Supplementary Appendix to: China's Prosperous Middle Class and Consumption-Led Economic Growth – Lessons from Household Survey Data

This supplementary appendix contains additional details about (A) the micro-level data used in our analysis, (B) our definition of the prosperous middle class, and (C) the calculations used in our decompositions of the increase in aggregate consumption.

A. The micro-level data

For the analysis we use household-level data from the 2002, 2007, 2013 and 2018 rounds of the CHIP surveys. The sample sizes are 61,889 individuals in 2002, 89,669 in 2007, 57,821 in 2013, and 70,431 in 2018 (18,124 households in 2002, 27,942 in 2007, 16,908 in 2013, 20,451 in 2018).[1]

The provincial coverage of the CHIP surveys has substantial overlap across the years but with some changes.[2] In order to adjust for changes in provincial coverage and also to correct for different sampling probabilities between the urban, rural, and migrant populations, in all estimations we employ two-level (east/west/center regions x urban/rural/migrant) sampling weights. These weights were constructed by the CHIP team using national population statistics from the official censuses and the NBS annual population sample surveys.[3]

Information in the CHIP datasets on household income and consumption was provided to CHIP by the NBS and is based on the NBS's yearly household surveys, which collect household income and expenditure data using real-time diaries. The NBS definition of disposable household income is quite comprehensive and includes wage earnings and other labor compensation, net business income, property income, and transfers received by the household from the public sector and from other households net of taxes paid and transfers to other households. The NBS definition of consumption expenditures is also quite comprehensive and includes household cash and in-kind expenditures on goods and services for daily living, including housing rents and the imputed value of farm products produced for own consumption. It does not include expenditures on the purchase of housing or mortgage payments.

In our analysis we use the disposable household income and consumption expenditure variables provided by the NBS, but some adjustments. Prior to 2013 the NBS did not include imputed rent on owner-occupied housing in either household income or consumption. Starting in 2013 it began to include an estimate of imputed rent in the income of urban and migrant (but not rural) households, and in the consumption of all households. In order to maintain consistency across years and also because the EU median income statistics that we

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[1] For more information about the CHIP surveys, see http://www.ciidbnu.org/chip/index.asp?lang=EN.

[2] The CHIP 2002 rural, 2013 rural and urban, and 2018 rural and urban surveys covered 14 common provinces: Beijing, Shanxi, Liaoning, Jiangsu, Anhui, Shandong, Henan, Hubei, Hunan, Guangdong, Chongqing, Sichuan, Yunnan, and Gansu. The CHIP 2002 urban survey covered only 12 of these provinces (Hunan and Shandong were not included). Among the above 14 common provinces, the CHIP 2007 survey does not include Shandong, but include four other provinces, which are Hebei, Shanghai, Zhejiang, Fujian.

[3] See http://ciid.bnu.edu.cn/index/news/read/id/689.html for an explanation of the CHIP weights.

use to determine the cut offs for the middle class do not include imputed rent (Eurostat 2018), in 2013 and 2018 we subtract imputed rent from the NBS income and consumption variables. Thus, in all years and for all households in our analysis, income and consumption consistently exclude imputed rent on owner-occupied housing.[4]

B. Definition of the prosperous middle class

Our cut offs for the prosperous middle class are defined relative to median income in the EU. Statistics for median EU income are published by Eurostat. The Eurostat statistics for median income are expressed per equivalent person. Eurostat uses an equivalence scale to adjust household size in order to account for economies of scale in household consumption. The equivalence scale gives a weight of 1.0 to the first adult in the household, 0.5 for additional adults, and 0.3 for each child (ages 14 years and younger). We apply this equivalence scale to the Chinese income data. Unless noted otherwise, all household income estimates reported here are per equivalent person.

Appendix Table 1. Income cut offs for the prosperous middle class (per equivalent person per year, 2018)

	Between the prosperous middle class and lower-income class	Between the prosperous middle class and upper-income class
US $	13,685	45,617
RMB	56,544	188,480

Notes: See the text for explanation.
Source: Authors' calculations based on median income per equivalent person for 28 EU member countries from the European Commission Statistical System (Eurostat, see https://ec.europa.eu/eurostat/web/main/home) and purchasing power exchange rates for private consumption from the World Bank World Development Indicators (https://databank.worldbank.org/source/world-development-indicators).

As mentioned in the text, cut offs for all years are based on the median income in a single reference year, i.e., we use fixed goalposts. Our fixed goalposts are set with reference to EU median income in 2018. We convert 2018 EU median income from Euros into RMB using the

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[4] Neither the CHIP 2013 nor 2018 dataset contains the NBS variable for income from imputed rent on owner occupied housing, but we know that the NBS estimates imputed rent income as equal to the annual depreciation of the current market value minus the cost of purchase or construction of the dwelling. We also know that the NBS calculates annual depreciation for urban households (including migrants) using straight-line depreciation with a housing lifespan of 50 years, and for rural households sets imputed rent income at zero. The datasets contain the NBS variables for the current market value and purchase/construction costs. We use them to estimate NBS imputed rent income for urban and migrant households; we set NBS income from imputed rent to zero for rural. We subtract this this estimate of NBS imputed from NBS income in 2013 and 2018. The NBS provided for the imputed rent component of consumption expenditure in the CHIP 2018 but not the 2013 dataset. We know that the NBS estimates consumption expenditures on imputed rent as equal to the annual depreciation in the market value of owned housing based on straight-line depreciation over a 50-year lifespan for urban and a 33-year lifespan for rural housing. For 2013 we therefore estimate the NBS imputed rent consumption expenditures using this formula and the current market value of housing. For 2018 we use the NBS-provided variable for consumption expenditure on imputed rent. In both years we subtract consumption expenditure on imputed rent from the NBS consumption variable.

2018 purchasing power parity (PPP) exchange rate for private consumption. The resulting cut offs are shown in Appendix Table 1.

To obtain the cut offs for 2002, 2007 and 2013, we deflate the 2018 RMB cut offs using China's domestic consumer price indexes published by the NBS. So as to allow for rural-urban differences in consumer price trends, we deflate the rural cut offs using the rural consumer price index and the urban cut offs using the urban consumer price index.

C.   Decompositions of the increase in aggregate consumption

Appendix Table 2 summarizes the calculations in the different steps of our decompositions of the increase in aggregate household consumption. To obtain these estimates we multiply the change in one variable by the level of a second variable, e.g., we multiply the change in average household consumption by the number of households. As noted in the table, the level of the second variable must be held constant. In our calculations we hold the level of the second variable constant at the average of the base- and end-year values.

Appendix Table 2 Calculations for the Decomposition of the Increase in Aggregate Household Consumption

Contribution of:	How calculated:	Notes:
i) The change in the national population of households	(The change in the national population of households) x (national average household consumption expenditures)	Average household consumption is held constant at the average of the base- and end-year values
ii) The change in national average household consumption	(The change in national average household consumption) x (the national population of households)	The population of households is held constant at the average of the base- and end-year values
iia. The change in average household consumption within each class	(The change in class average household consumption expenditures) x (the % of households in the class)	% Of households in each class is held constant at the average of the base- and end-year values
iib. The movement of households between classes	(the % of the national population that moved from one class to another) x (the difference in average household consumption between the two classes)	The difference in average household consumption between the two classes is held constant at the average of the base- and end-year values

Notes: The sum of (i) and (ii) equals the increase in national aggregate consumption. The sum of (iia) and (iib) for all classes equals (ii), the increase in national average household consumption.

Ideally, step (iib) would be calculated using data about households that moved from one class to another. Because the CHIP data are cross section, however, we cannot identify which households moved between income classes. Consequently, we must make some assumptions. First, we assume that the reduction in the population share of the lower-income class is entirely due to movement of lower-income households into the prosperous middle class, i.e., the reduction in the lower-income class's population share equals the share of the population that moved from the lower-income to the middle class. Second, we assume that the increase

in the population share of the upper-income class equals the share of the population that moved from the prosperous middle into the upper-income class.