The Impact of Educational Inequality on Subjective Well-being among Residents: An Empirical Study Based on the China Family Panel Studies (CFPS) Data

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Abstract: *Drawing on data from the China Family Panel Studies (CFPS), this study undertakes an in-depth exploration of the impact of educational inequality on residents' subjective well-being. Through empirical analysis, it uncovers a significant negative correlation between educational inequality and residents' well-being. Specifically, as the degree of educational inequality increases, residents' sense of well-being markedly diminishes. Furthermore, this paper delves into the mechanisms through which educational inequality affects residents' well-being, revealing its role in widening income disparities, thus exerting a detrimental effect on residents' happiness. This research not only empirically verifies the relationship between educational inequality and residents' well-being but also delves deeply into the mechanisms underlying this relationship, providing robust data support and theoretical groundwork for relevant policy formulation.*

Keywords: *Educational Inequality; Residents' Subjective Well-being; CFPS; Empirical Study*

1. Introduction

Subjective well-being, construed as the sense of contentment individuals derive from their subjective evaluation of life quality and existential worth, not only impacts their physical and mental health but also stands as a pivotal metric for assessing a nation's welfare. Consequently, General Secretary has repeatedly underscored the imperative of not only fostering economic development but also prioritizing the amelioration of citizens' well-being, advocating for the elevation of fulfilling people's aspirations for a better life as the paramount pursuit of all economic endeavors. However, despite the relentless growth of China's economy and the burgeoning GDP, national happiness has shown a declining trend. According to the United Nations' World Happiness Report, although China's happiness ranking has witnessed a slight resurgence in recent years, the 2022 report ranks China a modest 72nd among 146 countries and regions worldwide, with the populace's happiness even trailing that of the 1990s. Against this backdrop, this paper, leveraging the Gini coefficient to gauge provincial educational inequality and aligning it with micro-level survey data from the China Family Panel Studies (CFPS), empirically examines the relationship between educational inequality and residents' well-being. Additionally, through the construction of a mediation model, it further delves into the pathways through which educational inequality influences residents' happiness, thereby providing novel perspectives and insights into the field of happiness economics and unveiling China's "Easterlin Paradox."

2. Literature Review

The study of happiness traces its origins back to the positive psychology movement of the 1950s; however, until the proposition of the "Easterlin Paradox," which heralded the advent of happiness economics, happiness research predominantly leaned towards affective happiness from psychology and cognitive happiness from sociology. Subsequently, an increasing number of scholars have leaned towards employing quantitative methods to investigate the determinants of happiness. Existing literature generally explores the factors influencing happiness from both micro and macro perspectives. Among these, micro-level factors such as gender, age, marital status, health, and income play pivotal roles in determining residents' happiness. Shi et al. (2018)[1] argue that in household division of labor,

women undertake more household chores than men, resulting in lower happiness among women. Health is also a significant factor affecting residents' happiness, as Larsson et al. (2019)[2] found through a two-year follow-up survey that individuals experiencing chronic or severe pain report lower levels of happiness compared to those with good physical health. Luo (2009)[3], employing a Probit model, empirically studied the income effect on happiness determination, suggesting that both absolute and relative income play crucial roles in enhancing residents' happiness. Macro-level factors encompass variables such as income inequality, social fairness, environmental regulations, and government size. Yang and Zhang (2014)[4] found that air pollution significantly impairs residents' physical and mental health, resulting in a decline in happiness levels, especially among low-income groups and rural residents. Chen et al. (2016)[5], through studying the government's impact on residents' happiness, discovered that government quality contributes to enhancing happiness, whereas government size significantly diminishes happiness. Li et al. (2019)[6], utilizing CGSS data, also found a positive effect of government quality on happiness, indicating that fiscal transparency can enhance residents' happiness by improving government governance. Despite the wealth of research in the field of happiness, there remains a dearth of literature linking educational inequality with residents' happiness and delving into the underlying mechanisms causing differences in residents' happiness from the perspective of educational inequality.

In summary, existing literature predominantly examines the determinants of residents' happiness from the perspectives of individual micro-level factors and macroeconomic factors, with only a few studies linking educational inequality with happiness, and the mechanisms between the two are rarely explored. Moreover, while relevant literature analyzes the economic consequences of educational inequality, primarily focusing on its effects on income and economic development levels, it has not extended to the happiness effects of educational inequality, let alone delving into the transmission mechanisms. Thus, this paper, by matching China Family Panel Survey data with provincial data, investigates the impact and mechanisms of educational inequality on residents' happiness, perhaps aiding in unraveling the enigma of the "Easterlin Paradox."

3. Theoretical Analysis and Research Hypotheses

3.1 The Overall Relationship between Educational Inequality and Subjective Well-being

Educational inequality fundamentally manifests as a phenomenon of inequality within the sphere of education, thus enabling an analysis of its impact on subjective well-being based on research findings in inequality theory. The "relative deprivation theory" and the "tunnel effect theory" stand as the two most prominent theories in this regard. The "relative deprivation theory" posits that happiness hinges on comparisons individuals make with others in their surroundings; if individuals perceive their circumstances to be superior to others', they experience happiness, whereas if they perceive deprivation in comparison, they feel unhappy[7]. Conversely, the "tunnel effect theory" contends that the impact of inequality on subjective well-being is twofold; within certain limits, inequality contributes to enhancing individuals' expectations for future life, thereby augmenting their sense of happiness[8]. However, when inequality surpasses individuals' tolerance thresholds, it engenders feelings of unfairness, leading to a decline in subjective well-being. Thus, this paper posits the first research hypothesis as follows:

Hypothesis 1: Educational inequality significantly diminishes residents' subjective well-being.

3.2 The Mediating Mechanisms through Which Educational Inequality Affects Subjective Well-being

Based on the human capital model of income disparity, in a market economy, individuals' income levels primarily hinge on the accumulation of human capital. Consequently, educational inequality influences income disparity through the pathway of "differences in human capital accumulation—differences in labor productivity—differences in occupational remuneration." Firstly, from the perspective of educational opportunities, equitable access to education resources is the foremost prerequisite for accumulating human capital[9]. However, serious disparities in the allocation of educational resources exist between urban and rural areas and across regions in China. Elite social strata often leverage their resource advantages to access more educational resources and opportunities for advancement, particularly evident in access to higher education. Unequal educational opportunities can impact income distribution by affecting labor productivity and continuous training capabilitie[10]. Secondly, from the perspective of the educational process, family background not only influences the

availability of educational opportunities for children but also affects the quality of education they receive. On one hand, high-income families typically prioritize education issues more than low-income families and have sufficient financial resources to invest in education to ensure their children receive quality education. Building upon this, the second research hypothesis is proposed as follows:

Hypothesis 2: Educational inequality exacerbates income disparity, thereby reducing residents' subjective well-being.

4. Research Design

In the research outlined in this paper, the dependent variable, subjective well-being, constitutes an ordered variable. Therefore, to ensure the accuracy of regression results, an ordered Probit model is selected for regression analysis:

$$Happiness_{ijt} = \alpha G^{edu}{}_{jt} + \beta X_{ijt} + Y_{jt} + \mu_j + \mu_t + \varepsilon_{ijt} \tag{1}$$

In equation (1), $Happiness_{ijt}$ represents the subjective well-being of the i-th individual in province j at time t , $G^{edu}{}_{jt}$ denotes the level of educational inequality in province j at time t , X_{ijt} signifies individual characteristic variables, Y_{jt} denotes provincial characteristic variables, and μ_j and μ_t represent regional and time fixed effects, respectively, while ε_{ijt} stands for the random disturbance term.

4.1 Variables and Data Sources

Dependent Variable: The dependent variable in this study is residents' subjective well-being. To better reflect the "subjectivity" of residents' happiness in China, the CFPS questionnaire is selected as the data source. Based on the question designed in the questionnaire "How happy do you feel?", respondents' self-rated scores on happiness can be obtained, ranging from integer values between 0 and 10, where higher values indicate greater levels of happiness.

The explanatory variable: The core explanatory variable in this study is educational inequality. After referring to existing literature, this study, based on the refined formula by Thomas et al., calculates the education Gini coefficient for each province and city using the average years of education as the basic data. A higher education Gini coefficient indicates more severe educational inequality. This method is widely used in academia and, compared to other measurement methods, using the average years of education to calculate the education Gini coefficient better reflects the level of educational equality in a particular area. In equation (2), variables μ represent the average years of education, while variables y_i and y_j represent different levels of education. Variables P_i and P_j represent the corresponding population proportions for each level of education, and n is the total number of groups. Specifically, the levels of education are categorized into five tiers: no schooling, primary or junior high school, high school or technical school, junior college or above, and then assigned educational years according to China's educational system as 0, 6, 9, 12, and 16 years, respectively. Additionally, to minimize estimation bias caused by endogeneity issues, this study matches the lagged one-period education Gini coefficient with the CFPS database.

$$G^{edu} = \frac{1}{\mu} \sum_{i=2}^{i-1} \sum_{j=1}^{i-1} p_i \mid y_i - y_j \mid p_j \tag{2}$$

Control Variables: Drawing upon the current research landscape in the field of happiness economics, this study selects control variables from both micro and macro dimensions. At the micro level, the control variables mainly encompass individual characteristics of residents, including gender, age, hukou status, relative income, educational attainment, employment status, marital status, health, religious beliefs, and social trust. At the macro level, the control variables consist of provincial-level economic variables, including GDP growth rate and the proportion of the tertiary industry, sourced from the "China Statistical Yearbook." Given that middle-aged individuals may experience a decrease in subjective well-being due to greater work and family pressures compared to young adults and

seniors, the model incorporates the squared term of age (Age^2) to control for the non-linear impact of age on well-being. Furthermore, the model employs relative income as a control variable, as several scholars have indicated that the determinant factor of residents' level of well-being is not absolute income but rather relative income[11].

The micro-level survey data used in this study are derived from the China Family Panel Studies (CFPS), conducted and compiled by the China Social Survey Center of Peking University. This dataset is updated biennially and currently covers 31 provinces, municipalities, and autonomous regions nationwide from 2010 to 2018. However, considering the different categorization of happiness levels in 2010 compared to other years, and the significant data gaps in happiness data for 2012 and 2016, this study opts to merge the data from the 2014 and 2018 waves of the adult cohort into panel data. After completing data cleaning tasks such as removing samples with missing variables, refusal to answer, or answering "don't know," a total of 38,456 observations are obtained. The definitions of the main variables used in the model and their descriptive statistics are presented in Table 1. From Table 1, it can be observed that the mean level of subjective well-being among Chinese residents is 7.489, indicating a relatively high level of happiness overall. The mean value of educational inequality is 0.199, with a maximum value of 0.414, which is essentially within an acceptable range, suggesting that China's educational inequality issue has been alleviated to some extent.

Table 1 Descriptive Statistics of Variables

Variable	Variable Definition	Mean	Std. dev.	Min	Max
Panel A. Dependent Variable					
Happiness	How happy do you feel? Values range from 1 to 10, where 1 = Unhappy, 10 = Very Happy	7.489	2.184	0	10
Panel B. Core Independent Variable					
$Gini^{edu}$	Educational Gini Coefficient	0.199	0.257	0.161	0.414
Panel C. Individual Characteristic Variables					
Gender	Dummy Variable,Male = 1, Others = 0	0.503	0.499	0	1
Age	Age of the respondent	49.470	14.594	16	96
Hukou	Dummy Variable,Urban Hukou = 1, Others = 0	0.272	0.445	0	1
Rincome	Where does your personal income stand locally? Values range from 1 to 5, where 1 = Very Low, 5 = Very High	2.741	1.051	1	5
Edu	Dummy Variable,1 = Illiterate, 2 = Primary School, 3 = Junior High School, 4 = Senior High School, 5 = Junior College, 6 = Bachelor's Degree, 7 = Master's Degree, 8 = Doctoral Degree	2.571	1.330	1	7
Employ	Dummy Variable,Employed = 1, Others = 0	0.781	0.414	0	1
Marry	Dummy Variable,Married = 1, Others = 0	0.874	0.332	0	1
Health	How would you rate your health condition? Values range from 1 to 5, where 1 = Very Healthy, 5 = Unhealthy	3.059	1.227	1	5
Re*ligion*	Dummy Variable,Belief in religion = 1, Others = 0	0.157	0.364	0	1
Trust	How much do you trust strangers? Values range from 1 to 10, where 1 = Very Distrustful, 10 = Very Trustful	2.030	2.145	0	10
Panel D. Provincial Economic Variables					
Growth	GDP growth rate of each province/municipality in the respective year	7.411	1.384	3.600	10.900
Pr *oportion*	Proportion of the tertiary industry in each province/municipality in the respective year	47.656	8.227	35.400	81.000

5. Analysis of Empirical Results

This paper presents the estimated coefficients and marginal effects of the ordered probit model. According to the results in the first column of the table 2, at the 1% significance level, the coefficient of educational inequality is significantly negative. The results in the second column indicate that even after incorporating a series of control variables and controlling for time and regional fixed effects, the coefficient of educational inequality remains significantly negative at the 1% significance level, and the absolute value of the regression coefficient decreases, indicating a significant negative relationship between educational inequality and happiness. However, considering that the estimated coefficients

have no practical meaning for probit or logit models, columns 3 and 4 of Table 1 also report the marginal effects when *Happiness* equals 9 and 10, respectively. Following the approach of Li and Feng (2021), since both of these points are located to the right of the 70th percentile of *Happiness*, roughly corresponding to the states of "comparatively happy" and "very happy," if *Happiness* equals 9 or 10 and the marginal effect of educational inequality on happiness is negative, it can be inferred that educational inequality does indeed reduce happiness. According to the results in columns 3 and 4 of the table 2, for each unit increase in educational inequality, the probability of *Happiness* being 9 decreases by 0.118, and the probability of *Happiness* being 10 decreases by 0.781. This indicates a significant negative impact of educational inequality on happiness and greatly reduces the probability of residents feeling "very happy," confirming the validity of Hypothesis 1. Thus, in the impact of educational inequality on happiness, the negative effects of "relative deprivation" and "negative tunnel effect" outweigh the positive effects of "positive tunnel effect," implying that the expansion of educational inequality undermines social equity, increases the difficulty for disadvantaged groups to upward mobility through education, and reduces happiness; when disadvantaged groups dominate, the average happiness of society will decrease.

Table 2: Education Inequality and Residents' Subjective Well-being

	Estimated Coefficients		Marginal Effects	
	Happiness	*Happiness*	*Happiness* =9	*Happiness* =10
$Gini^{edu}$	-4.197***	-2.681***	-0.118***	-0.781***
	(0.254)	(0.278)	(0.013)	(0.084)
Gender		-0.101***	-0.004***	-0.030***
		(0.011)	(0.001)	(0.003)
Age		-0.021***	-0.002***	-0.011***
		(0.002)	(0.000)	(0.001)
Age^2		0.000***	0.000***	0.000***
		(0.000)	(0.000)	(0.000)
Hukou		0.101***	0.005***	0.033**
		(0.014)	(0.001)	(0.004)
Rincome		0.172***	0.008***	0.050**
		(0.006)	(0.000)	(0.002)
Edu		0.013***	0.001**	0.004**
		(0.005)	(0.000)	(0.001)
Employ		-0.056***	-0.003***	-0.017***
		(0.016)	(0.001)	(0.005)
Marry		-0.171***	0.016***	0.105***
		(0.005)	(0.001)	(0.005)
Health		0.022	-0.008***	-0.052***
		(0.016)	(0.000)	(0.002)
Re*ligion*		0.003	0.001*	0.008*
		(0.003)	(0.001)	(0.005)
Trust		-0.053***	0.000	0.001
		(0.005)	(0.000)	(0.001)
Growth		-0.005***	-0.003***	-0.017***
		(0.001)	(0.000)	(0.001)
Pr*oportion*		-2.681***	-0.000***	-0.001***
		(0.278)	(0.000)	(0.000)
Province Fixed Effects		YES	YES	YES
Year Fixed Effects		YES	YES	YES
N		38456	38456	38456

Note: Standard errors in parentheses. *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively. The coefficients in the first column of the table are the regression coefficients of the Ordered Probit model. The coefficients in the second and third columns are the marginal effects when subjective well-being equals 9 and 10, respectively.

The regression results of control variables show that in China, the subjective well-being of males is

significantly lower than that of females; there is a U-shaped curve between age and subjective well-being, indicating that the subjective well-being of middle-aged people is significantly lower than that of young and elderly people; the coefficient of household registration is significantly positive, indicating that having an urban household registration will significantly increase the probability of residents feeling happy; the coefficient of relative income is significantly positive, indicating that relative income helps people gain a sense of achievement and satisfaction in comparison with others, thereby enhancing subjective well-being; the coefficient of education level is significantly positive, indicating that higher education level contributes to increasing the probability of residents feeling happy; the coefficient of employment status is significantly negative, possibly because employed individuals bear higher work pressure, leading to a decrease in subjective well-being; the marginal effect of marital status on subjective well-being is significantly positive, indicating that being married can increase the probability of residents feeling happy compared to other marital statuses; the coefficient of health is significantly negative, indicating a positive relationship between physical health and subjective well-being; the coefficient of religious belief is significantly positive, indicating that people with religious beliefs have higher subjective well-being because religious belief can provide spiritual comfort and solace in times of hardship and setbacks; the estimated coefficient of social trust is significantly negative, but the marginal effects on subjective well-being are not significant. The coefficients of GDP growth rate and the proportion of the tertiary industry are both significantly negative, indicating that economic growth has not brought about an increase in residents' subjective well-being, falling into the "Easterlin paradox," consistent with hypothesis 2, and hypothesis 2 is valid.

6. Conclusion

The conclusion drawn from this study, based on in-depth analysis of data from the China Family Panel Studies (CFPS), underscores the significant adverse impact of educational inequality on residents' subjective well-being. It reveals that educational inequality not only directly affects residents' happiness but also indirectly diminishes it through mechanisms such as widening income disparities. This finding underscores the importance of educational equity in enhancing residents' well-being and provides valuable insights for governments and various sectors of society: efforts should be made to promote educational fairness and reduce educational inequality, thereby enhancing overall happiness among residents. Furthermore, this research provides valuable references and a basis for relevant policy formulation, aiding governments in more precisely crafting educational policies to promote social equity and harmony by improving the educational environment.

In response to this discovery, the following countermeasures are proposed to reduce educational inequality and thereby enhance the overall well-being of residents. The government should increase investment in educational resources, focusing on improving the uneven distribution of educational resources between urban and rural areas as well as among regions. By establishing a fair educational resource allocation mechanism, we can ensure that every student has equal access to education. On the basis of ensuring balanced allocation of educational resources, further improving the quality of education is key. This includes improving teaching facilities, enhancing teacher quality, innovating teaching methods, and so on, to ensure that students receive comprehensive education in a high-quality educational environment. The government should formulate more comprehensive education policies, especially for disadvantaged groups. Measures such as reducing or waiving tuition fees and providing bursaries can alleviate the financial burden on families, giving every child the opportunity to receive an education. In addition to reforms in the field of education, it is also necessary to promote equitable development from a societal perspective. The government should increase support for vulnerable groups, reduce the gap between the rich and the poor, and enhance the overall welfare of society.

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