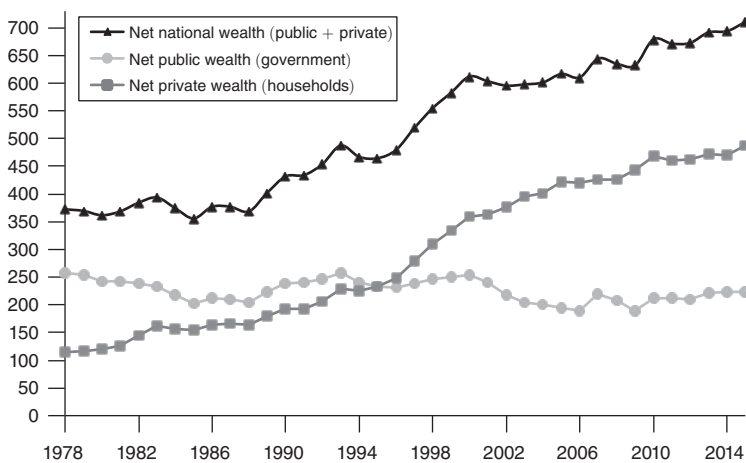
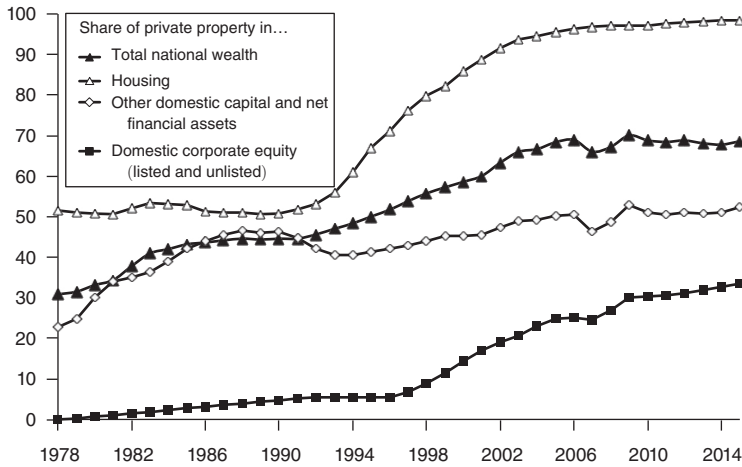


FIGURE 2

The share of public property in China today is somewhat larger than, but by no means incomparable to, what it was in the West from the 1950s to the 1980s.<sup>30</sup> Net public wealth used to be positive and substantial in all Western countries in 1978; the government owned between 15 percent and 25 percent of national wealth in the United States, Japan, France, Germany, and Britain in the mid-1970s. This mixed economy regime resulted from a combination of low public debt (following post-World War II debt restructuring and inflation) and a large public sector, including in some cases government ownership of large companies in banking and

<sup>30</sup>We present two alternative series on the public share in China's national wealth, depending on what fraction of agricultural land is assigned to the government and the private sector (see the discussion in Section IA). This makes a significant difference at the beginning of the period (given the importance of agricultural land in 1978), but has relatively little effect in 2015 (see online Appendix Figure A2). In any case, the general trend and orders of magnitudes are not affected.

Panel A. Rise of private property in China, 1978–2015 (%)



Panel B. Corporate ownership in China, 1978–2015 (%)

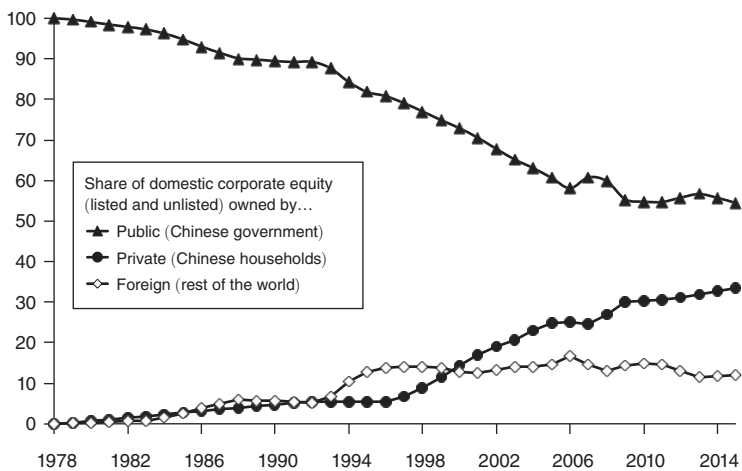


FIGURE 3

manufacturing. The public share in China’s mixed economy seems to have increased since the 2008 financial crises, while it has dropped in rich countries as public debts rose.

The structure of national property has implications for economic development. The size of public property affects the State’s ability to conduct industrial and regional development policy (sometime in an efficient way, sometime less so). It also has potentially large fiscal consequences: governments with negative net public wealth typically must pay large interest payments before they can finance public spending and welfare transfers, while those with large positive net public wealth can benefit from substantial capital income and finance more spending than what they levy in taxes. To a large extent this is an under-studied subject, partly because of the lack of adequate data collection on national balance sheets. Looking forward, it



would be valuable to collect more data to compare the evolution of China's property structure not only with Western countries but also with other emerging economies.

### B. *Decomposing Wealth Accumulation*

How can we explain the sharp increase in China's national wealth-national income ratio over the last decades? By our estimates, saving flows explain 50 to 60 percent of the rise in the wealth-income ratio since 1978, while the increase in relative asset prices accounts for the remaining 40 to 50 percent.<sup>31</sup> That is, equity and housing prices have increased above and beyond the rise in consumer prices.

Like in rich countries, the rise in relative asset prices can itself be accounted for by a series of factors. There is high demand for housing assets by Chinese households (maybe in part because of limited access to alternative investment vehicles and insufficient visibility on the expansion of public pensions). Moreover, changes in the legal system have reinforced private property rights: rent controls have been lifted; the relative power of landlords and tenants has changed, as has the relative power of shareholder and workers. It is striking that Tobin's  $Q$ , the ratio between the market and the book value of corporations, seems similar in China as in the United States and United Kingdom (around 100 percent), significantly higher than in Germany and Japan (50–80 percent, see Piketty and Zucman 2014). This may reflect strong shareholders' rights, although some of the cross-country differences in Tobin's  $Q$  may also reflect data limitations.<sup>32</sup>

## III. The Rise of Income and Wealth Inequality in China

We now turn to our results on the evolution of income and wealth inequality.

### A. *Income Inequality*

*The Distribution of National Income and Its Evolution.*—Table 1 reports our estimates of the distribution of pre-tax national income in China in 2015. The average income of the bottom 50 percent (a group that includes 536 million adults) is equal to 30 percent of the average income in the country. Hence the bottom 50 percent earns 15 percent (30 percent times 50 percent) of total income. By contrast, the average income of the top 10 percent is more than 4 times the average income in

<sup>31</sup> See online Appendix Tables A40 to A49, where we present detailed decompositions of wealth accumulation into volume and price effects for the 1978–2015 period, following the methodology used by Piketty and Zucman (2014) in rich countries.

<sup>32</sup> Similarly, our series do not allow us to take a stance on the (arguably even more complicated) issue of dynamic efficiency in China. Given China's huge growth rates and high wealth-income ratios, one might be tempted to conclude that China falls in the paradigmatic situation of dynamic inefficiency and excessive capital accumulation. Indeed, and although there is uncertainty about the exact level of the net-of-depreciation capital share  $\alpha$ , the average rate of return to capital  $r$  is less than the growth rate  $g$  (i.e., with a capital share  $\alpha \approx 35$  percent and a national wealth-income ratio  $\beta \approx 700$  percent we have  $r = \alpha/\beta \approx 5$  percent  $< g \approx 7$ –8 percent). In a standard one-good model of capital accumulation,  $r < g$  implies excessive capital accumulation, so that in principle an extension of the pay-as-you-go pension system (or higher public debt) could generate Pareto improvements. See, e.g., Song et al. (2015) for a discussion. However, the analysis is made more complicated by the fact that we are not in a simple one-good model: relative land prices matter, and so does the relative bargaining power of owners versus non-owners, and more generally the legal system. Our data series does not allow us to put precise numbers on all these parameters and is not sufficient to do a proper welfare analysis.

TABLE 1—INCOME THRESHOLDS AND INCOME SHARES IN CHINA, 2015

Income group	Number of adults	Income threshold	Average income	Income share
Full population	1,072,289,708	¥0	¥57,807	100.0%
Bottom 50%	536,144,854	¥0	¥17,645	15.3%
Middle 40%	428,915,883	¥35,029	¥63,021	43.6%
Top 10%	107,228,971	¥116,489	¥237,757	41.1%
Including top 1%	10,722,897	¥324,851	¥836,013	14.5%
Including top 0.1%	1,072,290	¥924,613	¥4,219,447	7.3%
Including top 0.01%	107,229	¥5,371,286	¥26,634,998	4.6%
Including top 0.001%	10,723	¥35,216,943	¥164,188,917	2.8%

*Notes:* This table reports statistics on the distribution of income in China in 2015. The unit is the adult individual (20-years-old and over; income of married couples is split in 2). In 2015, 1 euro = 7.0 yuans (market exchange rate) or 4.6 yuans (purchasing power parity). Income corresponds to pre-tax national income. Fractiles are defined relative to the total number of adult individuals in the population. Estimates are obtained by combining survey, fiscal, wealth and national accounts data.

*Source:* Online Appendix B

China. Hence, the top 10 percent earns more than 40 percent (4 times 10 percent) of total income. The middle 40 percent earns a bit more than 40 percent of all income, so that their average income is slightly higher than the average per adult income.

Income inequality has increased markedly since the beginning for the market reform process. By our estimates, the share of national income earned by the top 10 percent of the population has increased from 27 percent in 1978 to 41 percent in 2015, while the share earned by the bottom 50 percent has dropped from 27 percent to 15 percent (panel A of Figure 4). The bottom 50 percent of the population used to have about the same income share as the top 10 percent, while their income share is now about 2.7 times lower. Over the same period, the share of income going to the middle 40 percent has been roughly stable.

Comparing our inequality series to the official survey-based estimates, two remarks are in order. First, survey data also show a strong rise in the top 10 percent income share and a decline in the bottom 50 percent share from 1978 to 2015. Second, both the level and the rise of inequality are larger in our series. The top 10 percent income share rises 15 points against 9 points in surveys (see online Appendix Figure B1a). The upward correction is particularly spectacular for the top 1 percent: by our estimates the top 1 percent earns about 14 percent of total income in 2015, versus 6.6 percent only in the raw surveys (panel B of Figure 4).

Most of the difference between our estimates and the raw surveys comes from the high-income tax data. The undistributed-profits correction does rise at the end of the period, particularly for very top incomes (reflecting the rise of private business ownership), but it is always less important than the fiscal correction. In 2015, for instance, the top 1 percent income share is 6.6 percent in the raw surveys, it reaches 12.5 percent after factoring in the high-income taxpayers data, and 14 percent after factoring in undistributed profits and other tax-exempt income (see online Appendix Figure B1b).

According to our series, most of the increase in top income shares took place between 1980 and 2006. Income inequality appears to have stabilized since then. The surveys show a small but regular decline in income inequality since 2006, which in our series is offset by the rise of undistributed profits. Our results are consistent

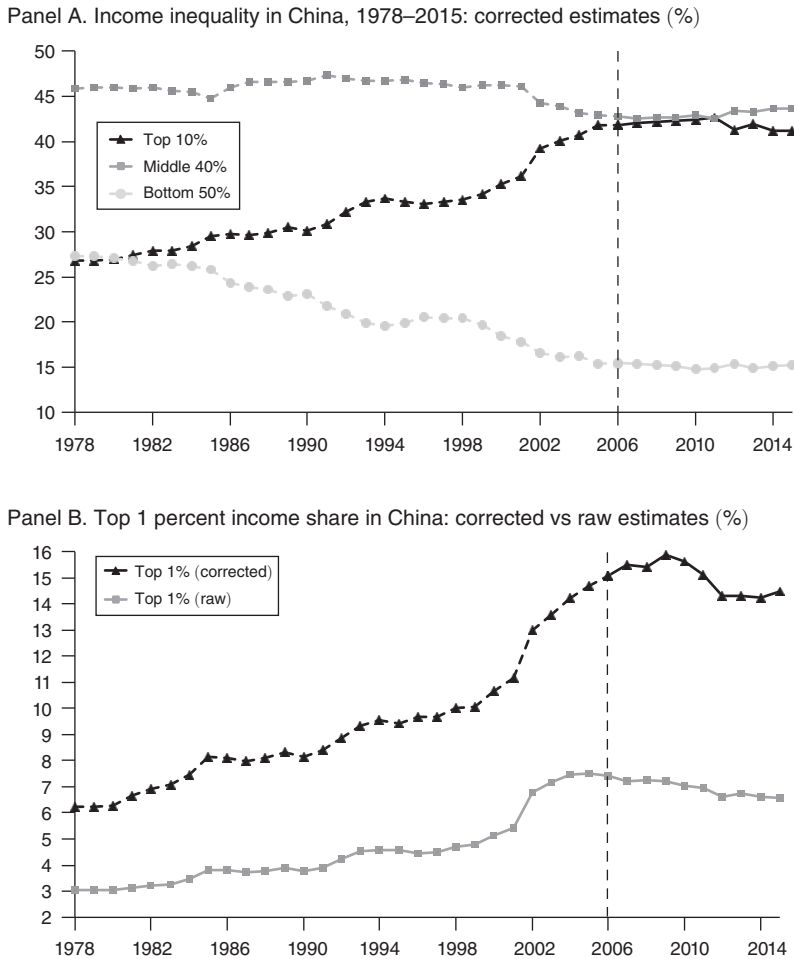


FIGURE 4

*Notes:* Distribution of pretax national income (before taxes and transfers, except pensions and unemployment insurance) among adults. Corrected estimates combine survey, fiscal, wealth, and national accounts data. Raw estimates rely only on self-reported survey data. Equal-split-adults series (income of married couples divided by 2). Pre-2006 series assume that the tax/survey upgrade factor is the same as the one observed on average over the 2006–2010 period when national-level tax data exist.

with the findings of Kanbur, Wang, and Zhang (2017) who argue that a turnaround indeed took place around 2006, due to a mixture of policy changes and the slow-down of structural transformation. This result, stabilization of inequality since 2006, should however be taken with caution, as it could partly reflect data limitations.<sup>33</sup>

*Income Inequality in Urban versus Rural China.*—What role does the urban-rural gap play in the evolution of Chinese inequality? Adult urban population rose from 100 million in 1978 to almost 600 million by 2015, while adult rural population

<sup>33</sup>In particular, the lack of national data on high-income taxpayers since 2011 forces us to apply the 2006–2010 average correction factors to years 2011–2015 (in effect making it impossible to detect a possible rebound of inequality since 2011). See Section IB and online Appendix Section B.

remained roughly stable. The income gap between urban and rural China has always been large, and it has grown over time: urban households earned on average twice as much income as rural households in 1978; they now earn 3.5 times as much (panel A of Figure 5). As a result, while the urban share in adult population has grown from 20 percent in 1978 to 55 percent in 2015, the urban share in income has increased from 30 percent to 80 percent (panel B).

Despite the increase of the urban-rural gap, the rise of inequality in China is primarily due to rising income dispersion within both urban and rural China. The top 10 percent income share has increased almost as much within urban and rural China as nationally (panel A of Figure 6). It is also interesting to note that there has always been more inequality within rural than within urban areas. Last, one can see the strong effect of the urban-rural gap when we look at the bottom 50 percent. The income share of the bottom 50 percent has sharply declined between 1978 and 2015, both within rural and urban China and nationally (panel B). The bottom 50 percent income share, however, is markedly lower at the national level (15 percent) than within rural China (20 percent) or urban China (25 percent) alone.<sup>34</sup> Note that the urban versus rural boundaries change over time. We do not attempt to isolate the effect of changing boundaries, migration, and urban incomes growing faster than rural incomes (keeping boundaries fixed) on the dynamic of the urban/rural gap, an exercise we leave to future research.

*Comparing China with Western Countries.*—Panels A and B of Figure 7 compare China to the United States and France. All series follow the same methodology: they all attempt to combine national accounts, surveys, and fiscal data to estimate the distribution of pre-tax national income (including tax-exempt capital income) among equal-split adults. In the late 1970s, China used to be substantially more equal than France and the United States. In the mid-2010s, it is more unequal than France (a country that is broadly representative of European inequality levels), and is getting closer to the United States.

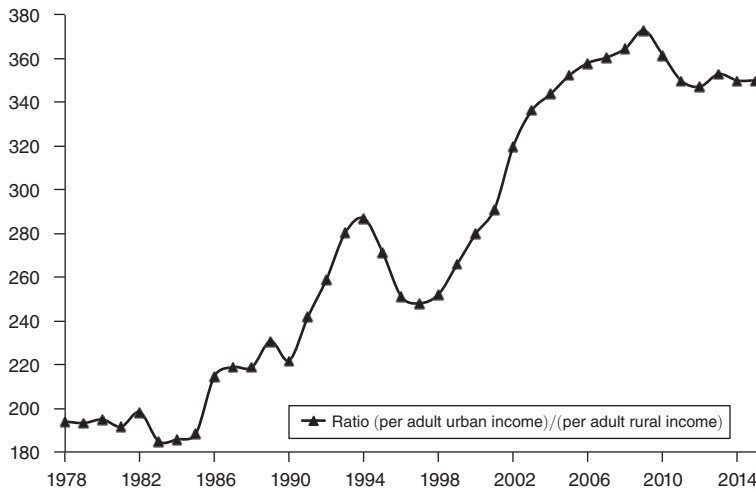
Despite the rise in inequality, China remains more equal than the United States today. The top 1 percent income share rose from 6 percent to 14 percent in China, while it increased from 11 percent to 20 percent in the United States. The bottom 50 percent income share is about 15 percent in China (20 percent in rural China, 25 percent in urban China), versus 12 percent in the United States and 22 percent in France (Figure 8). Even urban China, an economy twice as populated as the United States, is significantly more equal than the United States.

### B. *The Distribution of Economic Growth*

Our new series on the distribution of pre-tax national income allows us to decompose growth by income group in a way that is consistent with macro growth. Figure 9 and Table 2 compare the distribution of 1978–2015 income growth in China, the United States, and France. Macro growth has obviously been different in the three

<sup>34</sup> As a result, the middle 40 percent income share is now similar in China versus urban China: the top 10 percent income share is higher in China than in urban China, the bottom 50 percent income share is lower, leaving the share of the middle 40 percent at about 43 to 44 percent in both cases in recent years.

Panel A. Rural-urban inequality in China, 1978–2015 (%)



Panel B. Shares of urban China in population and income, 1978–2015 (%)

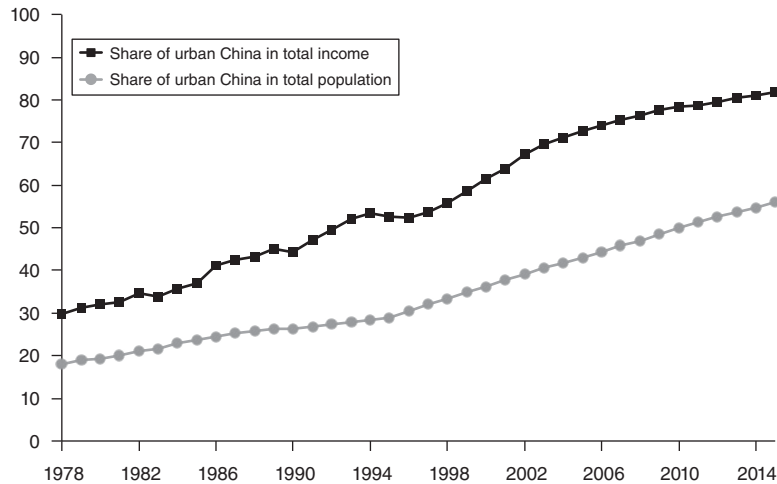
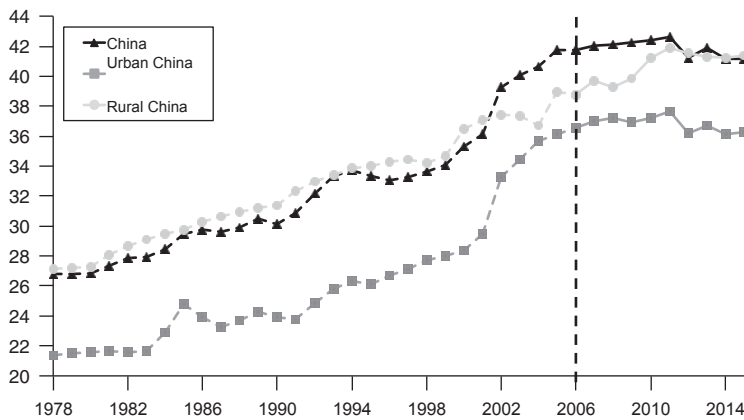


FIGURE 5

countries: average per adult national income has been multiplied by more than 9 in China, while it has increased by 59 percent in the United States and by 39 percent in France. But in both China and the United States, growth accruing to the bottom 50 percent has been smaller than macro growth, while growth accruing to the top 10 percent has been larger: even more so if one looks at the top 1 percent and smaller groups up to the top 0.001 percent. For instance, average income for the top 0.001 percent has been multiplied by more than 26 in China since 1978, and by almost 8 in the United States.

The key difference between China and the United States is that in China the bottom 50 percent has also benefited enormously from growth: its average income was multiplied by more than 5 in real terms between 1978 and 2015, which is less than macro growth and top income growth, but still very substantial. This increase

Panel A. Top 10 percent income share: urban versus rural China (%)



Panel B. Bottom 50 percent income share: urban versus rural China (%)

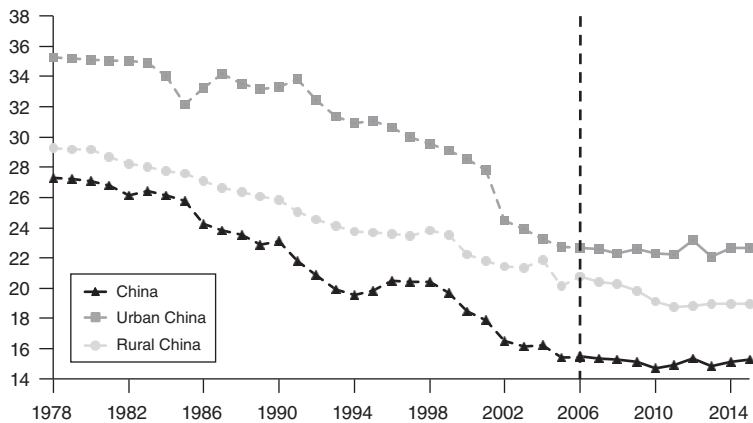


FIGURE 6

Notes: Distribution of pretax national income (before taxes and transfers, except pensions and unemployment insurance) among adults. Corrected estimates combine survey, fiscal, wealth and national accounts data. Equal-split-adults series (income of married couples divided by 2). Pre-2006 series assume that the tax/survey upgrade factor is the same as the one observed on average over the 2006–2010 period when national-level tax data exist.

has presumably made rising inequality more acceptable, especially since living standards were very low in 1978. In contrast, bottom 50 percent income growth has been negative in the United States (–1 percent). In our view, these findings illustrate the usefulness of distributional national accounts. Looking at macroeconomic growth is not enough: it is critical to decompose it to analyze which social groups benefit, or not, from it.

### C. Wealth Inequality

Table 3 reports our estimates of the distribution of wealth in 2015. Average wealth reaches 282,000 yuans per adult, about 5 times average income. That is, as studied in Section II, the private wealth to national income ratio is around 500 percent. Like



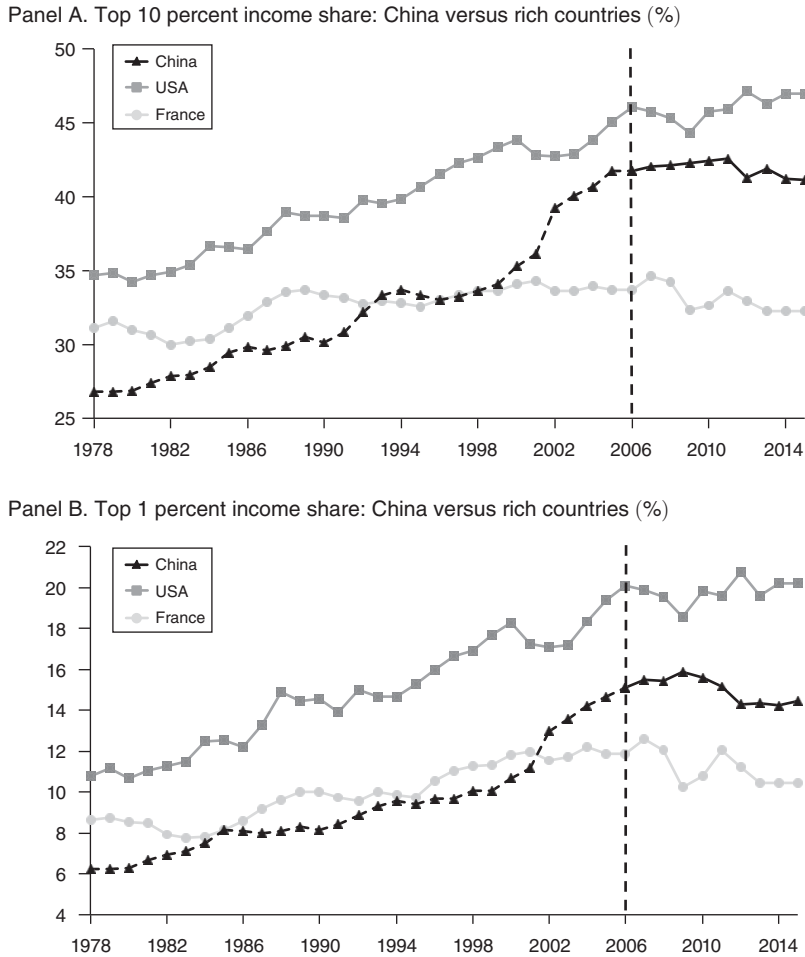


FIGURE 7

Notes: Distribution of pretax national income (before taxes and transfers, except pensions and unemployment insurance) among adults. Corrected estimates combine survey, fiscal, wealth, and national accounts data. Equal-split-adults series (income of married couples divided by 2). Pre-2006 series assume that the tax/survey upgrade factor is the same as the one observed on average over the 2006–2010 period when national-level tax data exist.

in other countries, wealth is significantly more concentrated than income: the top 10 percent share is 67 percent for wealth, versus 41 percent for income. The top 0.001 percent alone owns 5.8 percent of total wealth, about as much as the bottom 50 percent (the 531 million poorest adults).

Figure 10 shows that, consistent with the trend for income inequality, wealth concentration has sharply increased over the last decades. The top 10 percent wealth share rose from 40 percent in 1995 to 67 percent in 2015, while the middle 40 percent and bottom 50 percent wealth shares collapsed. As a result, while wealth inequality used to be much lower in China than in the Western world in the mid-1990s, it is now in between European and American levels. The Chinese top 10 percent wealth share (67 percent in 2015) is getting close to that of the United States (72 percent) and is much higher than in a country like France (50 percent). The

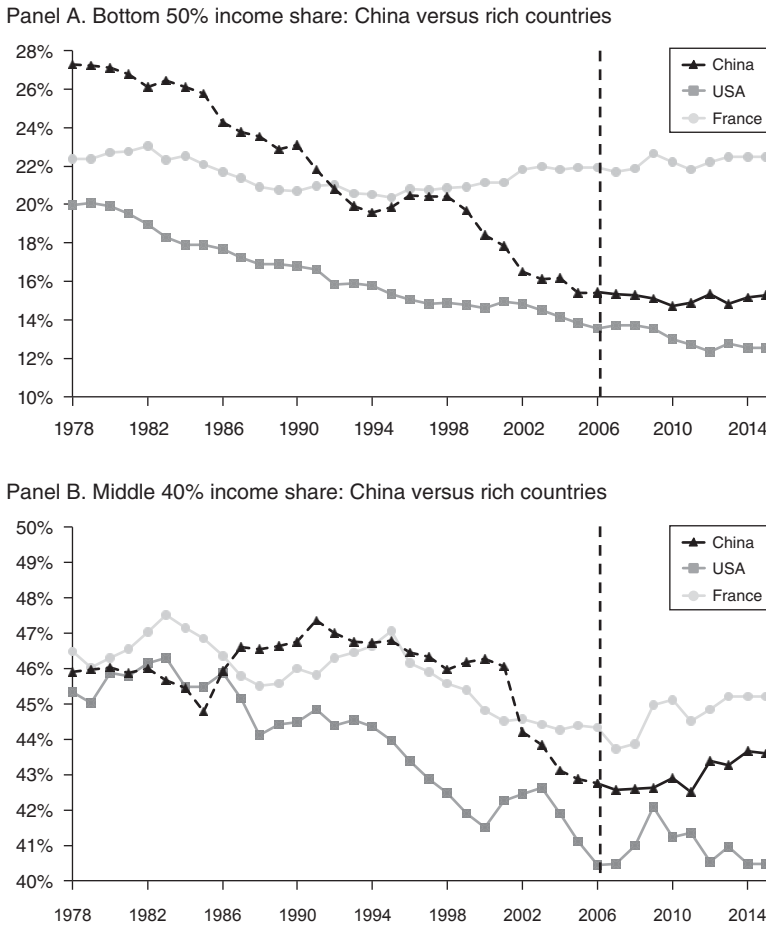


FIGURE 8

*Notes:* Distribution of pretax national income (before taxes and transfers, except pensions and unemployment insurance) among adults. Corrected estimates combine survey, fiscal, wealth, and national accounts data. Equal-split-adults series (income of married couples divided by 2). Pre-2006 series assume that the tax/survey upgrade factor is the same as the one observed on average over the 2006–2010 period when national-level tax data exist.

bottom 50 percent wealth share is now barely higher than in rich countries, where it is usually around 0–5 percent.

We stress that despite our best efforts, these series must still be viewed as imperfect. Looking forward, progress could be made in at least three directions. First, more detailed fiscal data would make it possible to revise our top 1 percent income share for recent years: possibly upward and by a significant margin.<sup>35</sup> Second, there is evidence that a growing amount of wealth is held abroad

<sup>35</sup> Using the 2011 CHFS survey data, a recent study (Tan, Zeng, and Zhu 2017) finds a top 1 percent income share in China as large as 23.8 percent in 2010, much higher than our estimate for 2010, 15.1 percent. Given the imperfections of the available tax data, we certainly cannot rule out the possibility that the top 1 percent income share in China could be over 20 percent. However, after carefully studying the 2011 CHFS data, we have several reasons to suspect that this result is driven by outliers, limited sample size, and issues related to sampling design; see online Appendix Section B2.

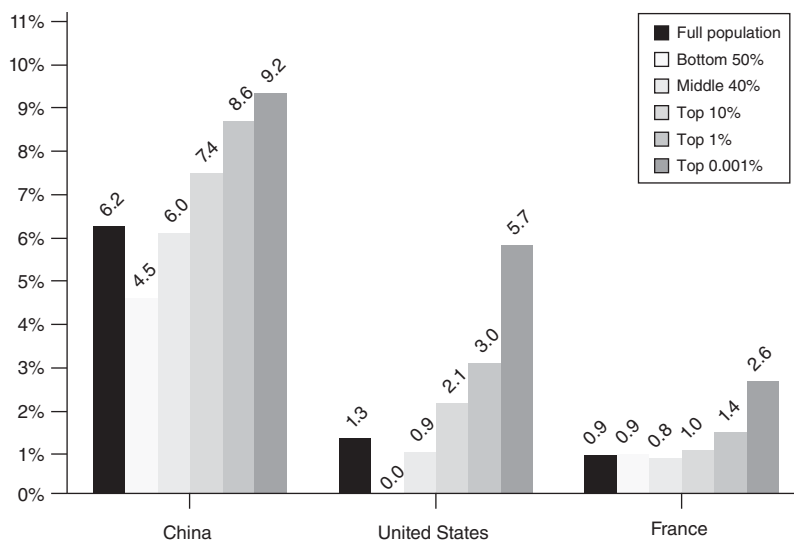


FIGURE 9. AVERAGE ANNUAL GROWTH RATE OF REAL PER ADULT PRE-TAX NATIONAL INCOME, 1978–2015

TABLE 2—INCOME GROWTH AND INEQUALITY, 1978–2015: CHINA VERSUS RICH COUNTRIES (PERCENT)

Income group (distribution of per adult pre-tax national income)	China		USA		France	
	Average annual growth rate 1978–2015	Total cumulated growth 1978–2015	Average annual growth rate 1978–2015	Total cumulated growth 1978–2015	Average annual growth rate 1978–2015	Total cumulated growth 1978–2015
Full population	6.2	811	1.3	59	0.9	39
Bottom 50%	4.5	409	0.0	–1	0.9	39
Middle 40%	6.0	765	0.9	42	0.8	35
Top 10%	7.4	1,297	2.1	115	1.0	44
Including top 1%	8.6	2,012	3.0	198	1.4	67
Including top 0.1%	9.4	2,645	4.0	321	1.7	84
Including top 0.01%	9.5	2,766	4.7	453	1.8	93
Including top 0.001%	9.2	2,529	5.7	685	2.6	158

*Notes:* This table reports statistics on the distribution of income in China in 2015. The unit is the adult individual (20-years-old and over; income of married couples is split in 2). In 2015, 1 euro = 7.0 yuans (market exchange rate) or 4.6 yuans (purchasing power parity). Income corresponds to pre-tax national income. Fractiles are defined relative to the total number of adult individuals in the population. Estimates are obtained by combining survey, fiscal, wealth and national accounts data.

*Source:* Online Appendix B

TABLE 3—WEALTH THRESHOLDS AND WEALTH SHARES IN CHINA, 2015

Wealth group	Number of adults	Wealth threshold	Average wealth	Wealth share
Full population	1,072,289,708	¥0	¥281,718	100.0%
Bottom 50%	536,144,854	¥0	¥36,293	6.4%
Middle 40%	428,915,883	¥84,932	¥184,173	26.2%
Top 10%	107,228,971	¥420,197	¥1,899,019	67.4%
included top 1%	10,722,897	¥2,979,431	¥8,347,004	29.6%
included top 0.1%	1,072,290	¥7,988,140	¥46,156,982	16.4%
included top 0.01%	107,229	¥67,744,170	¥309,247,711	11.0%
included top 0.001%	10,723	¥465,654,285	¥1,623,209,327	5.8%

*Notes:* This table reports statistics on the distribution of wealth in China in 2015. The unit is the adult individual (20-years-old and over; wealth of married couples is split in 2). In 2015, 1 euro = 7.0 yuans (market exchange rate) or 4.6 yuans (purchasing power parity). Wealth corresponds to net personal wealth (total assets net of liabilities). Fractiles are defined relative to the total number of adult individuals in the population.

*Source:* Online Appendix B

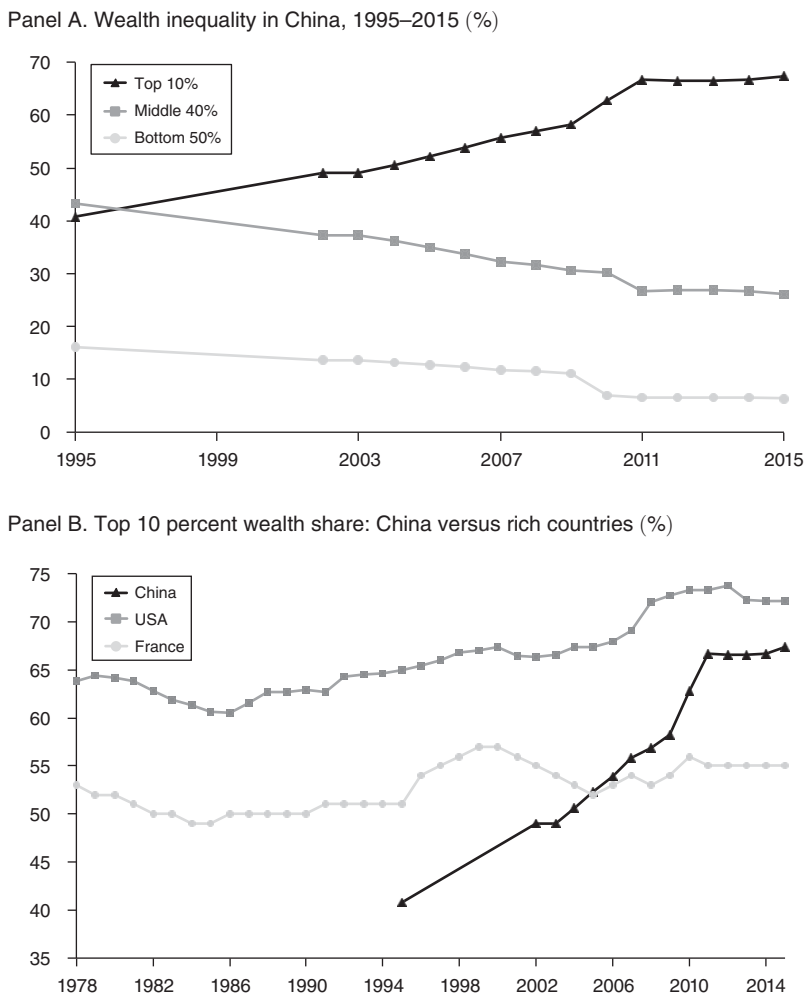


FIGURE 10

Notes: Distribution of net personal wealth among adults. Corrected wealth inequality estimates in China combine survey data and wealth rankings. Equal-split-adults series (wealth of married couples divided by 2).

by wealthy Chinese households (Zucman 2014, 2015). Our current series do not incorporate these assets, neither in the national wealth totals, nor in our distributions. Incorporating offshore assets and the income they generate could lift the top shares significantly (Alstadsæter, Johannesen, and Zucman 2017a, b). Last, Hong Kong and Macao are excluded from all our macro- and microdata. This could lead us to underestimate the rise of inequality, and ought to be taken into account in future research.

#### IV. Concluding Comments and Perspectives

By combining and confronting Chinese national accounts, surveys, wealth rankings, and tax data (including recently released income tax data covering high

earners), we obtain two main findings. First, the property structure in China is that of mixed economy: about 30 percent of national wealth in 2015 belongs to the government, including about 60 percent of domestic corporate equity. This is larger than the share of public property in the Western mixed economies of the post-World War II decades, though not far from it. The public share has stopped declining since 2007–2008 and might be a long-lasting feature of the Chinese economy.

Second, income inequality has increased substantially since the beginning of the reform process. China used to be more equal than Europe in the late 1970s, about as equal as the most egalitarian Nordic countries, while it is now approaching US inequality levels. Despite this rise, inequality remains lower than in the United States today, which given the size of China and the large gaps between its rural and urban regions is striking.

Our new estimates of capital and inequality in China lend themselves to a number of applications and suggest avenues for future research.

First, given the size of its economy, estimates of inequality in China are a critical building block for estimating the global distribution of income and wealth, which is the subject of much interest (e.g., Sala-i-Martin 2006, Lakner and Milanovic 2013). As one application, Alvaredo et al. (2018) use our findings to provide estimates of the world distribution of income that more precisely capture the tail of the distribution than previous work based on survey data.

Second, our estimates could be used for quantitative investigations of the drivers of the dynamics of inequality in China. For example, Hubmer, Krusell, and Smith (2016) employ the benchmark heterogeneous-agent model used in macroeconomics to examine drivers of the rise in wealth inequality in the United States. Our data make it possible to conduct a similar analysis in China which is likely to deliver different (and potentially insightful) results.

In particular, one hypothesis raised by our research is that our two key findings (declining but still high public ownership of capital; rising income inequality, but less than in the United States) may be related. China's mixed economy structure (with a high public share in national wealth) may have mitigated the rise of inequality, compared to the rise that would have happened if the government had only relied on the tax-and-transfer system. This could explain why inequality has increased less in China than in the United States (where public wealth is negative). Our new dataset, which includes detailed statistics on both public versus private wealth and income and wealth inequality that are comparable internationally, provides the necessary information to conduct quantitative and comparative analyses of how public property, taxes, public services, and welfare spending shape the distribution of income and wealth.<sup>36</sup>

Has inequality gone too far in China? The evidence compiled in this paper is obviously not sufficient to provide answers to such a complex issue. However, at the very least, our findings indicate that there is a need for more transparency about income and wealth. The recently released tax statistics on high earners leads us to

<sup>36</sup>To conduct such an analysis, however, one would need to collect systematic data on the amount of taxes paid and public transfers received by each group of the population. In this paper, we restricted ourselves to analyzing the distribution of pre-tax-and-transfer income; we leave the task of estimating the distribution taxes, transfers, and post-tax-and-transfer income to future research (see Piketty, Saez, and Zucman 2018 for an attempt in the case of the United States).

propose a large upward correction of official income inequality estimates. Improved access to tax statistics could lead to further revisions. The current lack of transparency about income and wealth data in China, and elsewhere, puts serious limits to our collective ability to monitor inequality dynamics and design adequate policy responses.

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