A Survey on Income Inequality in China

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1. Introduction

Contemporary China perhaps represents the most dramatic economic transformation in history. The economic reform since 1978 has transformed China from a centrally planned economy into a mixed market economy. Real GDP per capita in the past four decades were elevated more than twenty-fold, and nearly two-digit economic growth was sustained and more than doubled during the Maoist era (Xu 2011). Concurrent with the tremendous economic size and sustained high growth, the income inequality rapidly rose during the same period. According to estimates from various sources, the Gini coefficient in China increased from about 0.30 in 1978 to 0.47 in 2016 (see Figure 1). This reminds us that not everyone benefits equally from China's economic reform and that many may be left behind. Focusing only on increasing GDP per capita (or average living standards) and overlooking the rising inequality can disregard an important part of China's economic transformation.

In contrast with the fast growing inequality since the reform and opening up, measurable income inequality was mild in Maoist China, at the time when egalitarianism was regarded as an essential ingredient of socialism. Urban citizens were entitled to receive a vast array of social benefits, including assured employment, distributed housing, grain coupons, subsidised transportation, medical facilities, and other essentials and amenities of life. Meanwhile, the rural population were compulsorily recruited into agricultural collectives characterized by egalitarianism. As a result, interprovincial inequalities, measured in Gini coefficient, were only 0.25 to 0.26 between 1952 and 1965, in comparison with 0.38 in 2013 (Liao and Wei 2016). Therefore, the drastic economic transformation and rapid economic growth in China in the past four decades provide an ideal natural experiment for the study of income inequality.

Although China's rapid economic growth resembles the high-growth period of its Asian neighbors, the evolution of inequality in China shares more resemblances with the US and perhaps other Western countries in their earlier development stages. The Kuznets hypothesis (Kuznets 1955) seems to account for not only the experience of the US up to the 1970s but also that of China in the past four decades, which makes China a more general case rather than a distinctive one. Specifically, various measures of income inequality increase during the early stages of urbanization and industrialization (i.e., the first three decades since 1978) and decrease when industries have already attracted a large fraction of the rural labor force (i.e., the most recent decade). Wan, Wu, and Zhang (2018) argue that income inequality in China

has passed the turning point of the inverted U-shaped curve and entered the declining phase of the Kuznets curve.

Concern over the rising income inequality in China has motivated researchers to study its effect on growth, poverty and health. Using the provincial panel data from 1987 to 2001 in China, Lu, Chen, and Wan (2005) find that inequality has a cumulative negative effect on economic growth. Ravallion and Chen (2007) analyze provincial data in rural areas of China and reveal that provinces with a more rapid increase in inequality achieve less progress against poverty. Baeten, Van Ourti and Van Doorslaer (2013) suggest a potential effect of inequality on health. Using the China Health and Nutrition Survey (1991–2006), they find that the health disparity between the rich and poor is related to rising income inequality over time.

In addition, income inequality has constantly been a public concern in Chinese society. The official newspaper of the Chinese government, *People's Daily*, published several editorials to highlight the increasing concern on the unequal opportunities faced by the poor.[1] These articles imply that the potential adverse impacts of serious inequality on the economic transformation and social stability of China are evident. The articles also reflect the concerns and efforts of the top leadership on balancing between the dramatic economic growth and changes in the distribution of income and opportunities for the people.[2] With China currently in a critical stage of economic transformation, how to analyze and tackle inequality issues is of practical significance.

This survey aims to provide a comprehensive understanding of the evolution of income inequality in China. Specifically, I discuss recent studies on income inequality with a focus on trends, patterns, and sources of income inequality that may explain income inequality systematically. I attempt to reconcile the diverse findings on income inequality in China. Furthermore, I extend the existing literature by providing new perspectives on interpreting the various patterns and trends observed in recent research, such as the changing characteristics of the labor force and skill-biased technological change (SBTC). The Great Gatsby Curve is also briefly discussed as preliminary evidence of the interaction between income inequality and

[1] For example, the 2015 editorial, "How big is the gap between the rich and the poor?", http://society.people.com.cn/n/2015/0123/c1008-26434808.html.

[2] On October 18, 2017, President Xi Jinping proclaimed a prominent "contradiction" of China in the 19th National Congress of the Communist Party of China that "What we now face is the principal contradiction between unbalanced and inadequate development and the people''s ever-growing needs for a better life."

intergenerational mobility in China.

The survey answers three questions. What happened to the time series and cross-sectional income inequality in the last few decades since the economic reforms were initiated in 1978 in China? What are the underlying reasons for the rising income inequality? What important missing research issues are worth further exploration?

Corresponding to the major questions, the survey intends to convey several insights into the income inequality in China. First, China's recent income distribution is increasingly unequal along with its economic miracle. Within only a few decades, China has jumped from a poor and backward developing country to the second-largest economy in the world and continues to experience rapid growth. Meanwhile, it largely becomes a norm for people to earn income according to their contributions, because of the elimination of egalitarianism in the old planned economy. Productivity factors such as education, effort, and creativity are more recognized and, thereby, income inequality has become increasingly prominent. The general consensus is that the Gini coefficient is increasing since the reform and opening up, despite a stable or even slightly declining trend in the recent decade. Similarly, income distribution has been more unequal in terms of urban–rural, regional, and factor income inequality since 1978 but not in the past ten years. All in all, China's experience validates the well-known Kuznets hypothesis that as an economy grows, economic inequality initially increases and then decreases. China seems to lie mainly on the first half of the Kuznets curve, although whether it is around or beyond the turning point remains to be seen. Besides, the increasing pattern of inequality in recent China resembles that in the US up to the 1970s. All these findings seem to indicate the generality of China's recent experience in the economics literature.

Second, several mechanisms are responsible for China's increasing income inequality. The discussion involves changes in labor force features, increasing return to education, changing patterns of rural-to-urban migration, trade liberalization, directed and SBTC, market structure changes, redistribution policy, and minimum wage laws. These sources are critical for understanding and interpreting the patterns and trends of income inequality in China, especially during the period of institutional and economic transformation. So far, several studies put forward useful discussions on selected factors underlying China's income inequality (Knight 2017; Li, Sicular, and Tarp 2018) but studies that consider the relative contributions of these sources simultaneously are minimal or limited. The survey aims to fill

this gap and discuss the sources of inequality more comprehensively. Looking forward, once richer data sets become available, more complex decompositions should be carried out to evaluate relative contributions of these sources in one estimation.

Third, beyond the existing literature we discuss, there still remain unexplained or under-investigated questions about China's income inequality. Given the large size of its economy and rapid rate of recent growth, China provides an important context to study inequality in emerging economies and policy implications for other transition economies. For instance, how does the one-child policy, which has been distinctly enforced between urban and rural areas and across provinces, affect the urban–rural income disparity and regional inequality? How do global forces, such as FDI, outsourcing and SBTC, correlate with income inequality in China? What is the impact of rapid privatization and market-oriented reforms on rising inequality? What is the lesson we can learn from the study of life course and intergenerational inequality? These topics, some of which are unique to China and some are more general, call for further investigation.

The rest of the survey is organized as follows. Section 2 introduces an organizational framework that presents the main issues for subsequent discussion. Section 3 reviews pieces of evidence on the patterns and trends of household income inequality.[3] Section 4 examines the observed income inequality by various sources, ranging from the changing characteristics of the labor force to the redistribution and labor protection policies in China. Section 5 sheds light on the transmission of income inequality aross generations by presenting empirical evidence on the Great Gatsby Curve in China. Section 6 presents missing and valuable research questions for future studies. Section 7 concludes the survey.

2. Organizational framework

This organizational framework is presented to guide the subsequent discussions. To begin with, I give a general description of various measures of income inequality. Using the measures, I discuss an inequality decomposition method. To help make sense of China's income inequality, I further illustrate the major relevant features of institutions related to income inequality. Lastly, I introduce a regression-based analysis for estimating the contributions of sources to income

[3] Individual income inequality and how assortative mating aggravates individual inequality at the household level are not discussed (Greenwood, Guner, Kocharkov, and Santos 2014). Few or no such studies on China are available.

inequality in one comprehensive estimation.

1) Inequality measures and decomposition

Let y_i stand for the income of household i ($i = 1, 2, \cdots, n$) as the fundamental research unit and the starting point for understanding income inequality. Income can be broadly defined as earnings, wages, non-labor income, and wealth which serves as a proxy for economic welfare and as command over economic resources (Cowell 2008).

Let $I(\boldsymbol{y})$ be a general description of the inequality measure, where $\boldsymbol{y}$ is a vector of earnings or incomes across individuals or households. The unit of observation is a flow of income. The total household income is a post-tax measure that summarizes all sources of income, including transfer income. In addition, my discussions are centered on measurable income while ignoring privileged access to various goods and services that many senior managers of state-owned enterprises (SOEs), departmental heads in public institutions, and governmental officials enjoy at substantially low or even zero prices until today. Nevertheless, the caveat on the nonmarket dimension of mixed economy and its impact on the observed inequality measure will be briefly discussed in the following section. For the most part, I focus on household income inequality in this survey and consider a variety of inequality measures.

After obtaining a given inequality measure $I(\boldsymbol{y})$, I discuss inequality decompositions by population subgroups and by factor components. These decompositions correspond to the empirical results in Section 3.

First, the overall inequality can be decomposed by population subgroups, such as urban–rural divide and geographical regions (Bourguignon 1979; Shorrocks 1984).

$$I(\boldsymbol{y}) = I(\boldsymbol{y}_1, \cdots, \boldsymbol{y}_J) = \sum_{j=1}^{J} w_j I(\boldsymbol{y}_j) + I_B^J = I_W^J + I_B^J \quad (1)$$

where $(\boldsymbol{y}_1, \cdots, \boldsymbol{y}_J)$ represents any partition of distribution y into J subgroups, I_W is the "within-group" term of inequality within various subgroups and w_j is the weight for each subgroup, and I_B is the "between-group" term of inequality across subgroups, which is a function of subgroup means and population sizes. Specifically, if the total population is divided into two groups (i.e., urban and rural groups), then the overall inequality can be considered as a

combination of the "between-group term" (i.e., urban-–rural income disparity) and the "within-group term" (i.e., inequality within rural and urban sectors). Urban–rural divide and regional inequality can then be decomposed into between- and within-region inequalities. The decomposition of inequality can be more complicated if different grouping dimensions interact with one another. For example, urban–rural divide can interact with regional groupings so that both urban–rural and regional inequalities can be assessed comprehensively.

Next, the overall inequality can be decomposed by factor components or income sources, such as labor (wage) income, capital (property) income, proprietors' income, and transfer income (Shorrocks 1982; Atkinson and Bourguignon 2000).

$$I(\boldsymbol{y}) = I(\boldsymbol{y}_1, \cdots, \boldsymbol{y}_K) = \sum_{i=1}^{N} a_i\,(\boldsymbol{y}) y_i \tag{2}$$

where $(\boldsymbol{y}_1, \cdots, \boldsymbol{y}_K)$ represents the K factor components of income vectors and $a_i(\boldsymbol{y})$ is the weight for household i and is a function of the total income for all observations of $\boldsymbol{y}$. The decomposition method can be applied to a variety of inequality measures such as coefficient of variance, Gini coefficient, and Theil indices. In this case, the contribution of factor component k to overall income inequality can be simply expressed as:

$$s^k = \frac{\sum_{i=1}^{N} a_i(\boldsymbol{y}) y_i^k}{I(\boldsymbol{y})}. \tag{3}$$

2) Institutional background

Understanding China's unique political and economic systems is a prerequisite for making sense of the country's income inequality. There are five key features of Chinese institutional context that need to be understood when looking at how a rapid growth manifests itself in terms of inequality. Each feature needs to be treated as a facet to determine income or inequality.

Above all, China's governance structure is characterized as a combination of political centralization and economic regional decentralization which Xu (2011) calls the regionally decentralized authoritarian regime. On the one hand, this fundamental institution is politically centralized in the sense that the subnational government officials are appointed and promoted by the central government. Such an authoritarian political system may have the advantage of responding to grievances from rising inequality by adjusting its policies quickly. On the other

hand, each region not only enjoys a certain degree of autonomy but also is self-contained in its economic structure. Economic decentralization enhances regional competition which incentivizes officials to take reform initiatives or growth-enhancing measures (Xu 2011). However, it is possible that effective regional competition leads to undesirable outcomes, such as widening regional inequality.

Another unique feature is China's population control policy. China implemented the one-child policy in 1979, which is considered the most disputable fertility policy in the reform era. Subject to the restrictions of the one-child policy in China, decrease in the number of children per family in China will induce more resources to be allocated to each child so that average child quality will increase according to the influential Becker and Lewis (1973) quantity-quality model. Rosenzweig and Zhang (2009) find a modest impact of China's one-child policy on its human capital accumulation. However, Wang and Zhang (2018) find that the one-child policy actually reduces human capital in China due to the rural–urban fertility differential. Thus, the policy may have an important impact on the distribution of human capital and income.

Rural-to-urban migration is another key feature of China's economic transformation. Approximately 150 million rural Chinese moved to urban areas in the 1990s, and the rocketing number almost doubled to 290 million in 2018 (Freeman 2006; National Bureau of Statistics 2019). Despite the unprecedented volume of internal migration, the rural migrants have limited access to local public goods and services in the destinations due to the unique household registration system called *Hukou* (Facchini, Liu, Mayda, and Zhou 2019). The *Hukou* system serves as a barrier to labor and social mobility among rural farmers, urban migrants, and urban residents. For rural households, the system imposes a significant discriminative effect on reducing their income levels and enlarging the urban–rural income disparity (Wan and Li 2013). Rural-to-urban migrants earn persistently lower wages than their urban, *Hukou*-holding peers in China. Their families are locked in a second-class status, and even their children face discrimination in their access to housing, education, and other upward mobility opportunities (World Bank and DRC 2014).

Fourth, China's education system plays an important role in affecting human capital accumulation and income distribution. From the perspective of lower levels of education, the enforcement of the nine-year compulsory education since 1986 has made the enrollment rate of junior middle school nearly 100 percent, which increases overall education attainment and

mitigates educational inequality. However, the bound-to-*Hukou* feature of China's education system and unequally distributed educational resources induce educational inequality and particularly put rural migrant children at a disadvantage (Afridi, Li, and Ren 2015). In terms of higher education, a central exam system called *Gaokao*, formally referred to as the National Higher Education Entrance Examination, plays a decisive role in admission to elite universities in China (i.e., the 211 and 985 universities).[4] On the one hand, *Gaokao*, as a narrow gate to obtain opportunities for higher education, is criticized for blocking the chance of students to succeed in later life if they fail to perform well. On the other hand, it is considered as the only fair channel for hardworking poor rural students to seek upward mobility opportunities. In addition, the admission quota system in *Gaokao* results in the unequal allocation of high education resources across provinces in China.

Lastly, the nonmarket dimensions of mixed economy remains functioning in contemporary China. Early reforms in the first two decades have moved most of administratively determined in-kind benefits to the market determination of the valuation of productive endowments (Benjamin, Brandt, and Giles 2005). For example, the housing reform after the mid-1990s made the sale of state housing at price substantially below the cost as a lump-sum and implicit pecuniary transfer of housing subsidies to urban employees (Fu, Tse, and Zhou 2000). However, the nonmarket determination rules are still widely attached to senior managers of SOEs, departmental heads of public institutions, and governmental officials who have exclusive access to various goods and services. These goods and services range from an underpriced lunch in internal canteen of work units to business class transportation, official cars, security guards, high-quality medical care, and free rental housing. Although the top leaders such as the members of the Political Bureau have access to the highest quality of in-kind services and goods, their basic remuneration well lies at the left tail of the income distribution. The inclusion of their in-kind benefits possibly lowers rather than raises the overall income inequality. However, more common and predominant cases involve middle- and senior-level talents who have both upper-middle income and noticeable fringe benefits where the inclusion of the

[4] "Project 211" was initiated in 1995 by the Ministry of Education, aiming at enhancing research standards of 116 high-level universities. The name of the project comes from an abbreviation of the slogan "in preparation for the 21st century, successfully managing 100 universities." Similarly, "Project 985" was announced by President Jiang Zemin at the 100th anniversary of Peking University on May 4, 1998, aiming at further enhancing the speed of development and obtaining international reputation for 39 top universities. The name was derived from the date of the announcement, May 1998, or 98/5 according to the Chinese date format. "Projects 211 and 985" were succeeded by the plan of world-class universities and first-class disciplines on September 21, 2017, also known as "Double-First Class" initiative, which aimed to build a number of world-class universities and disciplines by the end of 2050. Through these projects and plans, China demonstrated its ambition to build world-class universities in the 21st century.

money value of the latter would unambiguously increase the overall income inequality. Thus, I suspect that Gini coefficients are likely to be underestimated given that most household surveys do not account for the value of access to various goods and services which are indeed hard to capture and measure.

3) Changing income inequality under economic transformation

The changes of income inequality in China since the economic reform in 1978 are closely related to the transition process that can be divided into two stages. In the first stage, China gradually moved from a planned economy, where workers and cadres are paid by either technical grading or hierarchical ranking, to a market economy, where workers' wages are more related to their productivity. As the economic transformation removes institutional restrictions, income inequality may decrease or increase depending on the nature of the economic reform. For example, the price reform on agriculture products in the early 1980s helped to increase the income of rural households and thus reduce the urban–rural income inequality temporarily. The price reform on the manufacturing goods from the dual-track system to the market system in the late 1980s and early 1990s, on the other hand, resulted in the drastic increase of intra-urban income inequality accompanied by high inflation and slow growth (Li 2018b). Therefore, economic and institutional transition is a necessary key for understanding and analyzing the changes of income inequality in China, especially in the early period of the economic reform.

In a well-established market economy, productivity may vary among workers, and their gap can change over time. In the second stage, China has transformed into a mixed market economy, in which marketization has contributed considerably to annual growth rates and total factor productivity during the period from 1999 to 2007 (Fan, Wang, and Ma 2011). For the market component, the rising inequality in the country can be attributed to both supply- and demand-side factors. From the supply side, education, experience, migration, and other fundamental labor force characteristics, such as population, labor size, and labor participation, are all important factors. As discussed in the preceding subsection, various local and national-level policies or constraints likewise exist in China, such as population policies and institutional features that affect and bind the supply-side factors. From the demand side, trade liberalization, SBTC, and privatization bring important opportunities to increase and further differentiate the productivity of workers.

Even in a mixed economy with a high percentage of market forces, however, wage setting rules in industries and firms that enjoy state monopoly fail to reflect the determinants of supply and demand. Specifically, wages in industries which are dominated by large SOEs and heavily protected by the government through industry policies, such as finance, electricity, and telecommunication, are persistently higher than other industries where private firms are dominant. Such inter-industry inequality contributed immensely with a rising share to the income inequality in urban China in the 1990s and early 2000s, just behind education (Chen, Dai, Pu, Hou, and Feng 2010; Yang, Huang, and Li 2008; Yue, Li, and Sicular 2010). These monopolistic rents further incentivize workers to seek entry into these high-income industries by sending signals to the state-owned employers such as strong social networks and urban *Hukou* (Chen, Lu, and Sato 2009).

In sum, institutional arrangements in the first and second stages may have large impacts on income inequality in China. On the one hand, I focus on institutional factors in the existing studies and examine whether those studies address the factors in the analysis of China's inequality. On the other hand, even if some unique institutional features are not present in the existing studies, I will keep these features in mind when interpreting the existing results whenever applicable.

4) Estimating the sources of income inequality by regression-based analysis

After the patterns and trends of household income inequality are presented, one can estimate the income inequality by various sources. I begin with a simple linear income equation:

$$\boldsymbol{y} = \boldsymbol{X\beta} + \boldsymbol{\varepsilon} \tag{4}$$

where $\boldsymbol{y}$ is an n-vector of individual or household income, $\boldsymbol{X}$ is an $n \times K$ matrix of independent variables that represent different sources of income inequality, $\boldsymbol{\beta}$ is an K-vector of regression coefficients, and $\boldsymbol{\varepsilon}$ is the disturbance term that stands for unexplained sources of income. The basic model of individual or household income explains inequality via observable ($\boldsymbol{X}$'s) and unobservable heterogeneity. In this survey, I include labor force characteristics, education or human capital, migration, trade liberalization, SBTC, ownership and market structure changes (e.g., privatization and state-owned monopoly), and redistribution policies as *seven* major sources of income inequality. The predicted income flows can be estimated by applying any micro-level survey data through standard regressions. These estimated income flows can then

be used directly to calculate the contributions of regression variables to the overall income inequality. According to the factor decomposition rules in Equation (3), the regression-based contribution of income source, x_k, to the total income inequality can be expressed as follows (Morduch and Sicular 2002):

$$s^k = \frac{\sum_{n=1}^{N} a_i(\boldsymbol{y})\widehat{\beta}_k {x_i}^k}{I(\boldsymbol{y})} \; for \; k = 1, \cdots, K. \tag{5}$$

In principle, given appropriate data, one can use this general formula to evaluate the contribution of any inequality source for a given inequality index such as the Gini coefficient. In reality, including all candidates of inequality sources discussed in Section 4 in one estimation equation is not feasible at the moment since it requires comprehensive data that have both individual or household characteristics as well as firm-level information. A possible solution is to use employer–employee matched data that could be promising for future work to make a systematic evaluation of the relative importance of inequality sources highlighted in Section 4.

3. Evidence on income inequality

This section presents the patterns and trends of income inequality from four perspectives. At the household level, a comprehensive summary of estimated Gini coefficients is provided on studies using different data sets, suggesting a general increasing inequality in China since 1978. Various data sources and data quality are also introduced in detail. In addition, I look at the evolution of income inequality by urban–rural divide, region and factor components respectively. For each of them, I describe related economic and institutional changes, show the pattern and trend of inequality in China, and review the literature on the extent to which a certain dimension of inequality contributes to China's overall inequality.

1) Household income inequality

Before I proceed to the pattern of income distribution in China, it is helpful first to introduce several official and unofficial data sets widely used for inequality estimations in China. These official data sets are initiated by various public agencies. The Urban Household Survey (UHS) and Rural Household Survey (RHS), collected by China's National Bureau of Statistics (NBS),

are the fundamental data used for evaluating income inequality in China. For example, NBS estimations on Gini are usually based on the income data from UHS and RHS. However, NBS micro-data are exclusive to certain researchers, making it difficult to truly evaluate the quality of the data. Thus, most of the early estimates (e.g., World Bank estimates) are based on the tabulations rather than the micro-data provided by NBS using UHS and RHS. Another widely used data set is the Chinese Household Income Project (CHIP), conducted through a collaboration between NBS and the Chinese Academy of Social Sciences, and later the Beijing Normal University. Six waves of household surveys in 1988, 1995, 2002, 2007, 2008, and 2013 have been conducted so far, covering comprehensive information, including income, expenditure, and employment, that are designed specifically for studying income inequality. Specifically, the CHIP data contain a subsample of UHS and RHS (except for CHIP 2007 and 2008) and an additional questionnaire through household interviews. One prominent advantage of CHIP is that it investigates urban and rural households consistently and includes an independent migrant survey starting from 2007. Moreover, to collect information on economic and institutional changes in rural China, the Chinese Ministry of Agriculture has been conducting a survey usually called Rural Permanent Observation Sites Survey since 1986, relying on the official Rural Fixed Observation Points System. This is a longitudinal survey of rural villages (except 1992 and 1994), covering 23,000 households living in 360 villages distributed across 31 provinces.[5] Finally, the 1% national population sample survey in 2005 (also referred to as Mini-Census 2005), which was conducted by NBS, also contains information on household self-recalled monthly income, and can be used to evaluate income inequality (Xie and Zhou 2014). The major advantage of Mini-Census 2005 lies in its large sample size, which includes more than 17 million observations.

Several university-based survey data flourished in the 2010s and brought readily available sources of nationally representative household income data to the public. The Survey and Research Center for China Household Finance at the Southwestern University of Finance and Economics conducted four rounds of the China Household Finance Survey (CHFS) in 2011, 2013, 2015 and 2017. Another longitudinal survey on Chinese communities, families, and individuals, namely, the China Family Panel Studies (CFPS), is conducted by the Institute of Social Science Survey at Peking University. The survey design for CFPS makes it possible to track household members that do not co-reside together. The institute launches the baseline

[5] Using the data, Benjamin, Brandt, and Giles (2005) examine the evolution of income inequality in rural China. See Gustafsson, Li, and Sato (2014) for a detailed discussion of the data set.

survey in 2010 and respondents are tracked through annual follow-up surveys in 2012, 2014 and 2016. Subsequently, two nationally representative surveys, namely, the Chinese General Social Survey (CGSS) and the China Labor-force Dynamic Survey (CLDS), are also used to calculate the income inequality in China. Since 2010, the CGSS has been carried out by the National Survey Research Center at Renmin University and has finished 2010, 2011, 2012, and 2013 fieldwork for the second cycle (2010–2019) of the survey. Besides income and other personal details, CGSS also provides information on values, social attitudes, religious belief, and happiness. Starting from 2012, the Department of Sociology at Sun Yat-sen University conducted three rounds of CLDS in 2012, 2014, and 2016, tracing the labor market dynamics among Chinese adults.

To see how different estimates are related to different data sets, Table 1 presents a systematic summary of key features, such as estimates and movements, data sources and status, income measurement, and estimation methods, from various studies on measuring China's income inequality. In the 1980s and 1990s, scholars mainly resorted to tabulations and groupings of official data to estimate the Gini coefficients. Micro-level data became available only to a small group of scholars affiliated with semi-official institutions and collaborating closely with statistical agencies from the late 1980s. Specifically, CHIP used household-level survey data obtained from the NBS and supplemented them with additional data collected from these same households by using an independent questionnaire that allows checks and adjustments to the NBS income data. Since the key income information was still collected through the official channel, the Gini coefficients estimated by tabulations or by micro-data showed no systematic differences. When several university-based surveys flourished in the 2010s, the unofficial estimates of Gini coefficients were found to be uniformly higher than the official measures (Xie and Zhou 2014).

Figure 2 displays the various estimates of Gini coefficients based on official and unofficial data sets from 2002 to 2013. In 2011, the estimates of Gini coefficients from three sources, namely, CFPS, CGSS, and CLDS, are relatively close to one another, implying consistency among the unofficial data. In addition, Figure 2 shows that estimates from CHFS ranks the highest, estimates from CFPS, CGSS, and CLDS sit in the middle, while the estimates of NBS and CHIP are the lowest. The differences between official and unofficial estimates may be attributed to different income measurement strategies and estimation methods. On the one hand, unofficial estimates are criticized mainly due to their unreliable self-recalled income (versus

the daily diary approach used by official and semi-official estimates), insufficient sample size, biased sampling composition on the surveyed individuals, inappropriate treatment of top and bottom tail of the income distribution, omission of imputed rent and income, and weak correlation between income and consumption (Yue and Li 2013; Luo and Li 2019). In an effort to assess different unofficial survey data, Luo and Li (2019) examine the differences in income measurements of CHIP, China Health and Nutrition Survey (CHNS), CHFS, CGSS, and CFPS and find that, although CGSS enjoys the lowest bias in the sampling composition, CHIP has higher (lower) incomes below (above) the median, the lowest poverty rate, and the strongest correlation between income and consumption. On the other hand, official surveys contain incompatible income definitions between urban and rural households, incapable of capturing information regarding migrant workers, no adjustment of cost of living and aggregation problems of underestimation (World Bank 1997; Zhou and Yang 2017). Interestingly, the turnaround of Chinese inequality in the recent decade, as shown in Figure 2, is captured by both official and unofficial estimates albeit their distinct levels (Xie, Zhang, Xu, and Zhang 2015; Kanbur, Wang, and Zhang 2017).

Regardless of which data source is used, the general consensus is that income distribution has become more unequal from the the mid-1980s to the early 21st century (Wei 1999; Benjamin, Brandt, and Giles 2005; Xie and Zhou 2014; Liao and Wei 2016), with the Gini coefficient increasing from approximately 0.3 to near 0.5 (1978–2008). Combined with various sources, Figure 1 plots the trend of income inequality in China since 1978. The Gini coefficient slightly increased from 0.30 to 0.32 (1978–1980) and then considerably decreased from 0.31 to 0.29 (1981–1984) due to the rural reform in the early period. Throughout the period of 1985–1989, it rose from 0.29 to 0.35. A more pronounced increase in income inequality was observed from 1990 to 1994, with the Gini coefficient rising from 0.35 to 0.43.[6] After quick drops in the two subsequent years, it again increased significantly from 0.40 to 0.48 during the period from 1996 to 2003 and reached a plateau afterward and peaked at 0.49 in 2008.

The rising income inequality in China in the first three decades bear some resemblances to the early development of the US economy, a big country with similar size and heterogeneity, in the late 19th and early 20th centuries. During that period, the US economy experienced growing regional disparities (Kim and Margo 2004), increasing wealth and income inequality

[6] The trend depicted in Figure 1 from 1981 to 1995 is highly similar to that by the World Bank (1997).

(Piketty and Saez 2014), rising returns to human capital (Katz and Margo 2014) and lowering intergenerational mobility (Olivetti and Paserman 2015), more similar to China's experience in the recent four decades. Therefore, China's case is more general in the sense that the economic growth benefits people differently with increasing inequality, like in the US and perhaps other Western countries in their earlier development stages. By contrast, Asian economies, such as Hong Kong, Korea, Singapore and Taiwan—the so-called "four tigers" — were characterized with both rapid growth and high equality over three decades before 1990 (Page 1994). Fields (1984; 1985) argues that the pursue of strict wage policies in these small open economies in the 1960s and 1970s is a causal factor to both the success of export-led growth and the improvement in income distribution. Although labor market regulations, such as the labor laws and minimum wage policy, are prevalent in China, economic decentralization and regional competition that characterize China's economic transformation effectively offset such regulations on wage setting rules, which makes China more subject to inequality than its Asian neighbors along the rapid growth path.

However, compared with previous years, the rising trend of income inequality over the last decade seems to have been reserved. One of the important pieces of evidence supporting this argument comes from official reports released by China's NBS. These reports employ a large and nationally representative data. Figure 1 further shows that the Gini coefficient slightly but continuously declined from 0.49 in 2008 to 0.47 in 2016. This finding is consistent with the evidence from Kanbur, Wang, and Zhang (2017) and the Gini coefficient estimated by the World Bank. Specifically, Kanbur, Wang, and Zhang (2017) provide evidence that Chinese inequality started to decline from 2010 after a quarter century of rapid and sustained rise. The World Bank estimates use household survey data obtained from World Bank country departments and government documents. The estimated Gini coefficients were 0.43 in 2008 and 0.42 in 2012. Based on the recent waves of CHIP data, Li, Sato, Sicular, and Yue (2017) confirm that the Gini coefficients decreased by 4% to 11% from 2007 to 2013. The most recent study by Wan, Wu, and Zhang (2018), who use various micro household survey data, including the CHIP data, also argues that income inequality in China has entered the declining phase of the Kuznets curve.

It is worth mentioning that estimates based on official (unofficial) data sources are not necessarily better than those based on unofficial (official) ones. Official and unofficial data share two common drawbacks. The first issue is the difficulty in collecting information on the

few and elusive high-income households. This issue is particularly relevant because gray or illegal income may play an important role in the total income of high-income households in China, in addition to their usually high refusal rates to be interviewed. One solution to the problem is to use administrative data that have the advantage over traditional survey data in obtaining full population records including high-income households (Card, Chetty, Feldstein, and Saez 2010). However, no such administrative data are available in China so far. An alternative approach is to directly use available information about high-income individuals, such as the income of the rich in the Hurun list and CEOs' compensation in the listed firms, and estimate the top tail distribution of income using the Pareto distribution (Li and Luo 2011; Luo, Sicular, and Li 2017). However, this approach relies on strong assumptions and is subject to incomplete information on the top-income households. The other issue is the large share of employment in the informal sector in China, such as family businesses. Such informal employment leads to difficulty in surveying household income accurately. This problem could be attenuated by the advancement in technology to track economic activities and collect accurate information in the informal sector. In addition, the importance of the informal sector will naturally decline as China develop further into a high-income economy.

2) Urban–rural divide

In this subsection, we turn to the literature discussing the intergroup and intragroup inequality for the urban–rural divide and show that both of them have an increasing trend. In terms of the urban–rural intergroup issue, the consensus is that the rising disparity of urban–rural income is a non-negligible force that drives income inequality in China, whereas its magnitude varies from one study to another. Figure 3 shows the evolution of urban–rural income disparity in China from 1978 to 2016 where such income disparity is measured by the ratio of urban disposable income to rural net income. From 1978 to 1985, the urban–rural income disparity in China went down from 2.6 in 1978 to 1.9 in 1985 because the rural reform remarkably benefited rural residents before the urban reform began to gain momentum after 1984. Subsequently, the reform focused on the urban area which in turn increased the urban–rural income disparity to approximately 2.9 in 1994 (NBS 1994). After a temporary drop in the mid-1990s, the urban–rural disparity increased from 2.5 in 1997 to 3.3 in 2009, pushing the per capita income in urban areas up to three times higher than that in rural areas. Li (2016) finds very similar trends based on CHIP survey data. Compared with other countries, China's urban–rural income disparity is extremely large. For instance, the urban–rural income disparity in the US is around 1.3, and the gap has remained relatively constant over time (Wu and Perloff 2005).

After 2009, the urban–rural income disparity has steadily decreased and reached below 3.0 after 2013.[7] Based on CHIP data, Li, Sato, Sicular, and Yue (2017) also confirm that the urban–rural income disparity decreased from 3.8 in 2007 to 2.4 in 2013.

The *Hukou* system plays a critical role in widening the gap of the urban–rural divide, especially in the first three decades. Although the restriction on the labor mobility through *Hukou* have been relaxed since the mid-1990s, it still exerts considerable migration costs to prospective rural-to-urban migrants, reducing their job opportunities and earning potentials. After migration to a destination, rural migrants are entitled to a limited access to local public goods and services, further contributing to the urban–rural divide. More generally, the urban-centered economic reform after the mid-1980s is the main cause of the widening urban–rural divide. Starting from the mid-2000s, genuine efforts on reviving rural areas by exempting taxes and providing subsidies on agriculture production may help explain the recent narrowing of the urban–rural income disparity since 2009.

Figure 3 also indicates that the evolution of urban–rural income disparity is highly correlated with the Gini coefficient over time with a high correlation coefficient of 0.92. Scholars typically decompose income inequality by using Equation (1) and calculate the contribution of urban–rural income disparity to the overall income inequality. Atinc (1997) suggests that the urban–rural income disparity in China explains 75% of the overall income inequality in the 1990s. By decomposing the Theil L (i.e., Mean Logarithmic Deviation), Gustafsson and Li (2001) and Sicular, Yue, Gustafsson, and Li (2007) observe a steadily increasing trend in the contribution of the urban–rural income disparity to national income inequality, which is from 38% in 1988 to 43% in 1995 and 47% in 2002 based on CHIP survey data. These findings are consistent with those of Liu (2010), who also decomposes China's income inequality by using the Theil index and finds that the contribution of the urban–rural gap to overall income inequality in China markedly increased from 58% in 1997 to 76% in 2004. Li, Luo, and Sicular (2013) and Luo (2017) find that the contribution of the urban–rural income disparity stabilized from 47% in 2002 to 46% in 2007 and further went down to 35% in 2013 by using new waves of CHIP survey data. Wan, Wu, and Zhang (2018) confirm that the changes in the contribution of the urban–rural gap exhibited an inverted U-shaped curve.

[7] Before 2013, NBS conducted separate urban and rural household surveys; thereafter, it implemented the reform of a unified urban–rural household survey. Therefore, the steep drop of urban–rural disparity between 2012 and 2013 may be attributed to the adjustment of the newly designed household survey.

Another strand of literature has sought to evaluate income inequality within rural and urban areas, namely, the urban–rural intragroup inequality. Bramall (2001) analyzes the evolution of income inequality in China from 1978 to 1999 by using the household-level survey data collected by NBS. The trend delineated in his study points to a rapid increase in Gini coefficient over time, from 0.21 in 1978 to 0.35 in 1999 for rural China and from 0.16 in 1978 to 0.28 in 1996 for urban China. Benjamin, Brandt, and Giles (2005) describe and compare income inequality for rural China and reveal a long-run increase but uneven pattern in inequality spanning from 1987 to 1999. Furthermore, the living standards of the poor initially rose, but the rising trend was reversed from 1995 to 1999. By 1999, real income returned to the level 12 years ago, with the population at the bottom 5% even worse off. On the basis of the data from the CHNS, the evidence presented in Zhong (2011) emphasizes a marked increase in Gini coefficient for rural China from 0.36 in 1991 to 0.55 in 2006. Li and Sicular (2014) calculate the Gini coefficient for rural and urban China and find that the Gini coefficient for rural China rose from 0.33 in 1995 to 0.37 in 2011, and that of urban China rose from 0.28 to 0.32. Consistent with the literature, Figure 4 shows the evolution of officially reported urban and rural Gini coefficients in China from 1978 to 2010. The two Gini coefficients exhibited upward trends with steep rises from 1978 to 1995 and steady increases from 1996 to 2010. The Gini coefficient of urban China is also consistently lower than that of rural China by approximately 3% to 8%. Wan, Wu, and Zhang (2018) attribute the relatively low urban inequality to diversified, untraceable and underreported features of urban income data. Based on CHIP data, Li, Sato, Sicular, and Yue (2017) find that the urban–rural intragroup inequality continued to increase from 2007 to 2013. Using Equation (1), Liu (2010) finds that urban–rural intragroup inequality contributed approximately 25% to 40% to the overall inequality from 1995 to 2006. Luo (2017) finds that the contribution of the urban–rural intragroup inequality increases from 54% in 2007 to 65% in 2013 by using CHIP survey data. By decomposing the Theil index, Wan, Wu, and Zhang (2018) find that urban–rural intragroup inequality is the dominant contributor, whether overall inequality increases or not, supported by CHNS, CGSS and CFPS, except for China Health and Retirement Longitudinal Study.

Overall, although income inequality within both rural and urban areas is rising and the urban–rural gap is narrowing, the urban–rural gap still plays an important role in the overall inequality. This inequality structure is significantly different from that in the US, where inequality growth is mainly driven by the increase in inequality within rural and urban areas (Wu and Perloff

2005). In the years after the 2008 global financial crisis, all inequality measures in China (i.e., inequality within urban or rural, urban–rural disparity and the overall Gini coefficient) have shown slightly reversing and decreasing trends (Figures 3 and 4).[8] However, whether the shift is temporary and to what extent such shift is due to the NBS statistical reform or the economic structure changes remain unclear.

3) Regional inequality

Closely related to the national development policy in China, the regional disparity among East, Middle and West China is evident and time-varying. Since the implementation of the open-door policy in 1978, one critical adjustment of the development policy in China has been the emphasis on the importance of regional comparative advantages. Some regions are allowed and even encouraged to "get rich faster" and others to follow. This encouragement greatly favors coastal provinces because of their geographical advantages, thereby widening the income disparities among East, Middle, and West China. Figure 5 illustrates the evolution of income gaps among the East, Middle, and West regions in China from 1978 to 2016. Per capita household income in the East regions was constantly higher than those in the Middle and West regions with widening gaps over time. The gap between the East and Middle regions grew relatively faster in the 1980s and 1990s whereas the gap between the East and West regions widened more quickly after the 2000s. Throughout the economic transformation, reform policies favoring the coastal provinces are widely criticized for increasing the regional gaps. One main consequence of regional inequality is the rising opportunity inequality which in turn enhances the regional income disparity. In the years after 2009, the gap among the East, Middle, and West regions has become stable and has slightly decreased due to the Western Development Strategy initiated in 1999 to rebalance the development among the three regions in the new century. By using CHIP data, Li, Sato, Sicular, and Yue (2017) confirm that regional income inequality in China is gradually narrowing, with notable decreases in inequality between the East and West regions. However, whether this situation is an ongoing trend or only a statistical illusion is uncertain.

Instead of comparing income gaps between the three regions, an alternative way is to observe the changes of regional inequality over time. One simple and direct measure of regional inequality is the coefficient of variation (CV). Figure 6 shows the CV of nominal regional per

[8] I observe a mild decrease for both urban and rural Gini coefficients between 2009 and 2010. I cannot observe the movements in subsequent years because NBS stopped reporting separate urban and rural Gini coefficients after 2010.

capita household income in China from 1978 to 2016. Similar to the urban–rural disparity, the regional income inequality shows very similar patterns as the Gini coefficient with a high correlation coefficient of 0.89. Initial decreases in regional inequality in the early 1980s were quickly overturned and two waves of rising regional inequality occurred in the 1990s and 2000s. Starting from the mid-2000s, regional income inequality went down, indicating a recent trend for regional convergence on household income. Compared with other countries, China's regional income inequality remains much higher. The recent ratio of per capita income for the 90^{th} to that of the 10^{th} percentile states is around 1.5 for the US. By contrast, the corresponding ratio for Chinese provinces is as high as 3.5 in 2000, which is close to that in the US two centuries ago (Tombe and Zhu 2015).

Furthermore, several studies concentrate on the contribution of regional disparity to overall income inequality in China, suggesting the significant role it plays. By decomposing the overall income inequality by regions through Equation (1), Wan, Wu, and Zhang (2018) argue that income inequalities within the three regions are the main contributors to overall inequality. Their decomposition results show that income inequality within the East region concurrently moves with the overall income inequality and provides increasing and decreasing contributions along with the rising and declining phases of the Kuznets curve of income inequality in China. Using data sets from 1978 to 2003, Wang and Xu (2006) find that on average 13% of overall income inequality in China can be accounted for by regional income disparities. Xie and Zhou (2014) further find that around 12% of income inequality in 2010 can be attributed to inter-provincial inequality. Similarly, Luo, Sicular, and Li (2017) find that the contribution of regional income inequality was mild and decreased from 14% in 2007 to 7% in 2013 based on the CHIP survey data. These estimates, however, are not directly comparable since the data sources and units of observation are different from each other. By comparing regional development strategies, Yang (1990) argues for an "uneven development strategy" adopted in post-Mao China. This strategy is characterized by four elements: regional comparative advantage, foreign direct investment, inevitable regional disparities, and technological innovation. This result implies that the different development strategies across regions in the early stage of reform and openness may be historical factors that explain the present income disparity in China.

Nonetheless, not all studies agree that regional inequality is a major source of overall income inequality in China. Benjamin, Brandt, and Giles (2005) decompose income inequality along

two dimensions, namely space of administration (village, province, and region) and source of income (farm and non-farm). Their analysis attributes the increased income inequality to non-agricultural incomes, rather than geographic factors. Moreover, they find that regional income disparity at various dimensions (village, province, and region) declines over time. More importantly, they also report that more than half of inequality is attributed to a neighboring difference in income within a village. This finding implies that the recently observed income inequality may be attributed to the increased inequality within villages rather than the spatial income differences at the village or provincial level. However, Benjamin, Brandt, and Giles (2005) focus on income inequality only in rural China owing to data constraints.

4) Factor income inequality

Since the reform and openness in 1978, China's miracle has been established on the extensive mode of economic growth by high physical investment and high energy consumption as well as low labor costs. The mode of economic development has shaped the distributional relationship between labor and capital factors in the national income (i.e. factor income inequality). One angle to observe factor income inequality from the household and individual perspectives is to examine different income sources or income types.[9] The reform and openness allow rural households in China to receive their income both from agriculture and non-agriculture activities. With the development of the capital market, households in China not only have fixed wage income but also property income, such as stock interests and housing rents. Different income sources are associated with their production factors. For example, wage income is associated with the labor factor, whereas property income corresponds to the capital factor. Thus, one approach in establishing the relation between factor income inequality and personal income distribution is to employ decomposition techniques of income inequality. As illustrated in Equations (2) and (3), the overall income inequality can be decomposed by income sources.

In China, NBS surveys identify four major income sources for urban and rural households. They are labor or wage income (i.e., income from wages and salaries), proprietors' income (net agriculture income for the rural households and net business income for the urban households), capital or property income (net income from properties), and transfer income (net

[9] An alternative angle to observe factor income inequality from the firm perspective is to examine the share of labor or capital income in each firm's value-added. The labor share of income at the macro level is the share of labor compensation in GDP. Zhou and Yao (2012) document the movement of the labor share and find a high and negative correlation between the labor share and the Gini coefficient, which they summarize as the distinctive "China model" of income distribution.

income from transfers). Figures 7 and 8 show the evolution of the shares of each income source in the total income for urban and rural households from the 1990s to 2012. For urban households, wage income dominates but decreases over time, a pattern that is compensated by the steady increases of business and transfer income shares. For rural households, net agriculture income shares drop dramatically due mainly to rural industrialization, leading to the significant rise of wage income shares. Moreover, property and transfer income shares steadily increase but only take modest shares (around 10%). Since 2013, NBS has implemented the reform of a unified urban–rural household survey and thus the income shares of each source are unified at the national level. Therefore, by combing the two data sources, Figure 9 shows the evolution of the aggregate income shares for the whole China from 1997 to 2016. This evolution reflects a story of structural change from the perspective of income sources. The proprietors' income shares go down by half and are offset by the rise of other shares, indicating the drastic transformation linking to industrialization and urbanization after Deng Xiaoping's Southern Tour in 1992.

Several studies in the 1990s (Zhang 1992; Zhu 1992; Khan, Griffin, Riskin, and Zhao 1993; Hare 1994; Rozelle 1994; Cheng 1996; Tsui 1998) address the impact of economic structure change on income inequality in rural China by the shift of rural income from agriculture activities to non-agriculture activities. These studies find that rural households rely more on non-agriculture wage income during rural industrialization, which gradually becomes the major source of rural income inequality. Due to data limitations, certain studies examine the income sources of rural income inequality by using the province as the unit of observation (Cai 1994; Yao 1997; Wan 1998). Nevertheless, they obtain similar results as those who use micro-level survey data. Based on the CHIP survey data, Zhou (2015) finds that non-agriculture income continued to be a dominant contributor to rural income inequality in 2002.

Inequality decomposition can help to analyze the relative contribution of the four income sources to the overall income inequality. Based on the two recent waves (2007 and 2013) of CHIP survey data, Luo, Sicular, and Li (2017) conduct a systematic inequality decomposition by income sources categorized by NBS for rural and urban households, as well as migrants. First, wage income refers to the income from wages and salaries through formal and part-time employment. As the major source of income, wage income is also the main contributor to the overall inequality for all types of households. For urban households, wage income contributes most to the overall urban income inequality with a decreasing trend from 76% in 2007 to 60%

in 2013. For rural households, wage income stably contributes more than 40% to the overall rural income inequality. For migrants, the contribution of wage income to the Gini coefficient significantly increases from 44% in 2007 to 62% in 2013.

Second, proprietors' income refers to the net agriculture income for rural households and net business income for urban and migrant households. For urban households, despite of a slightly increase in the contribution of net business income from 2007 to 2013, it only accounts for no more than 6% of income inequality. Net agriculture income is more important for the Gini coefficient of rural households, accounting for about 16% in both 2007 and 2013. For migrants, the contribution of net business income to income inequality (decreased from 46% in 2007 to 33% in 2013) is greater than its share of total income (decreased from 35% in 2007 to 27% in 2013), which suggests net business income is unequally distributed for migrants.

Third, property income refers to the income from properties, including interest, dividend, rent, and earnings from price appreciation. Compared with other income sources, property income is distributed more unevenly in China as well as in other countries with the Gini coefficients far above 0.4. With the rapid economic development in China, the level and inequality of net income from properties for both urban and rural households have increased over time. Thus, its contribution to the overall income inequality in China has increased subsequently. However, the contributing share is still relatively mild (below 10% according to various studies) due to the low share of net income from properties in the total household income (Chi 2012; Chi and Cai 2012; Lee 2013; Ning, Luo, and Qi 2016). The property income of NBS does not include imputed rent from owner-occupied housing, leading to an underestimate of its relative contribution to the overall inequality. Luo, Sicular, and Li (2017) find that the contribution to inequality of imputed rents has been rising and is well above 10% by 2013. If the contribution of asset income is added to that, property income contributes 15%–20% of inequality. Therefore, it is important to count imputed rents as a source of property income which reflects more accurate income inequality accounting for home ownership.

Fourth, transfer income, or net income from transfers, refers to public and private income transfers received by the households (e.g., pensions and remittances), abstracting from public and private expenditure transfers paid by the households (e.g., taxes and donations). Leaving pensions alone, other net income transfers contribute negatively to the overall income inequality for urban households at around -5% during 2007 to 2013, exerting an increasingly

equalizing impact to the overall inequality (Luo, Sicular, and Li 2017). Interestingly, the pension system in China is highly skewed towards urban households, failing to function as a redistributive tool and contributing a rising share to the overall income inequality during the same period (Cai and Yue 2018). It is interesting to look at how differences in income taxes and transfers matter in measuring inequality and its dynamics. I will elaborate further in Section 4.7 when revisiting redistribution and other labor protection policies as a source of income inequality.

Since NBS does not provide the inequality of each income source, I cannot calculate the changes in the contribution of such income sources to total income inequality over time directly from official data. However, I can extract from two books written by Li and Sato (2006) and Li, Sato, Sicular, and Yue (2017) to form a time series of contribution numbers for a relatively long period. Figures 10 and 11 show the evolution of the contribution of each income source to overall income inequality from 1995 to 2013 for both urban and rural households in China. For urban households, wage income contributes the most part of inequality while business income contributes the least. The contribution of wage income increased from 1995 to 2007 while decreased from 2007 to 2013. And such changes were mirrored by the changes of contribution of property and transfer incomes. For rural households, wage and property income contribute equally and mostly to the overall inequality. The contributing shares of wage and property income roughly stabilized from 1995 to 2007. From 2007 to 2013, the contribution of property income rapidly decreased mainly due to the rise in the importance of property income in total household income to a similar extent. Wan, Wu, and Zhang (2018) find similar results and argue that the improved distribution of transfer and wage income plays key roles in driving the recent decline of the overall income inequality.

4. Sources of income inequality

What factors can explain the increased income inequality in China over the past few decades? Existing literature has identified various sources of income inequality, such as labor force characteristics, education or human capital, migration, trade liberalization, skilled-biased technological changes (SBTC), ownership and market structure changes (e.g., privatization and state-owned monopoly), and redistribution policies, all of which I will review thoroughly in turn. In the economic structural and institutional context of China, analyzing these factors can facilitate our understanding of China's inequality evolution.

1) Changing characteristics of labor force

The characteristics of labor force have changed mainly in two aspects since the reform and openness were initiated in 1978 in China. The first fact is China's rapid demographic transition. China's natural population growth rate decreased to as low as 0.56% in less than 40 years, whereas the US took nearly 200 years and the UK took roughly 140 years (Li, Li, Wu, and Xiong 2012; Bacci 2017; Greenwood and Seshadri 2002). One consequence of the rapid transition of demography is the changes in the labor force composition. Zhong (2011) shows that household population aging can account for approximately 20% increase in income inequality in rural China. Similar results are obtained by Dong, Tang, and Wei (2018) for the whole China from 1996 to 2011.[10]

Another changing characteristic of the labor force is the change in educational composition of the labor force in China. In the past two decades China exerted considerable effort to increase public expenditures on education as a percentage of GDP from less than 3% in 1997 to over 4% in 2018. As stated in Section 2.2, the country has experienced a substantial increase in educational opportunities given its education reform. The illiteracy rate for ages 15 or above declined significantly from 22% in 1990 to 4% in 2010 (Tao and Kang 2012). The school enrollment rate between age 6 and 15 reached a high level of 98% in the mid-1990s (Wu and Zhang 2010).[11] As for higher education, the enrollment rate remained relatively stable until 1999 when the Chinese government decided to expand its higher education. By 2015, the enrollment rate for higher education reached 75%, compared with only 56% in 1999. However, there still exists a large gap of educational opportunities across regions and between urban and rural areas (Zhang and Kanbur 2005; Li, Loyalka, Rozelle, and Wu 2017). These changes have dramatically altered individuals' life and led to a substantial change in the educational composition, which may have contributed to the rising income inequality. For example, Chen and Li (2014) find that an increased variance of education levels across individuals and the

[10] Preference for sons is strong in China. It is widely believed that the preference, combined with a series of economic and social factors, has led to a male-biased imbalance in demographics. There is also the possibility that this preference has contributed to the increased income inequality by changing the gender composition of the working-age population across households because the level of income substantially varies with age and sex. While I find no empirical work directly testing the conjecture, Knight, Li, and Deng (2010) find a piece of relevant evidence that households with sons are more likely to earn higher income.

[11] Despite the achievement in advancing basic education, China's early childhood education is a little lagging behind compared to developed even some developing countries. For example, the enrollment rate for children aged 3–6 was only 50.9% in 2009 (Zhou 2011). In 2010, China enacted several policies to promote the development of the education of early childhood, which has been theoretically argued and empirically supported as determinants of adult outcomes.

contribution of education variation to income inequality rose from 0.6% in 1989 to 11% in 2009 in urban China.[12]

2) Increasing return to human capital (education)

Education affects the income inequality in China, similar to many other countries, in two ways. On the one hand, with the increased value of education, particularly higher education, higher returns can be earned by skilled, especially skilled labor, relative to their manual counterparts (Lemieux 2006). This change expands the income gap among workers with different education levels. Several pieces of evidence are consistent with this mechanism. Zhang, Zhao, Park, and Song (2005) demonstrate that the returns to education in urban China markedly increased from only 4% in 1988 to 10% per year of schooling in 2001. Ge and Yang (2014) indicate that market-oriented reforms effectively adjust the incentive structure, enhance labor productivity, and increase the private return to human capital.

On the other hand, rich and poor households may respond differently to the increased return to education. For example, rich households can respond to the change better than poor households by investing more in children's education. The varying responses of households with different economic statuses may amplify income inequality for the next generation. Recent empirical evidence lends support to the mechanism. Li, Loyalka, Rozelle, Wu, and Xie (2015) estimate the enrollment gap of students from poor counties and other counties in terms of their access to universities in China by using expansions in college enrollment, which began in 1998, as a policy experiment. The estimate shows that students from poor areas are 7 and 11 times less likely to gain access to universities and elite universities than those from urban areas, respectively. This finding implies that children from poor regions or households lose equal opportunity in accessing higher education. Using a data set of enrolled students, Li, Meng, Shi, and Wu (2013) report that students from rural or western China are more likely to live in poverty.

Although the two channels discussed above are theoretically reasonable and empirically supported by recent evidence, a more fundamental question is raised, "To what extent has the return to human capital (education) increased in China recently?" To answer the question, Zhang, Zhao, Park, and Song (2005) use the Urban Household Survey data to estimate the

[12] To save space, we abstract from a review of the few studies on gender or ethnic inequality. A related discussion can be found in Li, Luo, and Sicular (2013).

return to schooling from 1988 to 2001 in urban China. Their estimates show that the return to education sharply increased from 4.0% per year of schooling in 1988 to 10.2% in 2001. Using a similar data set, Heckman and Li (2004) find that the return to college education is as high as 43% in terms of lifetime earnings in 2000 in urban China, suggesting a rapid rise in the return to education since the early 1990s. This finding is consistent with Li, Liu, and Zhang (2012) who use twin data to estimate schooling returns and show a large return to college education in urban China. These findings also echo Li, Sato, Sicular, and Yue (2017) who ascribe the rising urban wage disparity to the increasing return to education which has not been attenuated by the high education expansion since 1995.

Although the above discussions follow the Mincerian earnings equations (Mincer 1974) and are concerned with education, exploring the impacts of unobservable characteristics has been a primary interest of some recent empirical papers. China's experience in rising income inequality seemingly also relates to these new discussions, especially unobservables. For example, Han, Liu, and Zhang (2012) decompose the wage inequality in China, and their findings suggest that the quantity of and returns to unobservables contribute to most of the rising wage inequality over 1988–2008, while the observed skill and experience also contribute substantially to the recent rise in inequality.

3) Leaving the countryside (migration)

There were significant changes in the labor migration policy in China. In the early years, particularly before the reform and opening up, labor migration from rural to urban areas was strictly restricted. All farmers in rural areas were universally enrolled into production teams (basic accounting and farm production unit of collective farming) for daily work, which was an opportunity cost for migration. On top of that, the household registration system (*Hukou*) officially categorizes residence status as agriculture or non-agriculture based on the parents' status, which is associated with an individual's access to social services and employment rights. However, the rural-to-urban migration restriction was relaxed in the mid-1990s. The large income gap between rural and urban areas triggered a tremendous incentive for migration to urban areas and the unprecedented labor flow in human history.

Several studies indicate that rural-to-urban migration could drive income inequality in rural areas. Once the strict restriction to migration was removed, migration, as one of the main sources of income inequality becomes straightforward and similar to that in other countries.

Self-selective rural migrants can take advantage of urban opportunities to raise non-agricultural income. Zhao (1999) finds that migrants earned substantially higher wages than rural nonfarm workers in Sichuan Province in 1995. Benjamin, Brandt, and Giles (2005) compare household income composition over time in rural China and find that the ratio of non-local wage income (i.e., income earned through temporary migrant employment) over total household wage income dramatically increased from 8% in 1987 to 24.5% in 1999. Sicular, Yue, Gustafsson, and Li (2007) and Zhou and Yang (2017) argue that excluding rural-to-urban migration biases upward the estimate for the urban–rural income disparity and overall income inequality. Using the CHIP data between 1995 and 2002, Sicular, Yue, Gustafson, and Li (2007) show that including migrants would decrease the urban–rural income disparity from 2.3 to 2.1. Ha, Yi, Yuan, and Zhang (2016) analyze the dynamic effect of rural-to-urban migration on income inequality in more than 100 source villages by using data from 1997 to 2011. Their analysis indicates an inverted U-shaped relationship between migration and income inequality, with China currently in a stage where migration raises income inequality in rural areas.

However, discrimination against rural workers still exists and is severe in China, even though the restriction of rural-to-urban migration has been gradually removed.[13] Meng and Zhang (2001) conduct a decomposition analysis of wage differentials between rural migrants and urban residents using two sets of survey data collected in Shanghai. That study shows that approximately 50% of the earning gap between migrant and urban workers cannot be explained by the differences in personal endowments. This evidence supports the discrimination on rural workers relative to their urban counterparts in the urban labor market.

4) Trade liberalization

There have been both theoretical and empirical discussions on the effect of trade liberalization, particularly for developing countries, with some empirical evidence consistent with the theory while some not. The Stolper-Samuelson theorem of the Heckscher-Ohlin (H-O) model predicts that trade liberalization decreases the wage premium for skilled labor, which is a key measure of wage inequality in developing countries. Unskilled labor is usually abundant in developing countries and is intensively used in export. Despite the theoretical appeal and empirical support

[13] In urban China, rural migrants are also known as peasant workers (or *nongmin gong* in Chinese), a term that emphasizes their rural background with prejudice.

from certain recent work[14], mounting income inequality in the developing world poses unprecedented challenges for this theorem (Goldberg and Pavcnik 2007; Han, Liu, and Zhang 2012). Fortunately, recent studies have proposed several theoretical mechanisms to reconcile these conflicting findings, ranging from global outsourcing and technological catch-up to the product quality upgrade of firms (Feenstra and Hanson 1995; Zhu and Trefler 2005; Verhoogen 2008).

In the context of China, the effect of trade liberalization on income inequality is still far from clear. Relevant studies are scarce and controversial. Wei and Wu (2001) contribute to the early work on this topic. They use urban–rural income disparity to proxy the overall income inequality and explore the effect of trade openness. Their findings confirm the prediction of the Stolper-Samuelson theorem that trade liberalization depresses income inequality in China. By contrast, Han, Liu, and Zhang (2012) contribute to the empirical literature, which clearly contradicts the Stolper-Samuelson prediction based on household-level survey data in China. Han, Liu, and Zhang (2012) take advantage of two trade liberalization shocks, namely, Deng Xiaoping's Southern Tour in 1992 and China's accession into the World Trade Organization (WTO) in 2001, to identify relative wage inequality changes in less-exposed regions compared to more-exposed regions in urban China. Quantile regressions suggest that China's WTO accession significantly drives wage inequality due to increased return to education. This channel proposed in Han, Liu, and Zhang (2012) echoes another work by Zhang, Zhao, Park, and Song (2005), who investigate economic returns to schooling in urban China and provide strong evidence that the most dramatic increase in returns to education occurred after 1992, coinciding with Deng Xiaoping's Southern Tour. Kanbur and Zhang (2005) show a positive correlation between trade and inter-regional inequality in China. Fan (2019) quantifies the aggregate and distributional effects of international trade by using a spatial equilibrium model. The estimates show that international trade leads to a significant increase in skill premium by 5%, with the welfare gain for skilled workers more than two times that for the unskilled, and hence increased inequality in China.

[14] For example, Atkin (2016) finds that export expansion in low-skill manufacturing decreases human capital accumulation in Mexico by driving dropout rates, and the wage premium is relatively lower in districts highly exposed to trade expansion compared with the more exposed ones in Uganda (Calì 2014). Other pieces of evidence supporting the H-O model include but are not limited to Amiti and Cameron (2012) for Indonesia, Chiquiar (2008) for Mexico and Gonzaga, Menezes Filho and Terra (2006) for Brazil.

Conflicting evidences between Wei and Wu (2001) and Han, Liu, and Zhang (2012) may be attributed to three potential reasons. First, Wei and Wu (2001) investigate a relatively short time period from 1988 to 1993, which is the early stage of China's integration into the global market, whereas Han, Liu, and Zhang (2012) examine a longer period spanning 1988 to 2005, including Deng's Southern Tour in 1992 and China's WTO accession in 2001. Second, the household-level data used in the latter work likely to reveal micro-level facts that are elusive to aggregate data at the city level as used in Wei and Wu (2001). Moreover, the measures of income inequality between the two studies are substantially different as well. Wei and Wu (2001) focus on urban–rural income disparity, whereas the latter uses quantile regressions to compare wage inequality in more exposed regions to that in less exposed counterparts, with data on urban China.

There is extensive literature on trade theory discussing the role of globalization and outsourcing in altering income inequality within a country and across countries, such as Stolper and Samuelson (1941), Kremer and Maskin (2003), Antràs, Garicano, and Rossi-Hansberg (2006), Verhoogen (2008), and Helpman, Itskhoki, and Redding (2010). These studies develop various frameworks for investigating the determinants of global income distributions that emphasize various forces, such as factor endowments, labor market frictions, workforce quality upgrading, the organizational structure of multinationals, and many others. Muendler (2018) provides a discussion on the evolving explanations of the relationship between the global distribution of incomes, international trade, and the labor market.

5) Skill-biased and directed technological change

I now turn to the indirect evidence on the role of skilled biased and directed technological changes, which suggests that the two types of technological changes may be among the driving forces of income inequality in China. Han, Liu, and Zhang (2012) point out that the increased return to education is the main mechanism through which trade liberalization drives income inequality. Zhang, Zhao, Park, and Song (2005) attribute this increase to China's institutional reforms in the labor market. Different from their perspectives, I draw special attention to the skill-biased technological change (SBTC) that has pervaded the past decades. SBTC has been proposed as a principal culprit for the decline of relative wages of less-skilled labor in OECD countries in the 1980s.

For China, one piece of evidence is from Ge and Yang (2014), who establish the importance

of SBTC as a source in explaining wage growth and wage inequality from 1992 to 2007. If SBTC was as pervasive in China as in developed countries (Bekman, Bound, and Machin 1998; Autor, Levy, and Murnane 2003), then the labor market outcomes of less-skilled workers, relative to skilled workers, may have worsened over the past few decades. The more pervasive SBTC is, the greater is its potential in affecting relative wages. Considering the few studies on the distributional effect of SBTC in China, further work on the skill nature of technological change and its impact on income inequality is needed.

Another evidence is from China's great success in attracting foreign direct investment (FDI), which is generally regarded as a main driver for skill-biased technology progress. Bekman, Bound, and Machin (1998) point out that a skill-biased technological innovation cannot occur and be adopted for production in one country but fail to be imitated or adopted by the same industries in other countries. The pervasive SBTC in the developed world should spread from host countries to China, given China's enormous FDI, most of which comes from developed countries or regions such as Hong Kong, Japan, and the US. Hale and Long (2011) analyze the heterogeneous effect of FDI on the recent wage increase in China and find that FDI firms employ more skilled workers and pay higher wages than do domestic firms. This finding can be attributed to FDI increasing the demand for skilled labor through the labor market competition. In this case, FDI inflow may be closely associated with the recent wage premium for skilled labor in China.[15]

Moreover, directed technological changes, such as capital-biased technological changes, can also affect income inequality through the return to factors when relative wages are extended to relative factor prices. Using provincial panel data, Zhang, Wan, Wang, and Luo (2017) find a capital-biased technical change in China and show a negative association between the capital-biased technological change and the labor share of income from 1978 to 2012. This finding suggests that directed technological change may be important in explaining both of the reduction in labor share of income and the rise in income inequality in recent China.

6) Ownership and market structure changes

In socialist China, nearly every urban resident was assigned to a state-owned or collective work

[15] FDI can also affect income inequality through other channels. Zheng, Zhang, Ma, and Zhang (2018) find that FDI positively contributes to income inequality because it can cause labor and environmental standards to decline. Their decomposition shows that the decline in labor and environmental standards caused by FDI contributes 5% and 40% to income inequality, respectively.

unit, which was an extension of the state organization and was rigidly controlled by central or local governments, from production decisions to employment behaviors.[16] The wage system in these units was also under government control, and thus wage distribution was regulated in the wage ladder according to the employee's seniority, personal status, and administrative position (Wu 2002). With the rigid control in the wage distribution, the income disparity across individuals in state-owned and collective sectors was more moderate than that in the private sectors. However, the state-owned economy share decreased markedly when the market-oriented economic reforms were initiated in 1978 because of the rapid development of self-employment and private economic activities. Szamosszegi and Kyle (2011) show that the share of urban employment by SOEs decreased from 78% in 1978 to 21% in 2009.

Such a rapid shift of employment demand from state-owned and collective sectors to private sectors obviously has a strong impact on the increase in income inequality because the private sectors are more focused on the productivity of labor. In a mixed economy with both market and state sectors, Wu (2002) finds that the returns to human capital are higher in market sectors than in state sectors. This finding implies that market-oriented economic reform itself can increase income inequality between individuals with high and low education, although the rise of inequality is not inevitable. Indeed, Song and Li (2010) point out that the fast development of private enterprises enlarges earnings inequality.

After the reform by "relaxing small state-owned firms" in the late 1990s, the existing state-owned firms in the new century are large in size and enjoy a monopolistic status in the Chinese market structure. Unlike its pre-reform role of moderating income inequality, the state-owned sector plays an opposite role in enlarging income inequality due to its monopoly. However, the inequality attributed to monopolistic rent-seeking behaviors is unjustified and largely unsatisfactory to the public, which is, by nature, different from the sources of privatization. Several recent studies attribute the rising inter-industry inequality to the rent-seeking and sharing behaviors between firms and workers which arose from industry monopoly (Chen, Wan, and Lu 2010; Yue, Li, and Sicular 2010; Ye, Li, and Luo 2011; Liu and Zhang 2015). One natural way of examining inter-industry inequality is to use firm-level data. By using the 2004 National Economic Census data, Ye, Li, and Luo (2011) find that both ownership and

[16] Three types of work units generally exist: profit-making enterprises (*qiye danwei*), government or party agencies (*dangzhengjiguan*), and institutions (*shiye danwei*), among which profit-making enterprises employ the majority of the labor force. See Wu (2002) for details.

monopoly are key contributing factors in explaining the inter-firm wage differences where the former plays a more important role. More specifically, rent-seeking and sharing behaviors are present in the SOEs where monopolistic powers are transformed into high labor costs by granting wage premium to SOE workers, which, in turn, widens wage disparities among firms. Conversely, efficiency wage theory may explain the wage disparities in private-owned and foreign-owned enterprises. Liu and Zhang (2015) obtain very similar results by using data from China's Annual Survey of Industrial Firms (ASIF) for 2005–2007 and further report that the unjustified component of the wage gap between monopolistic and non-monopolistic firms is around 25% (27% for labor compensation and 23% for wage income).

In addition to firm-level data, an alternative way of examining the rising inter-industry income inequality is to utilize household-level data. Using several rounds of the CHIP survey and UHS data, Chen, Wan, and Lu (2010) and Jiang, Guo, and Lu (2013) document the rising contribution of inter-industry income inequality on income inequality in urban China and attribute it to the soaring earnings of workers in industries with strong monopolistic powers from the late 1980s to the early 2010s. By using 2005 mini-census data and employer-employee matched data, Ye, Li, and Luo (2011) and Nie and Yue (2016) consistently find that half of the income differentials between monopolistic and competitive industries are unjustified and can be attributed to administrative monopoly. Xia, Li, Song, and Appleton (2012) use four rounds of the CHIP survey from 1988 to 2007 to examine the impacts of employment and wage structure of SOEs on the wage inequality of urban China. They find that the fall of employment share and rise of wage premium of SOEs have countervailing effects on the decrease or increase of urban wage inequality. However, Chen, Lu, and Sato (2009) argue that social network, father's education and political connections, and *Hukou* status are key industrial entry barriers in Chinese urban labor markets for explaining the rising inter-industry income inequality. Démurger, Gurgand, Li, and Yue (2009) further argue that the systematic earning disparity between urban residents and rural migrants mainly comes from pre-market (education opportunities) rather than on-market aspects.

7) Redistribution and other labor protection policies

Generally speaking, government intervention is necessary to reduce inequality, even in a market economy. Workers and entrepreneurs are paid according to the productivity of their labor and capital endowment, which naturally produces income inequality in society. Despite the neoclassical view on income determination and distribution, governments have a desire to

play an active role in adjusting or rectifying distributional outcomes by policies or regulations. For example, governments can implement labor protection policies, such as minimum wage laws ex-ante, or resort to redistributive measures, such as pensions, taxes, and remittances (net income from transfers) ex-post. Agents, on the other hand, can make optimization by incorporating these governmental policies as exogenous factors and in turn change their behaviors accordingly, regardless of whether these policies are ex-ante or ex-post.

Likewise, several redistribution policies and minimum wage laws serve as government tools in China. As mentioned in Section 3, transfer income is one of the four income sources in China. According to the redistributive principle of "taking from the rich then giving to the poor," transfer income benefits the poor but harms the rich. Therefore, the redistribution between the rich and poor imposes a direct effect on income distribution. There are different types of transfer incomes. Pensions can be universal to all elders, regardless of their employment history, but the amount of which can be conditional on employment duration and the working wages of pensioners. In addition, China has implemented a series of important poverty alleviation programs and achieved substantial poverty reduction in the 1980s and 1990s. The success of the early ‘‘poor area" poverty alleviation program was then shifted to the minimum living standard guarantee (dibao) program since the 2000s, a nationwide cash transfer program targeted at poor urban and rural households. The program provides sufficient income to poor beneficiaries in both urban and rural areas but does not substantially reduce the overall level of poverty (Gao, Garfinkel, and Zhai 2009; Golan, Sicular, and Umapathi 2017). On the other hand, minimum wage laws aim to help those unskilled workers at the bottom of the economic ladder. As a measure of price control in the labor market, the impact of minimum wages on overall income inequality is more indirect and complicated. Minimum wages are closely associated with employment status but subject to provincial variations in enforcement. In sum, pensions, poverty alleviation programs, and minimum wages are institutional arrangements that have shown governmental efforts to counteract rising the income inequality.

Modernization of China's social security system leads to the rising importance of transfer income in shaping inequality dynamics. Several studies examine whether and how income taxes and transfers matter in measuring inequality and its dynamics but arrive at conflicting results. Various types of public transfers, such as pensions and medical insurances, are found to be equalizing in some early studies for both rural residents and urban workers in the 1990s and 2000s (He and Sato 2008; Wang and Kang 2009; Tan and Zhong 2010). Using the 2013

wave of CHIP data, recent studies show that income transfers played an equalizing role in lowering the overall income inequality only when pensions are excluded (Cai and Yue 2018). If pensions are included, the equalizing effect disappears and net income transfers contribute positively, not negatively, to the overall income inequality since most pensioners would have zero income if they do not receive pensions (Cai and Yue 2018). The results also hold true for the early waves of CHIP data, particularly for urban households (Li, Zhao, and Gao 2013). It is well-known that the pension system in China is highly skewed towards urban households. Consequently, the system can be generally viewed as a dis-equalizing policy in current China. To put this in a global perspective, even for studies supporting the equalizing effect, the difference in inequality between pre-tax income without transfer and post-tax income with transfer in China is modest, compared with that in European countries which have well-established welfare systems. The Gini coefficient for post-tax income with transfer decreased by 30% in European countries, whereas the corresponding number was approximately 11% for China in 2013 (Li, Zhu, and Zhan 2017).

Regarding the effect of minimum wage on inequality in China, no consensus has been reached, which is similar to the existing literature on industrialized countries. Since China promulgated the new minimum wage regulation in 2004, the magnitude and frequency of changes in the minimum wages have accelerated, both over time and across regions. Therefore, the increase in minimum wages may raise earnings for millions of low-wage workers and, in turn, lessen wage and earning inequality.[17] Indeed, several studies using micro-level survey data find that minimum wages improve income distribution in China. For example, by combining city-level minimum wage panel data and UHS data, Lin and Yun (2016) find that an increase in the minimum wages reduced the earning gap between the median and the bottom decile from 2004 to 2009. Similarly, using six waves of CHIP survey data from 1993 to 2013, Ma and Li (2016) find that the improving effect of minimum wages on the low-wage workers was only confined to the recent period from 2007 to 2013. By contrast, studies using provincial panel data in the 2000s find a limited effect of minimum wages on income distribution in China. For example, using 2000–2010 provincial panel data, Fu (2014) argues that the minimum wage system has not played a role in narrowing industrial wage gap in China, especially for coastal regions. Similarly, using the 2002–2012 provincial panel data, Weng and Xu (2015) find that the

[17] In minimum wage literature, there has been a long-standing debate since the seminal work by Stigler (1946) on whether the effect of minimum wages on low-wage workers is positive due to increasing earnings or negative due to the creation of unemployment.

increase in minimum wages has a modest negative impact on the labor share of income in the industrial sector. This result implies that firms can respond to the increase in minimum wages through capital-labor substitution so as to worsen the income distribution in favor of capital.

Let me conclude with a brief summary for this section. To provide the context for quantitative understanding of the sources for rising income inequality in post-reform China, I presented a systematic discussion of seven primary candidates from the present literature. They ranged from China-specific changing characteristics of the labor force to the redistribution and other labor protection policies. The unexplained and residual sources of income inequality, most likely including administrative monopoly, government protection, and nonmarket benefits mentioned earlier, seem to have received little attention in the present literature. In addition, minimal or limited research has been conducted simultaneously on several inequality sources in China, such as returns to education, SBTC, and trade liberalization. In other words, little systematic analysis has been done so far to quantify the relative contributions of these sources simultaneously. For example, Luo (2017) evaluates only the role of education and family structure and focuses on the contribution of urban–rural disparity along these dimensions by using CHIP data. Using a similar regression framework, Wan (2004) quantifies the contributing sources of regional income inequality only for rural China and limits the investigation to variables such as the dependence ratio, education, family size, and per capita household capital and land. Such restrictions may be due to the availability of appropriate data to work with. It is promising for future work to use nationwide employer-employee matched data, if available, and make a systematic evaluation of the relative importance of inequality sources, following the regression-based decomposition analysis proposed in Section 2 in terms of Equations (4) to (5).

5. Transmission of income inequality over time: The Great Gatsby Curve and intergenerational income mobility

Inequality is not only reflected in household income, urban–rural inter- and intra-group, region and factor income but also in its transmission over time and across generations. This section first introduces the intergenerational mobility and then touch on empirical evidence on the Great Gatsby Curve (Corak 2013) in China, which describes a negative relationship in income inequality and intergenerational mobility.

1) Intergenerational mobility

To what extent income inequality is transmitted across generations? This can be analyzed by using the intergenerational income elasticity from a simple regression:

$$y_{i,t} = \beta y_{i,t-1} + \varepsilon_{i,t} \tag{6}$$

where t is the current period of life course or the children's generation and $(t - 1)$ is the early period of life course or the parents' generation; β is the (intergenerational) income elasticity when y is in log, and $(1 - \beta)$ is a measure of (intergenerational) income mobility.

2) Evidence from China

Fan, Yi, and Zhang (2019) plot the Great Gatsby Curve for China (Figure 12). As a preliminary exploration, they rank provinces (and municipalities) along two dimensions for two birth cohorts. The horizontal axis shows income inequality in a province (or municipality) as measured by the Gini coefficient for parents' generation, while the vertical axis shows the measure of intergenerational mobility estimated by regressing the logarithm of children's income on the logarithm of parental income in Equation (6). A negative correlation is observed between income inequality and intergenerational mobility, consistent with the well-documented evidence on the Great Gatsby Curve for developed countries (Corak 2004; 2013). They also briefly look at several correlates of international mobility but do not explore the underlying mechnisms of the Great Gatsby Curve.[18] Using rural time series data from the CHNS, Clement (2016) proxies mobility with a mobility index derived from Shorrocks' income rigidity index (Shorrocks 1978) and measures income inequality with the Gini coefficient and entropy indices. He finds that there is a decrease in income mobility and an

[18] In general, income inequality and mobility affect each other. Higher inequality worsens mobility, and lower mobility reinforces inequality. From the direction of how income inequality affects mobility, there are three mechanisms under which inequality restrains mobility. One way is by considering different borrowing constraints for families with different incomes, which originates from Becker and Tomes (1979, 1986). The elasticity between child income and parental income is larger for poor families if the credit constraint is more likely to affect the poor. As a result, there is a concave relationship between the income of children and parents, which explains the lower intergenerational mobility among poor families. Another mechanism emphasizes the complementary relationship between parents' human capital and their investments in children (Becker, Kominers, Murphy, and Spenkuch 2018). Wealthier parents, generally with higher human capital, invest more in children's human capital. With higher level of human capital, children from wealthier families are expected to earn higher income, and vice versa, which implies low mobility. The third hypothesis explains how inequality affects intergenerational persistence by segregation (Durlauf and Seshadri 2018). One key argument is that the formation of human capital is largely determined by social influences. The greater income inequality within parents' generation, the greater segregation of the neighborhood where children develop, which contributes to the greater differences in human capital between children of the rich and the poor. Therefore, socioeconomic status persists across generations and intergenerational mobility is low.

increase in income inequality during the period from 2000 to 2011. Thus, his finding implies a negative correlation between income inequality and mobility in China. In addition, with a focus only on urban individuals in China, Yin, Li, and Deng (2006) document a decreased trend in income mobility over 1998–2002, while Khor and Pencavel (2006) find that income mobility increased from 1990 to 1995. Both studies do not look at income inequality.

6. Future research

Although a growing literature contributes to the insights into the patterns, trends, and sources of income inequality in China, many important research questions remain unanswered. First, how did the one-child policy affect urban–rural income disparity? Although the one-child policy has been enacted and applied throughout China since 1979, its enforcement across rural and urban areas has never been uniform. For example, couples with only one daughter can have a second child in rural areas but not in urban areas (Zhang 2017). In addition, local governments also use their discretion to set one-child policy, leading to notable provincial variations in enforcement (Huang, Lin, and Zhang 2019). Given the relatively poor economic status of rural families, the heavier burden of childbearing possibly decreases human capital investment for the next generations and gradually creates a dynamic poverty trap in which fertility and poverty are mutually reinforced. Urban residents may reach a higher equilibrium in transmitting parents' advantages to the next generation. Wang and Zhang (2018) provide evidence that the level of human capital for the next generation is reduced by 1%-2% due to the enactment of the one-child policy in China because of the different enforcement of the policy in rural and urban areas.

Second, even though empirical work has provided strong evidence that FDI, outsourcing, and SBTC play important roles in explaining wage premium for skilled labor in the developed world, little is known on how these global forces relate to income inequality in China.[19] These under-explored aspects of globalization greatly limit our understanding of income inequality sources. Before one can draw general conclusions on the relationship between trade liberalization and inequality, more evidence is necessary from developing countries, especially from China, the largest country.

[19] See Goldberg and Pavcnik (2007) for discussions on the effects of FDI, outsourcing, and SBTC in developed countries.

Third, the impact of rapid privatization and market-oriented reforms is under-investigated. These policy changes considerably accelerate China's economic transformation and growth. However, these spectacular achievements coincide with mounting income inequality in transitional China. Thus, it is valuable to explore more whether these development strategies drive economic progress at the cost of increased income inequality (and if so, to what extent). At the early stage of reform and openness, China's economic transformation was called "reform without losers."[20] Unfortunately, nearly 40 years after the inception of China's reform, such vision is perhaps not the case. What lessons may be learned from China's experience? The answer to this question, it is important for any country aiming for rapid economic growth with low costs.

Another important research on China is the study of life course and lifetime inequality, with the former emphasizing the evolution of inequality along a life course and the latter comparing lifetime or permanent income inequality instead of short-term or transitory income inequality.[21] If social and labor outcomes for adults reflect to a large extent their early education and experience at specific points in their lives, then inequality at different life stages should be strongly correlated. By contrast, if the correlation of inequality across different life stages is weak for individuals, then upward mobility is still sufficiently high for those who struggle to improve their social and economic status throughout their life course. Cunha and Heckman (2007; 2008) suggest that around half of the inequality in the present value of lifetime earnings can be attributed to factors determined by age 18. However, the challenge is that any study on life course and lifetime inequality must be based on long-term tracking data, yet no such study has been conducted on China, perhaps because of this limitation. Fortunately, life course analysis is increasingly becoming feasible with the extension of panel data in China, such as CHNS, which has linked households and individuals since 1989 to allow for a longitudinal analysis.

7. Conclusions

I have presented an organizational framework to assess income inequality and reviewed recent household-level studies on income inequality in China. Overall, the patterns and trends of

[20] See Lau, Qian, and Roland (2000) for details.

[21] For example, Brown and Prus (2006) examine income inequality over stages of age 45 and older, which is defined as the later-life course in their study.

income inequality in China since 1978 can be summarized with the following stylized facts:

- A generally increasing trend in Gini coefficients is observed over the last four decades and holds at the household level, by region, or urban–rural divide.
- The inequality trend within the past decade tends to be stable or even slightly declining, as captured by both official and unofficial estimates, albeit at distinct levels.
- The trends of urban–rural disparity and regional inequality are closely correlated with the overall inequality in the 1980s, 1990s, and early 2000s, but not in the recent decade.
- The contributions of urban–rural disparity and regional inequality to overall income inequality show the declining importance in the recent decade relative to the previous three decades.
- There is a rising contribution of capital income to the overall income inequality, although its importance is still relatively mild. The moderating distribution of transfer income and wage income plays a key role in driving the recent decline of the overall income inequality.

To track the sources of mounting inequality, seven main forces are discussed in order, ranging from the changing characteristics of the labor force to redistribution and other labor protection policies. China's Great Gatsby Curve is also analyzed as an interaction of income inequality and intergenerational mobility. Unsurprisingly, a negative correlation is observed between income inequality and intergenerational mobility, consistent with the well-documented evidence on the Great Gatsby Curve in developed countries.

The evolution of income inequality is more complex in a transitional economy like that in China than in some other countries. The rising inequality in China shall be fully considered in the macro context where rapid economic growth and qualitative economic transformation go hand-in-hand. Although China's rapid economic growth resembles the high-growth period of its Asian neighbors, China's inequality trajectory bears more resemblances to the US and perhaps other Western countries in their earlier development stages, benefiting people differently with enlarging inequality. The Kuznets hypothesis seems to account for not only the experience of the US up to the 1970s but also that of China in the past four decades, which makes China a more general case rather than a distinctive one.

In the first three decades starting from the reform and openness in 1978, the consensus is that income distribution has become more unequal in terms of the dimensions of urban–rural, regional, and factor income inequality. The transition to an older, male-biased, and better-

educated labor force becomes the fundamental source of increased income inequality, and demand shifts by privatization, trade and investment liberalization, and skilled-biased technological progress worsen the huge gap between the poor and the rich in post-reform China. On the one hand, the increasing return to education and leaving the countryside through migration (urbanization) bring lucrative opportunities to and change the lives of millions of poor rural peasants and their children. On the other hand, rich households can respond to the change better than poor households by investing more in children's education, obtaining better non-agriculture *Hukou* status and benefiting more from rising housing prices. Finally, unjustified inequality triggered by monopolistic behaviors can undermine the notion of equal opportunity and may lead to persistent cross-sectional inequality over generations.

Over the past decade, the rising trend in income inequality has slightly reversed. This outcome can be attributed mainly to the expansion of the middle income group and the decrease of wage income disparities (Li, Sato, Sicular, and Yue 2017; Wan, Wu, and Zhang 2018). This result may also be due to the efforts of the Chinese government to rectify and reverse the ever-increasing inequality in the recent decade. For instance, 10 million people are expected to be lifted out of poverty every year from 2015 to 2020 through a comprehensive and precisely-targeted poverty alleviation program on education, relocation, industry, ecological compensation, and social security in the rural areas. In principle, the targeted poverty alleviation program can narrow the rural–urban income disparity and lower overall income inequality, at least to some extent. Other policies such as relaxation of the *Hukou* system and promotion of urbanization may also play roles in changing income inequality, but their impacts can be limited and confounded by other socio-economic factors.

It is well-known that Chinese cheap labor has come to an end since the late 1990s (Li, Li, Wu, and Xiong 2012). This change will naturally increase the labor's share of income and impose a natural pressure on the rise of income inequality in the future because such underpriced labor appears to be low-skilled migrant workers (Zhou 2016). However, it may be still too early to claim that high income inequality in China will be rectified automatically for two reasons. First, when the economy is restructured into a high-quality growth path, the demand for skilled labor continues to increase, which, in turn, prompts income disparity in the future. Second, the demographic change to an aging society may induce technological change toward automation (substituting labor with capital) and artificial intelligence (robot use) (Acemoglu and Restrepo 2018; Cheng, Jia, Li, and Li 2019). Therefore, relentless efforts are still needed by the Chinese

government to implement reform policies that can improve the income distribution in China (Li 2018b). For instance, the taxation shall be reformed into a more progressive and direct income tax system; the transfer income should trigger more pro-poor growth; the social security system, public service provision, and labor protection policy should be well-designed for more equal coverage and treatment across population groups.

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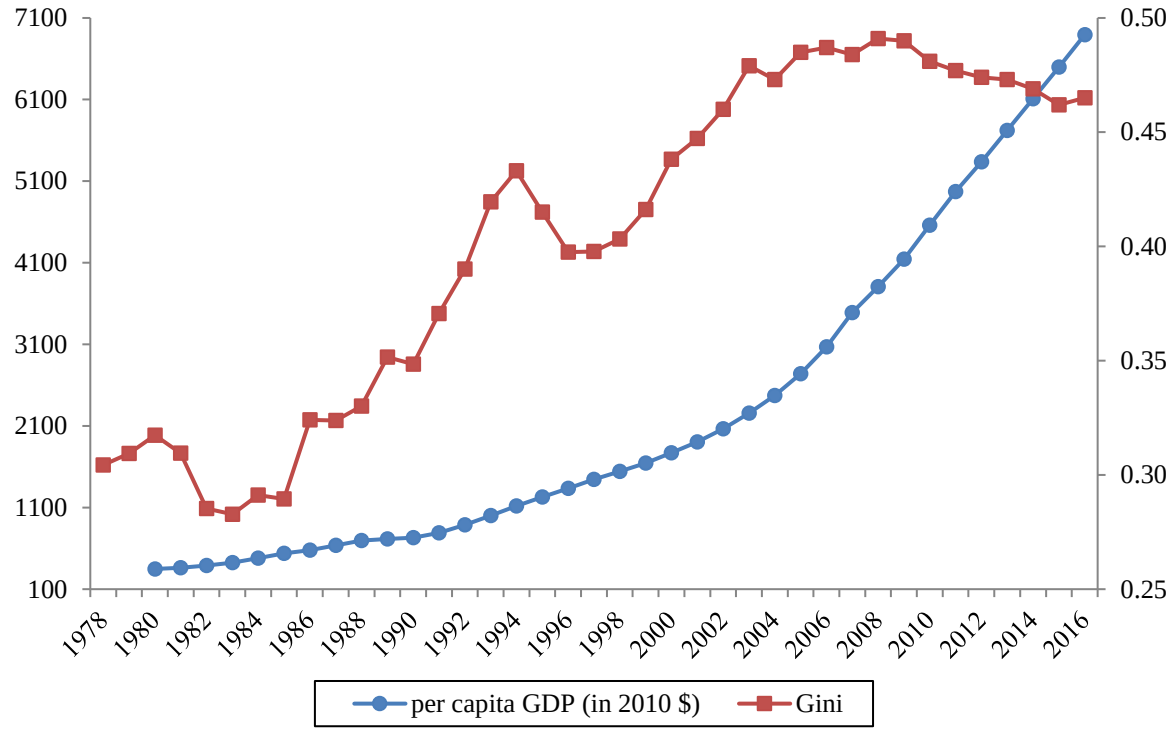

Figure 1: Real Per Capita GDP and Gini Coefficient in China, 1978–2016

Data sources: Real per capita GDP is from the World Bank at 2010 constant price in US dollar from 1980-2016. Gini coefficients during 1978-1980 are from Chen, Dai, Pu, Hou, and Feng (2010), 1981-2001 are from Ravallion and Chen (2007), 2002 is from Li (2018a), and 2003-2016 are from National Bureau of Statistics of China (NBS). Notes: Before 2013, the NBS conducted separate urban and rural household surveys; thereafter, it implemented the reform of a unified urban–rural household survey with unified indices, statistical caliber, sampling method, data collection, and processing (Wang, 2015). Therefore, the change of the Gini coefficient between 2012 and 2013 may be attributed to the adjustment of the newly designed household survey.

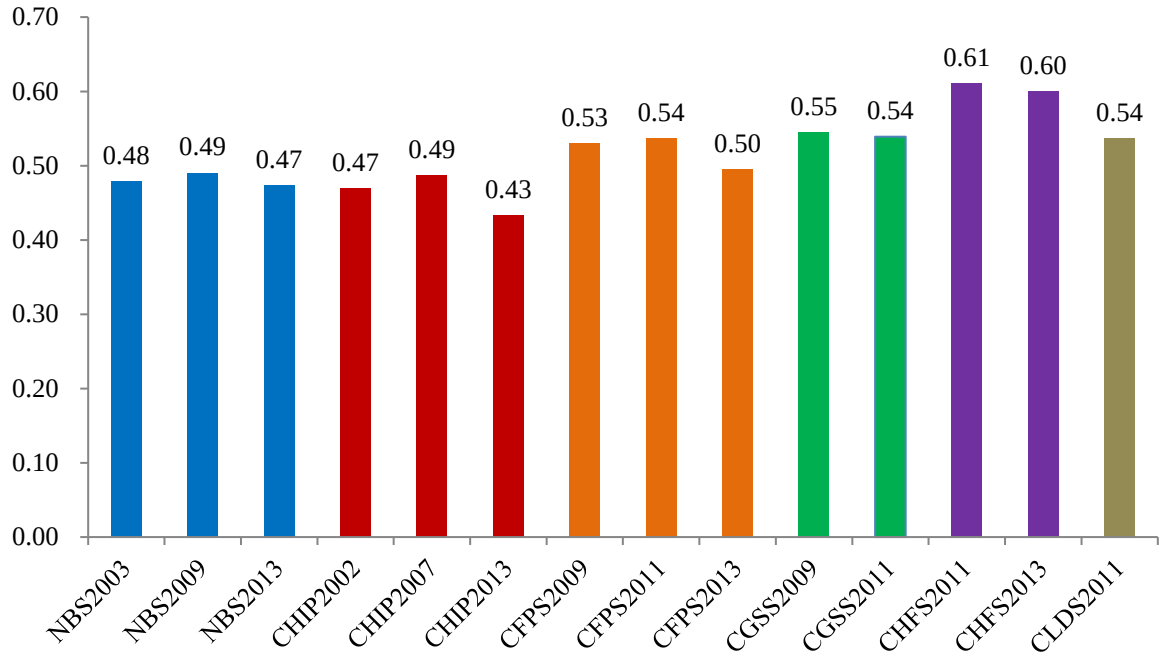

Figure 2: Comparison of the Gini Coefficients from Various Sources in China, 2002–2013

Data sources: NBS refers to the National Bureau of Statistics of China; CHIP refers to the Chinese Household Income Project first conducted by the Chinese Academy of Social Sciences and later by the China Institute for Income Distribution at Beijing Normal University; CFPS refers to the China Family Panel Studies conducted by the Institute of Social Science Survey at Peking University; CHFS refers to the China Household Finance Survey conducted by the Survey and Research Center for China Household Finance at the Southwestern University of Finance and Economics; CGSS refers to Chinese General Social Survey conducted by the Department of Sociology at Renmin University of China and the Survey Research Center at the Hong Kong University of Science and Technology; CLDS refers to the China Labor Force Dynamic Survey conducted by the Department of Sociology at Sun Yat-sen University.

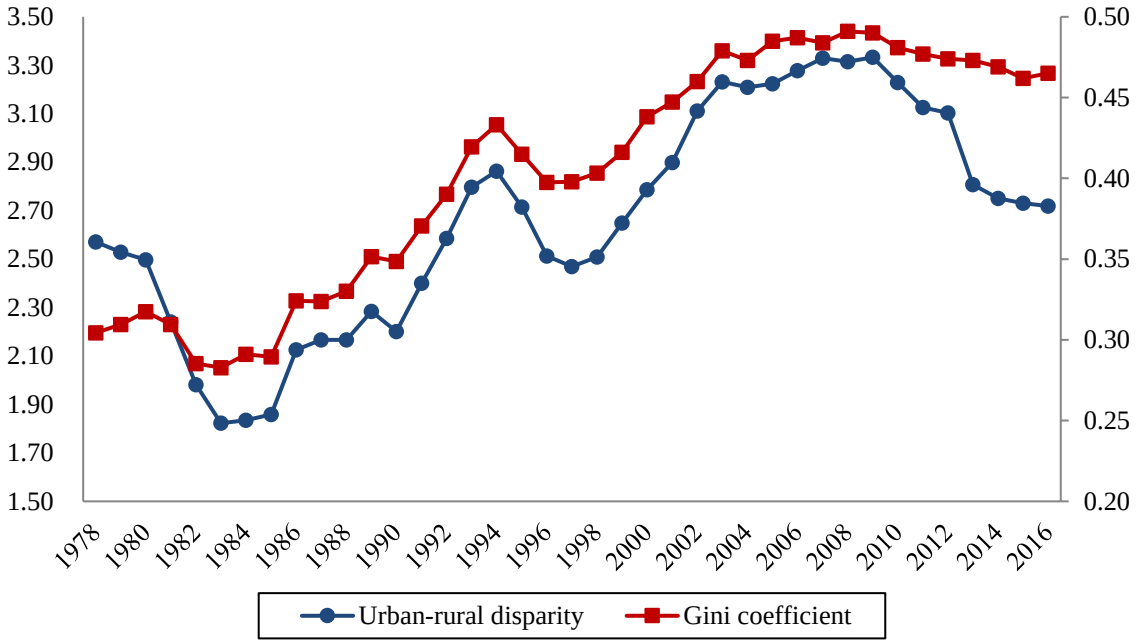

Figure 3: Urban–rural Disparity and the Gini Coefficient in China, 1978–2016

Data sources: Urban–-rural disparity during 1978-2016 is from the NBS. Gini coefficients during 1978-1980 are from Chen, Dai, Pu, Hou, and Feng (2010), 1981-2001 are from Ravallion and Chen (2007), 2002 is from Li (2018a), and 2003-2016 are from the National Bureau of Statistics of China (NBS).

Notes: Before 2013, NBS conducted separate urban and rural household surveys; thereafter, it implemented the reform of a unified urban–rural household survey with unified indices, statistical caliber, sampling method, data collection, and processing (Wang, 2015). Therefore, the change of urban–rural disparity and the Gini coefficient between 2012 and 2013 may be attributed to the adjustment of the newly designed household survey.

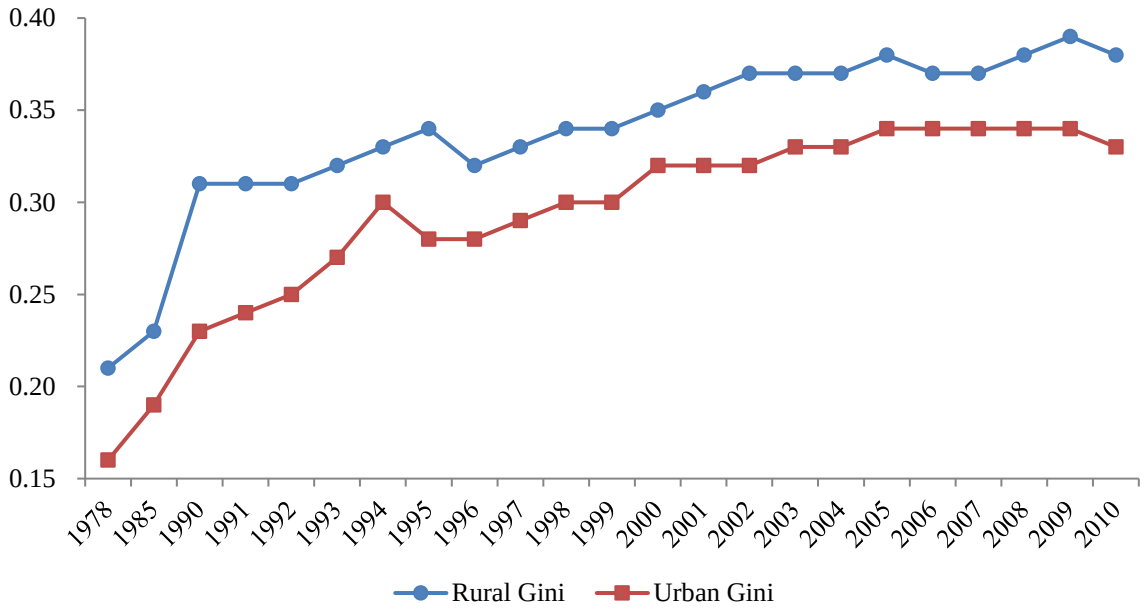

Figure 4: Urban and Rural Gini Coefficients in China, 1978–2010

Source: Zhang, Liu, and Wang (ed.) (2012), Report on Income Distribution in China 2011, Table 12 in Appendix 2.

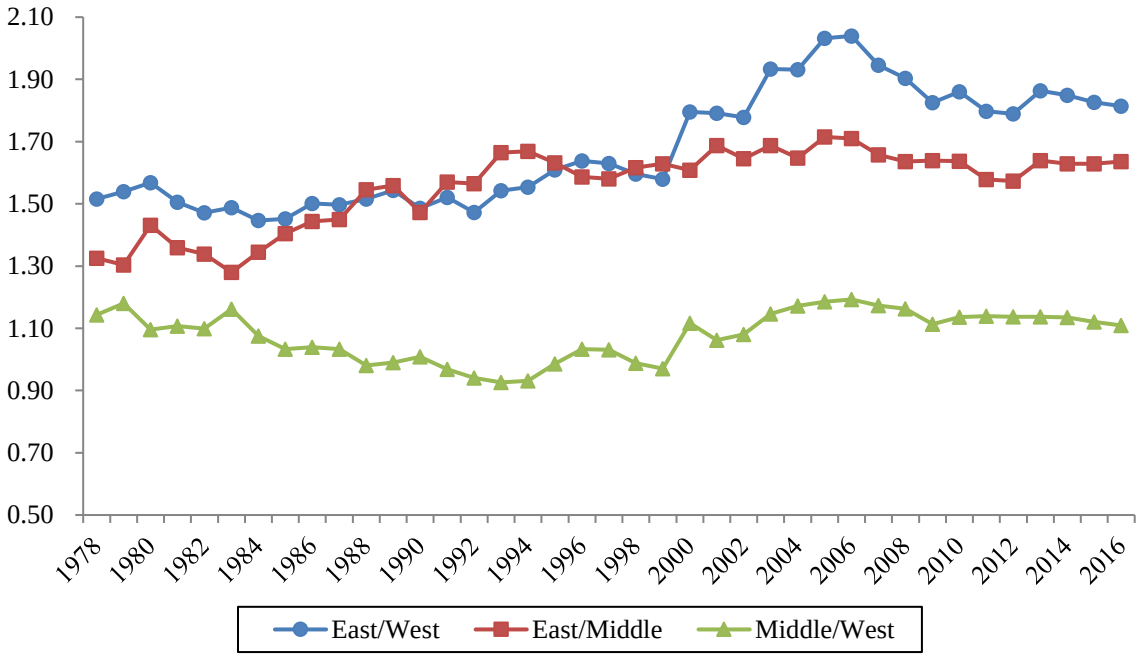

Figure 5: Income Gaps between East, Middle and West China, 1978–2016

Data sources: Before 2008, data for calculating regional inequality are from *China Compendium of Statistics: 1949–2008*. Recent data after 2008 are mainly from the NBS database.

Notes: Each line represents the ratio of per capita income between East, Middle, and West regions. These ratios are obtained as follows: I first calculate the per capita income in 31 provinces, autonomous regions and municipalities in China. Per capita income in each region is a weighted sum of per capita urban disposable income and rural net income with the population of urban and rural as weights. I directly use per capital disposable income after 2013 because the NBS has implemented the reform of a unified urban–rural household survey since 2013. I then aggregate real per capita income into three major regions, i.e., East, Middle, and West regions. According to the NBS, the East region includes Beijing, Tianjin, Heibei, Liaoning, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong, and Hainan; the Middle region includes Heilongjiang, Jilin, Shanxi, Anhui, Jiangxi, Henan, Hubei, and Hunan; and the West region includes Inner Mongolia, Guangxi, Chongqing, Sichuan, Guizhou, Yunnan, Tibet, Shaanxi, Gansu, Qinghai, Ningxia, and Xinjiang. The time series of Hainan is from 1987 to 2016, Chongqing is from 1995 to 2016, Tibet is from 1996 to 2016 and Qinghai is from 1983 to 2016. For robustness, I use regional consumer price index as a deflator to calculate real per capita GDP in each region, adjusting for differences in living costs across regions. I also drop regions with incomplete data for the data set to be consistent and comparable over time. Different treatments result in very similar regional income inequality trends.

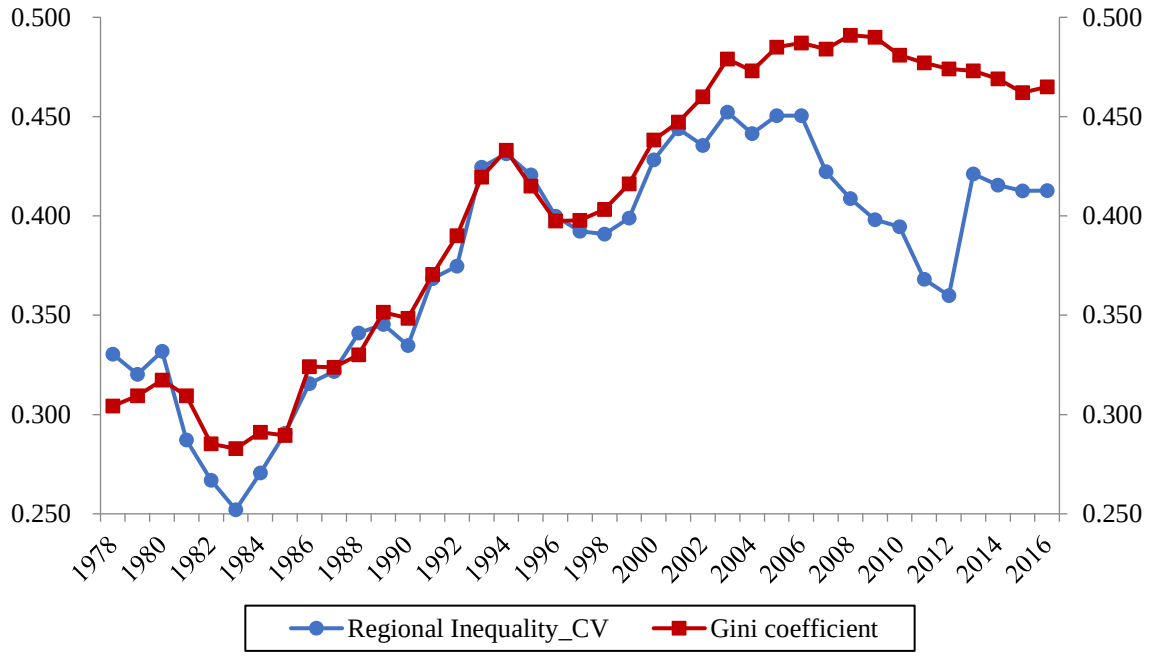

Figure 6: Regional Income Inequality and Gini Coefficients in China, 1978–2016

Data sources: Before 2008, data for calculating regional inequality are from *China Compendium of Statistics: 1949–2008*. Recent data after 2008 are mainly from the NBS database. Gini coefficients during 1978-1980 are from Chen, Dai, Pu, Hou, and Feng (2010), 1981-2001 are from Ravallion and Chen (2007), 2002 is from Li (2018a), and 2003-2016 are from National Bureau of Statistics of China (NBS).

Note: Regional coefficients of variation are obtained as follows: I first calculate the per capita income in 31 provinces, autonomous regions, and municipalities in China. Per capita income in each region is a weighted sum of per capita urban disposal income and rural net income with the population of urban and rural as weights. I directly use per capita disposable income after 2013 because the NBS has implemented the reform of a unified urban–rural household survey since 2013. I then calculate the coefficient variation of the nominal per capita income for all regions expect for Hainan, Chongqing and Tibet because their data are incomplete. For robustness, I use regional consumer price index as a deflator to calculate real per capita income in each region and account for different living costs across regions. Real regional income inequality is consistently lower than nominal regional inequality but exhibits very similar trends.

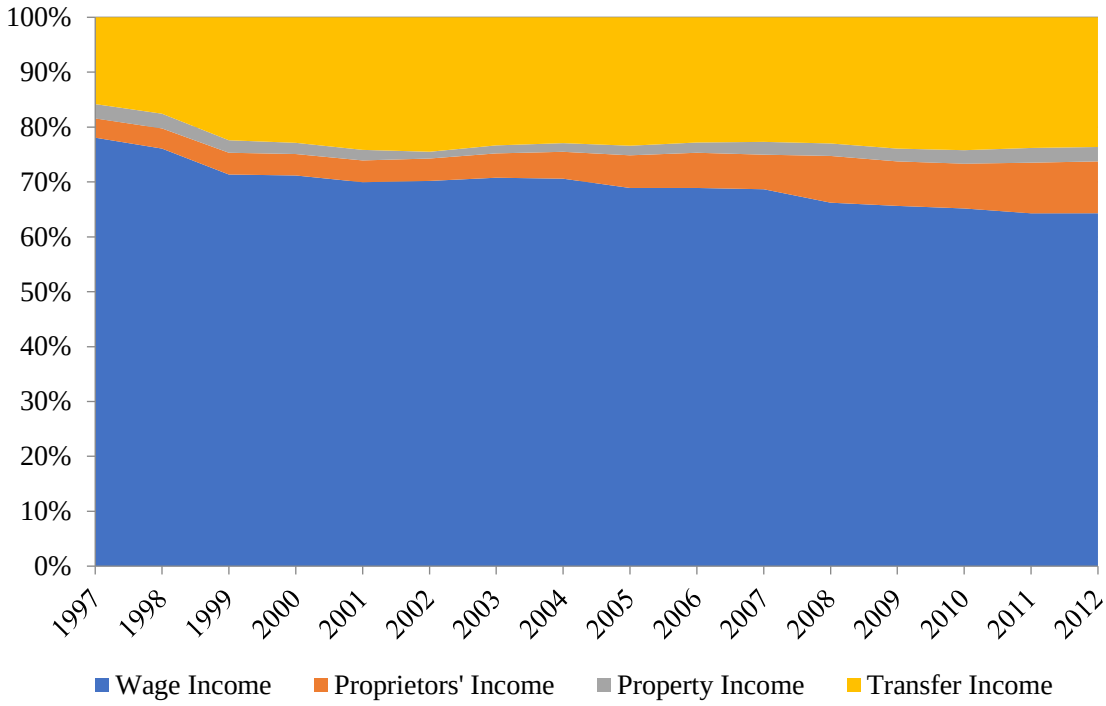

Figure 7: Shares of Income Sources in the Total Income for Urban Households, 1997–2012

Data sources: Data are from NBS database.

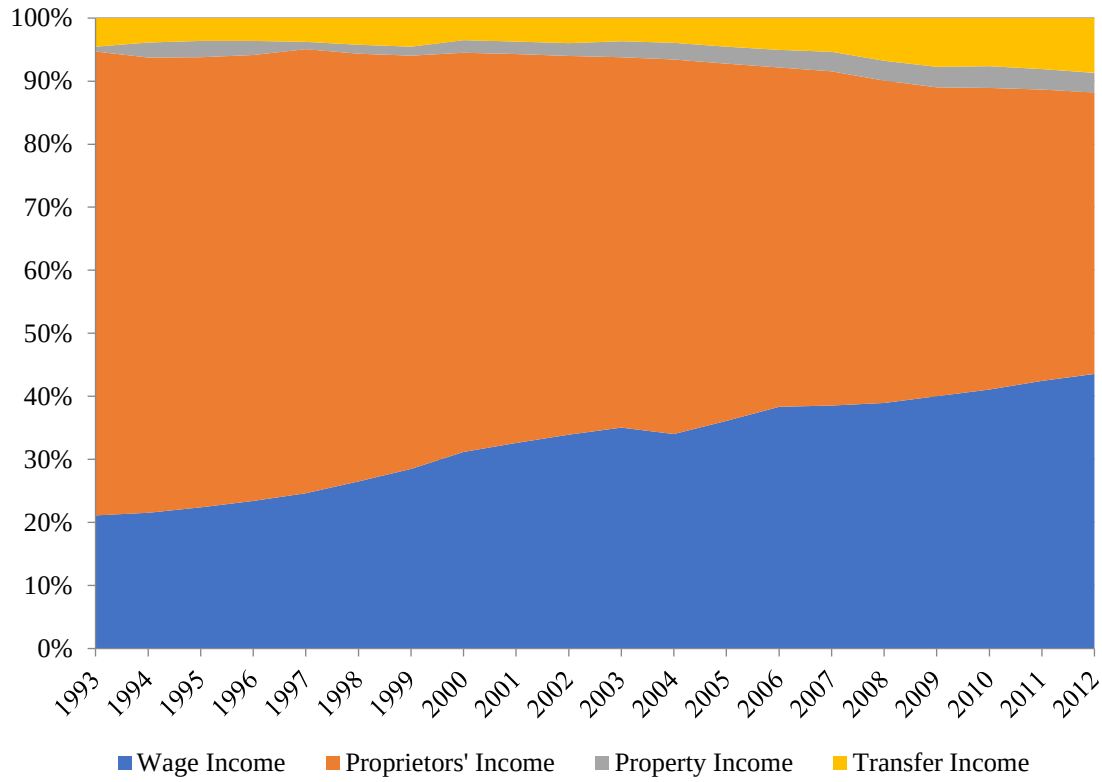

Figure 8: Shares of Income Sources in the Total Income for Rural Households, 1993–2012

Data sources: Data are from NBS database.

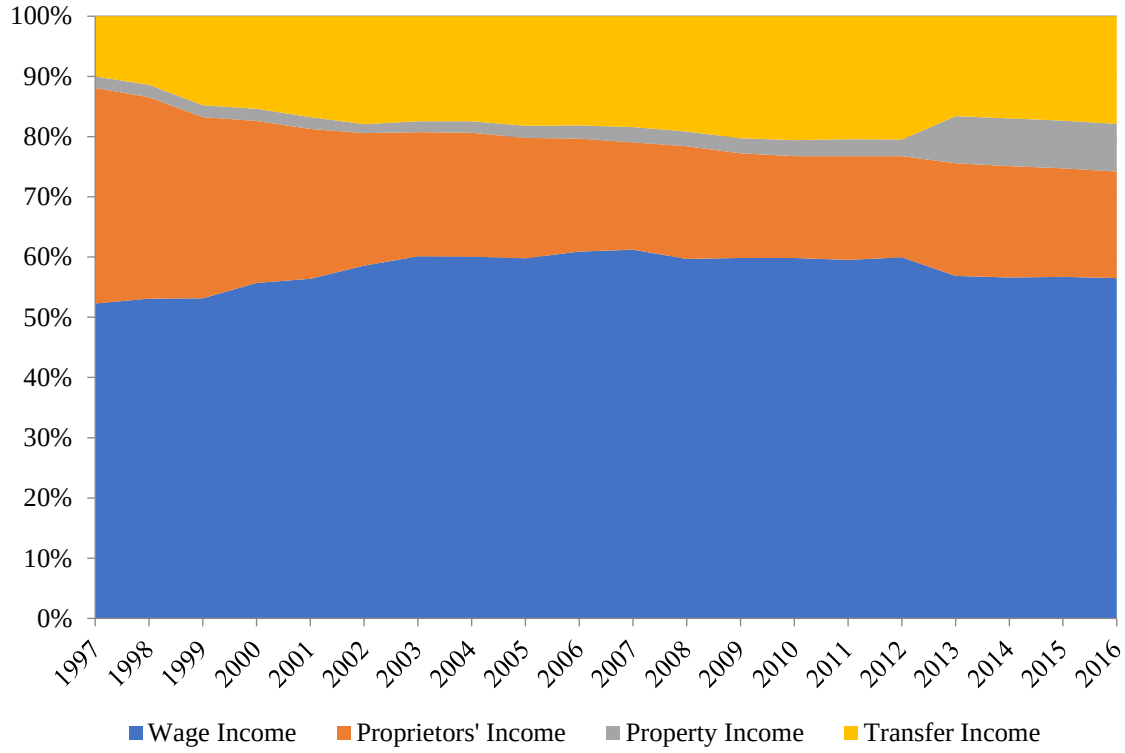

Figure 9: Shares of Income Sources in the Total Income for China, 1997–2016

Data sources: Data from 1997 to 2012 are weighted average of the urban and rural income shares for which the urban and rural population shares are used as weights. Data from 2013 to 2016 are directly calculated from the NBS database because the NBS has implemented the reform of a unified urban–rural household survey after 2013.

Figure 10: Contribution of Income Sources to Overall Income Inequality by Gini Coefficients for Urban Households, 1995–2013

Sources: Li and Sato (eds.). 2006. "Unemployment, Inequality and Poverty in Urban China." London: Routledge; Li, Sato, Sicular, and Yue (eds.). 2017. "Changing Trends in China's Inequality: Evidence, Analysis, and Prospects." Unpublished version.

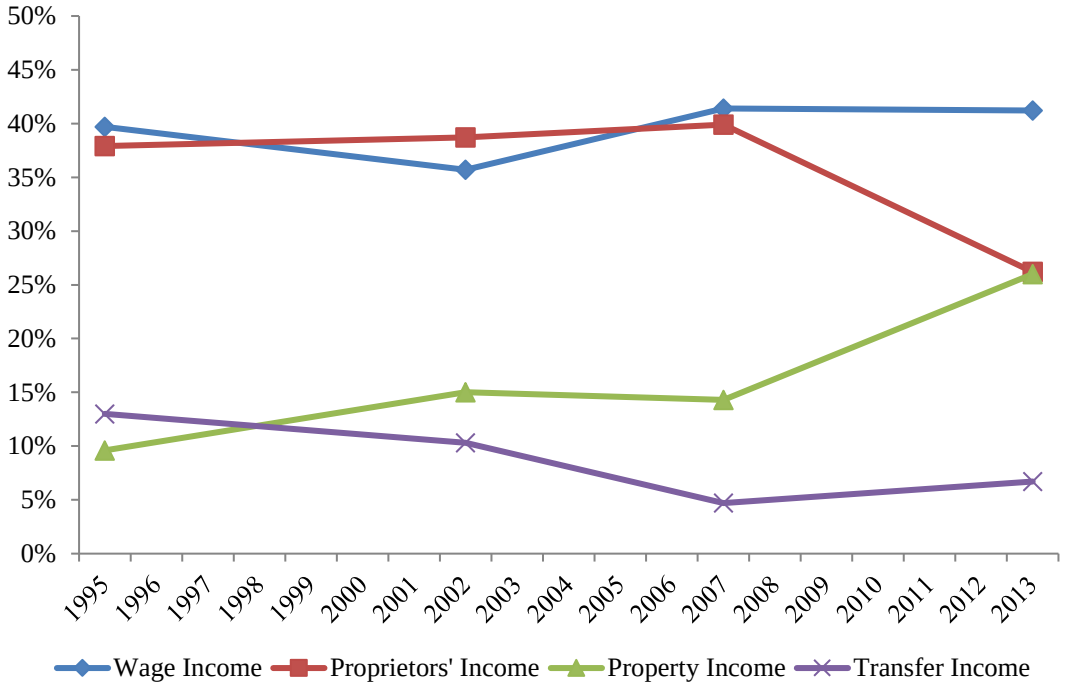

Figure 11: Contribution of Income Sources to Overall Income Inequality by Gini Coefficients for Rural Households, 1995–2013

Sources: Li, and Sato (eds.). 2006. "Unemployment, Inequality and Poverty in Urban China." London: Routledge; Li, Sato, Sicular, and Yue (eds.). 2017. "Changing Trends in China's Inequality: Evidence, Analysis, and Prospects." Unpublished version.

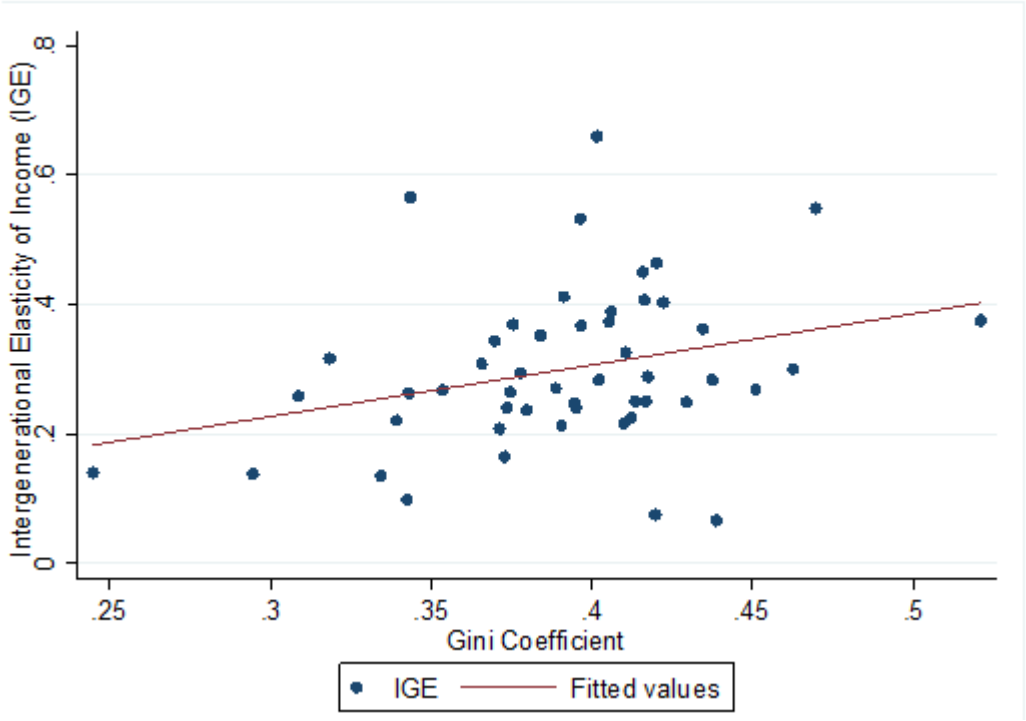

Figure 12: Great Gatsby Curve using 25 Provinces and Municipalities in Early and Late Cohorts

Source: CFPS. See Fan, Yi, and Zhang (2019) for details.

Table 1: Key features of income inequality estimates for China

References	Data Sources	Data Status	Ranges Estimated	Time Trends	Years Covered	Regions Covered	Income Measurement	Analysis Unit	Estimation Method
Adelman and Sunding (1987)	tabulation data from UHS and RHS	official	0.284~0.317	decrease	1978, 1983	31 provinces	daily diaries of rural total income and urban disposable income	household per capita	Kakwani interpolation and Gini coefficient
World Bank (1997)	tabulation data from UHS and RHS	official	0.288~0.388	decrease from 1981 to 1984 and increase afterwards	1981-1995	31 provinces	daily diaries of rural net income and urban disposable income	household per capita	Gini coefficient
Ravallion and Chen (2007)	tabulation data from UHS and RHS	official	0.283~0.447	decrease from 1981 to 1984 and increase afterwards with fluctuations between 1995 and 1999	1981-2001	31 provinces	daily diaries of rural net income and urban disposable income	household per capita	Gini coefficient
National Bureau of Statistics	UHS and RHS	official	0.462~0.491	increase from 2003 to 2008 and decrease afterwards	2003~2016	31 provinces	daily diaries of rural net income and urban disposable income	household per capita	Gini coefficient

National Bureau of Statistics	Mini-Census 2005	official	0.483	n.a.	2005	31 provinces	self-recalled monthly income	individual	Gini coefficient
Griffin and Zhao (1993); Riskin, Zhao, and Li (2001)	CHIP	semi-official	0.388~0.452	increase	1988, 1995	19~28 provinces	daily diaries of total income with imputed rents of self-owned rural and urban houses	household per capita	Gini coefficient
Li and Sato (2006); Gustafsson, Li, and Sicular (2008)	CHIP	semi-official	0.452~0.469	increase mildly	1995, 2002	19 provinces	daily diaries of total income with imputed rents of self-owned rural and urban houses	household per capita	Gini coefficient
Gustafsson, Li, and Sicular (2008); Li, Luo, and Sicular (2013)	CHIP	semi-official	0.462~0.487	increase	2002, 2007	16 provinces	daily diaries of total income with imputed rents of self-owned rural and urban houses	household per capita	Gini coefficient
Li, Luo, and Sicular (2013); Li, Sato, Sicular, and Yue (2017)	CHIP	semi-official	0.433~0.486	decrease	2007, 2013	15 provinces	daily diaries of total income with imputed rents of self-owned rural and urban houses	household per capita	Gini coefficient

Gan, Yin, Jia, Xu and Ma (2012); Gan (2013a; 2013b)	CHFS	unofficial	0.611	n.a.	2011	25 provinces	self-recalled total income	household	Gini coefficient
Xie and Zhou (2014)	CLDS	unofficial	0.536	n.a.	2011	28 provinces	self-recalled total income	household per capita	Gini coefficient
Xie and Zhou (2014); Xie, Zhang, Xu, and Zhang (2015)	CGSS	unofficial	0.539~0.545	decrease	2009, 2011	29~31 provinces	self-recalled total income	household per capita	Gini coefficient
Xie and Zhou (2014); Xie, Zhang, Xu, and Zhang (2015)	CFPS	unofficial	0.530~0.532	increase mildly	2009, 2011	25 provinces	self-recalled total income	household per capita	Gini coefficient
Kanbur, Wang, and Zhang (2017)	CFPS	unofficial	0.495~0.533	decrease	2009, 2011, 2013	25 provinces	self-recalled total income	household per capita	Gini coefficient
Piketty and Qian (2009)	UHS	official	2.6%~6.0%	increase	1986-2003	31 provinces	self-recalled total income	individual and household per capita	Pareto interpolation and Top 1% Income Share
Piketty, Yang, and	national accounts, UHS,	official and unofficial	27%~41%	increase	1978-2015	31 provinces	self-recalled total income	individual	Pareto interpolation and Top 10% Income Share

Zucman (2019)	wealth and income tax data								

Data sources: UHS and RHS refer to the Urban Household Survey and Rural Household Survey conducted by the National Bureau of Statistics; Mini-Census 2005, also called the China 2005 1% Population Survey, refers to the inter-census survey administered by the National Bureau of Statistics in China between 2000 and 2010 Population Census. CHIP refers to the Chinese Household Income first Project conducted by the Chinese Academy of Social Sciences and later by the China Institute for Income Distribution at Beijing Normal University; CHFS refers to the China Household Finance Survey conducted by the Survey and Research Center for China Household Finance at Southwestern University of Finance and Economics; CLDS refers to the China Labor Force Dynamic Survey conducted by the Department of Sociology at Sun Yat-sen University; CGSS refers to the Chinese General Social Survey conducted by the Department of Sociology at Renmin University of China and the Survey Research Center at the Hong Kong University of Science and Technology; CFPS refers to the China Family Panel Studies conducted by the Institute of Social Science Survey at Peking University.

Notes: Total income for each household is the sum of income components, such as wages, agriculture income, non-agriculture self-employment income, public transfers, privately provided transfers, housing subsidies, and property income. For each household, total income is divided by the number of household members as the per capita total income. This means that while the household is the income-receiving unit, the individual is mostly the analytical unit. One unique feature of Li's team is that they include imputed rents of self-owned housing as an important component of total income.