Original Paper

A Study of Inequality of Opportunity in Income Distribution

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Abstract

Addressing inequality in income distribution is an important tool to achieve the goal of significantly reducing the gap in living standards by 2025. Among the factors contributing to the widening of income inequality, there are both equity factors related to differences in individual effort and inequality factors related to differences in environment and opportunities. In this context, the key to solving the problem of inequality in income distribution lies in eliminating inequality of opportunity as much as possible, which in turn is predicated on measuring the extent to which inequality of opportunity leads to income inequality. The latest research trend in recent years has been to gradually focus on inequality of opportunity, an important environmental factor affecting income disparity. The scientific measurement and decomposition of the components of inequality of opportunity and their impact outcomes can help achieve inclusive growth with equality of opportunity at its core. The current relevant studies mainly use non-parametric and parametric estimation methods to measure the level of inequality of opportunity, especially the parametric method is more widely used.

Keywords

inequality in income distribution, inequality of opportunity, nonparametric estimation method, parametric estimation method

1. Introduction

An income distribution system that reflects efficiency and promotes fairness is the most important and direct way to protect and improve people's livelihood and realize the fruits of development shared by the people, and it is also a guarantee to achieve the goal of "achieving more obvious and substantial progress in the common prosperity of all people". Narrowing the income gap between regions, industries and groups of people is one of the important elements of building an income distribution system that reflects efficiency and promotes fairness. Since the reform and opening up, the income disparity among the residents of China has been expanding in general, and it is still hovering at a high

level in recent years (Luo et al., 2021). According to data released by the National Bureau of Statistics, the Gini coefficient, which portrays income distribution inequality, has remained in the range of 0.46 to 0.47 in recent years after reaching a peak of 0.491 in 2008, exceeding the internationally recognized alert line of 0.4, and even higher than the level of 0.24 to 0.36 in developed countries in general. General Secretary further pointed out in the 27th collective study of the Political Bureau of the CPC Central Committee that it is necessary to consciously and proactively solve the problems of regional disparity, urban-rural disparity and income disparity, and adhere to the protection and improvement of people's livelihood in development. Then, how to narrow the urban-rural development gap, improve income inequality, and achieve the goal of significantly narrowing the gap in residents' living standards by 2025 has become a realistic problem that needs to be addressed urgently.

It is undeniable that among the factors contributing to the widening of income inequality in China, there are both equity factors related to differences in individual effort and inequality factors related to differences in environment and opportunities. In contrast, income inequality caused by the former is relatively easy to be accepted by the public, while opportunity inequality caused by the latter is difficult to be accepted by the public and may easily lead to social conflicts and crisis events. For China at present, if excessive inequality of opportunity persists, it will result in a great waste of human resources, reduce the possibility of the poor to escape from poverty, lead to insufficient economic growth and polarization of income distribution, which may lead to the crisis of "middle-income trap". Under such circumstances, the key to regulating income inequality lies in eliminating inequality of opportunity as much as possible, which in turn depends on measuring the extent to which inequality of opportunity leads to income inequality.

2. Research on Income Distribution Inequality

The study of factors influencing income inequality has been an important part of income distribution-related research. Early studies of income inequality were limited by data availability and were mainly based on district-level data to explore the factors influencing group income inequality. Taken together, the main factors affecting group income inequality are historical legacy and government system (Sicular et al., 2007), resource endowment, and economic development (Blanchard & Giavazzi, 2003). In the classification of income inequality, the counterpart to group income inequality is individual income inequality (Huang et al., 2019), where the former describes the income gap between regions or groups, reflecting an objective gap, and the latter describes the individual's perception of inequality in income distribution, reflecting an individual's subjective evaluation of inequality. With the increased availability of micro household survey data, the study of income inequality has expanded from groups to individuals, and the measurement index has been converted from the Gini coefficient (Li et al., 2008), the Thayer index (Sun & Zhao, 2019) or the urban-rural income ratio (Zhao, 2020) to the individual relative deprivation index (Ren & Shi, 2016). Based on this, scholars have begun to explore the factors influencing individual income inequality. Individual

characteristics such as gender, age, marriage, education level, and health were the first to receive attention (Ren & Shi, 2016). Meanwhile, household characteristics such as household income level, household size, number of workers, and housing were confirmed to be factors influencing individual income inequality (Figari, 2012; Yang et al., 2019). Thus, individual characteristics, household characteristics, economic factors, and institutional factors constitute the basic framework for studying income inequality.

3. Research on Inequality of Opportunity in Income Distribution

3.1 Theoretical Basis of the Concept of Unequal Opportunities

The concept of unequal opportunity can be traced back to egalitarian political philosophy. Early theories of welfare equality were based on utilitarian thinking, which argued for an equal distribution of resources based on differences in individual preferences. However, the theory could not explain if some people's preferences were offensive or needed to be satisfied at great cost. Rawls (1971) focused on "primary goods" as the main resource. He proposed that in a just society, everyone should have equal access to these basic goods, including social basic goods (rights, freedom, income, wealth, etc.) and natural basic goods (intelligence, health, etc.) through the "compensation mechanism" of society. intelligence, health, etc.). In contrast, Dworkin (1981a, 1981b) argues that inequality due to subjective reasons (effort, ambition, etc.) can exist, so he focuses more on "starting equality" and discusses in detail how to use jealousy tests, auctions, and insurance markets to achieve equality between impersonal resources (external resources that can be transferred) He discussed in detail how to use jealousy tests, auctions, and insurance markets to achieve equality between impersonal resources (external resources that can be transferred) and personality resources (internal resources such as natural physical and mental resources). Later, Sen (1980) revised these two theories and proposed the first theory of individual viability, arguing that the focus should shift from "welfare" and "resources" to the freedom of people to enjoy and achieve functional activities.

In the late 1980s, welfare equality theory returned to the forefront, and Arneson (1989) revised "welfare equality" to "equality of opportunity in welfare", meaning that each individual should face a set of options that are equal to others and can The individual should face a set of options equal to others and can choose to receive a certain benefit according to his or her wish. In the same vein as Arneson (1989), Cohen (1989) attempts to correct all non-selective, inherently disadvantageous inequalities and proposes a "socialist equality of opportunity". Under socialist equality of opportunity, people differ only in terms of their preferences.

3.2 Lineage of Research on Inequality of Opportunity in Income Distribution

Abroad, inequality of opportunity has replaced inequality of outcome as the new focus of income distribution research in the last two decades. The core of the research on inequality of opportunity is that the root cause of income inequality is not only the efforts (or choices) made by individuals, but also factors that are not self-regulated by individuals from birth. The earliest studies of "inequality of

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opportunity" were conducted by philosophers in the late 1960s and early 1970s (Bowles, 1972; Hanoch, 1967; Weiss, 1970), who began to focus on the different economic outcomes of individuals from different backgrounds with equal effort outcomes. These literatures were seminal in that they began to focus on the returns of family background factors to individual economic (e.g., income). Subsequently, a large literature began to examine these inequalities generated by factors outside the control of individuals, and Roemer (1993, 1998) was the first to define this concept and introduce it into the analytical framework of economics. He divides the factors affecting individual economic outcomes (e.g., income) into two broad categories: individual "effort" (choices), such as how much effort one puts into work and how much time one spends on study, which are within the control of the individual; and factors that are beyond the control of the individual from birth "Environmental" factors, such as gender, parents' work and education, place of birth, etc., and the income inequality caused by such factors is called "inequality of opportunity", or equal opportunity is the distribution of individual economic outcomes (income, consumption, etc.) Independent of "environmental" factors. Drawing on the analysis of Rawls (1971) and Dworkin (1981a, 1981b), Lefranc et al. (2009) and Roemer and Trannoy (2016) also suggest that luck should be included in the analytical framework, including social contextual luck (i.e., environmental factors), genetic luck (e.g., genetics), native luck (e.g., some people are drafted and others are not), and conscripted and some are not), and selective luck (e.g., different life path choices may lead to different outcomes).

In China, income distribution research has long focused on outcome inequality measures. Although some studies in recent years have begun to focus on equality of opportunity from the perspective of public services and taxation, absolute equality of opportunity refers to the situation where individual income obtained after equalizing environmental factors as much as possible is influenced only by effort factors and not environmental factors (Lu et al., 2014). However, there are few studies measuring quantitative inequality of opportunity. The only studies that exist mainly stay at the level of single-factor effects, such as income inequality between urban and rural areas, regions, industries, and ownership systems (Hong, 2010; Yue & Cai, 2015), or the effects of individual characteristics such as gender, education level, or household registration on income (Wang & Zhou, 2014; Xing et al., 2013). Although the above studies corroborate the existence of inequality of opportunity from different perspectives, overall, the completeness and systematicity of the analytical framework of relevant studies need further improvement.

4. Research on the Measurement and Decomposition of Unequal Opportunities

The key to measuring the level of inequality of opportunity that affects individual economic outcomes is to measure the extent to which the overall inequality factor is due to individual effort factors and to the extent to which it is due to uncontrollable environmental factors. Since the publication of Roemer's (1998) results, a number of scholars have worked on the measurement and decomposition of inequality of opportunity (Bourguignon et al., 2007; Lefranc et al., 2008, 2009; Checchi & Peragine, 2010;

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Ferreira & Gignoux 2011; Singh, 2012; Bjrklund et al., 2011).

4.1 Measure and Decomposition Method of Unequal Opportunities

The estimation and decomposition methods for inequality of opportunity are mainly divided into non-parametric and parametric methods. The nonparametric method groups individuals according to environmental variables, obtains the mean value of income for each group, and then calculates within-group and between-group inequality using inequality indicators. Within-group income inequality is effort inequality, and between-group income inequality is opportunity inequality (Lefranc et al., 2008; Checchi & Peragine, 2010). The parametric method, on the other hand, uses the estimated results of the income regression equation to construct a counterfactual income distribution, and contains the following two methods. The first method, represented by Ferreira and Gignoux (2011) and Marrero and Rodr ǵuez (2012), substitutes the observed values of environmental variables into the income determination equation to obtain a new predicted income and calculates the Gini coefficient, the ratio of which to the actual Gini coefficient is the inequality of opportunity. The second approach, represented by Bourguignon et al. (2007), substitutes the mean of the environmental variables and the residual term into the equation to construct a "counterfactual" income distribution after eliminating environmental effects, which represents the inequality of effort component. The effort component was subtracted from the total inequality and divided by the total inequality to obtain an estimate of opportunity inequality.

4.2 Non-parametric Estimation Method

Since the non-parametric method requires large sample data and is limited to cases with few groups, not many relevant studies have used it because once the number of groups increases, the number of observations per group decreases sharply, making the estimated coefficient of inequality of opportunity small. Among the studies on inequality of opportunity in China, Jiang et al. (2014) used a nonparametric method to measure the inequality of opportunity faced by urban residents in China and explored the differences in inequality of opportunity between age, gender and region. Gong et al. (2017) used a propensity score matching method based on a stochastic parametric logit model to construct the counterfactual income distribution when all individuals exert maximum effort, and tested whether an increase in effort could reduce opportunity inequality by calculating the degree of opportunity inequality between the counterfactual income distribution and the actual income distribution.

4.3 Parameter Estimation Method

The parameter estimation method has been adopted by more scholars because it does not require a strict sample size and is more flexible to use. Zhang and Eriksson (2010) borrowed from Ferreira and Gignoux (2011) to estimate the contribution of each environmental variable to income inequality by re-estimating the model by removing a particular environmental variable. Song (2017), Dong (2018), and Shi (2018) and Dong (2018) estimated opportunity inequality using CGSS and CHIP data, respectively, and then decomposed opportunity inequality using the Shapley value method. However, these studies introduced only environmental variables in the income function, ignoring effort as an

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important factor affecting individual income, which obviously brings omitted variable bias.

For further optimization, Shi et al. (2018) introduced the effort factor in the income regression equation by both treating the residuals in the effort equation as "pure effort" and by directly using the original values of the effort variables (individual education and migration), and applied the variance decomposition method to calculate the contributions of environment and effort. Chen and Huang (2015) similarly considered only the environment variable and estimated and decomposed the inequality of opportunity in China from 1989 to 2009 using CHNS data. Liu et al. (2015) and Luo and Ru (2019) used a systematic estimation method to estimate a system of joint cubic equations consisting of an income function (with both environmental and effort variables) and an effort function (with only environmental variables). Li and Lu (2018) quantified the direct versus indirect effects of environmental factors on income by setting two income regression equations with only environmental variables as well as with both environmental and effort variables. Lei et al. (2018) used the relative income quantile dummy variable as a proxy for the unmeasured effort variable and the residuals in the effort decision equation as the "net effort", respectively, to correct for the endogeneity bias caused by the unmeasured effort variable and the measurement bias problem caused by the correlation between the environment and effort variables.

5. Summary

The issue of income distribution has always been a major topic in China's economic development. Solving the problem of income inequality is an important grasp to achieve the goal of significantly reducing the gap between residents' living standards by 2025, and it has become a realistic problem that needs to be solved urgently. For a long time, the measurement of income inequality has mostly used the Gini coefficient and other similar indicators. Although such indicators can describe the current situation of income disparity, their shortcomings are obvious, namely, they not only ignore the possibility of intergenerational and intergenerational income transfer, but also do not explore the deep-seated root causes of income disparity, such as the extent to which income inequality depends on individual effort differences, and the extent to which it depends on individual uncontrollable factors such as family background and social environment. In this context, the latest research trend in recent years has gradually tilted toward inequality of opportunity, an important environmental factor affecting income disparity. Scientific measurement and decomposition of the components of inequality of opportunity and their impact results not only help clarify the degree of inequality in the income gap and provide an objective basis for the formulation of public policies aimed at reducing the income gap, but also help achieve inclusive growth with equality of opportunity at its core.

The current relevant studies, mainly use non-parametric estimation method and parametric estimation method to measure the level of inequality of opportunity, especially the parametric method is more widely used, and there is consistency in the research results of many scholars on inequality of opportunity in income distribution, indicating that based on the environment-effort framework

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proposed by Roemer (1993, 1998), using the relatively mature The parametric estimation method to measure the degree of inequality of opportunity in overall inequality is scientific and operable, but at present, both the nonparametric and parametric estimation methods have differences in the selection of environment and effort variables in the model itself, and the interpretation and treatment of the residual terms are more subjective, which may be an entry point to further improve the study of inequality of opportunity in income distribution.

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