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China's Urban-Rural Income Gap: A Re-examination

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China's Urban-Rural Income Gap: A Re-examination

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1. Introduction

Since the 1990s China has experienced relatively high levels of income inequality. A major contributor to this inequality has been a large income gap between its urban and rural populations. As discussed in past studies, a root cause of China's urban-rural income gap is long-term government policies associated with China's household registration or 'hukou' system, which has inhibited migration and segmented China's rural and urban populations, each with different privileges, opportunities, and outcomes. These policies have disadvantaged rural citizens in multiple regards, including employment, education, housing, and social welfare benefits.

Much of the seminal literature on China's urban-rural income gap was written in the 1990s and early 2000s, when China's population was still majority rural and when rural-to-urban migration was largely temporary in nature. The situation has changed markedly in recent years. In 2011 the share of China's rural population fell below 50 percent for the first time in history.¹ By 2024 it had fallen yet further, to 33 percent.² Concurrently, China's rural-urban migrants became increasingly settled in cities as long-term residents (Zhu et al. 2023).

China's recent rapid urbanization has taken place in the wake of an ambitious set of policy reforms calling for the transformation of China into an urban society and for the elimination of the distinctions between the urban and rural populations. These aims were embodied in China's New-type Urbanization Plan (NtUP), launched in 2014, an ambitious plan that contained ambitious targets for the urban population share and called for major changes in China's hukou system by 2020, as well as more the New Urbanization Implementation Plan for the 14th Five-Year Plan period (2021-25).

These developments motivate our re-examination of China's urban-rural income gap and its contribution to national inequality. We argue that in the context of rapid urbanization, the standard approach to measuring the urban-rural income gap is problematic, and we propose an alternative, more suitable approach. We also point out some issues specific to measurement of the gap using Chinese data and propose relevant adjustments.

The standard approach to measuring the urban-rural income gap is to calculate the ratio of average per capita household income of the urban population to the average of the rural population. With rapid urbanization large numbers of individuals who were previously in the rural denominator are reclassified as urban and shift into the nominator. Such reclassification can affect the standard urban-rural income ratio even if all incomes and national inequality remain unchanged. If, for example, average rural incomes are lower than average urban incomes, then if average rural households move to the city, the urban-rural income ratio will decline. Thus, changes in the standard gap can be an imperfect indicator of underlying changes in relative incomes.

A second problem with the standard approach is that it does not control for selection. Urbanization usually involves selection. Rural individuals who move to the city are not necessarily representative of the wider rural population. Furthermore, the extent of selection changes during the process of urbanization, as early movers can be more skilled and entrepreneurial than late movers. Selection

¹ <https://data.stats.gov.cn/english/easyquery.htm?cn=C01>, accessed 5 August 2025.

² National Bureau of Statistics of China (NBS), Statistical Communique of the People's Republic of China on the 2024 National Economic and Social Development, https://www.stats.gov.cn/english/PressRelease/202502/t20250228_1958822.html, accessed 5 August 2025.

causes changes in average incomes in the two sectors and so can bias measurement of trends in the urban-rural income gap.

In view of these problems, we propose an alternative approach in which individuals are classified as urban versus rural based not on their current situation, but on their situation in an initial, base year. All individuals are categorized as urban or rural at a fixed point in time. This approach keeps the population groups in the nominator and denominator of the income gap unchanged across years. As a result, changes over time in the gap will reflect changes in the relative incomes of the two groups, and not reclassification or selection. Trends over time in this alternative gap therefore tell us whether the incomes of individuals who were initially rural have lagged behind, kept up with, or caught up with the incomes of individuals who were initially urban.

Applying this approach for requires data that contains historical information. For our analysis of China we employ the China Household Income Project (CHIP) survey datasets for 2002, 2007, 2013, 2018, and 2023. The 2023 CHIP data are new and allow us to provide an update the literature. All in all these surveys span more than 20 years and make possible the analysis of long-term trends starting when China was largely rural through its period of rapid urbanization.

The CHIP datasets contain historical information on hukou. Using the historical hukou information, we classify individuals as urban versus rural based on whether they held urban versus rural hukou in 2002, the initial survey year. At that time China was as yet in the early stages of urbanization and had not yet embarked on significant reforms of the hukou system. We estimate the urban-rural gap based on initial hukou classification.

Employing the new approach and some additional statistical adjustments that address some problems specific to the Chinese income data, we re-estimate China's urban-rural income gap. Using inequality decomposition we estimate the contribution of the gap to total inequality. We carry out this analysis using both our alternative approach and the standard approach employed in other studies. Comparison of the results reveals significant differences.

We also analyze factors contributing to the gap. For this purpose we employ the Oaxaca-Blinder methodology, which decomposes the gap between the contributions of differences in characteristics and of differences in the returns to those characteristics. We conduct this analysis using the CHIP data for 2013 and 2023, so as to gain a picture of how the factors underlying the gap changed during a decade in which China embarked on an ambitious urbanization programme. We carry out the estimation using both our alternative approach and the standard approach. Once again, we find important differences.

We begin in the next section with background about urbanization policies and trends in China. This background provides motivates our alternative approach to measurement of the urban-rural gap. Section 3 discusses data, discusses drawbacks of the standard measurement of the urban-rural gap, and explains our alternative approach. In this section we also raise some measurement issues that apply to Chinese household income data and propose relevant adjustments. Important here is a statistical break in 2013, when China's National Bureau of Statistics revised the definition of income.

In section 4 we report standard and alternative estimates of the urban-rural income gap, discuss the differences among the estimates, and examine trends over time. In section 6 we present estimates of the decomposition of inequality by population subgroup and compare the results using the alternative

and standard approaches. In section 7 we report results of the Oaxaca-Blinder decomposition, again comparing estimates using the two approaches. We conclude in section 8 with a discussion of key insights and lessons from the analysis. We find that our alternative approach where individuals are classified as urban versus rural based on their historical hukou yields useful insights relevant to understanding the effects of China's rapid urbanization and formulating policy.

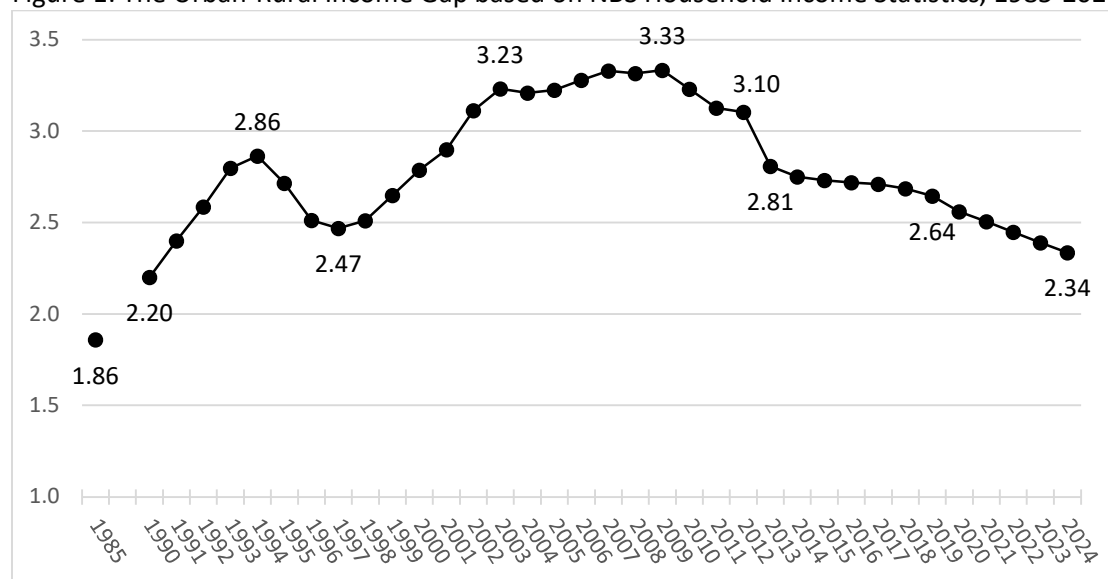
2. China's Urban-Rural Gap, Urbanization, and Hukou: Background

Much has been written about China's urban-rural divide and related policies. Here we give a brief overview of the literature, describe past trends in urbanization, and give an overview of the household registration or hukou system and relevant policy reforms, including the New-type Urbanization Plan (NtUP).

2.1 Past studies

According to the literature, inequality in China began to rise in the 1980s and peaked at a high level in 2008-09, after which it declined somewhat but remained relatively high (e.g., Kanbur, Wang & Zhang, 2021; Luo, Li & Sicular, 2020; Sicular et. al, 2007; Sicular et al., 2020; Zhang, 2021; Zhuang, Zhan & Li, 2023). Studies identify the urban-rural income gap as a principal factor underlying trends in national inequality (e.g., Kanbur, Wang & Zhang, 2021; Luo, Li, & Sicular 2020; Meng, Gustafsson & Knight 2023; Sicular et al., 2007; Zhang, 2021). For example, using inequality decomposition by subgroup, Luo, Li and Sicular (2020) finds that the urban-rural gap's contribution to national inequality rose from 27% in 1995 to 42% in 2002 and further to 50% in 2007, after which it fell to 28% in 2013.

Figure 1: The Urban-Rural Income Gap based on NBS Household Income Statistics, 1985-2024



Note: Authors' calculations using NBS statistics for average urban and average rural household incomes per capita.

Sources: <https://data.stats.gov.cn/english/>, accessed 10 August 2025.

The standard way of measuring the urban-rural gap in the literature is as the ratio of average urban household income per capita to average rural household income per capita, with urban and rural defined based on location of residence. Figure 1 shows the gap so measured calculated using official

Chinese statistics for average urban and rural household incomes published by China's National Bureau of Statistics (NBS). This figure shows that the gap peaked at 3.3 in 2007-2009 and then declined. As of 2024 the gap was 2.34, which although lower than before remains relatively high by international standards (Kanbur, Wang & Zhang, 2021; Sicular et al., 2007).

The NBS income data are widely used but have weaknesses. To address these weaknesses, some studies have made adjustments to the NBS income variable, e.g., including imputed rent on owner-occupied housing in income and adjusting for inflation or spatial price differences, and use household income data from other sources (e.g., Sicular et al. 2007; Zhuang, Zhan & Li, 2023). The alternative estimates of China's urban-rural income gap differ somewhat from those in Figure 1, but they generally concur that the gap has remained relatively large and has followed trends similar to those in figure 1.

One weakness with the NBS income data that has received little attention to date, but which we address here, is a statistical break. In 2013 the NBS revised the measurement household income per capita. The revision affected its estimates of urban and rural incomes differently, so as to reduce the size of the urban-rural gap. As a result, the 2013 drop in the gap shown in figure 1 is overstated.

2.2 Reforms in urbanization and hukou policies

China adopted the household registration or hukou system in 1958 to control large population movements and facilitate planning (Chan 2020; Zhang, Wang and Lu 2019). Each individual's hukou registration specified the urban or rural location of residence and also classified the holder's occupation as agricultural or non-agricultural. Initially the locational and occupational categories were largely coincident—urban residents had non-agricultural occupation, and rural residents had agricultural occupation. The hukou system thus divided the population into two groups, one with urban/non-agricultural hukou and another with rural/agricultural hukou.

Significantly different policies applied to these two groups. The smaller, urban/non-agricultural population was incorporated into state planning, through which it was allocated employment, housing, planned rations of food and other consumer goods, and publicly funded social benefits such as housing, schooling, health care, and pensions. The larger, rural/agricultural population was largely self-sufficient and outside the plan (Chu 2020). Rural households were organized into collective farms that faced planned production targets and delivery quotas for farm products at relatively low prices, to help finance urban industrialization, and they received minimal planned allocations of consumer goods and few social welfare benefits. The result was a substantial income gap between the relatively privileged urban population and relatively disadvantaged rural population.

With the transition from plan to market in the post-Mao period, policy reforms changed both the locational (urban-rural) and occupational (agricultural/non-agricultural) aspects of the hukou system (Wang 2020, Song 2014). Reform of the locational aspect started earlier and has proceeded farther. The early reform years saw the easing of barriers to geographic movement and the growth in migration, mostly of individual workers from the countryside to cities on a temporary, short-term basis. With ongoing relaxation of restrictions on movement, migration expanded further and, especially after 2000, became longer-term and increasingly involved migration by families (Fan and Li 2018, Wang 2020).

Until recently migration from rural to urban areas occurred mostly without any change in hukou. In other words, migrants moved to new locations and kept their original rural/agricultural hukou registration. Such migrants are referred to as the 'floating population'. Lacking urban hukou, their access

to urban-based benefits and public services, including schooling for their children, was limited, and their employment and living status in the city was often precarious (Chan 2020).

Reforms to the occupational aspect of hukou came later and proceeded more slowly. One reason for slow progress on this front has been the fiscal cost of providing the public goods and social benefits to which the urban non-agricultural hukou population is entitled (Wang 2020). These expenditures are largely borne by local city governments, which have faced ongoing, serious fiscal challenges (Wong 2013, 2021). The slow pace of hukou reforms is thus not surprising.

Hukou reforms allowing fuller integration of rural citizens into cities began in the 1990s, when some cities developed local schemes for urban hukou purchase or conversion. In 1997 and again in 2001 the State Council issued central policy guidelines for relaxation of hukou conversion in small cities and towns (Wang 2020; Zhang, Wang and Lu 2019). The central policy allowed local governments to determine local criteria for hukou conversion (Wang 2020), which were typically based on age, education, type and duration of local employment, duration of local residence, and investment in local housing or business (Zhang, Wang and Lu 2019).

In 2006 the State Council announced a further relaxation of hukou restrictions as well as improvement in employment conditions and social protections and benefits for rural migrants (Wang 2020, State Council 2006). Following the 2006 announcement some cities began to implement the so-called 'resident' (居民户口) hukou, a new type of hukou that eliminates the agricultural/non-agricultural distinction and grants resident hukou holders the same rights and benefits enjoyed by an urban hukou holder in the same city (Song 2014). The effects of this reform were limited, however, because resident hukou were offered only to individuals whose agricultural hukou place of registration was local, and not to migrants whose hukou was registered in a different location (Song 2014). Chen and Fan (2016) refer to this as hukou conversion (converting from non-agricultural to agricultural hukou without changing the location of registration) as opposed to hukou transfer (transferring hukou from location of origin, e.g., a rural village, to location of residence, e.g., current city of residence).

The next major reform in the hukou system was announced in 2013. Implementation began in 2014 when China embarked on the NtUP (2014-2020). The NtUP called for an acceleration of urbanization and further, substantial reforms of the hukou system.³ A central goal was to integrate rural migrants more thoroughly into cities and to grant them fuller access to urban public services and social welfare programs. The NtUP set a national urbanization target of 60% in 2020, up from 52.6% in 2012. It also set a 2020 national target for the urban hukou population of 45%, up a substantial ten percentage points from 35% in 2012. These two targets implied a decline in the share of the floating population from 17% in 2012 to 15% in 2020.

The NtUP was superseded in 2022 by the New Urbanization Implementation Plan (NUIP) and in 2024 by the Five Year Action Plan for Deeply Implementing the People-Oriented New Urbanization Strategy

³ The key documents were the "National New-type Urbanization Plan (2014-2020)" 国家新型城镇化规划 (2014-2020年), Central Committee and State Council (see https://www.gov.cn/zhengce/2014-03/16/content_2640075.htm), March 16, 2014, and "State Council Opinion on Further Promoting the Household Registration System Reform" 国务院关于进一步推进户籍制度改革的意见, State Council (see https://www.gov.cn/zhengce/content/2014-07/30/content_8944.htm), July 30, 2014.

(FAP).⁴ The NUIP set a national urbanization target of 65% in 2025; this target was in fact attained in 2022 (see below). The FAP mentions a yet higher target of 70%. Both plans call for continued reforms of the hukou system so as to substantially increase the urban hukou population and reduce the floating migrant population. As well, both plans call for ongoing reforms to improve the provision of public services and social programs for rural migrants, with a long-term goal of equal coverage for and full integration of rural migrants into cities.

2.3 Trends in urbanization and hukou

China's population statistics give some insights into the impact these policy reforms. Figure 2 shows trends in three urban population data series, expressed here as a share of China's population. The first series, urbanization, measures the overall size of China's urban population.⁵ The second series, urban hukou population, gives the number of people that hold urban non-agricultural hukou and urban resident hukou, i.e., the population with formal urban status and entitlements. Subtracting the urban hukou population from the urban population gives the third series, the rural migrant or floating population, which encompasses those urban residents without full urban status and entitlements (Chan 2020, 2021).

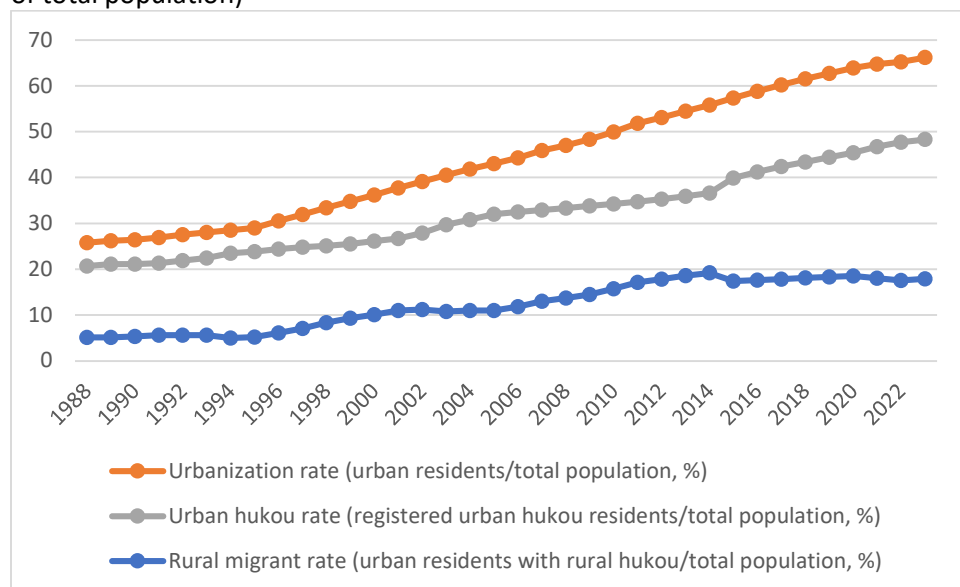
As shown in the figure, urbanization in China began to accelerate after 1995. Initially the acceleration reflected growth in the floating migrant population, which rose from 5% of the population in 1995 to 10% in 2001. In 2001 following the State Council's call for the relaxation of hukou restrictions, the urban hukou population showed a temporary uptick, after which until 2014 migration was once again the main driver of urbanization. By 2014 the population share of rural-urban migrants reached 19%.

After 2015 urbanization continued but with a change in the shares of migrants versus urban hukou holders. In 2015, the first year of implementation of the NtUP, the urban hukou population share jumped three percentage points, and the migrant population share dropped two percentage points. Thereafter, the urban hukou share continued to grow while the migrant share remained fairly stable. By 2023 73% of the urban population held urban hukou, up from 66% in 2014.

⁴ See Government of the PRC (2021) https://www.gov.cn/xinwen/2021-03/13/content_5592681.htm, National Development and Research Council (2022) [P020220712357038234914.pdf](https://www.ndrc.gov.cn/xxwfbq/202207/20220712357038234914.pdf), and State Council (2024), accessed 1 September 2025.

⁵ "Urban" is defined as location of residency in an urban place for > 6 months during the year and is constructed from the census and annual population sample surveys. We use the most recently published urbanization data by the NBS, which after the 2020 census were updated for earlier years based on the new census results. These updated statistics are considered to be more accurate than those published earlier, which are based on extrapolations from the inter-census sample surveys. Chan (2021) notes that the updated population numbers show a larger floating population than the old estimates.

Figure 2: Urbanization, the Urban Hukou Population, and the Floating (rural hukou urban) Population (% of total population)



Notes:

Sources: National Bureau of Statistics of China Statistical Yearbook (various years), China Population Statistics Yearbook (various years), China Population and Employment Statistics Yearbook (various years), China City Statistical Yearbook (various years). For 2021, 2022, 2023 the sources are NBS (2025) and the following websites, accessed 12 August 2025: https://www.gov.cn/zhengce/2022-03/22/content_5680376.htm?utm_source=chatgpt.com, https://news.cctv.com/2023/08/03/ARTItw1EIGzczY1Gs0d8KL3a230803.shtml?utm_source=chatgpt.com, https://news.cctv.com/2023/08/03/ARTItw1EIGzczY1Gs0d8KL3a230803.shtml?utm_source=chatgpt.com.

In sum, Figure 2 shows China's rapid transformation from a predominately rural to a predominately urban society. The urban share of China's population rose from less than 30% prior to 1995, to 39% in 2002 (the initial year of our analysis), further to 50% in 2010 and yet further to 66% in 2023. This growth was overwhelmingly the result of migration and reclassification of rural citizens.⁶ Furthermore, Figure 2 reveals an expansion in the urban hukou population. Prior to 2014 this expansion was slow; since 2014 it has accelerated. In theory, these changes could, all else equal, reduce China's urban-rural income gap. They also raise some new considerations for measurement of the urban-rural gap.

3. Measurement, data, and definitions

The urban-rural income gap is typically measured as the ratio of average urban household income per capita to average rural household income per capita. Estimation of the level and trends in the gap requires reliable, consistent information on household incomes per capita as well as an appropriate, consistent definition of urban versus rural.

⁶ Growth in the urban population due to natural increase in the urban hukou population has been very low. Chan (2012) estimates that from 2000 to 2010 only 15% of growth in the urban population was the result of natural increase in the urban hukou population, 43% was from net migration from rural areas, and 42% was due to the reclassification of rural areas as urban.

3.1 Data and measurement of income

For our analysis we use data from the 2002, 2007, 2013, 2018, and 2023 rounds of the CHIP household survey. The CHIP datasets encompass large samples of 57,000 and 90,000 individuals, depending on the year. They span urban and rural areas in China's eastern, central and western regions, contain detailed information on income, hukou and other variables of interest, and are relatively consistent over time. Sampling is designed to be representative at the national and sectoral (urban/rural) levels.^{7, 8}

The different rounds of the CHIP survey have substantial overlap in the provinces covered, but with some changes from year to year. For consistency, we restrict the sample to the 12 provinces common to all five rounds of the survey.⁹ In order to correct for different sampling probabilities between regions and between the formal urban, rural, and rural-to-urban migrant populations, we apply two-level (east/west/center regions x urban hukou/migrant/rural) sampling weights constructed by the CHIP team using national population statistics from the official censuses and annual population sample surveys. In some of our analyses we further subdivide the formal urban population between recent and longer term urban hukou holders. For these analyses we employ modified two-level sampling weights (east/west/center x long-term urban hukou/recent urban hukou/migrant/rural). With the application of the population sampling weights, the estimates should be representative at the national, regional and sectoral levels (Yue & Sicular, 2017).

The CHIP datasets contain variables provided by the NBS from its income and expenditure surveys as well as variables collected by CHIP using an independent survey questionnaire. Importantly, they contain the NBS's estimate of disposable household income, which we refer to as 'NBS income'. NBS income is estimated using information collected using real-time diaries. It is a comprehensive measure of income that includes wage earnings, other labor compensation, net business income (including from farming), in-kind income, income from property and assets, and public and private transfers received by the household, net of taxes paid and transfers to other households.

As discussed in past studies (e.g., Li & Sicular, 2014; Sicular et al., 2020), NBS income has some weaknesses. Here we adjust for an important flaw that has been largely ignored in the literature. In 2013 the NBS reformed its household income and expenditure survey and modified its definition of income. These statistical changes affected measurement of rural and urban incomes differently, causing a statistical break in measurement of the gap. In 2013 and 2014 the NBS published average urban and rural household incomes per capita using both the new and old methodologies. Comparing the

⁷ The CHIP samples are subsets of the much larger survey samples of the NBS's annual household income and expenditure surveys. The NBS survey samples are selected using stratified random sampling from a sampling frame based on the population census. Selection of the CHIP samples from the larger NBS samples involves two steps: first, a subset of provinces is chosen purposefully so as to reflect the range of economic development in China and to cover the eastern, central and western regions. Second, within each province households are selected using stratified random sampling.

⁸ Prior to 2013 rural-to-urban migrants were underrepresented in the NBS household surveys. In 2002 and 2007 the CHIP carried out independent surveys that collected comparable information for a sample of migrants. We incorporate these migrant samples into our 2002 and 2007 estimation datasets. Starting in 2013 the NBS changed its survey sampling approach so as to encompass migrants more fully, and the CHIP's independent migrant survey was discontinued.

⁹ The twelve provinces in our sample are Beijing, Liaoning, Jiangsu, Guangdong in the East; Shanxi, Anhui, Henan, Hubei in the Center; and Chongqing, Sichuan, Yunnan, Gansu in the West.

published incomes in each of these two years at the new and old definitions, we found that in both years the average urban income at the new definition was 2% lower, and average rural income at the new definition was 6% higher, than at the old definition. As a result, the statistical reform reduced the urban-rural gap by 8%.

In our analyses of long-term trends in the gap, we adjust for this statistical break. Specifically, we use the ratios of published NBS incomes for 2013/14 at the new and old definitions to convert the post-2013 incomes to the pre-2013 definition. This gives us consistent estimates of the urban-rural income gap from 2002 to 2023 using the pre-2013 NBS income definition.¹⁰

The literature points out several additional issues with NBS income. One is that NBS income levels reflect geographic price differentials. This is relevant to analysis of the urban-rural gap because the cost of living is higher in urban than in rural areas in China; moreover, over time trends in the cost of living in urban and rural areas have differed. Unfortunately, the information needed to correct for geographic price differentials is unavailable. The NBS does, however, publish separate consumer price indexes for urban and rural areas. Using these price indexes, we estimate the urban-rural income gap in constant 2023 prices.¹¹ Our constant-price estimates cannot eliminate the absolute difference in the cost of living between urban and rural China, but they remove the impact of changes in relative urban versus rural prices on trends in the gap.

A second issue is the treatment of imputed rent on owner-occupied housing. Before 2013 NBS income excluded imputed rent; starting in 2013, NBS income has included an estimate of imputed rent for urban, but not rural residents. In our analysis we uniformly exclude imputed rent. We choose to exclude imputed rent because estimation of imputed rent in China is challenging, especially in earlier years and in rural areas due to the absence of well developed housing and rental markets. In addition, the housing and rental prices on which imputed rent estimates are based have been volatile, resulting in large year-to-year fluctuations in estimates of imputed rents.¹²

3.2 Definition of urban versus rural

Studies of China that differentiate between the urban and rural populations typically adopt the NBS's definition, which classifies individuals as urban (rural) if they live more than half the year in an urban (rural) location. In a context of rapid urbanization, using this standard approach to track trends in the urban-rural gap is problematic. First, reclassification of large numbers of people from the rural denominator to the urban nominator will cause the standard gap to change even if all incomes and thus overall inequality remain constant. Second, the individuals who migrate or live in locations that are reclassified from rural to urban are likely to be above-average in terms of their income, skills, etc., compared to those who remain rural. Consequently, changes in the standard gap will be affected by selection.

¹⁰ We use the pre-2013 income definition for this adjustment because starting in 2013 the NBS began to include an estimate of imputed rents in urban (including migrant) but not rural incomes. Moreover, the NBS method for calculating urban imputed rents was flawed. By using the pre-2013 income definition, our estimates avoid biases associated with this newly added, problematic imputed rent income component.

¹¹ For these calculations we use constant 2023 prices because in most years between 2002 and 2023 the consumer price index rose faster in rural areas than in urban areas. Consequently, the difference in the cost of living between rural and urban areas was smaller in 2023 than in most earlier years.

¹² We conducted some sensitivity analyses using estimates of imputed rent and found that including imputed rents does not qualitatively change our main conclusions.

In view of these problems, we propose an alternative definition based on one's urban versus categorization in the initial or base year of analysis. In our analysis, the base year of analysis is 2002. The CHIP datasets contain information about current and past hukou type. Using this information, we can identify whether each individual in each round of the survey held agricultural or non-agricultural hukou in the base year. We classify each individual in each round of the survey as rural versus urban accordingly. Using this definition of urban versus rural, we calculate our alternative gap, which we call the 'initial hukou' gap.

The initial hukou gap is our preferred measure of the gap. It differs from the standard urban-rural gap in that it is not affected by migration, place reclassification, or selection. Individuals who held agricultural hukou in 2002 will be classified as rural in all years, even if they later migrated to the city or obtained urban hukou. Trends over time in the initial hukou gap can therefore tell us whether, on average, the incomes of individuals who started out rural in 2002 have been catching up with the incomes of individuals who started out urban.

The initial hukou gap is related to, but different from, the current hukou gap. The current hukou gap defines individuals as urban (rural) if they report holding a non-agricultural (agricultural) hukou in the current year of the survey. In the base year the current and initial hukou gaps will be equal. In later years, the difference between trends in these two hukou gaps will depend on the prevalence of hukou conversions or transfers. If there are no hukou conversions or transfers, trends in the current hukou and initial hukou gaps would be identical. In the presence of hukou conversions and transfers, the two will differ.

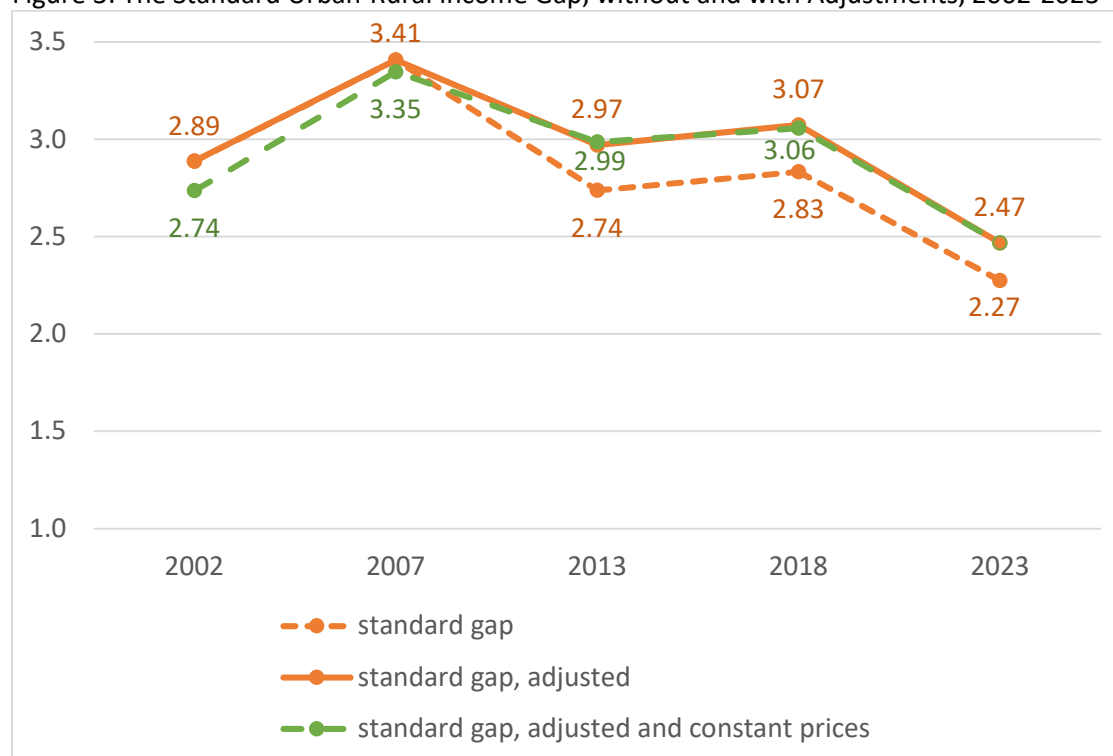
Although the initial hukou gap is our preferred measure of the gap, below we report estimates of the standard gap and current hukou gap, as well as of the initial hukou gap. Comparison of the three gaps yields some insights into the effects of migration and hukou conversions/transfers on relative incomes. Also, historical hukou information is not available in the CHIP 2007 dataset, so that we cannot estimate the initial hukou gap for 2007. Consequently, we have no information about how the initial hukou gap changed from 2002 to 2007 and from 2007 to 2013. At that time trends in the current and initial hukou gaps should however be similar, because hukou conversions/transfers were relatively few.

4. Estimates of the Standard Urban-Rural Income Gap

Figure 3 shows our estimates of the standard urban-rural income gap without and with adjustments for the statistical break and price changes. The dashed orange line is the standard gap without adjustments.¹³ The solid orange line is the standard gap adjusted for the 2013 change in income definition. Here we use the pre-2013 NBS income definition for all years, so that unadjusted and adjusted standard gaps are identical in 2002 and 2007 and differ thereafter. The dashed green line is adjusted for the 2013 definitional change and also holds prices constant at their most recent level (2023). Here we have deflated urban incomes by the urban consumer price index and rural incomes by the rural consumer price index, so that the relative costs of living are held constant across the years.

¹³ Our standard gap, estimated using the CHIP household survey data, differs somewhat from the gap calculated using published NBS estimates of urban and rural average household income per capita (see Figure 1). As the CHIP NBS income variable was supplied by the NBS and the CHIP sample is a subsample of the larger NBS sample, the difference can be attributed to sampling. Regardless, trends in both sets of estimates are similar.

Figure 3: The Standard Urban-Rural Income Gap, without and with Adjustments, 2002-2023



Notes:

1. The standard gap is the ratio of average urban NBS household income per capita divided by average rural NBS household income per capita, with no adjustments, and with urban and rural defined by location of residence. In 2002 and 2007 the standard gap and adjusted standard gap are the same.
2. The adjusted standard gap is an estimate of the gap using the pre-2013 NBS income definition for all years. The NBS published average urban and rural household incomes per capita for 2013 and 2014 at both the old and new definitions. For both these years the ratio of urban income at the old definition to the new definition is 1.02, and the ratio of rural income at the old definition to new definition is 0.94. We multiply our estimates of the standard gaps in 2013, 2018 and 2023 by 1.02/0.94 to obtain estimates of the adjusted standard gap measured consistently using the pre-2013 NBS income definition.
3. To obtain the gap in constant prices, for each year we convert urban and rural average household incomes per capita to constant 2023 prices using the published NBS urban and rural consumer price indexes.
4. For full results, see Appendix Table 1.

Sources: Authors' calculations using the CHIP data, NBS statistical yearbooks (various years).

All three gaps in Figure 3 show a marked increase from 2002 to 2007, a substantial decline from 2007 to 2013, a modest increase from 2013 to 2018, and then another substantial decline from 2018 to 2023. The unadjusted and adjusted estimates diverge noticeably after 2007. The decline between 2007 and 2013 in the unadjusted gap is 21%, and in the adjusted gap 15%. Figure 3 thus illustrates the extent to which the statistical break led to overstatement of the 2013 decline in the gap. Hereafter we therefore adjust for the statistical break in all analysis that involves comparisons of the gap before and after 2013.

Figure 3 also shows the gap after further adjustment for change in the relative costs of living. This adjustment has a relatively small impact on our estimates. In all years except 2002 the constant-price

estimate is within 1% of the current-price estimate. Even in 2002 the difference between the two estimates is less than 5%. In view of these results, hereafter we do not adjust our estimates for changes in relative urban-rural prices.

5. Estimates of the Current Hukou and Initial Hukou Gaps

Figure 4 contains our estimates of the adjusted standard gap (orange), initial hukou gap (red), and current hukou gap (blue). All estimates are adjusted to the pre-2013 NBS income definition (see notes to Figure 3). The CHIP 2007 dataset contains no information on past hukou, so estimates of the initial hukou gap in 2007 are missing.

Figure 4 shows that the hukou gaps and the adjusted standard gap differ in magnitude and trends over time. The initial hukou gap is everywhere smaller than the adjusted standard gap. This difference arises due to the treatment of two population subgroups: people who obtained urban hukou after 2002 and people with current agricultural hukou who live in urban areas (floating population). The initial hukou gap classifies both these subgroups as rural (denominator), and the standard gap classifies them as urban (nominator). Shifting these subgroups from urban (standard gap) to rural (initial hukou gap) reduces the gap.

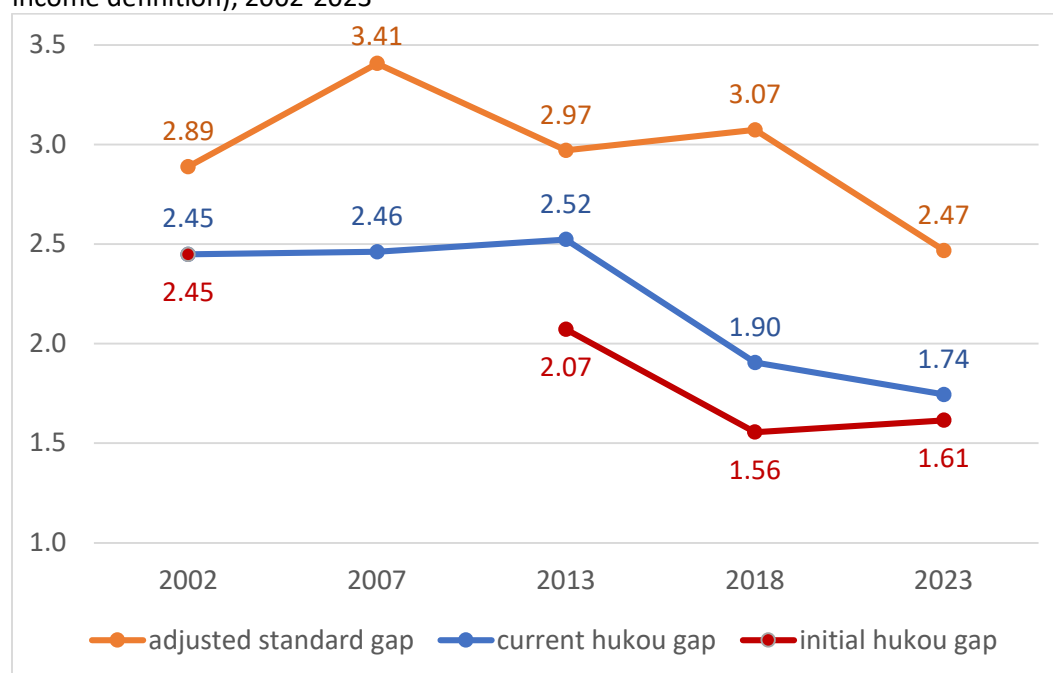
Similarly, in all years except 2002 the current hukou gap is smaller than the initial hukou gap. The difference between these two groups arises due only to the treatment of the first subgroup, people who obtained urban hukou after 2002. The initial hukou gap classifies this group as rural (denominator), and the current hukou group classifies it as urban (nominator). Shifting this subgroup from urban to rural further narrows the gap.

We note that if these two subgroups had been representative, that is, if the average incomes of these two subgroups had been equal to the average income of the population of initial rural hukou holders, then shifting them from urban to rural would increase the gap. In other words, the initial hukou gap would be larger than the current hukou gap, and the current hukou gap would be larger than the standard gap. Our estimates, however, show that the opposite is true. We conclude that differences in the magnitudes of the three gaps reflects the impact of selection.

Trends in the gaps also differ. For example, from 2002 to 2013 the current hukou gap remained stable while the adjusted standard gap first increased and then decreased. From 2013 to 2018 the initial and current hukou gaps declined, while the adjusted standard gap increased.

Trends in the initial hukou gap (red) reflect the extent of income catch up achieved by individuals who initially held a rural hukou in 2002. Figure 4 shows that such catch up was substantial. In 2002 the initial hukou gap was 2.45, falling to 1.56 in 2013, after which it increased slightly to 1.61. In other words, the income advantage of initial urban hukou holders had fallen from 145% to 60%. This catch up was the combined result of migration, which allowed formerly rural individuals to take advantage of higher income opportunities in cities, and of hukou conversions and transfers, which gave formerly rural hukou holders access to benefits associated with urban hukou. The accelerated catchup post-2013 suggests that policy reforms associated with the NtUP made a positive difference in these regards.

Figure 4: The Initial Hukou, Current Hukou, and Adjusted Standard Urban-Rural Income Gaps (pre-2013 income definition), 2002-2023



Notes:

1. The adjusted standard hukou gap is based on current location of residence, as explained in the text and notes to Figure 3.
2. The current hukou gap is the ratio of the average income of individuals currently holding urban hukou (non-agricultural 非农 or citizen 居民) to the average income of individuals currently holding rural hukou (agricultural 农).
3. The initial hukou gap is the ratio of the average income of individuals who held urban hukou in 2002 to the average income of people who held rural hukou in 2002. Individuals born after 2002 are classified according to their hukou at birth. Information on initial hukou is not available in CHIP 2007.
5. All estimates are adjusted to the pre-NBS 2013 income definition (see notes to Figure 3).
6. For estimation of the standard and current hukou gaps we use sampling weights based on current location of residence, as explained in the text. For the initial hukou gap, we modify the population sampling weights to distinguish between long-term and recent urban hukou holders (held urban hukou in 2002 versus obtained hukou after 2002), i.e., weights for the urban hukou population are subdivided between urban hukou holders who held urban hukou in 2002 and those who obtained urban hukou after 2002. We construct the modified weights using data by province on the number of individuals with non-agricultural hukou in each survey year (compiled by the Public Security Bureau). The natural rate of increase of initial urban hukou holders was low, so we assume that the population of people who converted to urban hukou after 2002 equals the increase in the population of urban hukou holders between the years. We carried out sensitivity analyses with alternative assumptions regarding growth in the initial hukou population due to natural increase and found that this has minimal effect on our estimates of the initial hukou gap.
7. For full results, see Appendix Table 2.

Sources: Authors' estimates using the CHIP data, provincial population data from the NBS, and provincial non-agricultural hukou population data compiled by the Public Security Bureau and obtained from CEIC (ceicdata.com).

As of 2023 the income disadvantage of initial rural hukou holders was thus much reduced. This raises the question of what explains the urban-rural income gap that remained in 2023. One possibility is that by 2023 initial rural hukou holders had caught up with initial urban hukou holders in terms of their education, etc., but that they continued to face discrimination and other disadvantages. Below we use Oaxaca-Blinder decomposition to analyze the contribution to the gap of differences in characteristics versus differences in returns to characteristics, and we find that the contribution of differences in characteristics and indeed declined while the contribution of differences in the returns to characteristics had increased.

6. Contribution of the Urban-Rural Gap to National Inequality

Past studies have found that China's large urban-rural income gap has been an important contributor to overall inequality in China. Using the CHIP data, we can investigate trends in the gap's contribution to inequality and examine whether the definition of urban versus rural affects the estimates. Following past studies, we employ decomposition of inequality by population subgroup using the Mean Logarithmic Deviation (MLD).^{14,15} The between-group component of the decomposition is an estimate of the contribution of the urban-rural income gap to overall inequality.

We carry out the decomposition for the standard, current hukou and initial hukou definitions of rural and urban. When interpreting the results, one should keep in mind that national inequality changed over time, increasing between 2002 and 2007, declining between 2007 and 2013, remaining fairly stable between 2013 and 2018, and declining again between 2018 and 2023. If national inequality changes, the percentage contribution of the urban-rural gap to inequality can change even if the absolute size of the gap remains constant. Also, we note that the contribution of the urban-rural gap to overall inequality depends both on the size of the urban-rural income gap and on the population shares of the two groups as well as the level of within-group inequality.

Figure 5 shows the decomposition results. The initial hukou gap's contribution to inequality (red) is in all years considerably smaller than those of the adjusted standard and current hukou gaps. The contribution of the contribution of the initial hukou gap was 26% in 2002. By 2018 it had fallen below 6%. Although its contribution increased between 2018 and 2023, in 2023 it remained below 10%. We conclude that by 2018 and 2023 the initial hukou income gap was no longer an important contributor to national inequality.

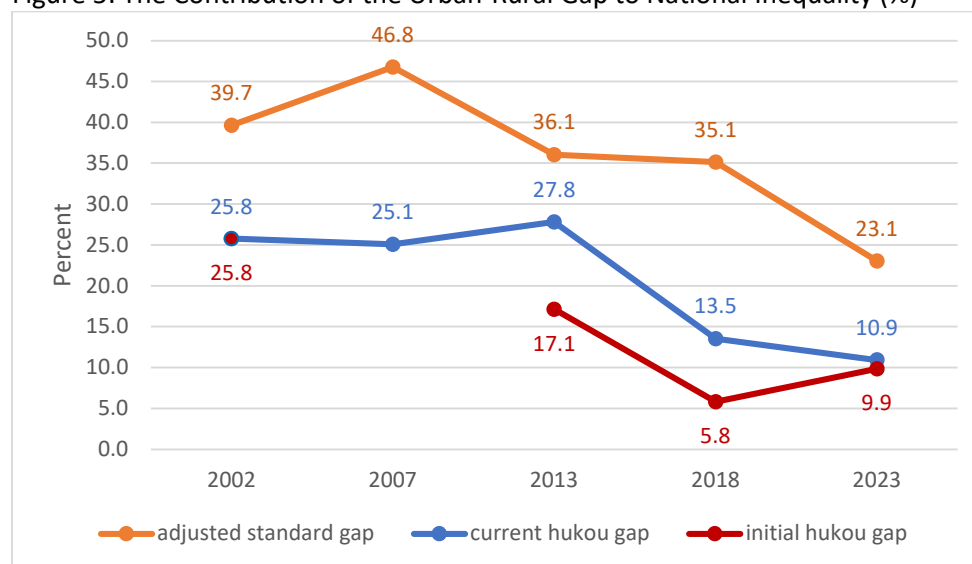
The results for the adjusted standard gap (orange) are quite different. Its contribution declined after 2007, but in 2018 it still contributed more than a third, and in 2023 more than a fifth, of national inequality. Our estimates for the standard gap are consistent with those in the literature (e.g., Luo, Li and Sicular 2020), except are a few percentage points higher after 2012 due to our adjustment for the

¹⁴ Decomposition of inequality by population subgroup divides overall inequality into two components, within-group inequality (the weighted sum of inequality within each of the subgroups) and between-group inequality (inequality measured across the mean incomes of the subgroups). This method requires choice of an inequality index that is decomposable, usually the Mean Logarithmic Deviation (MLD) or Theil entropy measures. This methodology and its applications are widely used and have been discussed extensively elsewhere by Shorrocks (1984) and Shorrocks and Wan (2005).

¹⁵ We also carried out the decomposition using the Theil index, which gave comparable results. See Appendix Table 3.

2013 statistical break. With or without the adjustment, the standard gap's contribution to inequality remained substantial in 2018 and 2023.

Figure 5: The Contribution of the Urban-Rural Gap to National Inequality (%)



Notes:

1. Estimated using standard decomposition of inequality by subgroup employing the MLD inequality index.
2. All estimates are adjusted for the 2013 change in NBS income definition. See notes to Figure 3.
3. All calculations use population sampling weights, as explained in the text.
4. For full results, see Appendix Table 3.

Source: Authors' estimates using the CHIP data.

We note that the current hukou gap's contribution to inequality was in all years between those of the standard gap and initial hukou gap. By 2023, however, its contribution was nearly identical to that of the initial hukou gap. The results for the two hukou gaps thus tell a similar story and yield similar policy implications.

In sum, we see that the results of the inequality decomposition depend on the definition of urban versus rural. The results of the decomposition using the standard definition imply that despite improvement, the urban-rural income gap is still a major contributor to national inequality. The results from using the initial hukou decomposition imply that the urban-rural income gap is no longer a major contributor, and that inequality within groups is now by far the leading contributor to national inequality. Thus the decompositions based on different definitions tell different stories with different policy implications.

7. Factors underlying the Urban-Rural Income Gap

We investigate factors underlying the urban-rural gap using the Oaxaca-Blinder decomposition, which provides estimates of the contribution of differences in characteristics between the urban and rural populations versus the contribution of differences in the returns to those characteristics. We confine the decomposition analysis to the two years 2013 and 2023, a decade apart and before and after the big urbanization push following implementation of the NtUP.

The first step of the Oaxaca-Blinder decomposition is estimation of income equations for the urban and rural subgroups. These equations take the form:

$$\ln(y^g) = \alpha_g + \beta_g X^g + \varepsilon^g,$$

where g indicates urban (u) or rural (r), y is a vector of household per capita incomes of individuals, X is a matrix of characteristics that explain the incomes of individuals, and β is vector of the returns on those characteristics.

The second step uses the estimated regression results to decompose the difference in mean \ln incomes between the groups. The difference in mean \ln incomes between the higher-income urban and lower-income rural group can be written as:

$$\overline{\ln(y^u)} - \overline{\ln(y^r)} = (\hat{\alpha}_u - \hat{\alpha}_r) + \hat{\beta}_u(\bar{X}^u - \bar{X}^r) + (\hat{\beta}_u - \hat{\beta}_r)\bar{X}^r.$$

Here the hats indicate estimated coefficients. The first term on the right-hand side is the portion of the urban–rural income gap contributed by differences in the constants; the second term is the portion contributed by differences between the two groups in their average endowments of characteristics; and the third term is the portion contributed by differences in the estimated returns to characteristics. The second term is considered the “explained” portion of the gap; the first and third terms are considered as “unexplained.”

The above equation uses the coefficients of the richer group as weights for the differences in characteristics and uses the mean characteristics of the poorer group as the weights for the differences in coefficients. This is the ‘standard’ Oaxaca-Blinder decomposition. The ‘reverse’ decomposition switches the weights, that is, uses the coefficients of the poorer group as weights for the differences in characteristics and the mean characteristics of the richer group as weights for the differences in coefficients. For reasons explained below, we present estimates for the reverse decompositions.

7.1 Estimation of the income equations

We estimate the income equations using CHIP data for 2013 and 2023. Our dependent variable is the \ln of household income per capita. Both these years are after the statistical break, so we simply use the 2013 NBS income definition.¹⁶ Our control variables are consistent with those used in the literature (e.g., Golley et al., 2019; Gustafsson & Li, 2003; Morduch & Sicular, 2002; Sicular, Yue, Gustafsson & Li 2007; Jin & Xie, 2017). Our dependent variable, household income per capita, is the joint outcome of collective decisions and activities of multiple family members. Our control variables are therefore the characteristics of the households to which individuals belong including education of working-age adults, household size, and household composition.

Some studies include household asset holdings as controls. With one exception, we do not do so because asset holdings are a function of household income and therefore endogenous. The exception is farmland contracted to rural households during the rural household responsibility system reforms of the late 1970s through early 1980s. Under these reforms collectively owned village farmland was divided

¹⁶ We make one modification to this NBS income variable. The new NBS income definition includes the NBS’s estimate of imputed rent on owner-occupied housing for urban but not for rural households. We subtract this component of urban income, so that imputed rents are consistently excluded from both rural and urban incomes.

among households within each village. Each household was given contractual rights to farm its allocated farmland and to keep the income therefrom. The division of farmland among households was carried out administratively by the village or township, typically on the basis of household size, and with few if any subsequent reallocations. Over time land tenure reforms expanded the rights of rural households, allowing households to lend and lease their contracted land, but not to sell or buy it. Contracted farmland is thus effectively an exogenous asset, and so we include it as a control variable. We note that when members of a rural household obtain urban (non-agricultural or citizen) hukou, they usually must relinquish their farmland. Opportunities to obtain urban hukou have until recently been limited, so such cases are relatively few.

In China political status and political networks can affect income (Bian and Logan, 1996; Morduch and Sicular, 2000; Lam, 2003). The CHIP datasets contain information on Communist Party membership, which is correlated with political status and networks, and so we include an indicator variable for the share of working-age household members who belong to the party as a control variable. In interpreting the estimated coefficient, we acknowledge that Party membership can be correlated with unobserved ability or ambition (Gerber, 2000; Lam, 2003).

To allow for nonlinearity, we include squared terms for age, education, household size, and contracted farmland. To capture the effects of geographical location, we include dummy variables for province of residence.

Tables 2a and 2b show descriptive statistics for our control variables separately for the urban and rural subsamples. Table 2a shows descriptive statistics for the standard definition of urban and rural; Table 2b shows them for the initial hukou definition. For both definitions characteristics differ between urban and rural households in similar and expected ways. We therefore expect that our estimates for the Oaxaca-Blinder decomposition will show that differences in characteristics make a positive contribution to the urban/rural gap.

Table 2a: Descriptive Statistics, Standard Urban/Rural

	2013			2023		
	Standard Urban	Standard Rural	Standard Urban/Rural	Standard Urban	Standard Rural	Standard Urban/Rural
average years education of adults (ages 16 and over)	10.25	7.57	1.36	10.60	8.23	1.29
average age of working-age adults	43.67	43.57	1.00	45.14	47.20	0.96
household size	3.45	4.33	0.80	3.84	4.48	0.86
% of household members of working age	85.81	84.64	1.01	81.61	83.70	0.98
% of working-age members in the Party	11.74	4.65	2.52	12.05	6.25	1.93
% of working-age members in poor health	0.42	1.00	0.42	2.52	4.59	0.55

% of working-age members who are male	44.14	49.91	0.88	46.86	49.16	0.95
% of household members that are ethnic minority	9.73	8.29	1.17	4.60	9.22	0.50
Contracted farmland per capita (mu)	0.00	1.41	0.00	0.00	2.07	0.00
No. of observations	16253	31230		25149	24975	

Table 2b: Descriptive Statistics, Initial Urban/Rural Hukou

	2013			2023		
	Initial Hukou Urban	Initial Hukou Rural	Initial Hukou Urban/Rural	Initial Hukou Urban	Initial Hukou Rural	Initial Hukou Urban/Rural
average years education of adults (ages 16 and over)	10.82	8.13	1.33	10.69	9.03	1.18
average age of working-age adults	45.61	42.29	1.08	45.79	45.04	1.02
household size	3.37	4.05	0.83	3.78	4.24	0.89
% of household members of working age	87.53	84.22	1.04	82.13	82.01	1.00
% of working-age members in the Party	15.31	4.51	3.39	13.27	6.55	2.03
% of working age members in poor health	0.48	0.71	0.67	2.71	3.45	0.78
% of working-age members who are male	45.60	46.67	0.98	46.22	49.00	0.94
% of household members that are ethnic minority	4.65	12.16	0.38	4.97	6.81	0.73
Contracted farmland per capita (mu)	0.00	0.87	0.00	0.00	1.29	0.00
No. of observations	13933	33550		22502	27622	

Notes:

1. Means of characteristics are calculated using weights. Numbers of observations are unweighted.
2. Fewer than 15 urban observations held contracted farmland, and their endowments of contracted farmland were small. Consequently, the mean values of contracted farmland for the urban samples were trivial and equaled 0.00 when rounded to two decimal places.

Source: Authors' calculations using the CHIP data.

For both definitions, moreover, the differences between the urban and rural characteristics changed between 2013 and 2023. For example, urban education remained higher than rural education, but the

education gap shrank. The ratio of urban to rural average years education for standard urban/rural was 1.36 in 2013 and 1.29 in 2023; for initial hukou it was 1.33 in 2013 and 1.18 in 2023. The extent of the decline was larger for initial hukou (-.15) than for standard urban/rural (-.07). We therefore expect education to make a positive contribution to the income gap in all years and for both definitions, and we expect a larger reduction in the contribution of education to the income gap for the initial hukou definition.

Tables 3a and 3b show our regression estimates. For both definitions of urban/rural and in both years, the estimated coefficients are mostly significant and have the expected signs. For both definitions and in both years, most coefficients differ between urban and rural and in expected ways. Based on these estimates, we expect that differences in the returns to characteristics will contribute to the urban–rural income gap.

Table 3a: OLS Regression Estimates, 2013
Dependent variable = ln (NBS household income per capita)

VARIABLES	Standard urban	Standard rural	Initial urban hukou	Initial rural hukou
average education of working-age adults	0.0292*** (0.00757)	0.0212*** (0.00704)	0.0298*** (0.00808)	0.0286*** (0.00671)
education squared	0.00269*** (0.000353)	0.00310*** (0.000460)	0.00281*** (0.000373)	0.00302*** (0.000426)
average age of working-age adults	0.0138*** (0.00292)	0.0349*** (0.00295)	0.0159*** (0.00317)	0.0391*** (0.00285)
age squared	-7.32e-05** (2.93e-05)	-0.000387*** (3.12e-05)	-7.46e-05** (3.16e-05)	-0.000446*** (3.01e-05)
household size	-0.236*** (0.0192)	-0.277*** (0.0130)	-0.215*** (0.0214)	-0.325*** (0.0125)
household size squared	0.0141*** (0.00238)	0.00993*** (0.00131)	0.0121*** (0.00268)	0.0134*** (0.00128)
% of household members of working age (16-65)	0.00255*** (0.000303)	0.000697*** (0.000254)	0.00209*** (0.000336)	0.000749*** (0.000245)
% of working-age members in the Party	0.00198*** (0.000189)	0.00209*** (0.000287)	0.00191*** (0.000193)	0.00196*** (0.000278)
% of working age members in poor health	-0.00232*** (0.000897)	-0.00178*** (0.000549)	-0.00199** (0.000917)	-0.00220*** (0.000553)
% of working age members that are male	-0.000217 (0.000245)	-0.000445* (0.000234)	0.000353 (0.000271)	-0.00171*** (0.000220)
% of household members that are ethnic minority	3.17e-05	-0.00193***	-0.00103***	-0.000693***

	(0.000204)	(0.000176)	(0.000256)	(0.000160)
Contracted farmland per capita		-0.0123***		-0.0380***
		(0.00314)		(0.00310)
Contracted farmland per capita squared		0.000448***		0.00135***
		(0.000160)		(0.000161)
Constant	9.092***	9.153***	9.069***	9.204***
	(0.0851)	(0.0792)	(0.0944)	(0.0764)
Observations	16,186	31,036	13,887	33,335
R-squared	0.312	0.275	0.327	0.289

Table 3b: OLS Regression Estimates, 2023

Dependent variable = ln (NBS household income per capita)

VARIABLES	Standard urban	Standard rural	Initial urban hukou	Initial rural hukou
average education of working-age adults	0.0196**	0.0510***	0.0252***	0.0334***
	(0.00817)	(0.00877)	(0.00848)	(0.00806)
education squared	0.00288***	0.000281	0.00279***	0.00192***
	(0.000375)	(0.000511)	(0.000390)	(0.000450)
average age of working-age adults	0.0248***	0.0280***	0.0259***	0.0294***
	(0.00457)	(0.00452)	(0.00490)	(0.00432)
age squared	-0.000217***	-0.000256***	-0.000217***	-0.000291***
	(4.85e-05)	(4.79e-05)	(5.17e-05)	(4.61e-05)
household size	-0.352***	-0.196***	-0.327***	-0.276***
	(0.0152)	(0.0142)	(0.0162)	(0.0133)
household size squared	0.0224***	0.00634***	0.0206***	0.0124***
	(0.00163)	(0.00136)	(0.00173)	(0.00130)
% of household members of working age (16-65)	0.00433***	0.00262***	0.00443***	0.00206***
	(0.000305)	(0.000297)	(0.000325)	(0.000284)
% of working-age members in the Party	0.00428***	0.00338***	0.00425***	0.00309***
	(0.000212)	(0.000302)	(0.000220)	(0.000288)
% of working age members in poor health	-0.00523***	-0.00343***	-0.00527***	-0.00370***
	(0.000413)	(0.000315)	(0.000428)	(0.000313)
% of working age members that are male	-2.78e-05	-0.000356	-0.000296	-0.000378
	(0.000255)	(0.000254)	(0.000271)	(0.000244)
% of household members that are ethnic minority	-0.000368	-0.000571***	-0.000406	-0.000688***

	(0.000246)	(0.000187)	(0.000255)	(0.000186)
Contracted farmland per capita		0.0149***		0.0128***
		(0.000901)		(0.000911)
Contracted farmland per capita squared		-1.73e-05***		-1.36e-05***
		(2.15e-06)		(2.17e-06)
Constant	9.405***	9.407***	9.335***	9.672***
	(0.116)	(0.113)	(0.125)	(0.108)
Observations	22,784	23,588	20,216	26,156
R-squared	0.308	0.262	0.310	0.294

Note:

1. See text for discussion of the income variable and characteristics. The regressions also included dummy variables for province of residence, not reported in the table.
2. The regressions are estimated over individuals. The control variables are the characteristics of the household in which each individual resides.
3. * indicates significant at the 10%, ** at 5%, and *** at the 1% level of confidence. Standard errors are shown in parentheses.

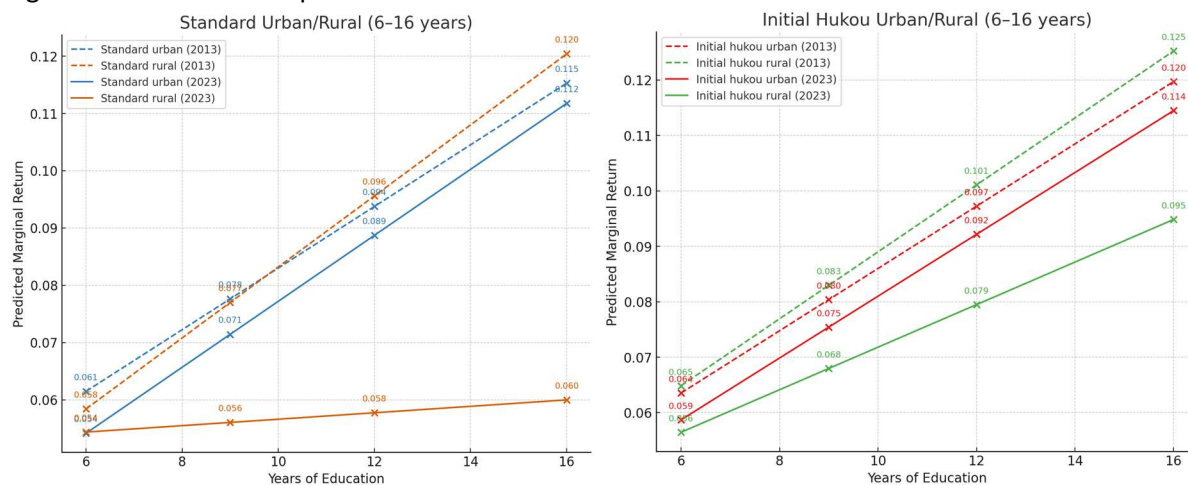
Source: Authors' estimates using the CHIP data.

The estimated coefficients for education, a policy-relevant variable that has, as reported below, a relatively large contribution to the income gap, warrant discussion. The relationship between income and education is nonlinear, so we show plots of the predicted marginal returns for the relevant range spanning primary completion through university completion (Figure 6). The marginal returns are everywhere positive and increasing with years of education. For standard urban/rural, in 2013 the urban and rural marginal returns to education are fairly close, but below 10 years urban is slightly higher than rural and thereafter higher. In 2023 this is no longer the case. In 2023 the returns to both urban and rural education are everywhere lower than in 2013, but the decline is much larger for rural education. In 2023 the returns to rural education are everywhere smaller than urban, and the differential widens markedly as education increases.

The picture is similar for the initial hukou definition, but with some differences. In 2013 the marginal returns to rural education are everywhere higher than for urban education, but the difference is fairly small except at higher years of education. As with standard urban/rural, the marginal returns to both urban and rural education decline from 2013 to 2023, and the decline is greater for rural. Also, as with standard urban/rural, in 2023 the returns to rural education are now lower than urban, and the differential widens as education increases.

These figures show that the difference between urban versus rural returns to education were relatively small in 2013, but in 2023 were noticeably larger for urban, especially beyond middle school. We therefore expect the contribution of the difference in returns to education to be larger in 2023 than in 2013.

Figure 6: The Relationship between Years of Education and Income



Notes: The predicted values are obtained using estimated coefficients on education and education squared from the income regressions (Tables 3a, 3b).

7.2 Results of the Oaxaca-Blinder Decomposition of the Urban-Rural Income Gap

Table 4 shows the results of the Oaxaca-Blinder decomposition for both definitions of urban/rural. The top half of the table gives the contributions in absolute terms; the bottom half gives them as percentages of the difference in ln incomes. The results of the decomposition differ between the standard and initial hukou definitions. First, the sum contribution of the constant term and provincial dummies is large for standard urban/rural and close to zero for initial hukou urban/rural. This difference indicates that, after controlling for other characteristics, unexplained variation among provinces in the urban/rural gap is important for the standard definition but not so much for the initial hukou definition. This difference could reflect variation among provinces in patterns of migration and in the extent of hukou reforms.

Second, the sum contribution of other explanatory variables—which includes all characteristics except province of residence—is substantially larger for the initial hukou gap than for the standard urban/rural gap. This difference is mainly due to the coefficients: the contribution of coefficients to the initial hukou gap is more than double that for the standard gap.

For both definitions the gap in ln incomes shrank between 2013 and 2023, as did the absolute values of the sum contributions of the constant terms and provincial dummies and the sum contributions of other explanatory variables. For both definitions, moreover, the decline in the sum contributions of other explanatory variables was entirely due to a marked decline in the contributions of endowments. This finding is consistent with the observed narrowing over time of urban/rural differences in many characteristics (Tables 2a, 2b). In contrast, the absolute contributions of coefficients increased. The numbers in Table 4 thus result reveal, regardless of the definition of urban/rural is defined, a decline in the importance of differences in characteristics and an increase in the importance of unequal returns to characteristics.

Table 4: Results of the Oaxaca-Blinder Decomposition, 2013 and 2023

	Standard urban/rural, 2013	Standard urban/rural, 2023	Initial hukou urban/rural, 2013	Initial hukou urban/rural, 2023
Difference in ln incomes	1.053	0.832	1.028	0.749
<i>Contributions to difference, absolute values:</i>				
Constant term & provincial dummies	0.463	0.404	0.177	-0.02
Other explanatory variables, of which	0.589	0.427	0.850	0.767
Endowments	0.453	0.228	0.531	0.283
Coefficients	0.136	0.199	0.318	0.482
<i>Contributions as % of difference in ln incomes:</i>				
Constant term & provincial dummies	44.0%	48.6%	17.2%	-2.7%
Other explanatory variables, of which,	55.9%	51.3%	82.7%	102.4%
endowments	43.0%	27.4%	51.7%	37.8%
coefficients	12.9%	23.9%	30.9%	64.4%

Notes:

1. The results shown in this table are for the reverse decomposition. Note that the results of the standard and reverse decompositions are identical except for the estimates of the contributions of endowments versus coefficients in the bottom two rows of this table. We report the reverse decomposition results because a few explanatory variables equal or are close to zero for the urban subgroup, importantly, contracted farmland. The reverse decomposition attributes the contributions of such variables to differences in endowments, which makes sense. The standard decomposition, however, attributes the contributions of these variables to differences in coefficients.

4. As discussed by Jones (1983) and Oaxaca and Ransom (1999), when dummy variables are included in the regression equations, the constant terms and the coefficients of the dummy variables will depend on the choice of reference groups for the dummy variables. For this reason, the separate contributions of the constant terms and dummy variables are impossible to identify, and so we do not present them separately.

Source: Author's calculations using the CHIP data.

Tables 5a and 5b show the estimated contributions of the different control variables, so providing information on which characteristics are more important and whether their contributions are mainly due to differences in endowments or differences in coefficients. Table 5a reports the estimates for the standard urban/rural definition, and Table 5b for the initial hukou definition.

Education is important for both definitions and in both years, in all cases contributing more than 25% of the gap. In 2013 the contribution of education was almost entirely due to differences in endowments. For education, in 2013 the difference in returns made little contribution to the gap. By 2023, however, the contribution of the difference in the returns to education was positive and about 10%. This is consistent with the changes in the marginal returns to education shown in Figure 6. Meanwhile, the contribution of education endowments declined, which is consistent with the narrowing of the urban/rural education gap between these years.

Household demographic characteristics—household size, share of working-age adults in the household, and average age of working-age adults—also had relatively large contributors to the gap. Household size and share of working-age adults contributed positively to the gap, and age negatively. The contributions of these variables changed between 2013 and 2023. For example, for both definitions of urban/rural the

contribution of household size decreased, and this reflected decreases in the contributions of both the endowments and coefficients.

Table 5a: Percentage Contributions of Other Explanatory Variables to the Urban/Rural Gap for Standard Urban/Rural, 2013 and 2023 (%)

Characteristic	2013			2023		
	Total	Endowment	Coefficient	Total	Endowment	Coefficient
average education of working-age adults (years)	28.1	24.6	3.5	25.5	13.9	11.6
average age of working-age adults	-28.7	-1.3	-27.4	3.2	-0.8	4.1
household size	37	17.7	19.3	-3.4	9.5	-12.9
% of household members of working age (16-65)	16.3	0.2	16.1	12.2	-0.4	12.6
% of working-age members in the Party	1.8	1.9	-0.2	3.2	2.5	0.6
% of working age members in poor health	0.1	0.1	0.0	0.5	0.7	-0.2
% of working age members that are male	1.2	0.2	1.0	4.0	0.1	3.9
% of household members that are ethnic minority	1.6	0.4	1.3	0.4	0.2	0.2
Contracted farmland per capita	1.5	1.5	0.0	-2.9	-2.9	0.0

Table 5b: Percentage Contributions of Other Explanatory Variables to the Urban/Rural Gap for Initial Hukou Urban/Rural, 2013 and 2023 (%)

Characteristics	2013			2023		
	Total	Endowment	Coefficient	Total	Endowment	Coefficient
average education of working-age adults (years)	26.6	28.0	-1.5	27.8	18.0	9.8
average age of working-age adults	-25.1	-1.9	-23.2	-3.6	-0.4	-3.3
household size	55.0	19.4	35.6	25.3	9.9	15.4
% of household members of working age (16-65)	12.0	0.2	11.8	20.8	-0.2	21
% of working-age members in the Party	2.0	2.1	-0.1	3.9	2.3	1.5
% of working age members in poor health	0.1	0.1	0	0.5	0.6	-0.1
% of working age members that are male	10.1	0.7	9.4	3.8	0.1	3.7
% of household members that are ethnic minority	0.1	0.3	-0.2	0.4	0.2	0.2
Contracted farmland per capita	4.2	4.2	0.0	-2.2	-2.2	0.0

See notes to Table 4.

Source: Author's calculations using the CHIP data.

Other characteristics had relatively small contributions to the gap, mostly less than 5%. For example, the share of working-age adults that belonged to the Communist Party contributed only 2-4% of the gap, with the majority of its contribution due to the difference in endowments, i.e., the higher proportion of Party members in the urban group.

To summarize, for both the standard and initial hukou definitions of urban/rural we find that the narrowing of the urban-rural income gap from 2013 to 2023 reflected a considerable narrowing of differences in characteristics. In contrast, the contribution of differences in returns to characteristics increased markedly. Thus the decline in the ‘explained’ portion of the gap was offset by an increase in the ‘unexplained’ portion. Such was the case for education, for example. Despite a reduction in the gap between urban and rural years of education, a widened gap in the returns to education meant that the contribution of education to the urban-rural ln income gap remained stubbornly in the 26-28% range.

Despite important similarities, the decomposition results of the standard versus initial hukou definitions differ in an important way. The contributions of ‘other’ characteristics, e.g., education, household demographics, etc., are noticeably larger for initial hukou than for standard urban/rural. Conversely, fixed effects associated with province of residence, and the constant term are larger for standard urban/rural. Consequently, the two sets of estimates have somewhat implications. Specifically, the results for standard urban/rural imply a role for geographical or regional policy measures to address inequality, while the results for initial hukou urban/rural do not.

8. Conclusion

In this paper we have discussed how in a context of rapid urbanization the standard approach to measuring the urban-rural income gap in which individuals are classified as urban or rural based on current place of residence has certain drawbacks. We suggest an alternative approach in which individuals are classified as urban or rural in an initial or base year. Changes in the alternative urban-rural gap will then reflect changes in the relative real incomes of the two groups, and not reclassification or selection. A narrowing of the alternative gap can be interpreted as evidence of catch up, that is, it shows whether, on average, the incomes of people who were initially rural lagged behind, kept pace with, or caught up with the incomes of people who were initially urban.

We use this approach to re-examine China’s urban-rural income gap using Chinese household survey data. Accurate measurement of the income gap and inequality in China requires attention to some weaknesses with Chinese household income data. Important here is a statistical break in 2013 that results in overstatement of the recent decline in overall inequality as well as in the size of the urban-rural gap. We propose and apply an adjustment for the statistical break so that the measurement of income in our long-term analyses is consistent over time.

The alternative approach requires historical information. Our data contain information on current and past hukou registrations, and we classify individuals as urban versus rural based on their urban (non-agricultural) versus rural (agricultural) hukou type in 2002, the initial year of our data. In 2002 hukou and location of residence were highly correlated, so this approximates classification based on initial urban/rural residence. Using the initial urban/rural hukou classification, we estimate the urban-rural income gap, analyze its contribution to overall inequality, and employ the Oaxaca-Blinder decomposition to identify contributing factors. We conduct the same estimations using the standard approach. Comparison of the results contributes to our re-examination of the gap.

Several interesting findings emerge from this re-examination. One such finding is that the alternative gap shows considerable narrowing over time. This narrowing reveals a substantial income catch up by people who started out as rural. Due to this catch up, by 2023 the contribution of the alternative gap to national inequality was small. One can conclude that future distributional policies should emphasize inequality within rather than between groups.

The contribution of the standard gap to national inequality also narrowed, but in 2023 it was still fairly large. One might therefore conclude that continued policy interventions are needed to address inequality between groups. Such interventions can be justified, but their design should be informed by analysis of the alternative gap. For example, such policy interventions should be designed with attention to differences between current urban and rural residents that arise due to selection. In addition, when measuring the effectiveness of such interventions, analysts should keep in mind that the standard gap is an imperfect indicator.

Another interesting finding emerges from the Oaxaca-Blinder analysis, which show a clear reduction in the importance of urban-rural differences in characteristics and an increase in the importance of differences in returns to urban versus rural characteristics. Decomposition results for both the alternative and standard approaches give this result, although more emphatically for the alternative approach. Together, the two approaches point to the need to continue efforts to reduce differences in characteristics, but to place greater emphasis on efforts to address differences in returns.

Our findings about changes in the returns to education provide a case in point. Both the standard and alternative approaches show a decline in the returns to both urban and rural years of education. This is not entirely surprising given the supply-side effect of China's major expansion of secondary and tertiary education and the demand-side effect of China's slowing economic growth. More surprising is the widening of the gap between the returns to urban and rural education. In 2013 their returns were fairly close; in 2023 the returns to rural education at the secondary and tertiary levels were well below those of urban education.

Differences in the quality of urban and rural education, which have been noted in the literature (see, e.g., , seem a possible explanation, but why then was the gap in the returns to education small or even negative (alternative gap) in 2013? Changes in labor demand are another possible explanation. Studies of other countries have found that economic downturns affect labor market outcomes differentially across age, race and gender groups (Hoynes, Miller, and Schaller 2012). It is possible that differences in the returns to urban versus rural education are affected by the degree of tightness of the labor market. In 2013 China's labor market was relatively tight, and in 2023 it was slacker. Further research is needed to identify the reasons for the differential change in the returns to education in China and identify an appropriate policy response.

As the above discussion reveals, the standard and alternative approaches to the urban-rural gap give results that are sometimes consistent and sometimes inconsistent. Although we prefer the alternative approach, the needed historical data are not always available. Furthermore, the standard approach remains informative as a way to analyze income differences between people who are currently resident in rural areas versus urban areas. Policy analysis can therefore benefit from the use of both measures. As urbanization in proceeds, the alternative approach nevertheless will become especially useful, as it provides evidence about the extent to which, in the longer term, people of rural origin have been able to integrate successfully in cities.

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Appendix Table 1: Average household incomes per capita and the urban/rural income gap based on the standard definition of urban/rural

	2002	2007	2013	2018	2023
NBS Unadjusted Income					
National	4506	9036	19040	27960	35839
Urban (incl. migrants)	7677	14655	26906	37635	44237
rural	2652	4290	9801	13383	19455
Urban/Rural	2.89	3.42	2.75	2.81	2.27
NBS Adjusted Income					
National	4506	9036	19060	28093	36028
Urban (incl. migrants)	7677	14655	27444	38388	45122
rural	2652	4290	9213	12580	18287
Urban/Rural	2.89	3.42	2.98	3.05	2.47
NBS Adjusted with Constant Prices					
National	7359	12961	22687	30557	36028
Urban (incl. migrants)	12334	20964	32762	41716	45122
rural	4495	6247	10941	13745	18287
Urban/Rural	2.74	3.36	2.99	3.03	2.47

Note: See text and notes to Figure 1 for explanations.

Source: Authors' calculations using the CHIP data.

Appendix Table 2: Average household incomes per capita and the urban-rural gap based on current hukou and initial hukou definitions of urban/rural

	2002	2007	2013	2018	2023
Urban hukou	7880	14784	29563	38344	46101
Rural hukou	3223	6007	11782	20145	26425
Urban-rural hukou gap	2.44	2.46	2.51	1.90	1.74
Initial urban hukou	7880	na	30210	38882	45334
Initial rural hukou	3223	na	14228	24417	27122
Urban-rural initial hukou gap	2.44		2.12	1.59	1.67

Note: Income in this table is NBS adjusted income. See text and notes to Figure 2 for explanations.

Source: Authors' calculations using the CHIP data.

Appendix Table 3: Full Results of the Inequality Decompositions by Population Subgroup

	2002		2007		2013		2018		2023	
	MLD	Theil Index	MLD	Theil Index	MLD	Theil Index	MLD	Theil Index	MLD	Theil Index
Standard urban-rural income gap, unadjusted NBS income										
Total	0.350	0.354	0.392	0.380	0.362	0.353	0.363	0.346	0.338	0.348
Between	0.138	0.138	0.182	0.167	0.119	0.107	0.115	0.100	0.068	0.059
Within	0.212	0.217	0.209	0.213	0.244	0.247	0.248	0.247	0.270	0.289
Total	100	100	100	100	100	100	100	100	100	100
Between	39.41	38.9	46.56	44.02	32.74	30.17	31.76	28.73	20.06	17.07
Within	60.59	61.1	53.44	55.98	67.26	69.83	68.24	71.27	79.94	82.93
Standard urban-rural income gap, adjusted NBS income										
Total	0.350	0.354	0.392	0.380	0.381	0.368	0.381	0.359	0.351	0.357
Between	0.138	0.138	0.182	0.167	0.137	0.122	0.133	0.113	0.081	0.070
Within	0.212	0.217	0.209	0.213	0.244	0.246	0.248	0.246	0.270	0.288
Total	100	100	100	100	100	100	100	100	100	100
Between	39.41	38.9	46.56	44.02	36.07	33.12	34.9	31.43	23.05	19.49
Within	60.59	61.1	53.44	55.98	63.93	66.88	65.1	68.57	76.95	80.51
Current hukou gap, adjusted NBS income										
Total	0.350	0.354	0.392	0.380	0.382	0.368	0.379	0.359	0.351	0.357
Between	0.089	0.096	0.097	0.100	0.104	0.103	0.051	0.051	0.038	0.038
Within	0.261	0.259	0.295	0.281	0.277	0.265	0.328	0.308	0.312	0.320
Total	100	100	100	100	100	100	100	100	100	100
Between	25.4	26.97	24.84	26.3	27.36	27.99	13.58	14.24	10.94	10.51
Within	74.6	73.03	75.16	73.7	72.64	72.01	86.42	85.76	89.06	89.49
Initial hukou gap, adjusted NBS income										
Total	0.350	0.354	na	na	0.361	0.349	0.372	0.349	0.333	0.336
Between	0.089	0.096	na	na	0.060	0.065	0.022	0.023	0.033	0.033
Within	0.261	0.259	na	na	0.301	0.284	0.351	0.326	0.300	0.303
Total	100	100			100	100	100	100	100	100
Between	25.4	26.97	na	na	16.65	18.66	5.86	6.65	9.86	9.72
Within	74.6	73.03	na	na	83.35	81.34	94.14	93.35	90.14	90.28

Notes: See text and notes to Figure 3 for explanations.

Source: Authors' calculations using the CHIP data.