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WHY HAS CHINA'S INEQUALITY OF HOUSEHOLD WEALTH RISEN RAPIDLY IN THE TWENTY-FIRST CENTURY?

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The inequality of wealth in China has increased rapidly in recent years. China presents a fascinating case study of how inequality of household wealth increases as economic reform takes place. Wealth inequality and its growth are measured and decomposed using data from two national sample surveys of the China Household Income Project (CHIP) relating to 2002 and 2013. The changing relationships between income and wealth are explored. An original attempt is made to explain the rising wealth inequality in terms of differential saving, differential house price inflation, income from wealth, and a growing urban-rural wealth disparity. Income from wealth as conventionally measured makes a negligible contribution but becomes central when it is reformulated to include real capital gain as part of income. A series of counterfactual experiments are conducted in order to measure the contributions of the various factors to the rise in inequality. Wealth and wealth inequality increase most rapidly for those in the top wealth decile.

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Prior to the economic reform that began in 1978, most Chinese households possessed negligible wealth. In that time, there was no entrepreneurial class, no markets for assets, urban land and housing were publicly owned, rural land was communally owned, and rural people merely had rights of occupation to their village houses. Inequality of wealth largely took the form of unequal access to state

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TABLE 1
National Gini Coefficient of Wealth per capita and Income per capita Inequality

	Level	Change
2002 wealth	0.495	
2013 wealth	0.617	0.122
2002 income	0.424	
2013 income	0.444	0.020

assets. Four decades later, if we are to believe the *Hurun Rich List 2016*, China had more dollar billionaires than any other country in the world. China, therefore, presents a fascinating case study of how inequality of wealth increases rapidly as economic reform takes place, marketization occurs, and capital accumulates.

We address the question posed in our title, proceeding as follows. Section 1 sets the scene and briefly discusses the relevant literature. Section 2 describes the data to be analyzed. Section 3 examines and decomposes China's increasing inequality of wealth. Section 4 explores the relationships between income and wealth in the 2 years. Sections 5–7consider various possible reasons for the rise in wealth inequality: differential saving rates (Section 5), house price inflation and its variation across households (Section 6), andthe share of income from wealth in total income (Section 7). An attempt is made in Section 8 by means of counterfactual analyses to estimate the conditional contributions of different forces to the overall rise in wealth inequality. Section 9 concludes and reflects. A Data Appendix explains how the data were prepared.

1. Setting the Scene

Table 1 reports the basic facts of national wealth inequality as measured by the Gini coefficient. Wealth inequality is shown on a household per capita basis. The Gini coefficient expressed in nominal terms rose from 0.50 to 0.62 between 2002 and 2013.[1] Over those 11 years, wealth inequality did indeed increase sharply, by some 11 or 12 Gini percentage points depending on the precise method of estimation, that is, by about one percentage point a year.

To put China's inequality of wealth in international perspective we draw on Davies *et al*. (2008). The authors report estimates of the Gini coefficient of household wealth in major economies, centering on the year 2000. The degree of wealth inequality is generally higher than that of income inequality. China's unadjusted wealth Gini of 0.62 in 2013 is exceeded by no fewer than 20 of the 26 countries. The average value of the Gini for all the countries is 0.68. China's degree of wealth inequality is moderated by its remarkably high rate of home ownership in both urban and rural areas compared to most countries, and by its relatively

[1]The Gini coefficient of household wealth per capita is generally 3 to 5 percentage points higher than that per household. Expressing 2002 wealth in 2013 consumer prices makes little difference: the 2002 Gini falls by about one percentage point as a result. However, when wealth is corrected for province, urban and rural consumer price differences [based on Brandt and Holz (2006) and adjusted to our 2 years], the 2002 Gini becomes 0.45 and the 2013 Gini 0.57.

high—almost universal—rate of land "ownership" in rural areas. The inequality of wealth in China is not exceptional. What might be exceptional, however, is its rate of increase. Knight *et al*. (2020) used the Pareto distribution to correct the estimate of wealth inequality in 2013 for under-reporting and under-representation, and concluded on plausible assumptions that the Gini coefficient might be raised by nine percentage points, from 0.62 to 0.71. It is likely that the scope and incentive to hide wealth at the top increased over the period, in which case our estimate of the increase in wealth inequality is understated.

Piketty *et al*. (2019) provides a good survey of, *inter alia*, the growth and distribution of household wealth in China. The authors draw on several sources for this purpose, including National Bureau of Statistics annual household surveys, earlier CHIP household surveys, The China Household Finance Surveys, the China Family Panel Studies, and national accounts data. The authors report that the inequality of wealth per capita among households increased rapidly over the period 1995–2016. Their measure of inequality is the percentage of wealth owned by a specified top or bottom percentage of households. For instance, the share of the top 10 percent increased from 44 percent in 1995 to 67 percent in 2016 (Piketty *et al*., 2019, p. 2489). However, they do not conduct research on the causes of this rise in wealth inequality. Nor do the authors mention the analysis of causes in other cited publications. Several authors make estimates of wealth inequality or its growth, including Li *et al*. (2014), Xie and Jin (2015), and Li and Wan (2015). Of those who measure the increase in wealth inequality over a period, each finds a rapid increase, but to the best of our knowledge only Li and Wan (2015) examines causes—in fact, only one cause. They make the counterfactual assumption that the relative housing price remained constant between 2002 and 2010, and on that basis they find that house price inflation made a substantial contribution to the rise in wealth inequality. The question that we pose in our title appears to be virgin territory.

In the absence of prior research upon which to build, consider the various factors that might be responsible for this rising inequality of wealth. China has experienced very rapid physical capital accumulation: since 2000 the proportion of GDP that is invested has generally exceeded 40 percent. Wealth has, therefore, risen rapidly: the question is whether the increase in wealth has accrued unequally among households.

If the saving rate is positively related to income, and if wealth is positively related to income, this provides a channel that is likely to unequalise wealth-holding. The share of profits in national income has been high throughout the period, being 37 percent in 2007 (Knight and Ding, 2012, p. 164). Some profits accrued to the state, some accrued to shareholders, and some were saved. Some of this saving raised the value of personal holdings of company shares. If share-holding were unequally distributed among households, paid-out profits and capital gains would probably contribute to the rising inequality of household wealth in China. If there is a higher saving rate out of income from wealth than out of other income, that too can increase wealth inequality.

A relative rise in the price of wealth assets—property and in particular housing—enriched those who held wealth and enriched most those who held most wealth. China has experienced a great surge in house price, and this is likely to have

increased the inequality of housing wealth. Financial markets in China remain imperfect, so providing opportunities to acquire wealth for those with preferential access to funds or with the ability to save a high proportion of their income. For these reasons, it is possible that the real rate of return on wealth increases as wealth increases.

2. The Data

Being members of the team that designed and implemented the China Household Income Project, we utilise two rounds of the CHIP national sample surveys. The surveys were carried out in 1988, 1995, 2002, 2007 and 2013. We decided to compare wealth inequality using the 2002 and 2013 CHIP surveys. The CHIP surveys are representative sub-samples of the National Bureau of Statistics household surveys for these years. Some information is obtained directly from the NBS questionnaires and much is obtained from the CHIP questionnaires, which are designed with research hypotheses in mind. The year 2013 is the latest for which we have data. We opted for 2002 as the base year rather than an earlier or later year because the 2002 CHIP survey is the first comprehensive data source on wealth and because it is interesting to take a long-term view of trends in wealth. Privatisation of urban housing occurred in the 1990s: urban households acquired the houses that they occupied, at controlled and subsidised prices. Household inequality of urban wealth actually fell during a period in the late 1990s and early 2000s as the remaining minority of urban housing stock became privatised. It is more illuminating to analyse the later period of rising wealth inequality.

We need the data to be as comparable as possible. Fortunately, the variables relating to wealth are identical or very similar in the 2002 and 2013 surveys. Thus the estimates of wealth distribution can be compared given appropriate weighting. The weights used were effectively the same as those applied generally in the CHIP 2002 and 2013 surveys to achieve national representativeness.[2] Thus, a strength of the CHIP surveys is that the 2 years (11 years apart) are rigorously comparable, and changes in wealth inequality over the period, and their causes, can be precisely examined.

Another strength is that the CHIP surveys provide the best data set on household wealth in China that is available to answer our title question.[3] National accounts data on wealth are too aggregative, the NBS household survey data are not available at the micro-level, we share the conclusion of Piketty *et al*. (2019, p. 2490) that the China Household Finance Survey has a problem of' "outliers, limited sample size, and issues related to sample design," and it and other available

[2]The CHIP samples were stratified by two criteria: urban/rural and east/centre/west. A set of sampling weights was created on the basis of population numbers in each stratum in 2002 and in 2013. Our samples are representative of urban and rural areas and of provinces, and representative within each province. Weighting is discussed in the volume (Sicular et al., 2020, ch. 2, pp. 37–39) based on the 2013 CHIP survey.

[3]Piketty *et al*. (2019, p. 2479, fn. 26) states incorrectly that the 2013 CHIP survey has no information on housing values. Unfortunately, the NBS required that certain data, including housing wealth, that were obtained directly from its own survey should not be made public. Housing wealth is, therefore, not reported on the 2013 CHIP website.

wealth data series, such as the China Family Panel Survey, are too short in duration to offer a satisfactory explanation of the causes of rising wealth inequality.

Details of how the wealth data were prepared are provided in the Appendix. Here we concentrate on the most important data issues. Valuing wealth—in particular housing and land wealth—inevitably encountered problems given China's marketising, but still semi-marketised, economy. Net housing is housing value minus housing loan. This is based on respondents' reported values (of both owner-occupied and other houses) in each year, despite the weakness of the housing market in rural China. No information was gathered in the surveys on the asset value of rural land: households merely have user rights to their land. It is possible to base the valuation of rural land (defined as cultivated land, pasture and forest) on reported net agricultural income. As is explained in the Appendix describing the components of wealth, the formula for the conversion from net agricultural income to the value of rural land is based on previous research findings. Land assets in urban areas are defined to be zero.

Missing values had to be interpolated. For instance, where a housing value is missing, the imputation of housing value is on the basis of price per square metre at the local (county or city or municipality district) level. Where consumer durables are listed but not valued, they are valued using local consumer durable prices, derived from households which reported both values and quantities.

Comparative real wealth is obtained by inflating 2002 nominal wealth by the NBS's consumer price indexes, so as to express the 2002 values in 2013 prices. We use province-level consumer price indexes, distinguishing also between urban and rural indexes. Throughout the paper our discussion of wealth is real wealth, that is, measured at 2013 constant cpi-adjusted prices. The wealth concept of most interest is not total household wealth but household wealth per capita. Thus, when we refer to the term wealth, we mean real household wealth per capita.

It will become evident below that the growth of housing wealth has made a considerable contribution to the growth in inequality of household wealth. It is, therefore, important to examine the role of house price inflation in this process. The task is complicated by the fact that our two data sets do not constitute a panel. It was necessary to create a pseudo-panel. Our approach was to calculate house prices from the CHIP surveys for each of the urban and rural areas within each included province. Cities or districts within cities (in the case of metropolitan areas) were used for urban areas and the local city in rural areas. Reflecting the data available, each subsample was divided into ranked subgroups based on average house value per square metre, and these subgroups were compared in 2002 and 2013. If an area was not included in both years another location in the province with very similar housing price was substituted. The resultant house price inflation index was then applied to all households in each area. As a robustness test we also used data published by the Ministry of Housing and Construction, which show the value of sales of commercialised buildings, and the corresponding sold floor space, at district and county level. From this information it was possible to construct a housing inflation index for each district and county. The results obtained by the two approaches were similar. Only the measures based on the CHIP surveys are reported.

Our interest is in relative house price inflation, measured as house price inflation divided by consumer price inflation. Because wealth in 2002 and 2013 is

calculated in real terms using 2013 constant prices, 2002 house prices are already inflated by the consumer price index. We shall refer to this measure as relative house price inflation or real capital gain from house ownership.

At several points in this paper, household wealth is related to household income, both expressed in per capita terms. We follow the CHIP income definition in the 2013 survey except in the case of imputed rents of owner-occupied housing, which is less reliable than other components of income. In all analyses involving income, two estimates were made—including and excluding imputed rents in income—but if the differences are trivial, only the results excluding imputed rents are reported. We follow Luo *et al*. (2020) in estimating imputed rents. For urban households occupying their own houses the imputed rent is set equal to the expected market rent from the dwelling, as self-reported by the household. For rural home-owning households the rent is imputed as the self-reported value of the dwelling multiplied by the rate of return on long-term safe assets. However, in cases where imputed rents can make a substantive difference, both sets of results are shown.

We confine our analysis to the rural and urban samples of CHIP. Although there was a rural-urban migrant sample in both 2002 and 2013, the 2002 migrant questionnaire contained little information relating to income and, especially, wealth. Since our objective is to examine the rise in wealth inequality between the 2 years and its causes, it is necessary to exclude rural-urban migrants from the analysis. Insofar as the rural surveys include households containing absent migrants, their wealth is covered by the rural questionnaire.

As the rural and urban surveys are separate, it is possible to examine wealth in each of them as well as in the weighted national survey. There is an analytical case for doing so because the rural sector is much poorer and subject to sharply different economic policies and institutional arrangements: their trends in inequality might differ. However, for brevity and because their trends are generally similar, we present only the national measures unless the rural-urban distinction is important for understanding.

Certain limitations of the data sets should be noted because they restrict the analysis. First, as the two surveys do not constitute a panel of households, it is not possible to examine inter-temporal mobility of wealth, and it is necessary to calculate rates of house price inflation by means of a pseudo-panel. Second, there is no information on capital gain in 2002 or 2013, only average capital gain over the period 2002–2013. It is, therefore, not possible reliably to include capital gain as part of income in the 2 years, and capital gain is not initially included in annual income. Third, because there are no data on the years between the two survey years, it is not possible to test for causation by means of time series analysis. Fourth, we can measure only gross income or gross saving of a household, not net income or net saving. Despite these qualifications, the data set is a rich source of information with which to answer the question posed in our title.

3. China's Increasing Inequality of Wealth

3.1. *The Level of Wealth and its Growth, 2002 and 2013*

Table 2 has six columns: the first two (A and B) relate to the level of wealth (per capita) in 2002, the next (C) to the level of wealth in 2013, and the fourth column

TABLE 2
National Level, Growth and Structure of Wealth per capita (in Yuan, %)

Category	Actual 2002	CPI-Adjusted 2002	Actual 2013	Annual Real Growth Rate, 2002–2013	Structure of Wealth (%)	
	(A)	(B)	(C)	D=(C−B)/B	2002	2013
Overall net wealth	21803.4	30118.3	162828.6	16.6	100.0	100.0
Land	2517.8	3644.2	4818.7	2.6	12.1	3.0
Financial assets	4830.0	6615.8	25650.0	13.1	22.0	15.8
Net housing	11646.7	15952.8	117977.9	19.9	53.0	72.5
Productive fixed assets	1020.3	1455.5	4560.0	10.9	4.8	2.8
Consumer durables	1785.8	2459.8	9600.0	13.2	8.2	5.9
Other assets	228.2	309.1	972.8	11.0	1.0	0.6
Non-housing debt	−225.5	−318.9	−750.9	8.1	−1.1	−0.5

Note: In this and all subsequent tables and figures wealth is defined as household wealth per capita, we show only cpi-deflated wealth, that is, both 2002 and 2013 wealth is reported in constant 2013 prices.

TABLE 3
National Household Wealth Share by Wealth per capita Decile and Income per capita Decile (%)

Deciles from Lowest to Highest	Wealth Share by Wealth Decile		Wealth per capita (Yuan) by Wealth Decile		Wealth Share by Income per capita Decile	
	2002	2013	2002	2013	2002	2013
1	1.2	0.4	3,748.0	7,687.9	2.9	2.5
2	2.6	1.4	8,254.1	22,575.2	3.9	2.9
3	3.6	2.2	11,665.9	33,396.8	4.8	3.3
4	4.6	3.0	15,151.2	45,232.3	6.0	4.4
5	5.7	4.0	19,086.9	59,417.4	7.0	5.2
6	7.0	5.4	23,956.0	77,473.8	8.4	6.9
7	8.9	7.4	30,799.5	104,427.6	10.5	9.0
8	11.8	10.7	41,266.0	148,946.4	13.4	12.1
9	17.5	17.2	60,446.5	238,683.0	16.4	17.5
10	37.2	48.4	121,947.2	701,954.6	26.6	36.0

(D, derived from C and B) shows the real annual growth rate of wealth over the 11 years. National wealth is reported by asset type in the final two columns.

At the national level, overall net real wealth per capita increased by 16.6 percent per annum, and net housing was the asset type that increased fastest (19.9 percent). Similar patterns were found in urban and rural China, the corresponding figures being 16.8 percent and 19.4 percent, respectively, (urban) and 14.1 percent and 17.9 percent, respectively (rural). The share of net housing rose from 53 percent to 73 percent of China's total wealth. Housing clearly plays a central role in China's accumulation of wealth. It will be important to enquire whether it also plays a central role in the rising inequality of wealth.

3.2. *The Distribution of Wealth, 2002 and 2013*

The distribution of real household wealth by real wealth per capita decile is reported in the first two columns of Table 3. The share of the richest decile rose from 37 percent to 48 percent, a rise of 11 percentage points. In fact, only the top decile experienced an increase in share over the period: the shares of each of the other nine deciles fell. The next two columns report the national wealth per capita by decile. The ratio of the highest to the lowest decile was 33 times in 2002 and no less than 91 times in 2013. The ratio of the tenth to the ninth decile rose from 2.0 to 2.9.

A Lorenz curve for household wealth per capita for China as a whole (not presented) shows that the 2013 curve is more bowed than the 2002 curve throughout its range, indicating a rise in inequality throughout the wealth distribution. The same is true in both urban and rural China.

Relating the share of wealth to income deciles instead of wealth deciles, Table 3 reports as well the share held by each household income per capita decile. There is a monotonic rise in this share with income per capita. For instance, in 2002 the share of the lowest income per capita decile was 2.9 percent and that of the highest decile 26.6 percent, and in 2013 the share varied from 2.5 percent to 36.0

percent. The ninth decile and, in particular, the tenth decile increased their share of total wealth not only in the country as a whole but also in urban and in rural China. The share of household wealth per capita is positively related to household income per capita, and increasingly so.

3.3. *Decomposition of Wealth Inequality, 2002 and 2013*

Table 4 employs the standard method for the decomposition of inequality among different components, in this case forms of wealth holding. The first column shows the share of each item in total wealth, the second column the Gini coefficient for that item, the third column the concentration ratio, reflecting the correlation between wealth of that item and total wealth. The final column, derived from the product of these three variables, yields the result of most interest: the contribution of each item to overall wealth inequality.

The contribution of net housing to the inequality of wealth rose, being 64 percent in 2002 and a remarkable 79 percent in 2013. The only other form of wealth holding to make an important contribution was financial assets, and this fell between 2002 and 2013, from 25 percent to 13 percent, reflecting the rising contribution of net housing.

4. The Wealth-Income Ratio

How does wealth relate to income? Do households with higher income per capita have proportionately higher wealth per capita? Figure 1 shows the wealth/income ratio by income decile (both expressed in per capita terms) in 2002 and 2013. Causation cannot be attributed to the relationship: it might run from income to wealth or from wealth to income, or in both directions. Nevertheless, the results are informative.

In 2002 the wealth/income ratio was very similar for the urban, rural and national samples. The ratio was highest for the poorest income decile but beyond the second decile the ratio was fairly constant, declining only slightly. In China as a whole the average ratio was 4.9. The high ratio for the poorest two income deciles might be due to the egalitarian system of land holding and the possibility that income fluctuations raised the ratio of wealth (for instance, land and housing) relative to the income of households in temporary income poverty (for example, instances of negative net income). The analysis by income decile reveals a relationship that might well be obscured if it were estimated by means of a functional form.

The wealth/income ratio was generally higher in 2013, notably for the poorest and the richest households. The national, as well as the urban, ratio increased beyond the median income, so producing a U-shape. This tendency for the wealth/income ratio to rise with income (beyond a low income level) is observable in 2013 but not in 2002. It is possible that the tendency for some households to have high transitory income (placing them temporarily in the upper deciles), and thus low transitory wealth-income ratios, can be seen in 2002, whereas in 2013 this tendency is outweighed by the tendency for high-income households to have accumulated wealth disproportionately over the period, at least in the urban and national

TABLE 4
National Household Wealth Inequality and its Decomposition

Category	Wealth Structure	Gini Index	Concentration Ratio	Contribution to Overall Wealth Inequality
2002				
Land	0.096	0.699	−0.011	−0.001
Financial assets	0.229	0.686	0.795	0.250
Net housing	0.548	0.637	0.915	0.639
Productive fixed assets	0.043	0.852	0.416	0.030
Consumer durables	0.083	0.573	0.673	0.064
Other assets	0.011	0.962	0.620	0.014
Non-housing debt	−0.010	−0.951	0.252	0.005
2013				
Land	0.039	0.714	−0.012	−0.001
Financial assets	0.160	0.647	0.763	0.130
Net housing	0.711	0.702	0.960	0.785
Productive fixed assets	0.031	0.942	0.608	0.029
Consumer durables	0.059	0.746	0.685	0.049
Other assets	0.006	0.915	0.695	0.006
Non-housing debt	−0.005	−1.212	0.203	0.002

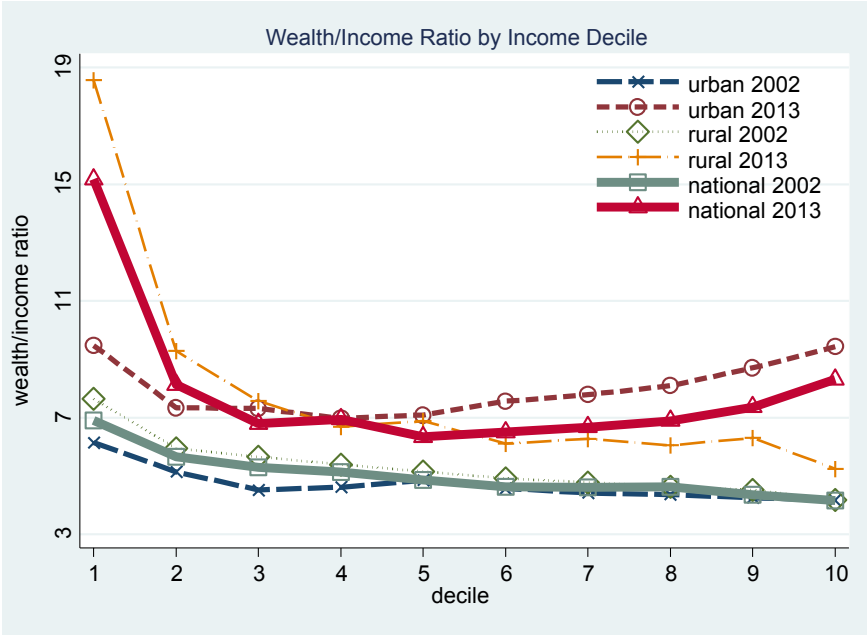

Figure 1. Wealth/Income Ratio by Income per capita Decile [Colour figure can be viewed at wileyonlinelibrary.com]

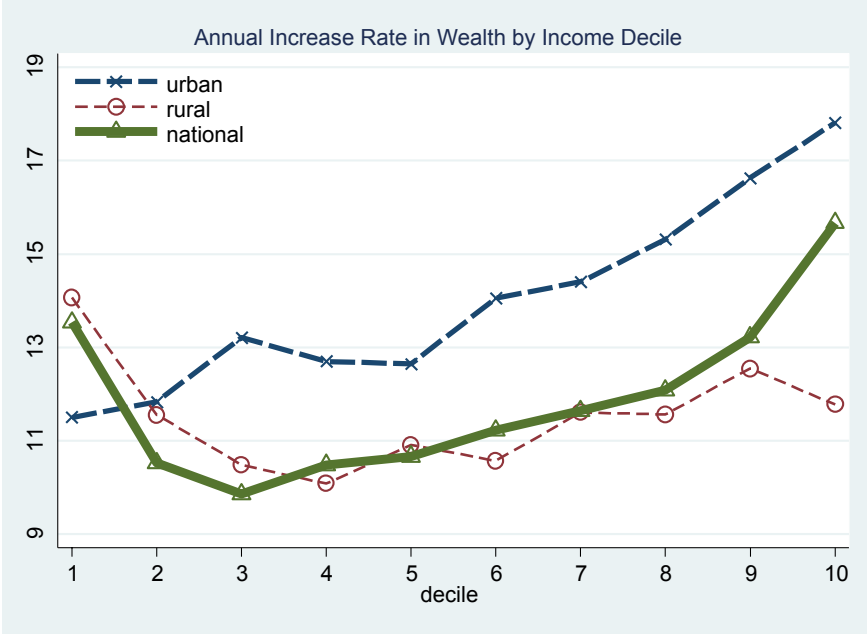

Figure 2. Annual Percentage Increase in Wealth by Income per capita Decile [Colour figure can be viewed at wileyonlinelibrary.com]

samples. The country's wealth/income ratio in 2013 was 7.4, having increased rapidly—by no less than 2.5—over the 11 years. The inclusion of imputed rent in income reduces the ratios only slightly: the national ratios become 4.5 in 2002 and 6.2 in 2013.

Figure 2 reports the growth of real wealth per capita over the period 2002–2013 by income per capita decile. In the rural sample the growth rate begins to rise after the fourth decile, and in the national as well as the urban, sample, after the second decile, being highest in the tenth decile. There is a tendency for China's income-rich to become relatively wealth-richer.

5. Differential Saving Rates

One channel by which wealth inequality can increase is through differential saving: the rich might save a higher proportion of their income than do the poor. Saving is defined as disposable income per capita minus consumption per capita, with imputed rent excluded from both income and consumption. Expenditure on consumer durables is not part of measured consumption, being treated instead as an addition to wealth.

Our objective in this section is to consider whether differential saving rates are likely to have contributed to the rise in wealth inequality. We do so by examining how saving rates vary by household income per capita decile and wealth per capita decile, and then analysing the responsiveness of the saving rate both to income per capita and to wealth per capita in the same regression equation.

Table 5 and Figure 3 show the saving rate (i.e. saving as a percentage of income) by income per capita decile.[4] The table displays a monotonic rise in the saving rate as we move up the deciles. Figure 3 shows that this is also true for rural and for urban China.[5] At the national level, in 2002 the saving rate rose from −36.8 percent in the lowest decile to 32.3 percent in the highest, and in 2013 it rose from −55.5 percent to 56.6 percent. Some negative saving is to be expected in the lowest decile if there is transient poverty. Table 5 (but not Figure 3) shows as well the saving rate when imputed rent is included in income. Because the numerator is unchanged (imputed income is added to both income and consumption) and the denominator is increased, the saving rate is universally lower (closer to zero), but only slightly so. The saving rate is again a strongly positive function of income per capita decile.

Table 5 and Figure 4 also do the same by wealth per capita decile. Again, there is a general upward trend in the saving rate as we move up the wealth per capita deciles. For instance, at the national level in 2002 the saving rate rises from 12.4 percent in the lowest wealth decile to 26.2 percent in the highest, the corresponding

[4]The small number of observations with income less than or equal to zero are excluded from the table and figure because they produce misleading, positive saving rates. This adjustment is made whenever the saving rate is calculated or results are shown by income decile. The effects of exclusion are small.

[5]IMF (2018) obtained higher saving rates (but with similar upward trend) from the CHIP 2013 survey but these results are unreliable because many observations (with negative income for any income source) were possibly excluded from the sample.

TABLE 5
National Saving Rate by Income and by Wealth per capita Decile (%)

Deciles from Lowest to Highest	Income Decile				Wealth Decile			
	Imputed Rent Excluded		Imputed Rent Included		Imputed Rent Excluded		Imputed Rent Included	
	2002	2013	2002	2013	2002	2013	2002	2013
1	−36.8	−55.5	−27.3	−35.5	12.4	29.8	12.1	28.7
2	−2.6	0.4	−3.0	2.3	14.0	31.2	13.5	29.3
3	6.4	17.1	8.4	15.8	15.2	32.4	14.5	29.8
4	17.2	25.4	14.2	22.9	17.0	34.4	16.1	31.1
5	18.0	33.4	17.3	29.6	21.1	37.8	20.0	34.0
6	18.3	39.9	17.7	34.1	22.2	40.9	20.8	36.4
7	20.1	44.3	18.9	37.9	23.1	44.7	21.5	39.2
8	22.5	46.1	20.4	40.2	23.7	46.4	21.9	40.4
9	24.7	49.5	22.4	43.6	24.3	47.3	22.0	40.1
10	32.3	56.6	28.8	47.7	26.2	52.4	22.8	41.9

figures in 2013 being 29.8 percent and 52.4 percent, respectively. The difference in saving rate between the lowest and the highest wealth decile exceeds 20 percentage points in 2013. Table 5 records that when imputed rent is included in income, the saving rate is slightly lower but the story is not at all affected. Figure 4 shows that the 2002 national and urban curves barely rise after the mid-deciles, whereas in 2013 the rise in the saving rate is almost monotonic for all three curves. The sensitivity of the saving rate to income decile may be overstated on account of transitory changes in income. Households with temporarily low income are likely both to be reported in a lower income decile and to reduce their saving rate in order to maintain consumption, and those with temporarily high income are likely both to be in a higher income decile and to save more. However, transitory income should not affect the relationship between the saving rate and wealth decile.

Table 6 presents a regression analysis to distinguish the separate effects of income per capita and wealth per capita on the saving rate. Columns 1–3 refer to 2002 and 4–6 to 2013. In each year income per capita on its own has a positive and significant coefficient, and the same is true of wealth per capita. However, when both explanatory variables are included (columns 3 and 6), the income per capita coefficient is even larger but the wealth per capita coefficient becomes negative. For instance, in 2013 an increase in income per capita of 1,000 yuan raises the saving rate by 0.86, whereas the same increase in wealth per capita reduces the saving rate by 0.01. The addition of an income squared term and a wealth squared term in the regressions (singly and combined, not shown in the table) makes no difference to our interpretation: the income terms have a positive effect over the relevant range and both wealth terms have negative coefficients.

These results are understandable. There is a tendency for the wealthy to reduce saving as they approach their target levels of wealth. The important point, however, is that income and wealth are positively correlated, so that—because they tend to have higher income—wealthier households tend to save more of their income. Even though wealthier households might on average be closer to their

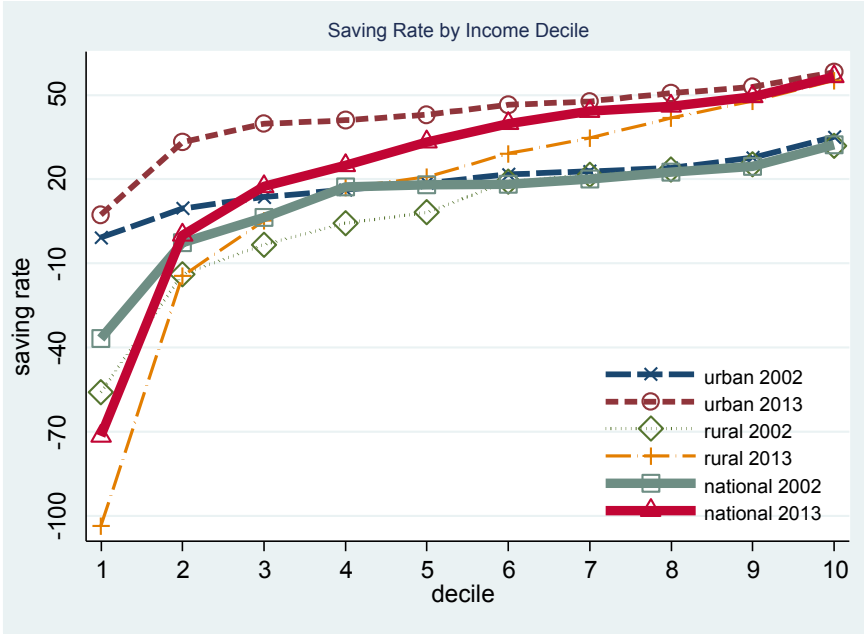

Figure 3. Saving Rate by Income per capita Decile (%) [Colour figure can be viewed at wileyonlinelibrary.com]

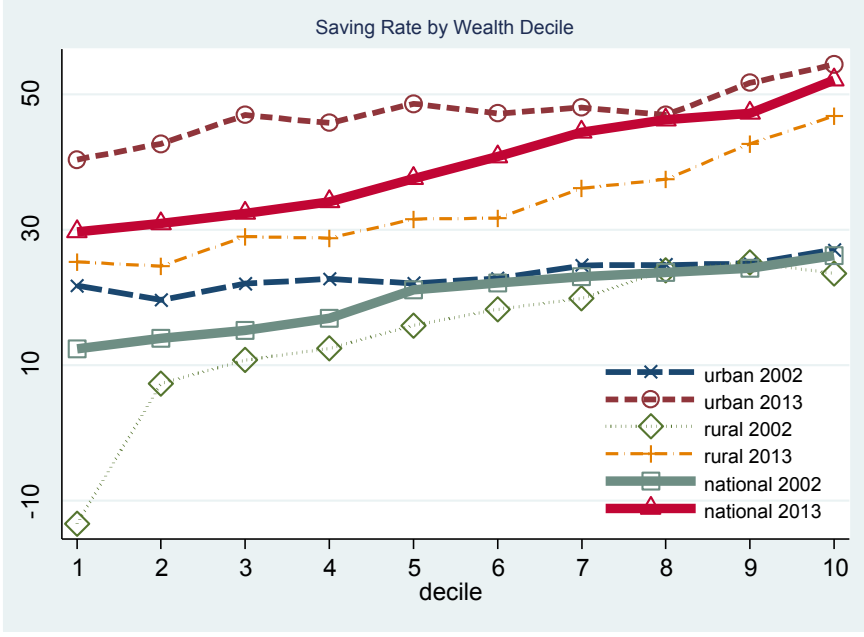

Figure 4. Saving Rate by Wealth per capita Decile (%) [Colour figure can be viewed at wileyonlinelibrary.com]

TABLE 6
ROLES OF INCOME AND WEALTH AS DETERMINANTS OF THE SAVING RATE: REGRESSION ANALYSIS

	(1)	(2)	(3)	(4)	(5)	(6)
	2002	2002	2002	2013	2013	2013
Income per capita	1.972***		2.590***	0.761***		0.860***
	(0.060)		(0.081)	(0.017)		(0.020)
Wealth per capita		0.139***	−0.159***		0.024***	−0.013***
		(0.011)	(0.014)		(0.001)	(0.002)
Constant	−0.786	7.929***	−0.046	13.612***	26.647***	13.527***
	(0.530)	(0.484)	(0.532)	(0.516)	(0.431)	(0.515)
Observations	16,483	16,483	16,483	17,090	17,090	17,090
R-squared	0.061	0.010	0.068	0.108	0.019	0.112

Note: The dependent variable is the saving rate, ranging from −200 to 100. Observations with income less than or equal to zero are excluded because they produce misleading saving rates. The income per capita and wealth per capita variables are in yuan divided by 1,000. Income and saving exclude imputed rent of owner-occupied housing. *** denotes statistical significance at the 1% level.

target wealth levels, they tend to accumulate more quickly. To summarise, households with higher income, and also those with higher wealth, save a higher proportion of their income. We show in one of the counterfactual experiments of Section 8 that these disparities in saving rates do indeed contribute to the rising inequality of wealth among households.

6. Differential House Price Inflation

Our objective in this section is to judge whether differential house price inflation is likely to have contributed to the rise in wealth inequality. We use a measure of house price inflation relative to consumer price inflation and distinguish between the effects of increased quantity and increased price of housing. Given that much of the difference in household wealth per capita is found to be due to relative house price inflation, we then examine its variation across the sampled areas.

Table 7 divides the increase in housing wealth into that part which is due to relative house price inflation and that part due to a real increase in housing. However, our measure of relative house price inflation necessarily includes the value of house improvements per square metre: it is not a pure price effect. The real increase (the increase in housing quantity) is represented by an increase in the average number of square metres reported. Insofar as part of the increase in house values is due to housing improvements, these improvements represent a form of wealth holding that yields high returns to the investment. After eliminating the effect of relative house price inflation (74 percent of the increase), 26 percent is due to the increase in the volume of housing wealth. The proportions are very similar to the national case in both urban and rural China. Much of China's rapid growth in housing wealth can be attributed to a relative increase in house price—by no less than 14.9 percent per annum.

This seems important enough to examine its effect on the growth of household wealth as a whole. Thus, Table 7 also divides the change in household wealth over the 11 years into that part which is due to house price inflation (relative to consumer price inflation) and other factors. No less than 57 percent of the increase in household wealth reflects the relative house price index and 43 percent reflects other influences. We see the great importance of relative house price inflation for the growth of household wealth in China, albeit greater in urban than in rural areas.

Figure 5 shows the housing price (per square metre) in 2002 on the horizontal axis, with regions (county, city, or district of municipality) of the country, ordered from the lowest priced region in 2002 on the left to the highest priced on the right; the prices (in 10,000 yuan) range from 0 to 0.6. The regions to the far right are the four municipalities that are included in both years, Beijing, Shanghai, Tianjin and Chongqing. The vertical axis (also measured in 10,000 yuan, but ranging from 0 to 4.0) shows the housing price of each region in 2013. The best fit to the points is curvilinear, curving upwards. Areas with initially higher house prices benefited from proportionately faster house price inflation. The importance of relative house price inflation and it wide variation suggests that it may well have contributed to

TABLE 7
GROWTH OF HOUSEHOLD NET WEALTH PER CAPITA: SIMULATION WITH DEFLATED HOUSE PRICES

	Level of Household Net Housing Wealth per capita (Yuan)			Change in Housing Wealth	Contribution to Change in Housing Wealth (%)	
	2002	2013	2013 (Deflated by Relative House Price Increase)	2002–2013	Relative House Price	Housing Quantity
Sample	(A)	(B)	(C)	(B−A)	(B−C)/(B−A)	(C−A)/(B−A)
Urban	30,698	214,021	73,410	183,323	76.7	23.3
Rural	8,074	49,336	19,644	41,261	72.0	28.0
National	15,951	117,978	42,054	102,027	74.4	25.6

	Level of Household Wealth per capita (Yuan)			Change in Wealth	Contribution to Change in Wealth (%)	
	2002	2013	2013 (Deflated by Relative House Price Increase)	2002–2013	Relative House Price	Other
Sample	(A)	(B)	(C)	(B−A)	(B−C)/(B−A)	(C−A)/(B−A)
Urban	49,840	273,840	133,229	224,000	62.8	37.2
Rural	19,576	83,488	53,797	63,912	46.5	53.5
National	30,112	162,829	86,905	132,717	57.2	42.8

Figure 5. Housing Price by Common Area in 2002 and 2013 [Colour figure can be viewed at wileyonlinelibrary.com]

the rise in wealth inequality. This hypothesis is explored by means of a counterfactual analysis in Section 8.

7. Ratio of Wealth Income to Non-Wealth Income

Piketty (2014) argues that wealth increases more rapidly than income if the rate of return on wealth exceeds the growth of income. As wealth accumulates, so the income derived from wealth rises, and the share of income from wealth rises. If the saving rate for income from wealth is higher than that for income from non-wealth, this generates proportionately faster growth of wealth for those with more of their income derived from wealth. Thus, as the share of income from wealth in total income increases, the inequality of wealth increases. Piketty regards this mechanism to be an important explanation of the rise in wealth inequality in the advanced economies.

Nevertheless, this effect is unlikely to be important in the Chinese case. We define income from wealth as interest, dividends and rent received. In 2002 the proportions of income from wealth were very low, at 4.6 percent for the urban sample, 1.8 percent for the rural sample, and for the two combined it was 2.8 percent; in 2013 the corresponding figures were 10.8 percent, 4.5 percent, and 7.1 percent, respectively (Table 8). Thus, it is to be expected that in 2002 the proportion of income from wealth would have a negligible effect on saving, and even in 2013 only a small effect. Although the inclusion of imputed rent in income more than doubles the share of wealth income in total income, its addition is not relevant to the argument because that reduces the saving rate (the numerator of the saving rate stays constant as both income and consumption rise, and the denominator gets larger).

TABLE 8
Income from Wealth as Share of Household Income

	Urban		Rural		National	
	2002	2013	2002	2013	2002	2013
Share with imputed rent excluded (%)	4.64	10.83	1.80	4.45	2.79	7.11
Share with imputed rent included (%)	13.37	21.36	7.98	16.46	9.86	18.50

In order to investigate the argument further, we estimate OLS equations with the saving rate as the dependent variable and the share of income that is derived from wealth as an explanatory variable (Table 9). In both years there is a significant positive and significant coefficient on the share of wealth income (columns 1 and 4). However, this effect could be a non-causal association resulting from the positive relation between the share of income from wealth and income, on the one hand, and between income and the saving rate, on the other hand. Indeed, we see in the third and sixth columns that the addition of income per capita in the estimated equation (with its significant positive coefficient) eliminates the wealth effect.

Income from wealth was defined above as income from interest, profits and rents. However, if we accept Hicks' (1946, p. 178) concept of income, relative capital gain is included as income. In that case, a rise in relative housing wealth over a period is part of the income of that period. Consider the implications for the rate of return on wealth. Table 10 sets out how a more relevant rate of return to wealth in China can be constructed. The table (with explanatory notes) shows a rate of return on non-housing wealth of 2.7 percent in 2002 and 6.1 percent in 2013, and a rate of return on housing wealth (excluding real capital gain) of 4.9 percent in 2002 and 4.6 percent in 2013. They are combined together according to their proportions of total wealth to yield a return on wealth in 2002 of 3.7 percent and in 2013 of 5.1 percent. However, these low returns omit the most important benefit of holding wealth: real capital gain. The rate of return on relative house price inflation over the period was estimated above to be 14.9 percent per annum. We have to assume that this rate of return applied in the year 2002 and in the year 2013. When weighted by the share of housing wealth, their contribution raises the rate of return on total wealth by 7.2 in 2002 and by 9.5 percent in 2013, for it to become 10.9 percent and 14.6 percent, respectively.

The CHIP surveys indicate the average household real income per capita increased by 11 percent per annum between 2002 and 2013, and NBS data also indicate 11 percent per annum. It is, therefore, plausible that, when real house price inflation is included, the annual return on wealth exceeded the growth of income for much of the period. That is consistent with our evidence that the wealth/income ratio rose markedly between 2002 and 2013.

Our objective is to assess whether capital gains from housing wealth have contributed to the increase in wealth inequality. Indeed, such capital gains do increase with wealth. This is apparent from Figure 6, which shows, by wealth per capita decile, the annual percentage increase in relative house price inflation (derived for each household by the method explained above) over the 11-year period. The

TABLE 9
SHARE OF INCOME FROM WEALTH AS A DETERMINANT OF THE SAVING RATE: REGRESSION ANALYSIS

	(1)	(2)	(3)	(4)	(5)	(6)
	2002	2002	2002	2013	2013	2013
Share of income from wealth	0.330***		−0.107	0.207***		0.039
	(0.068)		(0.067)	(0.026)		(0.025)
Income per capita		1.972***	1.992***		0.761***	0.757***
		(0.060)	(0.062)		(0.017)	(0.017)
Constant	11.189***	−0.786	−0.618	29.154***	13.612***	13.422***
	(0.410)	(0.530)	(0.540)	(0.420)	(0.516)	(0.530)
Observations	16,483	16,483	16,483	17,090	17,090	17,090
R-squared	0.001	0.061	0.061	0.004	0.108	0.108

Note: The dependent variable is the saving rate, ranging from −200 to 100. The share of income from capital, excluding imputed rent from owner-occupied housing, ranges from 0 to 100. Because they produce misleading values of the saving rate observations with income less than or equal to zero are excluded. Income variables are in yuan divided by 1,000. Standard errors in parentheses. *** denotes statistical significance at the 1% level.

TABLE 10
THE REAL RATE OF RETURN ON WEALTH IN CHINA

		2002	2013
1	Share of non-housing wealth in total wealth (%)	52.2	36.3
2	Share of housing wealth in total wealth (%)	47.8	63.7
3	Rate of return on non-housing wealth (%)	2.7	6.1
4	Rate of return on housing wealth, excluding real capital gain (%)	4.9	4.6
5	Real rate of return on housing capital gain (%)	14.9	14.9
6	Weighted rate of return on total wealth, excluding real capital gain (%)	3.7	5.1
7	Weighted rate of return on total wealth, including real capital gain (%)	10.9	14.6

Note: All monetary variables are in real terms, that is, 2013 prices. Household income from non-housing wealth is interest, dividends and rent received; this is divided by non-housing wealth to obtain the rate of return (row 3). The rate of return on housing wealth excluding real capital gain is based on rent both received and imputed (row 4). Real capital gain on housing wealth is, by necessity, the average annual capital gain on housing wealth over the 11-year period, applied to 2002 and to 2013 (row 5). The rate of return on total wealth is the weighted rates of return on housing and on non-housing wealth, where the weights are taken from the shares of housing and non-housing wealth in each year (rows 1 and 2). It is shown both without (row 6) and with (row 7) real capital gain on housing wealth.

figure distinguishes urban and rural China and, within urban China, metropolitan cities and non-metropolitan areas. The rural house price inflation rate is fairly stable across the wealth deciles. In contrast, the urban rate rises after the fourth decile, and dramatically so in the tenth decile. The national rate is static up to decile 7 and thereafter rises monotonically. The figure shows that non-municipal urban areas, like rural areas, have rough stability in house price inflation across the wealth per capita deciles. The rise in the Gini coefficient of housing wealth is heavily concentrated in the big cities and near the top of the wealth distribution.

Figure 7 depicts the real rate of return (including capital gain from housing) on overall wealth per capita increasing monotonically in both years: the range being from 5.9 percent for the lowest wealth per capita decile to 12.7 percent for the highest decile in 2002, and from 10.4 percent to 14.6 percent in 2013.These figures are merely illustrative because it has to be assumed that the real capital gain in housing wealth over the period 2002–2013 applies in both end-years. The greater return that the wealthy obtain on their wealth again contributes to the rise in wealth inequality. The extent of its contribution is analysed by means of a counterfactual experiment in Section 8.

8. CONTRIBUTIONS TO THE RISE IN WEALTH INEQUALITY

A standard method was employed in Table 4 to decompose the rise in overall inequality of wealth into its various forms of wealth holding. In this section we attempt where possible to employ counterfactual analyses to estimate the

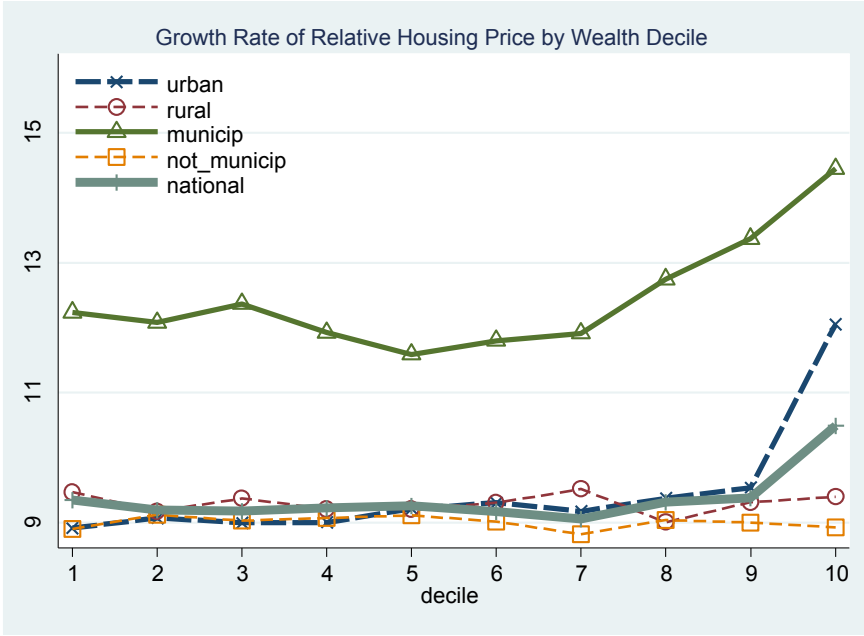

Figure 6. Annual Growth Rate of Relative Housing Price by Wealth per capita Decile (%) [Colour figure can be viewed at wileyonlinelibrary.com]

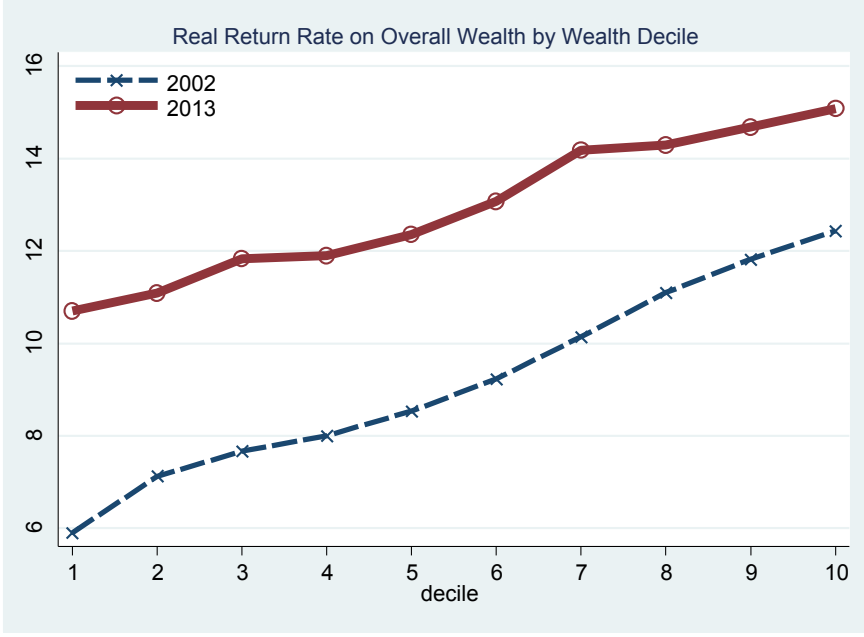

Figure 7. Real Rate of Return on Overall Wealth by Wealth per capita Decile (%) [Colour figure can be viewed at wileyonlinelibrary.com]

conditional contribution of some of the different forces at work. Each counterfactual exercise is conducted separately, and it is possible that the sum of the estimated contributions will exceed or fall short of the rise that they are intended to explain owing to interactions among the explanatory variables.

Our first counterfactual is intended to measure the extent to which the increase in wealth attributable to relative house price inflation contributes to the rise in wealth inequality. The method is to assume that house prices remained at their 2002 level in order to quantify the effect of house price inflation on the Gini coefficient of household wealth per capita (Table 11). Columns A and B show the Gini as previously estimated. Column C reports the Gini for 2013 if wealth is deflated by the relative rise in house prices between 2002 and 2013. Column (B−A) shows the rise in the undeflated Gini over the 11 years. Columns E and F measure the contributions to this rise that are due to the rise in relative house prices (B−C) and to other factors (C−A). Relative house price inflation accounted for 56 percent of the rise in urban China, 17 percent in rural China, and 47 percent at the national level. The smaller contribution in rural China reflects the lower house price inflation there. We learn from the table that the excess of house price inflation over consumer price inflation makes an important contribution to the increase in wealth inequality.

The counterfactual analysis measures the pure effect of differential house price inflation on the inequality of wealth, holding other explanatory variables constant. It does not take account of any consequential change in other determinants, which would be part of the causal effect of differential house price inflation. Yet house prices and the saving rate can be inter-related. The higher saving rate of the group of households with high income can boost their relative demand for housing and so increase their capital gain. Their greater capital gain can encourage them to consume. In that case it reduces their saving rate as conventionally defined, and, therefore, reduces the causal effect of differential house price inflation below the measured effect. However, given that the counterfactual analysis could explain almost half of the increase in wealth inequality, it is very unlikely that this endogeneity, should it occur, would obviate a large contribution to wealth inequality from differential house price inflation.

The second counterfactual is to divide the rise in housing wealth into the parts which are due to relative house price inflation and to the increase in housing volume. The lower part of Table 11 reports the results. The same columns remain relevant, the only difference being that columns A and B relate to housing wealth only (and not total wealth) and columns E and F show the contributions to the rise in the Gini of housing wealth. Volume contributed 35 percent of the increase in housing wealth in urban areas, 81 percent in rural areas, and 63% in China as a whole. At both the rural and the national levels, the rise in housing volume makes a larger contribution to the rise in housing wealth then does house price inflation.

An act of saving represents an initial addition to wealth. The third counterfactual is intended to measure the effect of differential saving rates on wealth inequality (Table 12).The method is to measure the effect on inequality of wealth per capita of the decile saving rates against the counterfactual effect that would occur if the saving rate were the same for all deciles. Average income per capita in each decile is multiplied by the decile saving rate in one case and by the national saving rate in

TABLE 11
EFFECT OF RELATIVE HOUSE PRICE INFLATION ON WEALTH INEQUALITY AND ON HOUSING WEALTH INEQUALITY

Sample	Gini Coefficient of Household Wealth			Change in Gini	Contribution to Change in Gini (%)	
	2002	2013	2013 (Deflated by Relative House Price Increase)	2002–2013	Relative House Price	Other
	(A)	(B)	(C)	(B−A)	(B−C)/(B−A)	(C−A)/(B−A)
Urban	0.472	0.557	0.509	0.085	56.4	43.6
Rural	0.384	0.548	0.520	0.164	17.4	82.6
National	0.495	0.617	0.561	0.122	46.6	53.4

Sample	Gini Coefficient of net Housing Wealth			Change in Gini	Contribution to Change in Gini (%)	
	2002	2013	2013 (Deflated by Relative House Price Increase)	2002–2013	Relative House Price	Volume of Housing
	(A)	(B)	(C)	(B−A)	(B−C)/(B−A)	(C−A)/(B−A)
Urban	0.559	0.612	0.578	0.053	64.8	35.2
Rural	0.530	0.685	0.655	0.155	19.3	80.7
National	0.642	0.707	0.683	0.065	37.4	62.6

TABLE 12
EFFECT OF DIFFERENTIAL SAVING RATES ON INEQUALITY OF WEALTH, 2002 AND 2013

		Saving rate (%)		Addition to wealth (Yuan)				Increase in wealth (%)					
				With decile saving rates		With average saving rate		With decile saving rates		With average saving rate		difference	
		2002	2013	2002	2013	2002	2013	2002	2013	2002	2013	2002	2013
		A	B	C	D	E	F	G	H	I	J	G−I	H−J
Total		22.0	43.9	1,436	9,808	1,436	9,808	4.8	6.0	4.8	6.0	0.0	0.0
Income deciles	1	−36.8	−55.5	−519	−1,539	309	1,219	−5.6	−4.2	3.3	3.3	−9.0	−7.5
	2	−2.6	0.4	−60	20	515	2,223	−0.5	0.0	4.0	5.4	−4.4	−5.3
	3	6.4	17.1	197	1,201	679	3,078	1.2	2.5	4.3	6.5	−3.0	−4.0
	4	17.2	25.4	676	2,330	862	4,025	3.4	3.7	4.4	6.4	−0.9	−2.7
	5	18.0	33.4	882	3,950	1,078	5,199	3.8	5.2	4.6	6.8	−0.8	−1.6
	6	18.3	39.9	1,125	6,029	1,349	6,637	4.0	6.2	4.8	6.9	−0.8	−0.6
	7	20.1	44.3	1,556	8,615	1,701	8,538	4.4	6.7	4.8	6.7	−0.4	0.1
	8	22.5	46.1	2,207	11,629	2,155	11,085	4.9	6.8	4.8	6.5	0.1	0.3
	9	24.7	49.5	3,145	16,895	2,800	14,994	5.6	7.0	5.0	6.2	0.6	0.8
	10	32.3	56.6	7,000	35,591	4,756	27,628	7.8	7.1	5.3	5.5	2.5	1.6
Wealth deciles	1	12.4	29.7	436	3,959	770	5,826	11.6	51.5	20.6	75.8	−8.9	−24.3
	2	14.0	30.9	465	3,268	732	4,624	5.6	14.5	8.9	20.5	−3.2	−6.0
	3	15.2	32.5	556	3,736	805	5,036	4.8	11.2	6.9	15.1	−2.1	−3.9
	4	17.0	34.2	735	4,681	951	5,993	4.9	10.3	6.3	13.2	−1.4	−2.9
	5	21.1	37.6	1,055	5,827	1,096	6,781	5.5	9.8	5.7	11.4	−0.2	−1.6
	6	22.2	40.8	1,341	7,101	1,329	7,613	5.6	9.2	5.5	9.8	0.1	−0.7
	7	23.1	44.5	1,637	9,723	1,555	9,570	5.3	9.3	5.0	9.2	0.3	0.1
	8	23.7	46.3	2,141	11,596	1,980	10,970	5.2	7.8	4.8	7.4	0.4	0.4
	9	24.3	47.3	2,729	14,815	2,462	13,716	4.5	6.2	4.1	5.7	0.4	0.5
	10	26.2	52.2	4,423	26,341	3,711	22,096	3.6	3.8	3.0	3.1	0.6	0.6

Note: The definitions of income, consumption and the saving rate are the same as in columns 1 and 2 in Table 5. For each income decile, columns A and B show the average saving rate, columns C−F show the addition that year to household wealth per capita through saving, in yuan, and columns G–J show the consequent percentage addition to the average wealth of each income decile.

the counterfactual case. It was shown above that saving is an important function of income rather than wealth but, because of the positive correlation between income and wealth, the saving rate is also positively associated with wealth. We first conduct the exercise using income deciles. Second, since our objective is to discover whether differential saving rates by wealth decile produce differential growth rates of wealth across the wealth deciles, we also use wealth deciles.

The saving rate for the sample as a whole is 22.0 percent in 2002 and 43.9 percent in 2013. The subsequent rows of columns A and B report the saving rate by income decile. The saving rate is highly sensitive to income, rising strongly with income decile. Columns C and D show, for each income decile, the additions to wealth through differential saving, and columns E and F if the saving rate is the same for all income deciles. Columns G and H show that the proportionate annual increases in wealth through saving rises dramatically with the income deciles. However, to measure the effect of differential saving rates against the constant saving rate counterfactual (shown in columns I and J) we calculate the difference between them for each income decile [columns (G−I) and (H−J)]. The increase in the difference is monotonic. In 2002 it varies from −9.0 percent in the lowest decile to 2.5 percent in the highest, and in 2013 from −7.5 percent to 1.6 percent. In both years the percentage growth rate of wealth per capita is faster for each succeeding income decile.

The lower part of the table does the same exercise for wealth deciles. The saving rates are not as sensitive to wealth as to income but the rise with wealth decile is again monotonic. The last two columns give the key results. Again, the proportionate growth rate of wealth rises monotonically with wealth decile, the range being 9.5 percentage points in 2002 and 25.0 percentage points in 2013. Other things being equal, inequality of wealth per capita grows on account of differential saving rates. The positive sensitivity of the saving rate to income decile may be overestimated owing to the effect of transitory income, but such bias should not arise if the saving rate is related instead to wealth decile.

This exercise could be conducted for only 2 years. The effect on the inequality of wealth will be cumulative over time but only if households are immobile in rank. Aggregation over the 11 years is unlikely to measure the rise in wealth inequality from this source, owing to possible movements up and down the deciles. The results for 2002 and 2013 show that, because the saving rate rises with the deciles, other things being equal, there is a powerful tendency for wealth to become more unequal in those 2 years.

The counterfactual analysis does not take account of any potential consequential change in other explanatory variables. There might be a reverse effect if greater wealth inequality alters differential saving. If wealth were more unequally distributed, the saving rates across the deciles would probably become more differentiated. In that case, the results imply cumulative causation in which the differential saving rates increase wealth inequality and the increase in wealth inequality accentuates the difference in saving rates. Such a cumulative process is itself a matter of relevance. The causal effect is then likely to exceed the measured effect, so strengthening our conclusion.

A fourth potential source of widening wealth that is amenable to counterfactual analysis concerns the increasing relative disparity between average wealth per

TABLE 13
EFFECT OF THE INCREASED RATIO OF AVERAGE URBAN TO RURAL WEALTH PER CAPITA ON THE INEQUALITY OF NATIONAL WEALTH

Sample	2002	2013	2013 with 2002 ratio	Change in Gini	Contribution to the Change in the National Gini (%)	
	A	B	C	(B−A)	Change in ratio (B−C)/(B−A)	Other (C−A)/(B−A)
Rural	0.384	0.548	0.548	0.164		
Urban	0.472	0.557	0.557	0.085		
National	0.495	0.617	0.595	0.122	18.15	81.85

capita in urban and rural China. The combination of the urban and the rural samples to obtain a national wealth Gini depends in part upon that relative disparity. We see in Table 13 that the rural, urban, and national Gini wealth coefficients were 0.384, 0.472, and 0.495 in 2002, and 0.548, 0.557, and 0.617 in 2013. The ratio of average urban to rural wealth per capita in 2002 was 2.55, and in 2013 it was 3.28. That increase in the ratio should have contributed to the increase in the national Gini.

To test this hypothesis, we assume that all urban incomes of 2013 are reduced in proportion so that the average ratio of 2002 holds also in 2013. The counterfactual is, therefore, that every urban household's wealth per capita is 0.776 of its actual level. Table 13 presents the results of this exercise. The contribution to the increase in the national Gini over the 11 years that is made by the rise in the ratio of urban to rural wealth per capita is equal to 18 percent of the total increase. The remaining 82 percent of the rise in the national Gini must be explained in other ways.

Each of these four counterfactual exercises is conducted on the assumption of exogeneity. However, some of the explanatory variables might be endogenous and so might complicate the effects on wealth inequality. Our attempt to measure separate contributions is merely broad-brush and indicative. However, it suggests that two of the variables examined—differential saving rates and differential house price inflation—are very likely to have made a substantial contribution to the increase in inequality of wealth and that the other two—increase in the volume of housing and growth in the urban-rural wealth ratio—have also contributed.

9. Conclusions and Reflections

Between 2002 and 2013 (real) household net wealth per capita in China increased by 17 percent per annum, and net housing wealth by no less than 20 percent per annum. Our comparison of China's inequality of household wealth per capita in the 2 years revealed that this inequality has risen rapidly in the twenty-first century. For instance, the share of the top wealth decile increased from 37 to 48 percent of total wealth. A decomposition of the sources of wealth inequality showed the great importance of net housing in its share of wealth and in its contribution to wealth inequality, and to their rise over time: the share rose from 53 to 73 percent and the contribution from 64 to 79 percent. The overwhelming importance of housing wealth in explaining the growth both of the level and of the inequality of household wealth is the most notable result of this paper.

To the best of our knowledge, our paper is the first attempt not only to describe China's rapidly rising inequality of wealth but also to explain the phenomenon. Our objective was to analyse that rise over the early years of the twenty-first century. Setting aside the poorest income groups, we found a tendency for the wealth/income ratio to rise with income in 2013, and for the wealth/income ratio to rise sharply over the 11-year period under examination.

The tendency for the saving rate to increase with income provides a mechanism for wealth inequality to grow, with those having more income (who also happen to have more wealth) saving more proportionately and thus accumulating wealth

more rapidly. China's conventionally measured income from wealth as a share of total income is still small, and so its effects on saving can be only minor. However, if real capital gain is regarded as part of income from wealth, it is likely to raise the saving rate of the wealthy and to accrue disproportionately to the wealthy. Housing prices rise proportionately more in the common areas with initially high housing prices– helping to explain why the real rate of return on housing increases with housing wealth.

In summary, we have adduced reasons why the inequality of wealth rises via differential saving behaviour and reasons why it rises via differential house price increases and thus via differential real capital gain. We attempted by means of counterfactual experiments to estimate the contributions of the various mechanisms at work. There are issues of endogeneity but all four of the variables examined in this way—house price inflation, increase in the volume of housing, saving rates rising with income and wealth, and growth in the urban-rural wealth ratio—appear to play an important role in unequalising household wealth per capita.

An underlying question that deserves further research is: why has house price inflation been so rapid? One possible explanation is the rapid increase in demand for housing and housing land in relation to its supply. Demand was influenced by "the greatest migration in human history" and supply by the tardy way in which land has been released for urban housing. Another possibility is that the housing market has grown stronger over time. Part of the house price inflation over this period might have represented some market undervaluation in 2002 and subsequent movement towards equilibrium market values. A reinforcing explanation is speculative demand for housing, which has occurred along with continuing house price inflation. There may be an endogenous element to the rising inequality of housing wealth: the growth of both income inequality and wealth inequality is likely to raise the relative demand for and the relative price of high-priced housing.

Although China's inequality of income appears from the 2007 and 2013 CHIP surveys now to be on the decline (Luo *et al*., 2020), we have suggested reasons to expect that the inequality of wealth will continue to rise: the tendency for the saving rate to rise with income and wealth, the remarkable inflation of relative house prices which benefits more wealthy households in particular, and the unequal opportunities for wealth creation. Only the possibility that house prices are reaching market equilibrium or are heading for a crash would be an exception. Rising inequality of wealth is a phenomenon of growing socioeconomic importance, and it calls for more extensive study in future.

Possible policy implications for China also deserve attention. These might include reform of the banking and financial system: reform can have the effect of reducing inequality in opportunities to secure access to funds, and so at least to reduce unfair wealth inequality. Government release of more land for housebuilding around the municipalities and the rapidly growing cities should reduce the highest rates of house price inflation. It is worth exploring the feasibility of introducing serious wealth, property, and inheritance taxes. Corruption among the powerful might well have increased wealth inequality. The current anticorruption campaign (described by Manion, 2016), which was introduced in 2013, is likely to temper the rise in wealth inequality that would otherwise stem from this source. It

might be necessary more generally to tackle the underlying issue of governance: the weakness of accountability that can give rise to rent-seeking and corruption.

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