2017

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Chuliang Luo

Terry Sicular

Shi Li

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Chuliang Luo, Terry Sicular and Shi Li

Working Paper # 2017-13 **August 2017**

Western

Centre for Human Capital and Productivity (CHCP)

Working Paper Series

Department of Economics
Social Science Centre
Western University
London, Ontario, N6A 5C2
Canada

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Overview: Incomes and Inequality in China, 2007–2013*

Chuliang Luo
Professor, Department of Economics, Business School
Beijing Normal University

Terry Sicular
Professor, Department of Economics
University of Western Ontario

Shi Li
Professor, Department of Economics, Business School, Beijing Normal University
Acting Director, China Institute for Income Distribution
Research Fellow, Institute for the Study of Labor (IZA)

*We acknowledge financial support for this research from the CIGI-INET Program on New Economic Theory, Practice and Governance.

Abstract

In this chapter we examine trends in China's household incomes, income distribution and inequality for China as a whole and for each of the urban, rural and rural-urban migrant subgroups, as well as analyzing changes in the income gaps between the urban and rural sectors and among the Eastern/Central/Western regions using the CHIP 2007 and 2013 data. Our base estimates show a decline in national inequality from 2007 to 2013. This decline is robust to alternative income definitions and different inequality indexes. The decline reflects reductions in important dimensions of inequality including the rural-urban income gap, regional income gaps, and inequality in the distribution of the major components of household income, e.g. wage earnings, asset income, etc. The decline in national inequality would have been even larger if not for rising inequality within the urban and rural sectors and the growing importance of unequally distributed income components, such as income from assets and imputed rents on owner-occupied housing. Moreover, the decline in national inequality is not robust to adjustments to correct for spatial differences in the cost of living and for under-representation of top-income groups in the survey sample. These adjustments reveal that some, if not all, of the apparent reduction in inequality from 2007 to 2013 is due to changes in prices and the growing importance of top-income individuals and their incomes that are not captured in the household surveys. The chapter contains further, detailed analyses of changes in incomes and income distribution within each of the urban, rural and migrant population subgroups.

Keywords: China, inequality, income distribution

JEL Classification: D31, O15, O53, P25, P36

1. Introduction

China's economic reforms and its transformation from a planned to a market-based economy have now been ongoing for almost four decades. During these decades China has experienced rapid economic growth, substantial structural change, and rising standards of living, as well as rising income inequality. During the early decades of reform, rising inequality was considered an inevitable and acceptable consequence of the economic reforms. As markets replaced planning, income differentiation based on supply, demand, and productivity emerged, and they provided positive incentives for work, investment and entrepreneurship. Despite the rise in inequality, moreover, the benefits of rapid growth were widely shared.

By the early 2000s, however, income inequality had reached a level that many viewed as worrisome. In the early 2000s China's Gini coefficient reached 0.45, a moderately high level by international standards (Li, Sato, and Sicular 2013; NBS 2013). In response, in the early 2000s China's new leaders, Hu Jintao and Wen Jiabao, announced a change in policy emphasis, and China embarked on a multi-pronged policy program to counteract the rising inequality and to create a universal social safety net. Nevertheless, inequality continued to rise such that by 2007 China's Gini coefficient approached 0.5 (Li, Sato, and Sicular 2013; NBS 2013).

Since 2008 inequality in China appears to have taken a new direction. According to

official National Bureau of Statistics (NBS) estimates, the Gini coefficient peaked at 0.49 in 2008–09 and then progressively declined to 0.46 in 2015, still moderately high by international standards but returning to the level of inequality observed in China in the early 2000s (NBS 2013; NBS 2016). These latest figures suggest that inequality in China may have turned a corner.

In this chapter we take a close, hard look at the recent decline in inequality using data from the CHIP 2007 and 2013 surveys. The detailed, household-level data in the CHIP surveys allow us to evaluate the official estimates in comparison to alternative, independent estimates and permit detailed analysis of the factors underlying the recent turnaround in inequality.

Our central estimates of inequality based on the CHIP data confirm the decline in national inequality from 2007 to 2013. Using the CHIP data, we calculate alternative measures of household income that adjust for deficiencies in the official income variable provided by the NBS, and we find the decline in inequality for the alternative income measures is somewhat larger than that for the official income statistics. The decline is also robust to alternative measures of inequality.

Disaggregating among subgroups and sources of income, we find that the decline in inequality reflects underlying changes in many important dimensions of China's income distribution. First, from 2007 to 2013 the urban-rural income gap narrowed, a noticeable change from the past when a secular widening of the urban-rural income gap

had contributed to rising national inequality. The narrowing of the urban-rural gap from 2007 to 2013 was the result of rapid growth in rural incomes. Urban incomes also grew but not as quickly. Within the urban and rural sectors, however, income inequality increased.

Second, regional income gaps narrowed, the result of relatively rapid income growth in the Center and West regions of the country. This was a continuation of the past catch-up among regions and suggests that increased mobility of both people and jobs in China were having an effect. Income growth was especially rapid in the West, where by 2013 average income had basically caught up to that in the Center. Within the regions inequality also declined.

Third, inequality declined not only for total household income but also for all its major components—wage earnings, income from agriculture and non-agricultural household businesses, asset income, pensions, and imputed rents on owner-occupied housing. However, the declines in inequality for the individual income components were partially offset by rapid growth in those income components that are unequally distributed, such as asset income and imputed rents on owner-occupied housing.

Although our core estimates of inequality show that inequality declined from 2007 to 2013, adjustments to correct for spatial differences in the cost of living reduce the magnitude of the decline. Furthermore, the decline disappears entirely—in fact, inequality increases rather than declines—when we adjust the estimates to correct for the

under-representation of the top-income groups in the survey data. These adjustments are based on some strong assumptions, and the results are sensitive to those assumptions. Nevertheless, they raise the possibility that recent trends in inequality are in part due to differential changes in prices rather than changes in real incomes, and that the increasing under-representation of the very rich in the household survey data is an important source of a bias.

We begin in Section II with data and measurement issues. Here we describe the data, discuss the weaknesses of the NBS income variable, and explain how we construct our alternative CHIP income variable. Section III presents our core estimates of income and inequality, paying attention to changes in the composition and distribution of different sources of income and across poorer, middle, and richer subgroups of the population. Section III also reports estimates of inequality adjusted for spatial price differences. Sections IV, V and VI examine incomes and inequality separately for formal urban residents, rural-to-urban migrants, and rural residents. Section VII reports changes in the urban-rural and the regional income gaps and examines the implications for national inequality.

In Section VIII we present alternate estimates of inequality that adjust for the under-representation of the top incomes in the CHIP survey data. We use a standard methodology based on the assumption that the distribution of income for the top-income group takes the shape of a Pareto distribution and can be estimated using public

information on extremely rich individuals. We conclude in Section IX with some reflections on the implications of our findings for policy and future research.

II. Data, Weights, and Income Definition

In our analysis, we use the 2007 and 2013 CHIP household survey data. The 2007 CHIP dataset consists of three separate samples for urban, rural, and migrant households respectively. The 2007 urban and rural samples each cover fifteen provinces and were drawn from the NBS urban and rural household survey samples, which are known to under-represent rural-urban migrants. To address this shortcoming of the NBS samples, the CHIP conducted an independent survey of rural-urban migrants. The CHIP 2007 migrant survey covers nine provinces of China with the largest migrant inflows and outflows. Details on the CHIP 2007 migrant sample can be found in Li, Sato, and Sicular (2013) and Luo et al. (2013). For our analyses of national income and inequality, we combine the 2007 urban, rural and migrant samples using population weights (to be discussed below).

In late 2012 the NBS adopted a new, unified sampling frame that covers all households nationwide, including rural, urban, and migrant households. The CHIP 2013 sample is drawn from the unified NBS 2013 sample and consequently the CHIP 2013 dataset differs from the previous CHIP datasets in that it is no longer comprised of

separate urban, rural, and migrant samples. To maintain consistency with the 2007 CHIP survey and to allow separate analysis by population subgroup, individuals in the 2013 CHIP survey are classified as urban, rural, and migrant based on place of household registration (*hukou*) and actual location of residence in line with the classification criteria used by the NBS (see Chapter 1).

[Table 2.1 about here]

Table 2.1 shows the sample sizes and provincial coverage of the 2007 and 2013 CHIP surveys. The sample provinces were selected deliberately to include provinces in each of China's Eastern, Central and Western regions so that the samples would reflect the nationwide economic conditions. To the extent possible, the CHIP selected provinces for the 2013 survey that were consistent with those in the 2007 survey so as to facilitate comparison across the two years.

[Table 2.2 about here]

The sectoral and regional distributions of the CHIP 2007 and 2013 samples are not entirely consistent with those of China's population, as reflected in the national census and annual population sample surveys. To make the CHIP samples consistent with the national population data, we use two-level region (Eastern, Central, and Western) times sector (rural, urban, and migrant) sampling weights. For sectoral (rural, urban, migrant) analyses, we use regional weights, and for regional (Eastern, Central, and Western) analyses we use sectoral weights. After applying weights, the sectoral and regional

compositions of the CHIP sample are consistent with those in China's population census and annual population sample surveys (Table 2.2).

A major aim of the CHIP is to provide a basis for estimating China's income levels and inequality in a way that is consistent over time and in line with international income measurement practices. Most of the income data in the CHIP 2007 and 2013 surveys are provided by the NBS, which collects income and expenditure data in its annual household surveys by means of daily household income and expenditure diaries. Using the information from these diaries, the NBS constructs estimates of household income and its components. In this regard, the NBS (and thus the CHIP) income variables differ from the estimates of income in many other Chinese household survey datasets that rely on recall by the respondents.[1]

The NBS income estimates are reasonably good measures of household income and are widely used by researchers. They are, however, inconsistent over time, and they do not follow international practices of income measurement. The CHIP has constructed

[1] Examples of surveys using recall-based income variables are the China Household Finance Survey and the China Family Panel Study. Collecting household income data using respondent recalls has some disadvantages; for example, the respondents' understanding of the concept of income may differ from that of the researchers, the income information provided by the respondents cannot easily be double-checked or verified, and the respondents may forget or overlook some income items. Problems with the recall method are likely to be greatest among rural incomes due to the relatively large amount of self-production and in-kind income, which respondents may not consider to be income or which they may value at differing and inconsistent prices, and among income from household businesses. The NBS collects income-related data using the diary method. Households record quantities and values of income and expenditures on a daily basis. The NBS checks the diary entries for consistency and uses the diary entries to calculate total, cash, and in-kind incomes as well as the income components using consistent definitions. Of course, the diary method also has shortcomings; for example, diary entries may not be complete or accurate, and completing the diaries requires effort, so some households may not complete the diaries regularly or may decline to participate in the survey.

alternative estimates of income for past rounds of the CHIP survey as well as for CHIP 2013 to address these problems. We use the CHIP alternative estimates of income for the 2007 and 2013 surveys in our analysis.

First, the CHIP has adjusted the NBS income variable to make it consistent between 2007 and 2013. Between 2007 and 2013 the NBS changed its definition of household income and modified the classification of some income items among the different components of income. Consequently, the 2007 and 2013 NBS income variables are not consistent. To the extent possible given the information available in the CHIP 2007 and 2013 datasets, the CHIP has adjusted the 2007 NBS income to match the 2013 definition. For one or two items, the necessary data are not available for 2007, so the 2013 NBS income variable is modified. In addition, the CHIP has corrected some errors in the 2013 NBS income variable. Hereafter we refer to the original, unadjusted NBS income variable as "NBS income" and the adjusted NBS income variable as "adjusted NBS income." A summary of these adjustments is provided in Chapter 1.

Second, aspects of the NBS income definition do not follow international practices. For 2007 and 2013 the major difference between the NBS income definition and international practices is the treatment of imputed rents on owner-occupied housing. International guidelines call for the inclusion of imputed rents on owner-occupied housing in household income. In 2007 NBS income did not include imputed rents. In 2013 the NBS included an estimate of imputed rents, but the estimation method was

inconsistent with standard practices.

The CHIP has estimated imputed rents following standard methods using information in the CHIP dataset. For urban (including migrant) homeowner households, imputed rents are equal to the expected market rent for the dwelling, as self-reported by the households. For rural homeowner households, imputed rents are set equal to the self-reported value of the dwelling multiplied by the rate of return on a long-term, safe asset.[2] For both 2007 and 2013, the CHIP's estimate of imputed rents is added to income. For 2013, we subtract the NBS's estimate of imputed rents.

NBS income also does not include the value of certain implicit subsidies associated with subsidized or in-kind income. Treatment of such implicit subsidies in the measurement of income is a complex issue and beyond the scope of this analysis. Nevertheless, the CHIP has constructed estimates for one such subsidy that historically has been important in China. For 2002 and 2007 rental housing subsidies for urban households that rent are estimated by comparing the actual rent paid to the predicted rent. Predicted rent is based on the results of a multivariate hedonic regression analysis using data for urban renter households that controls for housing characteristics and location of residence. In cases where the actual rent paid by a household is less than the predicted rent based on the regression estimates, the housing subsidy is set equal to the difference between the predicted and the actual rent values.

[2] Details on the CHIP's estimation of imputed rents can be found in a note by Yue and Sicular (2016). The rate of return used to estimate rural imputed rents is the interest rate on thirty-year government bonds, which in 2007 was 4.27 percent and in 2013 it was 4.90 percent.

Using these estimates of imputed rents on owner-occupied housing and implicit subsidies on rented housing, the CHIP has constructed a second measure of income that we refer to as "CHIP income." CHIP income is equal to the adjusted NBS income plus the estimates of the imputed rents on owner-occupied housing and urban rental housing subsidies. By 2007 and 2013 the amount of urban rental subsidies was small (increasing average urban incomes by less than 1 percent in both years), so the overwhelming majority of the difference between CHIP income and adjusted NBS income is due to the imputed rents.

CHIP income is our preferred measure of income, and we use it for most of the analyses reported below. To permit comparisons, for some results we also report estimates using NBS and adjusted NBS income.

III. National Income Inequality

Table 2.3 reports our estimates calculated using the CHIP survey data of mean incomes and income inequality for China as a whole in 2007 and 2013. Estimates are shown for NBS income, adjusted NBS income, and CHIP income. All estimates include the rural, urban, and migrant samples, which are combined using the population weights. Mean incomes are in current year prices; percentage changes are in constant prices. Income inequality is measured using the Gini coefficient, the mean logarithmic deviation (MLD),

and the Theil index.

[Table 2.3 about here]

Mean incomes and inequality differ somewhat depending on the income definition; however, in all cases mean income increased and inequality decreased from 2007 to 2013. For example, CHIP income per capita increased 61 percent from 2007 to 2013, equivalent to average annual growth of 8 percent over these years. This rate of growth is rapid by international standards, although it represents a slowdown relative to the period between the 2002 and 2007 CHIP surveys, when CHIP income per capita grew at an average annual rate of 13 percent.

With respect to inequality, past CHIP studies have reported progressive increases in inequality over time, and by 2007 China's Gini coefficient approached 0.5, a level that is moderately high by international standards. The 2013 CHIP data, however, show a substantial decline in inequality from 2007 to 2013. For example, the Gini for CHIP income declined by 11 percent. In comparison, from 2002 to 2007 the Gini coefficient for CHIP income increased by 5 percent.[3] The decline in inequality from 2007 to 2013 is also evident (and even larger) for the MLD and Theil indexes.

Comparisons of NBS income, adjusted NBS income, and CHIP income reveal several noteworthy differences. First, income levels and inequality for NBS income and adjusted NBS income are quite similar for 2007, but both income and inequality are a bit lower for adjusted NBS income than for NBS income in 2013. Growth in the level of

[3] Changes from 2002 to 2007 are from Li, Luo, and Sicular (2013, Table 2.1).

income is a bit smaller, and the decline in inequality is a bit larger, for adjusted NBS income than for NBS income. These comparisons reveal that the change in the NBS definition of income results in some overstatement of the increase in the level of income, and some understatement in the decline in inequality, from 2007 to 2013.

Second, CHIP income levels and inequality are different from those for both NBS income and adjusted NBS income. CHIP mean incomes are higher than both NBS and adjusted NBS mean incomes, reflecting the inclusion of imputed rents on owner-occupied housing and subsidies on urban rented housing. CHIP income inequality is higher than that for NBS and adjusted NBS income in 2007 and lower than that for NBS and adjusted NBS income in 2013. Consequently, the decline in inequality from 2007 is largest for the CHIP income.

This change in income inequality from 2007 to 2013 represents the first decline recorded by the CHIP since its initial survey in the late 1980s. The decline in inequality as shown Table 2.3 is consistent with—in fact, somewhat larger than—that given by the official NBS estimates of the Gini coefficient at 0.484 in 2007 and 0.473 in 2013, a reduction of about 2 percent (Gustafsson, Li, and Sato 2014). Relative to other countries, China's level of inequality went from being high (among the 15 percent of countries with the highest Gini coefficients) to moderately high (among the 30 percent of countries with the highest Gini coefficients).[4]

[4] Based on country Gini coefficients reported in the World Bank World Development Indicators database http://wdi.worldbank.org/table/2.9#. Accessed December 11, 2016.

Geographic size and market segmentation can cause prices to differ among regions. Consequently, nominal incomes in different regions may not reflect real income differences in terms of purchasing power. In principle, then, estimates of incomes and inequality should be adjusted for spatial price differences so that they reflect comparable purchasing power parity (PPP).

Studies of inequality typically do not adjust incomes for spatial prices differences, mainly due to a lack of spatial price data. For China, the only available estimates of spatial price indexes are those in Brandt and Holz (2006). Brandt and Holz construct their price indexes using geographic price data from about 1990, and then they use provincial rural and urban price indexes published by the NBS to extend the indexes to 2004. We update the Brandt and Holz indexes to 2007 and 2013 using the published NBS cost of living price indexes for more recent years. We then apply the updated indexes to the CHIP income data and calculate estimates of inequality that reflect PPP. The PPP estimates give an indication of how spatial price differences affect measured inequality, but they should be taken with a large grain of salt because Brandt and Holz's indexes are anchored on very old price data.

Table 2.4 presents estimates of inequality for NBS and CHIP income with and without the spatial price adjustments. In 2007 the PPP estimates of inequality are substantially reduced, e.g., for CHIP income the PPP-adjusted Gini is about 11 percent lower, and the PPP-adjusted MLD and Theil indexes are more than 20 percent lower than

the unadjusted estimates. In 2013 the differences between the PPP-adjusted and the unadjusted estimates are a bit smaller, reflecting the fact that from 2007 to 2013 prices rose more rapidly in regions with lower costs of living.

Adjustments for PPP reduce the decline in inequality between 2007 and 2013. As shown in the last column of Table 2.4, for NBS income PPP-adjusted inequality in 2013 is nearly the same as that in 2007. In other words, for NBS income the PPP adjustments essentially eliminate the decline in inequality. For CHIP income, the decline in inequality survives the PPP adjustments and is 7 percent for the Gini coefficient and 11 percent to 15 percent for the MLD and Theil measures.

[Table 2.4 about here]

Because the spatial price indexes are anchored on outdated prices and are so imprecise, hereafter we focus on estimates of inequality that are not PPP-adjusted. Nevertheless, we conclude from the PPP exercise that the decline in national inequality from 2007 to 2013 is due at least in part to changes in the relative costs of living among provinces and urban and rural areas.

The CHIP data permit us to examine changes in the underlying distribution of income in some detail. Figure 2.1 presents a graph of the change in household income per capita for each income decile, from richest to poorest. Income levels and the percentage changes are in constant 2007 prices. The vertical bars show the income levels, and the line shows the percentage changes.

[Figure 2.1 about here]

Incomes increased in real terms for all the decile groups. The gains were largest—exceeding 80 percent—for the bottom five deciles. For higher income deciles, income growth was slower. Thus, the decline in national inequality from 2007 to 2013 was driven by income gains for the low and middle-income deciles. This pattern differs from that between 2002 and 2007 when income growth went disproportionately to the top four deciles of the income distribution (Li, Luo, and Sicular 2013, Figure 2.2).

The differences in income growth across deciles of the income distribution are evident in the changes in the Lorenz curve from 2007 to 2013 (Figure 2.2). In the Lorenz curve, the population is arranged in ascending order from lowest to highest income per capita; the curve shows a plot of the cumulative share of income (vertical axis) going to the cumulative share of the population (horizontal axis). The closer the Lorenz curve lies to the 45-degree line, the lower the degree of inequality. Except for several percentiles at the very bottom of the income distribution, China's national Lorenz curve in 2013 is everywhere closer to the 45-degree line than it is in 2007.

[Figure 2.2 about here]

Do these shifts in inequality reflect changes in underlying sources of income? Table 2.5 shows the sources of household income in 2007 and 2013. Total income is divided into eight components: wage earnings, net income from household agricultural business, net income from non-agricultural household business, income from assets (excluding

imputed rents on owner-occupied housing), pension income, net transfer income (excluding pensions), implicit rental housing subsidies, and imputed rents on owner-occupied housing. Wage earnings were the largest component of income in both years. Although they grew more slowly than other components, wages contributed 45 percent of the increase in total household income from 2007 to 2013. The most rapidly growing sources of income were asset income, pensions, and imputed rents from owner-occupied housing. Net income from agriculture increased in nominal terms but it increased more slowly than inflation, so its real change was negative.

[Table 2.5 about here]

To analyze the contributions of different income sources to inequality, we carry out a standard decomposition of the Gini coefficient by factor component, in which each component's contribution to inequality depends on its share of income and how unequally it is distributed. More precisely, each income component's contribution to inequality is equal to its share of income times its Gini concentration coefficient (Shorrocks 1982). The Gini concentration coefficient measures how unequally an income component is distributed relative to the distribution of total income. For example, if an income component is unequally distributed such that it goes disproportionately to relatively low-income households in the distribution of total income, then that component will have a small or even negative concentration coefficient. Such is the case for net income from agriculture.

Comparison of the concentration coefficient to the Gini coefficient for total income indicates whether an income component is equalizing or disequalizing. Income components with concentration coefficients smaller than the Gini coefficient tend to be equalizing, and income components with concentration coefficients larger than the Gini coefficient tend to be disequalizing. All else being equal, an income component that constitutes a large share of income will have a large contribution to inequality, and all else being equal, an income component with a high concentration coefficient will have a large contribution to inequality.

Table 2.6 reports income shares, concentration coefficients, and percentage contributions to overall inequality for each income source. Wage earnings are the major contributor to inequality in both years, although the percentage contribution to inequality declined from 73 percent in 2007 to 60 percent in 2013. This large contribution to inequality reflects that wages remained by far the largest component of household income, and the concentration coefficients for wages were higher than the Gini coefficient for total income in both years.

[Table 2.6 about here]

Otherwise, components with moderately large contributions to inequality are net income from non-agricultural business, pensions, and imputed rents, all of which contributed more than 10 percent of inequality in one or both years. All three of these components had concentration ratios higher than the Gini. The contribution of

non-agricultural business to overall inequality remained stable at about 11 percent. This was not the case for pensions and imputed rents. The contributions to inequality of both pensions and imputed rents increased, and the increases were because their shares of income grew. The concentration coefficients of both pensions and imputed rents fell, indicating that they were less disequalizing in 2013 than in 2007.

More generally, the concentration coefficients for most major components of income declined from 2007 to 2013. In some cases, the decline was substantial, e.g., wage earnings, pensions, and imputed rents. The only exceptions were income from agriculture, which nevertheless continued to be substantially inequality-reducing, and rental housing subsidies, which in both years were a trivial income component (only 0.5 percent of income). We conclude that the decline in China's overall Gini coefficient from 2007 to 2013 reflected declines in inequality of most income components, including wage earnings, net non-agricultural business income, pensions, asset income, and imputed rents.

Income sources associated with public transfer programs merit some additional discussion. Pension income was distributed unequally, reflecting the relatively generous pensions to urban households that tended to have relatively high incomes. Nevertheless, the concentration coefficient of pensions declined, a reflection of the expansion and strengthening of pension programs for informal workers and the rural population. Income from other public transfer programs is part of net transfers, which income

category also includes private transfers. Net transfers in both years constituted a small share of total income and, on balance, were equalizing. In-depth analysis of the distributional impact of public social welfare and transfer programs is provided in other chapters.

IV. Formal Urban Incomes and Inequality (Excluding Migrants)

In this section, we examine changes in the level, composition, and inequality of incomes for formal urban residents. Migrants are examined separately in the next section. Table 2.7 reports data on the level and composition of formal urban household income per capita in 2007 and 2013. Average income per capita for this group increased 35 percent from 2007 to 2013 (constant prices), equivalent to an average annual growth rate of 5 percent. This pace of growth was slower than the national average (Table 2.3). It was also considerably slower than the growth from 2002 to 2007, when CHIP incomes for formal urban residents grew at an average annual rate of 12 percent (Li, Luo, and Sicular 2013, p. 65).

The breakdown by income components in Table 2.7 reveals that wage earnings remained the largest single source of income for formal urban households and contributed the largest share of income growth from 2007 to 2013. Nevertheless, wage earnings grew relatively slowly and their share of total income declined from 71 percent in 2007 to

60 percent in 2013.

The next largest components were pensions and imputed rents on owner-occupied housing. Pension income grew at an annual rate of 8 percent and its share of income rose from 16 percent to 19 percent. This growth reflects a strengthening of the urban pension system and the aging of the formal urban population. Imputed rents were the most rapidly growing component of urban incomes, rising at an average annual rate of 12 percent, a reflection of rising urban housing values as well as the upgrading of housing. By 2013 imputed rents accounted for 15 percent of urban household income, up from 10 percent in 2007.

Income from household businesses grew rapidly at 8 percent per year but remained a relatively small component, contributing 6 percent of total income in 2013. Asset income also grew rapidly but remained a relatively small component at 3 percent in 2013. Net transfers were negative in both years, reflecting that transfers out exceeded transfers in. Implicit rent subsidies were minor and contributed no more than 1 percent of income.

[Table 2.7 about here]

[Figure 2.3 about here]

[Figure 2.4 about here]

Figure 2.3 shows the pattern of income increases (in real terms) across deciles of the urban income distribution. The increase was small for the lowest decile, but for the rest of

the income distribution real increases in income were larger, ranging from 30 to 37 percent in real terms.

The consequences of this pattern of income increases are evident in the Lorenz curves for 2007 and 2013 (Figure 2.4). The Lorenz curves for 2007 and 2013 are close together, but everywhere the 2013 curve lies slightly below the 2007 curve. This shift in the Lorenz curve reflects a modest increase in inequality among formal urban residents. As shown in Table 2.8, the Gini coefficient for CHIP income per capita rose from 0.338 to 0.349, or by 3 percent. The magnitude of the increase is slightly larger for NBS income. The MLD and Theil indexes show larger increases in inequality than the Gini, reflecting their sensitivity to incomes at the bottom of the distribution.

[Table 2.8 about here]

[Table 2.9 about here]

Decomposition of inequality by income source for formal urban residents is reported in Table 2.9. Wage income contributed by far the largest share of inequality, although its contribution declined from 76 percent in 2007 to 60 percent in 2013. This decline was offset by increases in the contributions of most other sources of income. Notably, by 2013 the contribution to inequality of pensions had risen to 18 percent and that of imputed rents had risen to 15 percent. For pensions, the increased contribution reflects both an increase in its inequality and its income share, although in both years it was more equally distributed than total income. For imputed rents, the increased contribution

occurred despite a decline in its concentration coefficient; however, the concentration coefficient of imputed rents remained higher than the overall Gini coefficient. The contribution of net transfers to inequality was negative, reflecting that net transfers on average were negative, i.e., transfers out on average exceeded transfers in.

V. Incomes and Inequality among Rural-to-Urban Migrants

In this section, we examine changes in incomes and inequality among rural-to-urban migrant households, with migrant classification based on the urban location of residence and rural household registration (*hukou*). As noted above, in 2007 the migrant sample was obtained through an independent survey carried out by the CHIP, and in 2013 migrants were included in the unified NBS household survey. The migrant samples in the two years were thus selected using different sampling methods and may not be entirely consistent. Our use of regional sampling weights in all calculations improves comparability, but as will be seen below some inconsistencies are still apparent.

Migrant household income per capita remained higher than rural and lower than urban household incomes in both 2007 and 2013 (Table 2.10). From 2007 to 2013, the income of migrant households grew 3 percent per year, more slowly than the income of both formal urban and rural individuals. Consequently, the gap between migrant and rural incomes narrowed, whereas that between migrant and urban incomes widened. We

note, however, that although migrant income per capita grew slowly, migrant income per worker grew at a faster pace. The difference in growth of per capita and per worker income reflects a change in the structure of migrant households in the samples, specifically, an increase in the number of dependents. In 2007 migrant households contained relatively few dependents (19 percent of migrant household members were not employed). In 2013 half of the migrant household members were dependents (51 percent of the migrant household members were not employed). The real increase in wage earnings per employed person was 47.4 percent, equivalent to growth of 6.7 percent per year and substantially higher than the increase in wage earnings per capita. This change in the migrant household structure between 2007 and 2013 is a reflection of the evolution of migration from temporary to more permanent residence in the cities, but to some extent it may be due to the different sampling methods for the migrant survey in the two years.

[Table 2.10 about here]

Table 2.10 reports information on the composition of migrant income. Most of the growth in migrant incomes was contributed by wages and household business income. These sources of income grew slowly but together they accounted for more than 90 percent of total income. The fastest growing component of migrant income was imputed rents on owner-occupied housing, which reflects the combined effect of rising urban housing values and the increased home ownership for this group. The 2013 data

indicate that 31 percent of migrant households owned their homes, up from only 3 percent in 2007. Net transfers remained negative, but became less negative from 2007 to 2013. Negative net transfers for migrants reflect that migrants send private transfers out and that their contributions to social programs, such as pensions and health insurance, exceed their benefits.

Figure 2.5 shows the pattern of increases in income per capita across the deciles of the migrant income distribution. Income growth for the lowest decile was essentially zero. Moving up the income distribution, income growth tended to increase from decile to decile, except at the very top. The top four deciles all enjoyed income increases of more than 20 percent.

[Figure 2.5 about here]

This pattern of income growth causes the migrant Lorenz curve for 2013 to lie below that for 2007 everywhere except at the far-right corner, indicating that inequality increased for most of the migrant population (Figure 2.6). The Gini coefficient for the CHIP income per capita of migrants rose by 7 percent, from 0.324 in 2007 to 0.348 in 2013 (Table 2.11). The Gini for NBS income shows a larger increase in inequality. Alternative measures of inequality reveal increases similar to or larger than the Gini coefficient.

[Figure 2.6 about here]

[Table 2.11 about here]

Income inequality for migrants is largely determined by the distribution of the two major income sources—wages and household business income (Table 2.12). Wage earnings were relatively equally distributed, so their contribution to total inequality (44 percent in 2007 and 62 percent in 2013) was lower than their share of income. Household business income was unequally distributed, and its contribution to inequality (46 percent in 2007 and 33 percent in 2013) exceeded its share of income.

Other income components had small income shares and small contributions to inequality. Between 2007 and 2013 income from assets and imputed rents became more equally distributed, perhaps reflecting the fact that migrants in cities had become more regularized and stable over time, but perhaps also due changes between 2007 and 2013 in the sampling method for migrants.

[Table 2.12 about here]

Comparing estimates of inequality that exclude and include migrants provides an indication of the impact of migrants on income distribution, although it does not capture the indirect effects of migration, e.g., on the incomes of non-migrants. For urban China in 2007, the Gini coefficient for urban residents excluding migrants was not much different from that including migrants; in 2013 the latter was a bit higher (Table 2.13). Whether migrants are included or not, urban inequality increased from 2007 to 2013, with a somewhat larger increase for the estimates that include migrants.

[Table 2.13 about here]

Table 2.14 gives estimates of the national Gini coefficient excluding and including migrants in the calculation. In both years, including migrants reduces inequality. This is partly due to the positive relationship between the urban-rural income gap and national inequality. Including migrants, whose incomes lie between those of formal urban and rural residents, reduces the urban-rural income gap. As will be discussed later, the urban-rural income gap has been a key factor underlying national inequality in China. The decline in national inequality from 2007 to 2013 is slightly larger when migrants are included.

[Table 2.14 about here]

VI. Rural incomes and inequality

From 2007 to 2013 average rural income per capita doubled in real terms (Table 2.15), implying an average annual growth rate of 12.9 percent that substantially outpaced the 7.4 percent annual growth of rural income from 2002 to 2007 (Li, Sato, and Sicular 2013, Table 1.3). Indeed, growth in rural income from 2007 to 2013 approaches its high growth during the early years of the economic reforms in the 1980s when China carried out major rural reforms, including the decollectivization of agriculture, the raising of farm product prices, rationalization of planning of farm production, and enabling the growth of township and village enterprises.

Growth was rapid in all components of rural income except agriculture (Table 2.15). Wage earnings grew at an average annual rate of 12 percent and contributed 35 percent of the overall increase in rural incomes. Asset income, net transfers, and imputed rents on owner-occupied housing grew at average annual rates exceeding 20 percent but they were smaller components of income and so they contributed less of the rural income increase than wages. Income from non-agricultural business grew 13 percent per year. Information on rural pension income is not available for 2007, but pensions undoubtedly grew rapidly because in 2007 rural residents had limited access to pension programs. In 2010 the government introduced the New Rural Pension Scheme, which expanded rapidly thereafter.

A notable feature of rural income trends from 2007 to 2013 was the seismic shift in the role of agricultural income. Agriculture's share of rural household income had been declining since the 1990s, but in 2007 it still accounted for 35 percent of rural household income and was roughly equivalent to wage earnings (39 percent of income). Agriculture's share of income continued to decline after 2007, and by 2013 it contributed only 19 percent of rural household income, a far smaller share than wage earnings (36 percent of income). As of 2013, then, agriculture on average was a secondary income source for rural households.

[Table 2.15 about here]

Did the decline in agriculture as a source of income reflect slow growth in

agricultural income or the exit from farming by a segment of the rural population? Table 2.16 presents the proportions of rural individuals living in households that received non-zero income from each income source, a measure of participation in each activity. The share of households participating in agriculture indeed declined, but in 2013 it remained high at 90 percent. For participating households, agricultural income grew slowly, increasing only 18 percent, or 2.8 percent per year, in real terms. Thus, the decline in the importance of agricultural income reflected both slow growth in agricultural income and reduced participation in farming.

Participation in wage employment and non-agricultural business also declined; in these areas, however, participating households experienced substantial increases in income. Wage income for individuals in participating households more than doubled, with an average annual real growth of 13.5 percent. This rapid wage growth is consistent with reported shifts in the broader labor market that was characterized by shortages of unskilled workers and rising wages for unskilled workers (e.g., Das and N'Diaye 2013).

The declining participation rates in each of agriculture, wage employment and non-agricultural business suggest that rural households were becoming increasingly specialized. They also reveal the rising importance of alternative income sources. Specifically, the proportion of rural individuals in households receiving assets, transfers, and pension incomes increased markedly. By 2013 nearly one-third of individuals lived in households with pension income, and virtually all rural households reported transfer

income, up from 73 percent in 2007.[5] The share receiving asset income increased from 34 percent to 54 percent. These shifts reflect the expansion of China's rural pensions and social programs as well as of rural asset ownership. Indeed, by 2013 these three sources of income on average accounted for 19 percent of rural incomes, more than double their 8 percent share in 2007 (see Table 2.18 below).

[Table 2.16 about here]

Figure 2.7 shows real increases in household income per capita by decile in the rural income distribution. All deciles of the rural population experienced substantial income growth, but income growth was faster for richer deciles than it was for poorer deciles. The lowest income decile experienced a 78 percent increase and the highest income decile experienced a 121 percent increase in real income.

[Figure 2.7 about here]

[Figure 2.8 about here]

Not surprisingly, this pattern of income growth led to an downward shift of the rural Lorenz curve (Figure 2.8) and rural inequality as measured by the Gini and other inequality indexes increased (Table 2.17). Everywhere, the rural Lorenz curve for 2013

[5] The NBS changed the definition of transfer income for rural households in 2013. Before 2013 migrants who were away from their rural households for more than six months but maintained a strong economic connection to their rural households were treated as members of their rural households, and their remittances (as well as any wage earnings not sent home) were counted as wage income of their rural households. In 2013 rural migrants who lived away from their rural households for more than six months were no longer counted as rural household members, regardless of their economic relationship with their rural households, and their remittances were classified as transfer income for their rural households. This change in the treatment of migrant remittances contributed to the increase in transfer income for rural households from 2007 to 2013.

lies below that for 2007. The Gini coefficient for CHIP income rose by 8 percent, from 0.374 in 2007 to 0.405 in 2013; the MLD and Theil indexes show even larger increases. Increases in inequality measured using NBS income were similar to those measured using CHIP income.

[Table 2.17 about here]

As shown in Table 2.18, wage income contributed the largest share of inequality, more than 40 percent in both 2007 and 2013. Inequality of wage income rose between the two years, and in both years wages were somewhat more unequally distributed than total income. Income from non-agricultural business and asset income were the most unequally distributed components of rural income; the former contributed 16 percent of inequality in both years, and the latter's contribution rose from 5 percent in 2007 to 9 percent in 2013.

[Table 2.18 about here]

The most equally distributed income components were agricultural income and net transfers. Agriculture's contribution to inequality, already low at 23 percent in 2007, fell to 11 percent in 2013. This change reflected both the decline in agriculture's share of total income and its increasingly equal distribution. The contribution of net transfers to inequality was smaller and it also declined. The share of income from net transfer income rose from 2007 to 2013, but its distribution became considerably more equal, as

reflected in the marked decline of its concentration coefficient.[6] The contribution of pension income to inequality in 2013 was modest. The concentration coefficient for imputed rents was a bit higher than the Gini for total income and it increased, as did its share of income. Consequently, the contribution of imputed rents to inequality rose notably, from 9 percent in 2007 to 17 percent in 2013.

VII. Urban-Rural and Regional Income Gaps

Segmentation between China's urban and rural sectors has contributed to an ongoing, large income gap between urban and rural households. The urban-rural income gap widened continuously from the late 1980s through 2007 and it has been a key factor underlying the secular increase in national inequality (Li, Sato, and Sicular 2013). From 2007 to 2013, however, rural incomes grew more rapidly than urban incomes, with implications for the urban-rural income gap and national inequality.

Table 2.19 shows mean urban and rural incomes per capita and the urban-rural income gap as measured by the ratio of mean urban income per capita to mean rural income per capita. Estimates are given for both NBS and CHIP income, and for urban excluding and including migrants. From 2007 to 2013 the increase in rural income far outpaced that in urban income, regardless of whether migrants are included and

[6] See the prior footnote regarding the change in the measurement of transfers for rural households.

regardless of the income definition. Consequently, in all cases the urban-rural income gap declined substantially. For example, the ratio of mean CHIP urban to rural income (no PPP adjustment) was 3.5 to 4 in 2007 and below 3 in 2013.

[Table 2.19 about here]

In view of the difference in costs of living between the urban and rural areas, we report estimates of the urban-rural income gap that are adjusted for spatial price differences (the last two columns of Table 2.19). The PPP adjustment reduces the gap in both years, especially in 2013. The decline in the urban-rural income gap from 2007 to 2013 is robust to the PPP adjustment. For example, the urban-rural income ratio for PPP-adjusted CHIP income declined by one-third, from about 3 in 2007 to about 2 in 2013.

The narrowing of the urban-rural income gap from 2007 to 2013 was important to the decline in national inequality. Table 2.20 reports the results of inequality decompositions by urban/rural population subgroups, which give estimates of the contribution of the urban-rural income gap to national inequality. Without PPP adjustments, the urban-rural income gap's contribution to national inequality declined from roughly 45-50 percent in 2007 to 25-30 percent in 2013.

PPP adjustments reduce the size of the urban-rural gap and its contribution to national inequality. Regardless, the contribution of the urban-rural gap to inequality declined substantially. For PPP-adjusted CHIP income, the urban-rural gap's

contribution to national inequality was roughly 40 percent in 2007 and only 15 percent in 2013 (Table 2.20).

[Table 2.20 about here]

Historically China's regional income gaps have also influenced national inequality, although in recent years less so than the urban-rural gap. Table 2.21 shows the mean incomes for each of the Eastern, Central, and Western regions and the income ratios between the regions, with the Western region in the denominator. In both years incomes were highest in the Eastern region and lowest in the Western region.

From 2007 to 2013 the income gaps between the Eastern, Central, and Western regions narrowed. For example, the PPP-adjusted Eastern/Central income ratio declined from 1.53 to 1.31, and the PPP-adjusted Eastern/Western ratio declined from 1.80 to 1.39. Catch-up was especially marked for the Western region, which by 2013 had average incomes that were only about 6 percent lower than those in the Central region.

Compared by sector, one can see that by 2013 migrant incomes (PPP adjusted) were quite similar in the three regions, which likely reflects the mobility of migrant workers and the relocation of jobs among regions. In 2013 formal urban incomes in the Central and Western regions were similar, but lower than those in the Eastern region. Regional gaps were most persistent for the rural population, although they declined somewhat over time.

[Table 2.21 about here]

[Table 2.22 about here]

The narrowing of the regional income gaps contributed to the decline in national inequality. Table 2.22 shows the results of the decomposition of inequality among regions. The contribution of between-region income differences was already low in 2007, but it declined further to less than 10 percent of national inequality in 2013. Furthermore, within-region inequality declined in all regions. As shown in Table 2.23, within-region inequality was highest in Western China, which in 2013 had a regional Gini coefficient that exceeded that of China as a whole. The Gini coefficients of the Eastern and Central regions were similar or lower than that for China as a whole.

[Table 2.23 about here]

High inequality in Western China reflected in part the large urban-rural income gap (Table 2.24). In 2007 the urban-rural income ratio without PPP adjustments in the Western region was 4.2, as compared to 3.3 and 3.5 in the Eastern and Central regions. The pattern is similar with PPP adjustments. From 2007 to 2013 the urban-rural income ratio declined substantially in all regions as well as for China as a whole, but it remained highest in the Western region.

[Table 2.24 about here]

VIII. Robustness: Incorporating Top Incomes

During the 1980s and 1990s trends in inequality in China arose as the result of economic reforms, growth, and structural changes, as well as due to the evolution over time of differential subsidies and taxes that accompanied the dismantling of planning and the development of new distributional policies and programs. Such developments influenced income inequality through their impacts on taxes and subsidies implicit in the planning system as well as on household earnings from employment, farming, and household businesses. Beginning in the 1990s China began to implement economic reforms that opened the door to private ownership and the accumulation of household wealth. Subsequently, income from assets and returns to capital emerged as new and increasingly key factor affecting China's income distribution (Li, Sato, and Sicular 2013).

In China as elsewhere, income from assets and capital tends to be held disproportionately by individuals in the top tail of the income distribution. Incomes of individuals in the top tail of the income distribution, however, are not well represented in standard datasets based on household surveys, such as those of the NBS and thus the CHIP. Economists have recognized this problem and have developed methods to estimate and incorporate incomes at the top tail in inequality measurements (e.g., Alvaredo et al. 2013).

In this section, we apply one such method to obtain estimates of inequality in China that incorporate incomes in the top tail of the income distribution. The approach, applied previously to China by Li and Luo (2011), uses publicly available information

about the wealth of the ultra-rich to construct the top tail of the income distribution. The constructed top tail is then combined with household survey data for the rest of the income distribution to construct estimates of national inequality that incorporate the top-income group. We begin with an overview of the methodology and then report our findings (see Appendix B for additional details about the methodology and our estimates).

A. Methodology and Data

Suppose the true income distribution is as shown in Figure 2.9 and that the household survey sample only fully captures households in Section A of the distribution with incomes below some threshold x_0. Ultra-rich individuals with the very highest incomes (in Section C) are few in number and have a low probability of being selected for the sample through the survey sampling process. This group, however, tends to have high visibility, and information about its income or wealth is publicly available. The next highest income group (B) is larger numerically. The survey sampling process usually captures some individuals in this group, but they may be under-represented or their income may not be fully captured in the survey data.

It is generally assumed that the distribution of income for top-income individuals (Sections B and C) takes the shape of a Pareto distribution (Creedy 1985; Bronfenbrenner 1971). The Pareto distribution is given by the equation

$$logN = logK - \alpha logx \qquad (1)$$

with N being the number of people with income higher than x (Creedy 1985, pp. 24–25). Using data for N and x taken from publicly available data for very high-income individuals (in Section C of the distribution), one can estimate the parameters K and α to obtain the shape of the income distribution for the top sections (B and C) of the income distribution. This inferred income distribution for the top-income individuals can then be combined with the household survey data for the remainder of the income distribution (A) to construct an estimate of inequality for the entire population, including the top-income group.

[Figure 2.9 about here]

These calculations require that the researcher choose an income threshold x_0 for the top-income group. We follow common practice and set the threshold equal to the highest level of income per capita observed in the survey. The income distribution for individuals with income per capita above this highest observed level is then estimated using the Pareto distribution with information about very rich individuals available from public sources. This approach implicitly assumes that the survey sample accurately captures the income distribution in the population up to the highest income per capita present in the sample.

We also employ an alternative threshold of 120,000 yuan per capita. We choose

120,000 yuan because since 2006 by law China has required that all individuals with annual income exceeding 120,000 yuan file annual income tax returns and report their income (Gilley 2017). This requirement creates an incentive for individuals with income above this level to hide or under-report their income, and, in fact, the CHIP samples contain very few individuals with incomes per capita higher than this threshold.[7] We estimate the income distribution for individuals with income per capita above 120,000 yuan using the Pareto distribution and information about the top-income individuals from public sources. This second set of estimates assumes that the CHIP survey sample accurately captures the income distribution up to but not above 120,000 yuan per capita.[8]

For a third set of estimates, we treat 120,000 yuan as total household income rather than income per capita and divide by two to obtain a threshold of 60,000 yuan per capita for the top income group. The number of individuals in the CHIP sample with income per capita above this threshold remains small.[9] Once again, we estimate the income distribution for individuals with income per capita above 60,000 yuan using the Pareto distribution and information about top-income individuals from public sources. This

[7] Note that the income tax reporting threshold of 120,000 yuan remained unchanged over time, despite changes in the price level. Only 18 and 130 individuals in the CHIP samples have household per capita income over 120,000 in 2007 and 2013, respectively. The proportions (weighted) of the samples are 0.02 percent in 2007 and 0.29 percent in 2013.

[8] The NBS does not publish any information about how it calculates its estimates of the national Gini coefficient, but according to some sources within the NBS, in recent years the NBS has used data from the State Administration on Taxation on reported income of those with annual income above 120,000 yuan, which it then merges with information from with their household data.

[9] The number of individuals in the sample with income per capita over 60,000 yuan was 313 in 2007 and 1,351 in 2013, equivalent (with weights) to 0.36 percent and 3.02 percent of the population in each year, respectively.

third set of estimates assumes that the CHIP survey sample accurately captures the income distribution up to but not above 60,000 yuan per capita.

We obtain information about the wealth of the top-income individuals in China from two public sources, the Forbes Rich List and the Hurun Report. Each year Forbes publishes a list of the 400 richest individuals and their wealth. Hurun also publishes a list each year, but the number of individuals on the Hurun list has increased over time. In 2007 the Hurun list contained 797 individuals and in 2013 it contained 1,000 individuals. The larger size of the Hurun list means that it includes individuals with lower levels of wealth than the Forbes list.[10]

We construct separate estimates based on each of these two lists, as well as estimates based on a combination of the two lists. For the combined list, if an individual appears on both the Forbes list and the Hurun list, we include that individual in the combined list only once, using the average of the incomes on the two lists. The number of individuals on the combined list was 873 in 2007 and 1,040 in 2013.

The Forbes and Hurun lists report each individual's wealth. We convert wealth into an estimate of the corresponding level of annual income using the one-year fixed deposit interest rate.[11] We do not have information about the household size of these individuals,

[10] The lowest wealth levels of individuals on the Forbes list for 2007 is 1.5 trillion yuan and for 2013it is 3.66 trillion yuan, as compared to 0.8 trillion and 2.0 trillion yuan, respectively, on the Hurun list.

[11] The one-year deposit interest rates were 3.465 percent in 2007 and 3.375 percent in 2013. An alternate approach would be to calculate income as the change in wealth from one year to the next, but this approach is problematic because of substantial wealth fluctuations from year to year and because individuals on the lists change from year to year.

but we assume that that top income households on average contain two people, which is the average size of the ten households with the highest levels of NBS income per capita as well as of the top 1 percent of households in the CHIP 2013 sample. If top-income individuals in fact live in households with more people, our estimates of national inequality incorporating the top incomes may be overstated. We also assume that the second household member does not contribute any additional income to the household, i.e., household per capita income in the top income group is equal to the rich individual's income divided by two. If other household members in fact contribute income to the household, then our estimates of national inequality incorporating the top income may be understated. Note that we also calculated the estimates using alternative household sizes of one person and three people (see Appendix B), which changed the estimated levels of inequality somewhat but did not change the basic conclusion that inequality increased from 2007 to 2013.

We use the NBS income definition for all calculations and estimates in this section because the lack of information on housing for the top-income group prevents us from constructing estimates of CHIP income for this group.

B. The National Gini Coefficient Incorporating Top Incomes

Table 2.25 shows our estimates of the national Gini coefficient incorporating the top-income group. All estimates exceed our original Gini coefficients, but by varying

degrees. For 2007 the effect of incorporating top incomes on estimated inequality is relatively small and quite consistent across the estimates. The 2007 Gini estimates incorporating top incomes range from 0.483 to 0.502 and in all cases, they are less than 10 percent higher than our estimate of the Gini coefficient for NBS income without the top incomes (Table 2.3).

For 2013 the impact of incorporating the top incomes is larger, and the estimates span a wider range. Using the highest income in the CHIP sample as the threshold generally yields the lowest Gini estimates; using the 120,000 yuan and the 60,000-yuan cutoffs yields Gini estimates that are a bit higher and fairly similar. For 2013 estimates of the Gini incorporating the top incomes range from 0.493, which is 10 percent higher than the Gini coefficient without the top incomes, to 0.630, a substantial 41 percent higher than the Gini without the top incomes.

Reports by the State Administration of Taxation on the number of individuals filing taxes provides us with some external information that we can use to evaluate the alternative estimates based on the 120,000 yuan and 60,000-yuan cutoffs. As discussed in more detail in Appendix B, some of our calculations based on these cutoffs yield estimates of the top-income population that are improbably different from the reported numbers of tax filers, even after allowing for lack of compliance. In our view, the population estimates for 2007 and 2013 based on the 60,000-yuan cutoff and the Hurun list are most consistent with the reported number of tax filers, and they are associated

with an adjusted Gini of 0.494 in 2007 and 0.583 in 2013.

[Table 2.25 about here]

All our estimates of the Gini incorporating the top-income group show an increase rather than a decline in inequality between 2007 and 2013 (Table 2.26). For some of the estimates the increase is small, e.g., only 1 percent using the Forbes list and a threshold equal to the highest income in the CHIP sample. For some estimates the increase is large, e.g., 25 percent using the combined list and the thresholds of 120,000 yuan and 60,000 yuan. Regardless, incorporating the top incomes gives a different picture of trends in inequality than that from estimates without the top incomes.

[Table 2.26 about here]

The estimates of China's national Gini coefficient incorporating the top incomes depend on strong assumptions and imperfect data. The range of estimates for 2007 is fairly narrow, from about .48 to .50, and in all cases less than 7 percent higher than the Gini without incorporating the top incomes. For 2013 the estimates span a wider range, from .49 to .63 and 10 percent to 40 percent higher than the Gini without incorporating the top incomes. These estimates reveal that the extent of bias in standard estimates of inequality in China arising from the under-representation of incomes in the top tail of the income distribution was probably modest in 2007 but had become substantial in 2013.

IX. Conclusion

Estimates of inequality published by the NBS indicate that since 2007 income inequality in China has turned a corner. Our core estimates based on the CHIP survey data for 2007 and 2013 also show a decline in inequality, and the decline is robust to alternative income definitions (NBS and CHIP) and different inequality indexes (Gini, MLD, and Theil). These alternative calculations yield somewhat different levels of inequality, but for all income definitions and indexes inequality has declined.

Disaggregating among subgroups and sources of income, we find that the decline reflects reductions in several important dimensions of inequality. The rural-urban income gap narrowed. Regional income gaps between the Eastern, Central, and Western regions shrank. Inequality declined for the major components of household income—wage earnings, income from agriculture and non-agricultural household business, asset income, pensions, and imputed rents on owner-occupied housing. Reduced inequality in these dimensions contributed to the decline in overall income inequality nationwide. The decline in national inequality would have been even larger if it had not been offset to some degree by rising inequality within the urban and rural sectors and by the growing importance of unequally distributed income components, such as income from assets and imputed rents on owner-occupied housing.

In recent years China has experienced a slowdown in macroeconomic growth. According to NBS statistics, average growth in GDP per capita from 2007 to 2013 was

8.5 percent, as compared to 11 percent from 2002 to 2007. Some observers have suggested that the slowdown in GDP growth will have negative implications for household incomes in general and for the middle- and lower-income groups in particular. Our exploration of the CHIP data indeed finds that on average growth in household incomes slowed from 2007 to 2013, but the slowdown was mainly for higher income groups, including urban residents both formal and migrant. For lower- and middle-income households, including rural residents, income growth accelerated and averaged more than 10 percent per year. Income growth for lower- and middle-income groups occurred despite slow growth in agricultural income and it reflected solid growth in their wage income plus robust growth in their combined income from non-agricultural business, assets, and pensions, as well as imputed rent on owner-occupied housing.

Although the decline in national inequality holds for different income definitions and alternative inequality measures, it is not entirely robust. When we adjust the estimates to correct for spatial differences in the cost of living, inequality no longer declines for NBS income and for CHIP income the decline is noticeably reduced. These results indicate that some of the apparent reduction in inequality from 2007 to 2013 is due to price changes rather than changes in real incomes.

When we adjust the estimates to correct for under-representation of top-income groups in the survey sample, the decline in inequality disappears entirely. Indeed, certain scenarios of this exercise yield a substantial increase in inequality from 2007 to

2013. Our estimates incorporating top incomes suggest that an understatement of inequality due to the under-representation of top incomes was modest in 2007 but substantial in 2013. Although these adjusted estimates are sensitive to our assumptions and data for the top-income group, they nevertheless indicate that some, if not all, of the apparent reduction in inequality from 2007 to 2013 is due to the growing importance of top-income individuals and their incomes, which are not captured in the household surveys. Future analyses of inequality in China must devote attention to this problem.

Our findings of changing inequality and shifting income patterns raise a series of important questions about the underlying causes. To what extent were incomes and inequality affected by the Global Financial Crisis? How exactly did the new social programs implemented during the Hu-Wen period—for example, the expansion of medical insurance, pensions, and minimum livelihood guarantee (*dibao*) programs—contribute to the decline in inequality? What was the role of ongoing urban-rural migration and the government's push to accelerate urbanization? Did changing human capital and rising education levels underlie the growth in wage earnings and thus income distribution? Some of these questions are addressed in other chapters of this volume, whereas others await further research.

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Appendix A. Adjustments to the Definition of Household Income and the Relationship between NBS Income, adjusted NBS Income, and CHIP Income

Between 2007 and 2013 the NBS changed its definition of income and changed what was included in the different components of income. Consequently, NBS income and its components in 2007 are not consistent with NBS income and its components in 2013. In this Appendix, we summarize the major changes that NBS made to its definition of income and to income components. We then describe the adjustments made to the original NBS income variable to construct an alternate measure of NBS income that is consistent between 2007 and 2013, called "adjusted NBS income."

In most respects, adjusted NBS income follows the 2013 NBS income definition; in other words, to the extent possible 2007 NBS income is adjusted so as to match the new 2013 NBS income definition. For several items, the relevant information needed to make the adjustment to the 2007 income is not available, and the 2013 NBS income is adjusted to be consistent in these areas with the 2007 NBS income. Some additional adjustments are also made to address the errors and inconsistencies in the NBS income definition.

All adjustments are carried out using the relevant household-level data in the CHIP 2007 and 2013 datasets. Note that "CHIP income" is equal to the adjusted NBS income

plus rental subsidies and imputed rents on owner-occupied housing (see the text for a further explanation).

Summary of the Major Changes in the NBS Income Definition between 2007 and 2013 and the Steps Taken to Construct the Adjusted NBS Income

1) For urban households, severance payments in 2013 were classified as wage earnings but they were classified as transfer income in 2007; in the 2007 adjusted NBS income for urban households, severance payments have been removed from the transfer income and added to wage earnings.
2) For urban households, wage earnings in 2013 but not in 2007 include in-kind payments from employers and employer contributions to social insurance schemes; for the adjusted NBS income of urban households in 2007 these items have been added to urban wage earnings.
3) Rental income earned from real-estate properties is treated as asset income in 2013 but it is treated as business income in 2007; in the 2007 adjusted NBS income this item has been moved from business income to asset income.
4) Income from intellectual property is treated as business income in 2013 but it is as asset income in 2007; in the 2007 adjusted NBS income this item has been moved from asset income to business income.

5) 2007 NBS asset income includes “income from investment” and “income from other assets,” but these two items are not included in the 2013 NBS income; in the 2013, adjusted NBS income these two items have been removed from asset income.

6) The 2013 urban NBS income includes an estimate of imputed rents on owner-occupied housing as part of asset income, but the method the NBS used to estimate the imputed rents is incorrect; in the 2013 adjusted NBS income this item has been removed from urban incomes. Consequently, neither the 2007 nor the 2013 adjusted NBS income includes imputed rents on owner-occupied housing (in 2007 NBS income did not include imputed rents on owner-occupied housing).

7) In the 2013 NBS income the interest paid on consumption loans is subtracted from the asset income; this treatment of consumption-loan interest is inconsistent with the 2007 NBS income and with international practices. In the 2013 adjusted NBS income, interest on consumption loans has been added back to asset income.

8) The 2007 and 2013 NBS incomes include pension income as a component of net transfer income; in the adjusted NBS income for both years, pension income is removed from net transfer income and treated as a separate income component.

9) The 2007 NBS income includes reimbursements for medical expenses as part of net transfer income. This item is not included in the 2013 NBS income. Information on this item is available for 2013 but not for 2007. For consistency across the two years, reimbursements for medical expenses are added to the 2013 adjusted NBS income as part of the net transfers.

10) The 2007 NBS income for rural (but not urban) households includes gifts received for weddings and funerals and one-time compensations as part of net transfer income. These items are not included in the 2013 NBS income. Information on these items is available for 2013 but not for 2007. For consistency across the two years, these items are added to the 2013 rural adjusted NBS income as part of the net transfers.

Appendix B. Methodology for Incorporating Top Incomes in the Estimation of the Gini Coefficient

The income distribution for the top-income individuals is assumed to follow the Pareto distribution

$$logN = logK - \alpha logx \qquad \text{(B. 1)}$$

where N is the number of people with income higher than x (Creedy 1985, pp. 24–25). The values of N and x are taken from the available data for the top-income individuals; the parameters K and α are estimated.

For the Pareto distribution, the Gini coefficient among the top-income individuals $Gini_{top}$ is given by the formula (Lambert 1989, p. 29):

$$Gini_{top} = \frac{1}{2\,\alpha - 1} \qquad \text{(B. 2)}$$

Equation (B.2) reveals that the estimate of the Gini for the top-income group depends entirely on the magnitude of parameter α. The larger the value of α, the smaller the value of $Gini_{top}$.

Also, for the Pareto distribution the mean income of the top-income group is a function of the income threshold for the top-income group. For any given threshold x_0,

the mean income of the top-income group μ_{top} is

$$\mu_{top} = \frac{x_0 \alpha}{\alpha - 1} \qquad \text{(B. 3)}$$

To obtain estimates of the parameters *K* and α of the Pareto distribution, we apply an OLS regression to Equation (B.1). We then input these estimated parameters into Equations (B.2) and (B.3) to calculate the estimates of the Gini coefficient and the mean income of the top-income group. We also use the estimated parameters to predict the population of individuals in the top-income group $\widehat{N}$ for any given x_0 using the formula

$$\widehat{N} = \exp(\widehat{logK} - \hat{\alpha} log x_0) \qquad \text{(B. 4)}$$

According to Sundrum (1990), the Gini coefficient for the entire income distribution $Gini_{whole}$ can be calculated based on the Gini coefficients, population shares, and mean incomes of two subgroups as follows:

$$Gini_{whole} = P_1^2 \frac{\mu_1}{\mu} G_1 + P_2^2 \frac{\mu_2}{\mu} G_2 + P_1 P_2 \left| \frac{\mu_2 - \mu_1}{\mu} \right| \qquad \text{(B. 5)}$$

In our application, P_1 is the population share of the population represented by the household survey, P_2 is the population share of the top-income group, μ_1 and μ_2 are the

mean incomes of these two groups, and μ is the population-weighted mean income of the entire population including both groups. G_1 is the Gini of the population represented by the household survey, and G_2 is the Gini for the top-income group. P_1, μ_1, and G_1 are estimated using information from the household survey; P_2, μ_2, and G_2 are estimated using Equations (B.1) through (B.4) with publicly available information about the top-income individuals on the Forbes, Hurun, and the combined lists (as discussed in the text).

Table B2.1 reports the regression estimates for Equation (B.1) based on each of the Forbes, Hurun, and combined lists. The estimates of α are similar for the three lists, falling between 1.29 and 1.34 in 2007 and between 1.59 and 1.73 in 2013.

[Table B2.1 about here]

Using the parameter estimates in Table B2.1, we calculate estimates of the number of individuals (N), population share (P_2), average income (μ_{top}), and Gini coefficient ($Gini_{top}$) of the top-income group for each of the Forbes, Hurun, and the combined lists in 2007 and 2013. Estimates in the top panel of Table B2.2 use a threshold for the top-income group x_0 of 120,000 yuan per capita; the middle panel uses a threshold of 60,000 yuan per capita; the bottom panel uses a threshold equal to the highest income per capita reported in the CHIP survey samples. The highest incomes in the survey are in fact substantially higher than 120,000 yuan, so using this threshold generates higher average incomes and a smaller population for the top-income group. The choice of the cutoff does not,

however, affect inequality within the top-income group, because $Gini_{top}$ is based on the parameter α, which is estimated using information in the Forbes, Hurun, and the combined lists.

[Table B2.2 about here]

In all cases, the population of the top-income group is smallest for the estimates based on the Forbes list, larger for estimates based on the Hurun list, and largest for the combined list. Also, the population is largest for the lowest cutoff (60,000 yuan) and smallest for the highest cutoff (the highest income in the CHIP sample).

We can evaluate the estimates for the cutoffs based on the income tax filing requirement in relation to the information published by the Office of the State Administration of Taxation, which reported that in 2007 the number of individuals in China with incomes over 120,000 yuan who filed income tax returns exceeded 2 million.[12] Assuming a household of two members for each of these income tax filers, we would expect that the population of individuals with income per capita above 120,000 yuan in 2007 should, at the very minimum be about 4 million (but probably more, due to noncompliance with the tax filing requirements). Consequently, we regard the estimates that use the 120,000-yuan cutoff to yield the top-income populations to be improbably low (all less than 2 million). The estimates based on the 60,000-yuan cutoff and the

[12] The Office of the State Administration of Taxation reported that in 2007 the number of tax returns filed by individuals with incomes above 120,000 yuan was 2,126,786 (http://www.chinatax.gov.cn/n810219/n810724/c1218703/content.html). Many sources (e.g., Gilley 2017; http://www.kanshangjie.com/article/52811-1.html) note that the number of income tax filers is unreasonably small, reflecting weak compliance with the personal income tax filing requirements.

Hurun list and the combined lists give top-income populations for 2007 that in all cases are greater than 2 million yuan and thus they are more believable.

For 2015 the State Administration of Taxation reported that 28 million individuals with incomes over 120,000 yuan filed taxes.[13] Assuming there are two people per household implies the population of this group is 56 million, equivalent to about 4 percent of the 2015 national population (again, likely understated due to noncompliance). For 2013 the number of tax filers and their population share would have been a bit lower than this. Based on these numbers, for 2013 we regard the estimated population for the 120,000-yuan cutoff and the Forbes and Hurun lists to be low (both less than 40 million), and for the 60,000-yuan cutoff and the combined list to be high (over 200 million).

Table B2.3 reports information for the rest of the income distribution based on the CHIP 2007 and 2013 survey data. This information is combined with the estimates for the top-income group in the previous table to estimate $Gini_{whole}$ using Equation (B.5).

The top panel of Table B2.3 shows the mean incomes, highest incomes, and Gini coefficients for the full samples. In both years the highest incomes exceeded 120,000 yuan, although less than 1 percent of the sample had incomes above this threshold; a larger but still small proportion of the sample had incomes above the 60,000-yuan threshold (see the note to Table B2.3).

[13] Statistics on the number of personal income tax filers are not available for all years. They are not available for 2013, but for 2015 it was 28 million (Gilley 2017; http://www.kanshangjie.com/article/52811-1.html). Available reports indicate that the number has grown year over year, so in 2013 it was very likely less than 28 million.

The bottom panels of Table B2.3 report the mean income, highest income, and Gini coefficient after dropping individuals with income per capita above 120,000 yuan or above 60,000 yuan from the CHIP samples. Removing individuals with incomes above 120,000 yuan has only a small impact on the mean income and the Gini coefficient. In 2013, for example, the mean income is only 2.5 percent lower and the Gini is only 2.6 percent lower than that for the full sample. Removing individuals with incomes above 60,000 yuan makes a greater difference; for example, in 2013 the mean income is 11.0 percent lower and the Gini is 9.2 percent lower than that for the full sample.

[Table B2.3 about here]

We also calculated estimates using alternative household sizes of one person and three people for the top-income group. The resulting Gini coefficients are reported in Table B2.4. These alternative household size assumptions alter the level of the national Gini, with a smaller household size yielding a higher level of inequality and a larger household size yielding a lower level of inequality. Regardless, in all cases inequality increases from 2007 to 2013.

[Table B2.4 about here]

Table 2.1. ***Features of the CHIP 2007 and 2013 household survey samples***

	2007			2013		
	Urban	Rural	Migrant	Urban	Rural	Migrant
Number of individuals	29,262	51,847	8,404	20,331	39,408	2,839
Number of households	10.000	13,000	4,978	6,866	10,550	1.011
Number of provinces	15	15	9	15	15	15

Notes:

1.) The 2007 urban and rural samples each cover six Eastern provinces (Beijing, Hebei (rural only), Liaoning, Shanghai (urban only), Jiangsu, Fujian, and Guangdong), five Central provinces (Shanxi, Anhui, Henan, Hubei, and Hunan), and four Western provinces (Chongqing, Sichuan, Yunnan, and Gansu). The 2007 migrant sample covers the five largest migrant outflow provinces (Anhui, Henan, Hubei, Chongqing, and Sichuan) and the four largest migrant inflow provinces (Shanghai, Jiangsu, Zhejiang, and Guangdong).

2.) The 2013 urban rural and migrant samples cover the same provinces: five Eastern provinces (Beijing, Liaoning, Jiangsu, Shandong, and Guangdong), five Central provinces (Shanxi, Anhui, Henan, Hubei, and Hunan), and five Western provinces (Chongqing, Sichuan, Yunnan, Gansu, and Xinjiang).

Table 2.2. ***Regional and urban/rural compositions of the CHIP 2007 and 2013 Samples, with and without sampling weights (%)***

	Without Weights		With Weights	
	2007	2013	2007	2013
urban	32.69	32.49	34.51	40.93
rural	57.92	62.97	54.21	45.77
migrant	9.39	4.54	11.28	13.30
Eastern	44.86	33.89	39.85	41.48
Central	32.75	35.93	32.21	31.49
Western	22.39	30.18	27.94	27.03

Notes: The sampling weights are two-level (Eastern/Central/Western x urban/rural/migrant) weights ("weights 2") (Yue and Sicular 2013). See Yue and Sicular (2013) for a detailed discussion of the construction of the sampling weights. The composition of the CHIP samples with weights is equal to the shares of each sector/region in the national population (based on China's census and annual population surveys as reported by the NBS).

Table 2.3. ***National average household income per capita and income inequality, 2007 and 2013***

	2007	2013	change (%)
(a) NBS income per capita			
income (yuan)	9353	19023	+68.7
Gini	0.470	0.448	-4.68
MLD	0.401	0.356	-11.22
Theil	0.380	0.350	-7.89
(b) adjusted NBS income per capita			
income (yuan)	9432	18208	+60.2
Gini	0.478	0.436	-8.79
MLD	0.401	0.331	-17.46
Theil	0.388	0.333	-14.18
(c) CHIP income per capita			
income (yuan)	10934	21190	+60.8
Gini	0.486	0.433	-10.91
MLD	0.428	0.328	-23.36
Theil	0.405	0.325	-19.75

Notes: Here and elsewhere, calculated using the CHIP data and weights (see the text). Income levels are in current prices; income changes are in constant prices and deflated using the NBS national consumer price index which shows a price level increase of 20.536 percent from 2007 to 2013. The MLD and Theil indexes belong to the general entropy (GE) family of indexes; the MLD is also known as the Theil L or GE(0) index, and the Theil T is known as the GE(1) index.

Table 2.4. ***National income inequality with and without Spatial PPP adjustments, 2007 and 2013***

	2007			2013			change from 2007 to 2013 (%)	
	without PPP	with PPP	difference (%)	without PPP	with PPP	difference (%)	without PPP	with PPP
(a) NBS income per capita								
Gini	0.470	0.417	-11.3	0.448	0.414	-7.8	-4.7	-1.0
MLD	0.401	0.309	-22.9	0.356	0.300	-15.7	-11.2	-2.9
Theil	0.380	0.298	-21.6	0.350	0.299	-14.6	-7.9	+0.3
(b) CHIP income per capita								
Gini	0.486	0.431	-11.3	0.433	0.400	-7.6	-10.9	-7.2
MLD	0.428	0.328	-23.4	0.328	0.278	-15.2	-23.4	-15.2
Theil	0.405	0.315	-22.2	0.325	0.280	-13.8	-19.8	-11.1

Note: PPP estimates use urban/rural x province spatial price indexes from Brandt and Holz (2006), updated to 2007 and 2013 using urban/rural x province cost of living indexes published by the NBS.

Table 2.5. ***National average household income per capita growth and composition, 2007 and 2013***

Income component	Mean income (yuan)		Change from 2007 to 2013				
	2007	2013	Nominal increase（yuan）	Contribution to increase in total income (%)	Nominal increase (%)	Real increase (%)	Real average annual growth (%)
Wage earnings	6981	11576	4595	44.9	65.8	37.6	5.5
Net income from non-agricultural business	1166	2154	987	9.6	84.7	53.2	7.4
Net income from agriculture	891	1022	131	1.3	14.7	-4.8	-0.8
Asset income	224	722	498	4.9	222.8	167.8	17.8
Net transfers	-355	55	410	4.0	n.a.	n.a.	n.a.
Pensions	1066	2669	1603	15.6	150.4	107.7	13.0
Implicit subsidies on rental housing	51	101	50	0.5	99.4	65.5	8.8
Imputed rents on owner-occupied housing	912	2881	1969	19.2	216.0	162.2	17.4
Total income	10935	21180	10244	100.0	93.7	60.7	8.2

Notes: CHIP income per capita. Income levels are in current prices; real increases are converted to 2007 constant prices using the national consumer price index published by the NBS (1.20526). Here and elsewhere imputed rents on owner-occupied housing and pensions are shown as separate income categories (the former are not included in asset income and the latter are not included in net transfer income. The 2007 CHIP data report the income component "other in-kind income" for urban residents, a small item (on average 1 yuan per capita) reflecting mostly in-kind payments by employers. The CHIP 2013 data do not give separate information on "other in-kind income." Therefore, in this and later tables we include this component of 2007 urban income as part of the urban wage income. Net income from agriculture is not reported separately for formal urban residents and migrants. These groups are unlikely to have agricultural income, so we simply categorize the net business income of urban residents and migrants as "net income from non-agricultural household business."

Table 2.6. ***Decomposition of national inequality by income source, 2007 and 2013***

	2007			2013		
Income source	Share (%)	Concentration coefficient	Contribution to inequality (%)	Share (%)	Concentration coefficient	Contribution to inequality (%)
Wage earnings	63.8	0.554	72.8	54.6	0.477	60.2
Net income from non-agricultural business	10.7	0.506	11.1	10.2	0.471	11.1
Net income from agriculture	8.1	-0.211	-3.5	4.8	-0.169	-1.9
Asset income	2.0	0.592	2.5	3.4	0.572	4.5
Net transfer income	-3.2	0.801	-5.4	0.3	-7.439	-5.3
Pension income	9.7	0.649	13.0	12.6	0.568	16.5
Rental housing subsidies	0.5	0.705	0.7	0.5	0.730	0.8
Imputed rents on owner-occupied housing	8.3	0.516	8.8	13.6	0.448	14.1
Total income	**100.0**	**0.486**	**100.0**	**100.0**	**0.433**	**100.0**

Notes: CHIP income per capita; the decomposition is done using the standard decomposition of the Gini coefficient (Shorrocks 1982). The (Gini) concentration coefficient is also known as the pseudo Gini. The concentration ratio of the total income is the Gini coefficient of the total income.

Table 2.7. ***Formal urban household income per capita growth and composition, 2007 and 2013***

Income component	Mean income (yuan)		Change from 2007 to 2013				
	2007	2013	Nominal increase（yuan）	Contribution to increase in total income (%)	Nominal increase (%)	Real increase (%)	Real average annual growth (%)
Wage earnings	13584	18443	4859	41.3	35.8	13.3	2.1
Net income from business	1043	1953	910	7.7	87.2	56.3	7.7
Asset income	373	852	479	4.1	128.7	90.8	11.4
Net transfers	-895	-938	-42	-0.4	4.7	-12.6	-2.2
Pensions	3089	5932	2843	24.2	92.1	60.3	8.2
Implicit subsidies on rental housing	147	247	100	0.9	68.1	40.3	5.8
Imputed rents on owner-occupied housing	1872	4494	2622	22.3	140.1	100.4	12.3
Total income	19212	30983	11772	100.0	61.3	34.6	5.1

Notes: CHIP income per capita, excluding migrants. Income levels are in current prices; real increases are converted to 2007 constant prices using the urban consumer price index published by the NBS (1.19829).

Table 2.8. ***Estimates of income inequality among formal urban households, 2007 and 2013***

	2007	2013	change (%)
(a) NBS income per capita			
Gini	0.334	0.355	6.3
MLD	0.189	0.212	12.2
Theil	0.192	0.223	16.4
(b) CHIP income per capita			
Gini	0.338	0.349	3.3
MLD	0.191	0.205	7.3
Theil	0.191	0.214	12.0

Note: Excluding migrants.

Table 2.9. ***Decomposition of the formal urban Gini coefficient by income source***

Income component	2007			2013		
	Income share (%)	Concentration coefficient	Contribution to inequality (%)	Income share (%)	Concentration coefficient	Contribution to inequality (%)
Wage earnings	70.7	0.364	76.2	59.5	0.352	60.0
Net income from business	5.4	0.227	3.6	6.3	0.330	6.0
Asset income	1.9	0.509	2.9	2.7	0.575	4.5
Net transfers	-4.7	0.499	-6.9	-3.0	0.550	-4.8
Pensions	16.1	0.248	11.8	19.1	0.326	17.9
Implicit subsidies on rental housing	0.8	0.348	0.8	0.8	0.530	1.2
Imputed rents on owner-occupied housing	9.7	0.399	11.5	14.5	0.364	15.1
Total income	100	0.338	100	100	0.349	100

Notes: CHIP income per capita, excluding migrants. Decomposition method is the standard decomposition of the Gini coefficient (Shorrocks 1982). The (Gini) concentration coefficient is also known as the pseudo Gini.

Table 2.10. ***Migrant household income per capita growth and composition, 2007 and 2013***

Income component	Mean income (yuan)		Change from 2007 to 2013				
	2007	2013	Nominal increase（yuan）	Contribution to increase in total income (%)	Nominal increase (%)	Real increase (%)	Real average annual growth (%)
Wage earnings	11480	15110	3630	51.7	31.6	9.8	1.6
Net income from business	4786	5938	1152	16.4	24.1	3.5	0.6
Asset income	166	362	196	2.8	117.7	81.7	10.5
Net transfers	-1447	-820	627	8.9	-43.3	-52.7	-11.7
Pensions	n.a.	341	341	4.9	n.a.	n.a.	n.a.
Imputed rents on owner-occupied housing	352	1328	976	13.9	277.4	214.9	21.1
Total income	15233	22259	7026	100.0	46.1	21.9	3.4

Notes: CHIP income per capita. Income levels are in current prices; real increases are converted to 2007 constant prices using the urban consumer price index published by the NBS (1.19829). Information on pensions was not available for migrants in 2007, so we do not calculate the growth rates for this income source; migrant pensions were likely to have been very small or zero in 2007.

Table 2.11. ***Estimates of income inequality among migrant households, 2007 and 2013***

	2007	2013	change (%)
(a) NBS income per capita			
Gini	0.300	0.349	16.3
MLD	0.153	0.184	20.3
Theil	0.173	0.217	25.4
(b) CHIP income per capita			
Gini	0.324	0.348	7.4
MLD	0.168	0.183	8.9
Theil	0.203	0.216	6.4

Table 2.12. ***Decomposition of the migrant Gini coefficient by income source***

Income component	2007			2013		
	Income share (%)	Concentration coefficient	Contribution to inequality (%)	Income share (%)	Concentration coefficient	Contribution to inequality (%)
Wage earnings	69.7	0.198	43.9	67.9	0.318	62.0
Net income from business	35.2	0.409	45.8	26.7	0.427	32.7
Asset income	0.7	0.780	1.6	1.6	0.458	2.1
Net transfers	-7.8	-0.149	3.7	-3.7	0.479	-5.1
Pensions	n.a.	n.a.	n.a.	1.5	0.456	2.1
Imputed rents on owner-occupied housing	2.2	0.700	5.0	6.0	0.366	6.3
Total income	100	0.315	100	100	0.348	100

Notes: CHIP income per capita. Decomposition method is the standard decomposition of the Gini coefficient (Shorrocks 1982). The (Gini) concentration coefficient is also known as the pseudo Gini.

Table 2.13. ***Estimates of the urban Gini coefficient excluding and including migrants, 2007 and 2013***

	2007	2013	change (%)
(a) NBS income per capita			
Gini excluding migrants	0.334	0.355	6.3
Gini including migrants	0.327	0.359	9.8
(b) CHIP income per capita			
Gini excluding migrants	0.338	0.349	3.3
Gini including migrants	0.339	0.356	5.0

Table 2.14. ***Estimates of the national Gini coefficient excluding and including migrants, 2007 and 2013***

	2007	2013	change (%)
(a) NBS income per capita			
Gini excluding migrants	0.476	0.462	-2.94
Gini including migrants	0.469	0.448	-4.48
(b) CHIP income per capita			
Gini excluding migrants	0.502	0.445	-11.35
Gini including migrants	0.486	0.433	-10.91

Table 2.15. ***Rural household income per capita growth and composition, 2007 to 2013***

Income component	Mean income (yuan)		Change from 2007 to 2013				
	2007	2013	Nominal increase（yuan）	Contribution to increase in total income (%)	Nominal increase (%)	Real increase (%)	Real average annual growth (%)
Wage earnings	1839	4407	2568	35.0	139.6	95.40	11.8
Net income from agriculture	1644	2234	590	8.1	35.9	10.82	1.7
Net income from non-agricultural business	492	1235	743	10.1	151.0	104.70	12.7
Asset income	141	710	569	7.8	404.4	311.32	26.6
Net transfers	216	1198	982	13.4	454.8	352.39	28.6
Pensions	0	426	426	5.8	n.a.	n.a.	n.a.
Imputed rents on owner-occupied housing	439	1889	1450	19.8	330.7	251.17	23.3
Total income	4770	12098	7328	100.0	153.6	106.82	12.9

Notes: CHIP income per capita. Income levels are in current prices; real increases are converted to 2007 constant prices using the rural consumer price index published by the NBS (1.22633). Information on pensions was not available for rural households in 2007, but rural pensions were likely to have been minimal.

Table 2.16. ***Shares of individuals in rural households with non-zero income by income component, 2007 and 2013***

	% of individuals in households with non-zero income from this source		mean income per capita from this source among households with non-zero income (yuan)		
Income component	2007	2013	2007	2013	real change (%)
Wage earnings	89.4	80.8	2,063	5,447	115.3
Net income from agriculture	95.3	90.4	1,709	2,478	18.2
Net income from non-agricultural business	39.2	27.6	1,251	4,482	192.2
Asset income	33.8	54.4	428	1,296	146.9
Net transfers	73.4	98.3	289	1219	244.0
Pensions	n.a.	30.5	n.a.	1,385	n.a.
Imputed rents on owner-occupied housing	100	98.9	439	1,911	255.0

Notes: CHIP income per capita. Income levels are in current prices; the real increase is in constant prices and deflated using the rural consumer price index published by the NBS (1.22633).

Table 2.17. ***Estimates of rural income inequality, 2007 and 2013***

	2007	2013	change (%)
(a) NBS income per capita			
Gini	0.376	0.407	8.2
MLD	0.234	0.273	16.7
Theil	0.253	0.292	15.4
(b) CHIP income per capita			
Gini	0.374	0.405	8.3
MLD	0.232	0.273	17.7
Theil	0.251	0.297	18.3

Table 2.18. ***Decomposition of the rural Gini coefficient by income source***

Income component	2007			2013		
	Income share (%)	Concentration coefficient	Contribution to inequality (%)	Income share (%)	Concentration coefficient	Contribution to inequality (%)
Wage earnings	38.6	0.401	41.4	36.4	0.458	41.2
Net income from agriculture	34.5	0.253	23.3	18.5	0.229	10.5
Net income from non-agricultural business	10.3	0.591	16.3	10.2	0.623	15.7
Asset income	3.0	0.637	5.0	5.9	0.648	9.4
Net transfers	4.5	0.385	4.7	9.9	0.097	2.4
Pensions	n.a.	n.a.	n.a.	3.5	0.489	4.3
Imputed rents on owner-occupied housing	9.2	0.380	9.3	15.6	0.429	16.6
Total income	100	0.373	100	100	0.405	100

Notes: CHIP income per capita. Decomposition method is the standard decomposition of the Gini coefficient (Shorrocks 1982). The (Gini) concentration coefficient is also known as the pseudo Gini.

Table 2.19. ***The urban-rural income gap, 2007 and 2013***

	Mean income per capita (yuan)		Change, 2007 to 2013	Ratio (no PPP adjustment)		Ratio (with PPP adjustment)	
	2007	2013	(%)	2007	2013	2007	2013
(a) NBS income per capita							
Urban, excl. migrants	14982	28559	59.1	3.46	2.90	2.52	2.20
Urban, incl. migrants	15298	26764	46.0	3.53	2.72	2.57	2.06
Rural	4331	9850	85.5	--	--	--	--
(b) CHIP income per capita							
Urban, excl. migrants	19212	30983	34.6	4.03	2.56	2.94	1.90
Urban, incl. migrants	18231	28843	32.0	3.82	2.38	2.77	1.76
Rural	4770	12098	106.8	--	--	--	--

Notes: Income levels are in current prices; percentage changes are in constant prices. PPP estimates use the urban/rural x province spatial price indexes from Brandt and Holz (2006), updated to 2007 and 2013 using urban/rural x province cost of living indexes published by the NBS.

Table 2.20. ***Contribution of the urban-rural income gap to national inequality (%)***

	No PPP adjustment				With PPP adjustment			
	NBS income		CHIP income		NBS income		CHIP income	
	2007	2013	2007	2013	2007	2013	2007	2013
MLD	47.24	31.71	49.94	26.79	34.63	19.97	38.35	15.11
Theil	46.22	30.72	48.22	25.89	34.98	20.05	38.47	15.02

Notes: Urban includes migrants. For inequality indexes belonging to the general entropy class of indexes GE(α), as is the case for the MLD and Theil indexes (α = 0 for MLD and = 1 for the Theil), inequality between subgroups is as follows: $\mathrm{GE}(\alpha) = \mathrm{GE}_W(\alpha) + \mathrm{GE}_B(\alpha)$, where $\mathrm{GE}_W(\alpha)$ represents within-group, $\mathrm{GE}_B(\alpha)$ represents between-group inequality. $\mathrm{GE}_W(\alpha) = \sum_i \pi_i \mathrm{GE}_i(\alpha)$ and $\mathrm{GE}_B(\alpha) = \sum_i \pi_i log \frac{\pi_i}{p_i}$, with π_i,GE_i, and p_i representing group i's income share, group i's within-group inequality, and group i's population share, respectively.

Table 2.21. ***Household CHIP income per capita by region and regional income gaps, with and without PPP adjustments, 2007 and 2013***

	2007				2013			
region/sector	urban	rural	migrant	all	urban	rural	migrant	all
CHIP income per capita (yuan, current prices, no PPP adjustment)								
Eastern	25444	6896	16939	15574	37619	16042	22805	26764
Central	15114	4160	11536	8514	25309	10629	21274	17606
Western	13969	3273	12292	7107	26320	9556	21531	16774
regional income ratios (no PPP adjustment)								
Eastern/Central	1.68	1.66	1.47	1.83	1.49	1.51	1.07	1.52
Eastern/Western	1.82	2.11	1.38	2.19	1.43	1.68	1.06	1.60
Central/Western	1.08	1.27	0.94	1.20	0.96	1.11	0.99	1.05
regional income ratios (PPP adjusted)								
Eastern/Central	1.42	1.52	1.20	1.53	1.30	1.39	0.92	1.31
Eastern/Western	1.49	1.92	1.11	1.80	1.23	1.63	0.89	1.39
Central/Western	1.05	1.27	0.92	1.17	0.95	1.18	0.97	1.06

Notes: CHIP income per capita. The 2007 urban and rural samples each cover seven Eastern provinces (Beijing, Hebei (rural only), Liaoning, Shanghai (urban only), Jiangsu, Zhejiang, Fujian, and Guangdong), five Central provinces (Shanxi, Anhui, Henan, Hubei, and Hunan), and four Western provinces (Chongqing, Sichuan, Yunnan, and Gansu). The 2007 migrant sample covers the five largest migrant outflow provinces (three Central: Anhui, Henan, and Hubei; two Western: Chongqing and Sichuan), and the four largest migrant inflow provinces (all Eastern: Shanghai, Jiangsu, Zhejiang, and Guangdong). The 2013 urban, rural, and migrant samples cover the same provinces: five Eastern (Beijing, Liaoning, Jiangsu, Shandong, and Guangdong), five Central (Shanxi, Anhui, Henan, Hubei, and Hunan), and five Western (Chongqing, Sichuan, Yunnan, Gansu, and Xinjiang).

Table 2.22. ***Contribution of regional income gaps to national inequality (%)***

	No PPP adjustment				With PPP adjustment			
	NBS income		CHIP income		NBS income		CHIP income	
	2007	2013	2007	2013	2007	2013	2007	2013
MLD	12.95	7.54	14.08	7.29	8.63	4.37	9.88	3.95
Theil	13.84	8.16	15.03	7.72	9.12	4.69	10.48	4.14

Notes: For inequality indexes belonging to the general entropy class of indexes GE(α), as is the case for the MLD and Theil indexes (α = 0 for MLD and = 1 for the Theil), inequality between subgroups is as follows: $GE(\alpha) = GE_W(\alpha) + GE_B(\alpha)$, where $GE_W(\alpha)$ represents within-group, $GE_B(\alpha)$ represents between-group inequality. $GE_W(\alpha) = \sum_i \pi_i GE_i(\alpha)$ and $GE_B(\alpha) = \sum_i \pi_i log\frac{\pi_i}{p_i}$, with π_i,GE_i, and p_i representing group i's income share, group i's within-group inequality, and group i's population share, respectively.

Table 2.23. ***Gini coefficients for the eastern, central, and western Regions, 2007 and 2013***

	no PPP adjustments		with PPP adjustments	
	2007	2013	2007	2013
Eastern	0.445	0.415	0.397	0.388
Central	0.444	0.404	0.400	0.376
Western	0.485	0.442	0.450	0.424
National	0.486	0.433	0.431	0.400

Note: CHIP income per capita.

Table 2.24. ***The urban-rural income ratio for the eastern, central, and western regions, 2007 and 2013***

	no PPP adjustment		with PPP adjustment	
	2007	2013	2007	2013
Eastern	3.27	2.06	2.30	1.51
Central	3.51	2.32	2.69	1.80
Western	4.17	2.64	3.27	2.20
National	3.82	2.38	2.77	1.81

Notes: CHIP income per capita. Urban includes migrants. The gaps are a bit larger but follow a similar pattern if migrants are not included in urban.

Table 2.25. ***Estimates of the national Gini coefficient incorporating the top-income group***

	2007	2013	2007	2013	2007	2013
	Forbes	Forbes	Hurun	Hurun	Comb.	Comb.
Top income defined as > 120,000 yuan						
Gini including top incomes	0.488	0.523	0.497	0.575	0.502	0.630
Ratio to Gini without top incomes	1.038	1.167	1.057	1.283	1.068	1.406
Top income defined as > 60,000 yuan						
Gini including top incomes	.483	.524	.494	.583	.501	.626
Ratio to Gini without top incomes	1.028	1.170	1.051	1.301	1.066	1.397
Top income defined as > highest income in the CHIP sample						
Gini including top incomes	0.485	0.492	0.491	0.521	0.494	0.553
Ratio to Gini without top incomes	1.038	1.100	1.055	1.183	1.064	1.288

Notes: NBS income per capita; weights are applied to the CHIP sample data. Ratios to the overall Gini without top incomes are calculated using the national Gini of NBS income per capita of .470 in 2007 and .448 in 2013 (Table 2.3).

Table 2.26. ***Change in the Gini coefficient from 2007 to 2013 (%)***

	Forbes	Hurun	Combined
Top income defined as income per capita greater than 120,000 yuan	7.2%	15.7%	25.5%
Top income defined as income per capita greater than 60,000 yuan	8.5%	18.0%	25.0%
Top income defined as income per capita greater than highest income in the CHIP sample	1.0%	6.9%	15.4%

Note: NBS income per capita; weights applied to the CHIP sample data.

Table B2.1. ***OLS estimates of the Pareto distribution***

	Forbes			Hurun			Combined		
	log*K*	α	adj. R^2	log*K*	α	adj. R^2	log*K*	α	adj. R^2
2007	28.946	1.294	0.9749	29.461	1.303	0.9740	30.161	1.341	0.9821
	[114.07]	[92.93]		[72.32]	[59.66]		[168.52]	[136.14]	
2013	35.278	1.595	0.9907	36.413	1.634	0.9822	38.124	1.725	0.9919
	[158.02]	[135.02]		[89.29]	[75.72]		[259.47]	[219.18]	

Notes: Estimated based on information from the Forbes, Hurun, and combined lists, assuming that top-income households contain two members (see the text). t-statistics are reported in brackets; all estimates are significant at the 1 percent level.

Table B2.2. ***Estimates of the population and distribution of income for the top-income group***

	2007	2013	2007	2013	2007	2013
Top income defined as > 120,000 yuan	Forbes	Forbes	Hurun	Hurun	Combined	Comb.
Top income population (million)	1.00	16.59	1.50	32.70	1.94	62.44
Share of national population (%)	0.08	1.26	0.11	2.48	0.15	4.73
Average income of top- income group (yuan)	528,657	321,681	516,040	309,274	471,906	285,517
Inequality within the top-income group (Gini)	0.630	0.457	0.623	0.441	0.595	0.408
Top income defined as > 60,000 yuan	Forbes	Forbes	Hurun	Hurun	Comb.	Comb.
Top income population (million)	2.44	50.11	3.71	101.50	4.91	206.41
Share of national population (%)	0.18	3.79	0.28	7.68	0.37	15.62
Average income of top-income group (yuan)	264,328	160,840	258,020	154,637	235,953	142,759
Inequality within the to- income group (Gini)	.630	.457	.623	.441	.595	.408
Top income defined as > highest income in the CHIP sample	Forbes	Forbes	Hurun	Hurun	Comb.	Comb.
Top income population (million)	0.20	1.76	0.30	3.29	0.37	5.52
Share of national population (%)	0.02	0.13	0.02	0.24	0.03	0.41
Average income of top-income group (yuan)	1814350	1312821	1771048	1262190	1619582	1165233
Inequality within the top-income group (Gini)	0.630	0.457	0.623	0.441	0.595	0.408

Notes: Estimated using equations (B.2) through (B.5) and data from the Forbes, Hurun, and combined lists.

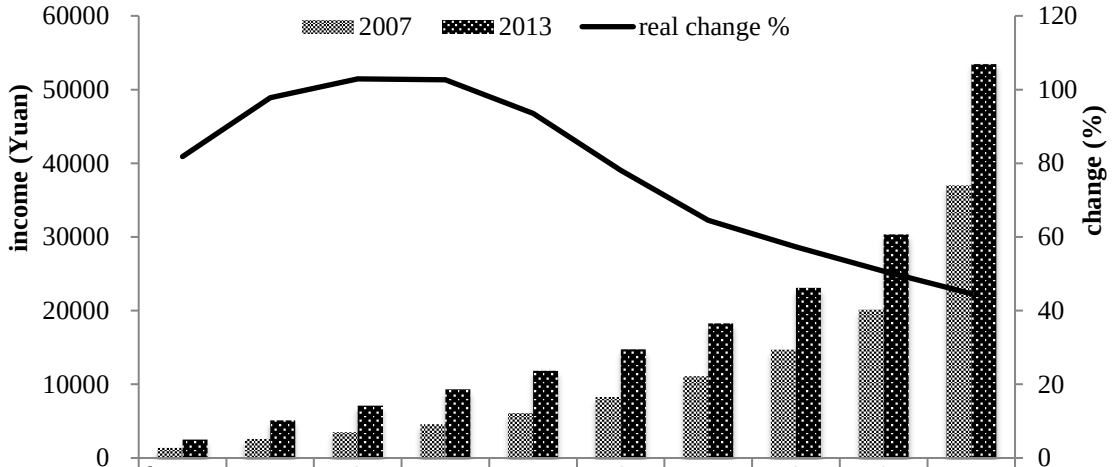
Table B2.3. ***Incomes and inequality in the CHIP surveys***

	CHIP 2007	CHIP 2013
Entire Samples		
Mean income	9,353	19,023
Highest income	411,840	489,736
Gini	0.470	0.448
Excluding observations with incomes above 120,000 yuan		
Mean income	9,301	18,550
Highest income	120,000	120,000
Gini	0.467	0.437
Excluding observations with incomes above 60,000 yuan		
Mean income	9,089	16,923
Highest income	60,000	60,000
Gini	0.458	0.407

Notes: NBS income per capita. Calculated using CHIP data with weights. The number of individuals in the sample with income per capita greater than or equal to 120,000 yuan was 18 in 2007 and 130 in 2013, equivalent (with weights) to 0.02 percent and 0.29 percent of the population in each year, respectively. The number of individuals in the sample with income per capita greater than or equal to 60,000 yuan was 313 in 2007 and 1,351 in 2013, equivalent (with weights) to 0.36 percent and 3.02 percent of the population in each year, respectively.

Table B2.4. ***Estimates of the Gini coefficient incorporating the top incomes with alternative household size assumptions and a threshold of 120,000 yuan***

	2007	2013	2007	2013	2007	2013
	Forbes	Forbes	Hurun	Hurun	Comb.	Comb.
Gini including top incomes, top income household size = 1	0.492	0.553	0.504	0.614	0.510	0.677
Gini including top incomes, top income household size = 3	0.491	0.525	0.499	0.554	0.504	0.601



	bottom	2	3	4	5	6	7	8	9	top
2007	1385	2570	3509	4603	6113	8277	11108	14686	20151	36976
2013	2518	5084	7119	9329	11831	14736	18275	23101	30363	53470
real change %	81.8	97.8	102.9	102.7	93.6	78.0	64.5	57.3	50.7	44.6

Figure 2.1. ***National income per capita by income decile: Level and change, 2007 to 2013***

Notes: CHIP income per capita. Incomes and income growth are in constant 2007 prices, deflated using the NBS national average consumer price index, which showed an increase in the price level of 20.536 percent from 2007 to 2013.

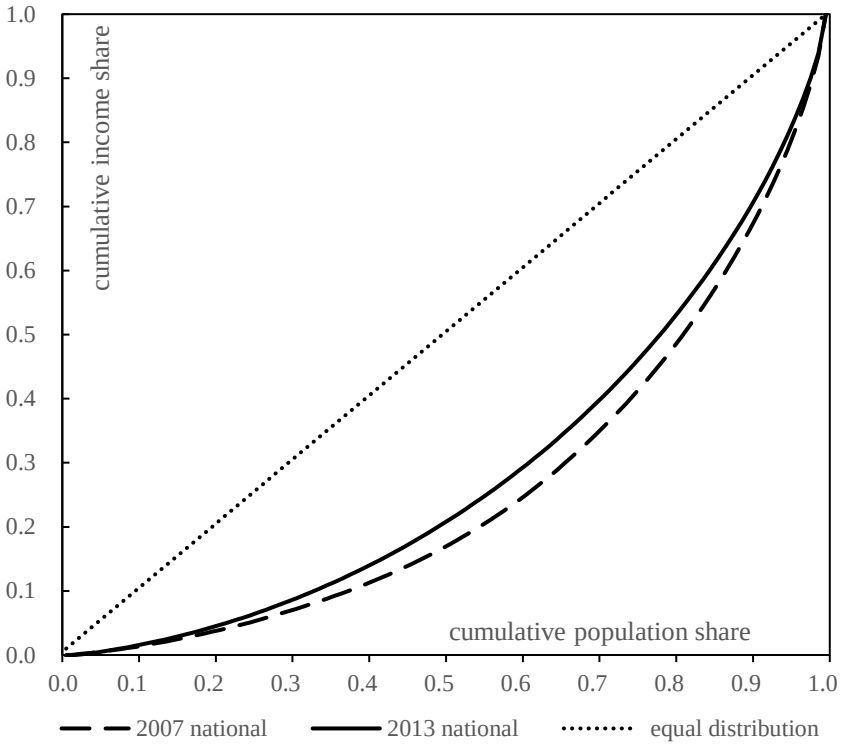
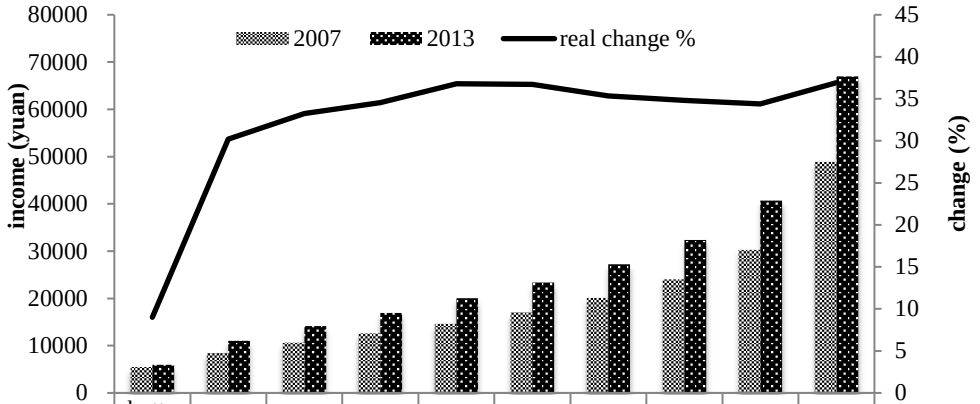


Figure 2.2. ***National Lorenz curves, 2007 and 2013***

Notes: CHIP income per capita. The Lorenz curves for NBS income per capita are very similar.



	bottom	2	3	4	5	6	7	8	9	top
2007	5463	8445	10604	12582	14629	17077	20115	24015	30285	48916
2013	5955	10997	14131	16930	20009	23349	27226	32370	40697	66975
real change %	9.0	30.2	33.3	34.6	36.8	36.7	35.4	34.8	34.4	36.9

Figure 2.3. ***Formal urban income per capita by income decile: Level and change, 2007 to 2013***

Notes: CHIP income per capita, excluding migrants. Incomes and income growth are in constant 2007 prices, deflated using the NBS urban consumer price index.

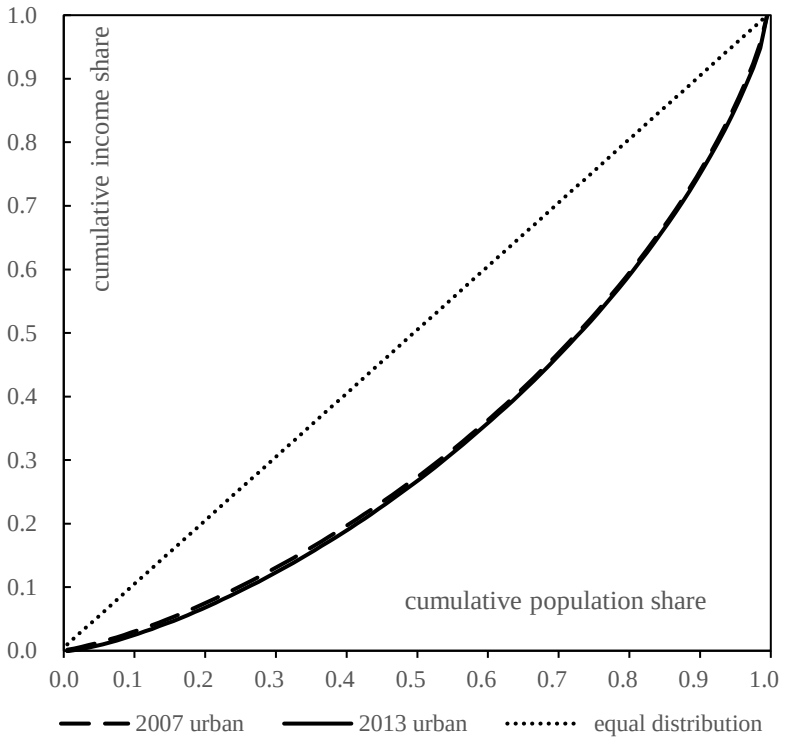
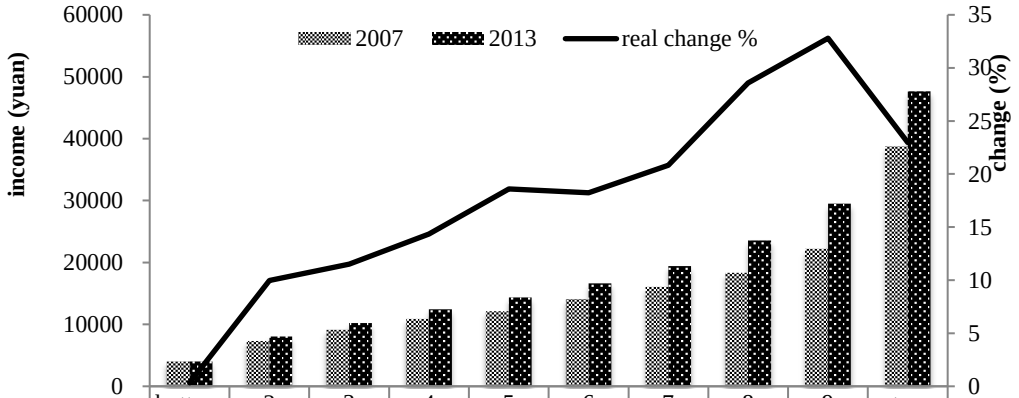


Figure 2.4. ***Lorenz curves for formal urban income per capita, 2007 and 2013***

Note: CHIP income per capita, excluding migrants.



	bottom	2	3	4	5	6	7	8	9	top
2007	4000	7311	9147	10886	12114	14081	16078	18316	22229	38769
2013	4013	8040	10201	12449	14366	16647	19427	23550	29519	47673
real change %	0.3	10.0	11.5	14.4	18.6	18.2	20.8	28.6	32.8	23.0

Figure 2.5. ***Migrant income per capita by income decile: Level and change, 2007 to 2013***

Notes: CHIP income per capita. Incomes and income growth are in constant 2007 prices, deflated using the NBS urban consumer price index.

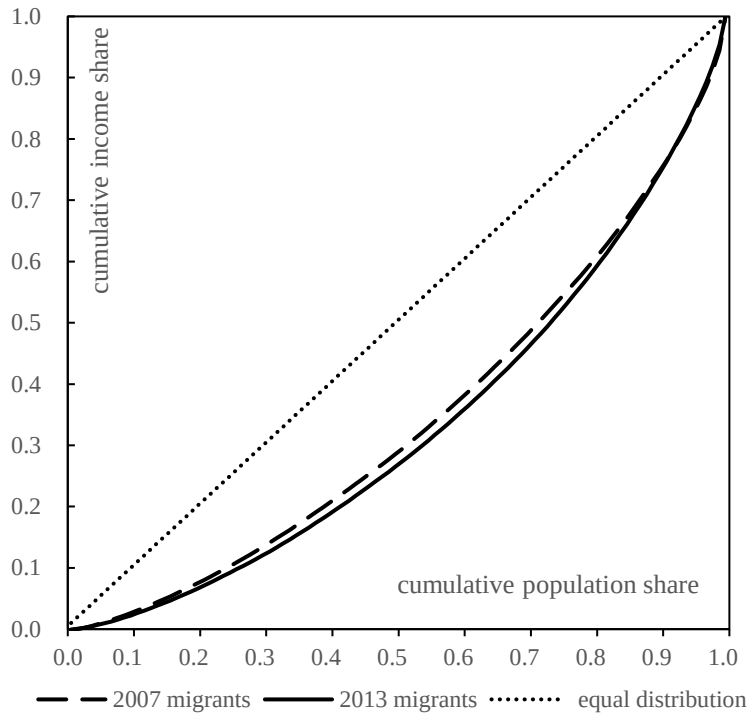
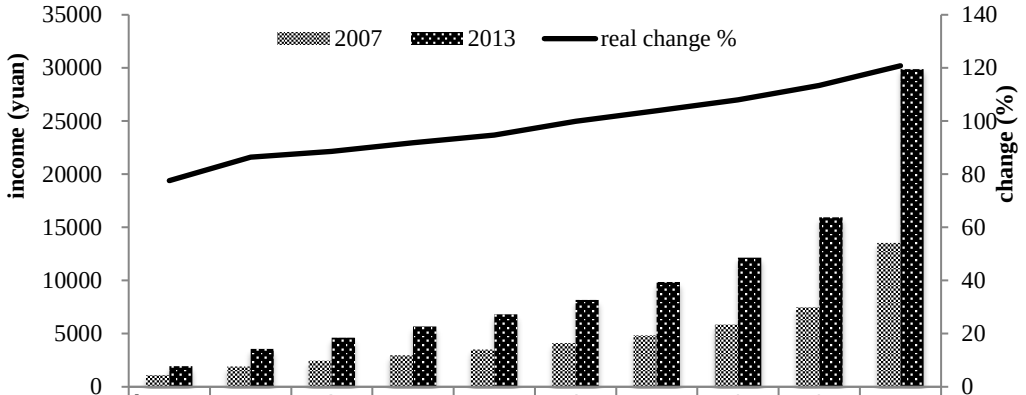


Figure 2.6. ***Lorenz curves for migrant income per capita, 2007 and 2013***

Note: CHIP income per capita.



	bottom	2	3	4	5	6	7	8	9	top
2007	1085	1918	2455	2959	3504	4094	4835	5844	7476	13529
2013	1927	3575	4629	5677	6823	8185	9860	12153	15952	29875
real change %	77.6	86.4	88.5	91.8	94.7	99.9	103.9	108.0	113.4	120.8

Figure 2.7. ***Rural income per capita by income decile: Level and change, 2007 to 2013***

Notes: CHIP income per capita. Incomes and income growth are in constant 2007 prices, deflated using the NBS rural consumer price index.

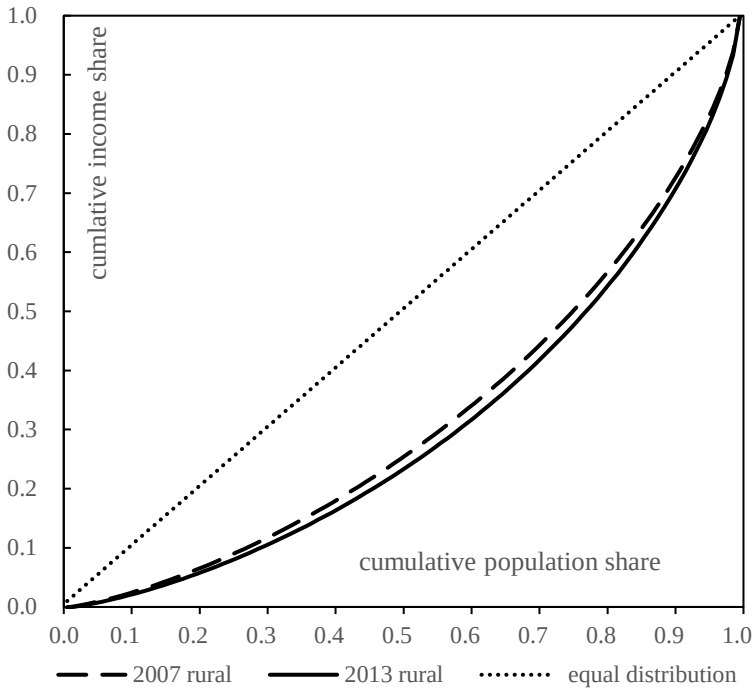


Figure 2.8. ***Lorenz curves for rural income per capita, 2007 and 2013***

Note: CHIP income per capita.

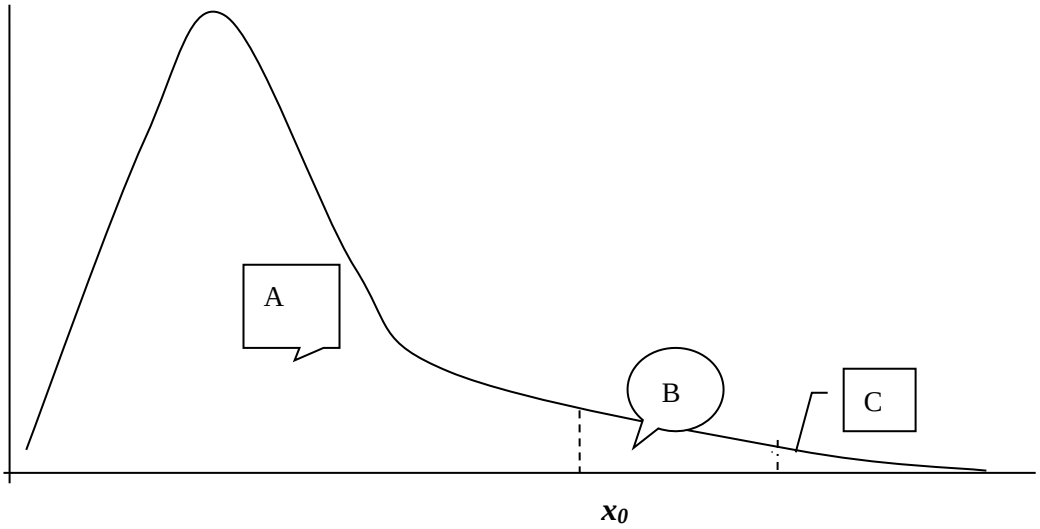


Figure 2.9. ***Notional graph of the true income distribution***