

# The Effect of Territories on Inequalities of Opportunities for Citizens in China over Their Lives

## **Xiaoyang Du**

Chongqing Depu Foreign Language School, Chongqing, China Email: duxiaoyang0223@163.com

How to cite this paper: Du, X. Y. (2022). The Effect of Territories on Inequalities of Opportunities for Citizens in China over Their Lives. *Open Journal of Social Sciences, 10,* 510-529.

https://doi.org/10.4236/jss.2022.109031

**Received:** June 23, 2022 **Accepted:** August 27, 2022 **Published:** August 30, 2022

Copyright © 2022 by author(s) and Scientific Research Publishing Inc. This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

http://creativecommons.org/licenses/by/4.0/

## Abstract

Inequality has been intensively studied for its role in promoting balanced economic development in China. The territorial inequality of coastal-inland provinces and urban-rural areas has been considered a leading cause of opportunity inequality and unequal individual development in different regions. This research aims to investigate how and to what extent territorial inequality affects personal development. The research also aims to provide a new understanding of inequality by presenting it throughout different life stages, from pre-working age to retirement age. Also, the research aims to evaluate the changes in data in terms of policies implemented by the Chinese government. The research method includes a series of econometrics tools. The research has adopted Ordinary Least Square (OLS) regression to analyse selected data from the most up-to-date survey years, from 2000 to 2015. To reflect the opportunity inequality, the study uses the ratio of the Gini coefficient from regression and the Gini coefficient from the sample. The Theil index is used to measure regional disparity, and the Mean Logarithmic Deviation Index is used to measure income inequality. The study also examines the correlation between different dependent variables to approach a more accurate and representative conclusion. The study conducts the quantitative research successfully and concludes territorial inequality strongly correlates with the inequality of opportunity at education and income levels. Problems at the education level have become more significant yearly, and the disparity in income distribution remains high throughout the period. The extension test supports a weak correlation between education and income, pension and education. The study suggests that the government could allocate more resources and focus on reducing territorial inequality by promoting technological advancement, geographical mobility and a series of welfare policies.

#### **Keywords**

Development Economics, Territorial Inequality, Opportunity Inequality

## **1. Introduction**

Economists, philosophers, and policymakers continue to discuss several issues related to the concept "territorial inequality", which is a kind of inequality caused by geographical differences and has been thought of as a key factor of inequality of opportunity distribution as well as the individual development (Schneider & Cottineau, 2019). Students in developed regions enter the top universities with greater ease than students in the developing world (Sewell, 1971). People in Shanghai can earn a decent salary in investment banking, consulting, and in the Internet industry, while in Guangxi they may face difficulties finding a high-paying job and could only work in the agriculture or manufacturing industries (Hu et al., 2011). People who live in the mountains may have to walk for a long distance for health care services, while citizens could receive better treatment in the hospital nearby (Pearce, 2012). For people in relatively underdeveloped areas, regional inequality means fewer resources and unequal access to opportunities, thus limiting their development and potentials (United Nation, 2020).

Therefore, the inequality in people's life chances caused by territorial inequality has become one of the main obstacles of individual development in China. Such an inequality will have an impact on human development at different life stages. From educational inequalities in adolescence, to the income and wealth inequalities in middle age, then to pension inequalities in retired age, are all issues that can result in barriers to individual development. As the competition continues to intensify, people who suffer from territorial inequality will have to work harder and take more pressure to reach the same level of success as others who benefit from territorial endowments (Iammarino et al., 2018). This research aims to investigate how territorial inequality causes unequal distribution of opportunities and limited individual development. The research also aims to provide a new understanding of inequality by presenting it throughout different life stages, from pre-working age to retirement age, which could provide new insights into promoting an equitable and sustainable development among regions.

#### 2. Literature Review

An individual's life chances are subject to the influence of territorial inequality in diverse ways. "Poverty pocket" was particularly raised as a concept in his study to refer to those regions that are dominated by impoverishment in a large scale (Van Kempen, 1997). The study shows that the presence of mechanisms that are derived locally has an inhibitory effect on the availability of choices in poverty pockets and thereby limit people's life chances. Unequal regional development is considered to account for the emergence and existence of poverty pockets. In poverty pockets, individuals are usually offered poor-quality products and services, and may even suffer more from great difficulties to get provisions in some cases. Admittedly, a number of targeted governmental programs have been launched to solve this problem, with the aim of providing the poor more opportunities unavailable elsewhere. However, it is still necessary to test the actual role of these programs in counterweighting or relieving the undesired impacts of living in poverty pockets. Social rights, stigmatization, socialization, and limited access to the labour market, four mechanisms identified to affect one's life chances, are featured with inter-relatedness and an all-encompassing character. The association between life chances and residential location was investigated (Atkinson & Kintrea, 2004). Through putting forward the phrase "area effects", the close relationship between neighbourhood or community where people are living and their prospects for economic activities and social engagement was also stressed (Atkinson & Kintrea, 2004). This idea permeates both theories of social exclusion and deprivation and social and urban policy. The researchers conducted in-depth interviews with volunteers and practitioners in either socially diversified or deprived communities to collect data for comparative analysis and get insights into local people's perceptions of the link between life chances and area of residence. They finally draw the conclusion that people in deprived areas might have a more fatalistic and entrenched understanding of being exposed to deprivation as a result of their perceptions of various adverse effects of their residential location on social engagement and action. Nevertheless, there are some contradictions between people in this general stance, mainly due to their difference in social status. Another research evaluated territorial differences in Hungary from the perspective of health and social inequality (Uzzoli, 2016). The results of their quantitative research indicate that Hungary has had growth in regional inequalities and enhancement in health since 1995. However, they noticed that unequal income in its western and eastern parts is related to their larger relative inequalities. When it comes to life expectancy, there are significant gender differences. The researchers also detected a higher incidence of disease among the unemployed.

In Chinese University of Hong Kong, a study on regional inequalities in China was decomposed into rural-urban, intra-urban, intra-rural, inter-provincial, and intra-provincial components were carried out (Tsui, 1993). The quantitative research enriched the academic attempt that was rarely made to evaluate the extent to inter-regional inequality contributes to overall inequality. At the same time, the research described the tendency of inequality in China in his study and stressed that the Open-Up in 1978 has been followed by the increasing severity of inequality.

Researchers have published a research paper aimed to introduce the concept of territorial inequality and the situation in UK (Schneider & Cottineau, 2019). More importantly, it describes the scope of the regional policy in UK, which is about the decentralization, and is newly adopted after the Brexit. Also, it evaluates the effectiveness based on the empirical data. This research is vital and useful as it provides a comprehensive explanation of territorial inequality, and also some thoughts in processing the data and designing the quantitative analysis.

The various mechanisms for geographic inequality to affect life chances have been summarized in previous studies. To be specific, individuals may undergo inequality in multiple aspects, such as employment opportunities, income levels, education and health care. Meanwhile, regional inequality in China is the target of analysis in some studies. Nonetheless, less attention has been paid to the responses of different age groups to varying inequalities. Besides, the degree to which the inequality of individual development and life chances is affected by the factors of territorial inequality has basically been ignored in most studies. Hence, this paper aims to fill in these blank areas.

## **3. Research Question**

Based on an analysis of past literature, I found that little analysis considered the counter-effects between income, education, and pension, and there was a lack of analysis of the extent to which different factors affected inequality of opportunity. Therefore, this study mainly focuses on the following three aspects.

Firstly, the previous literature rarely used age groups as a framework to analyze the different inequalities faced by a person at different stages of life, and the explanation of territorial inequality was not detailed enough. Therefore, this study analyzes the specific components of territorial inequality that affect inequality in education, income, and pensions.

Second, this study will distinguish and establish a link between the three previously mentioned inequalities and inequalities of opportunity, because the root cause of inequality is often that some people lack the opportunity to obtain an education, find a well-paying job, and so on.

Finally, the study will also address an important aspect: to what extent different geographical inequalities affect inequalities in education, income, and pension opportunities. This will be a direct indication of what factors need to be improved so that everyone has more equal life chances.

In terms of quantitative data, this study will also select data from recent years, from 2000 to 2015. In terms of region selections, this study also selects provinces with significant geographical location and development level differences for analysis.

1) What's the difference in individual inequality of opportunities across the regions?

2) Will a person experience inequality of opportunities across the life time?

## 4. Methodology

#### 4.1. Data

Data from the China Health and Nutrition Survey (CHNS)-an international

collaborative project between the Carolina Population Center at the University of North Carolina, Chapel Hill, the National Institute for Nutrition and Health (NINH), and the Chinese Center for Disease Control and Prevention (CCDC) tracks the development of individuals over 26 consecutive years. Thus, it is suitable to analyze the inequalities faced by individuals at different stages of life. Moreover, this database also reflects trends of income distribution and relevant inequality phenomenon like different access to higher education and pension differences. All database samples are from Heilongjiang, Liaoning, Jiangsu, Chongqing, Guangxi, Guizhou, Henan, Hubei, Hunan, Shandong, and Shanghai. Descriptive data summary is listed below (see Table 1).

## 4.2. Measures

The types and classifications of variables come from the data sets and the questionnaires from the database (CHNS).

#### 4.2.1. Dependent Variables

- Years of schooling: This variable describes the total years of schooling that the individual received at the survey year.
- **Income yearly, natural log of:** This variable is the sum of income in all forms of an individual annually, including wage, compensation, insurance, transferred payments, etc. Natural logarithm of have been applied to show the percentage change that can be caused by each factor.
- **Pension yearly, natural log of:** This variable reflects the retirement wages received by an individual within a year. Natural logarithm has been applied as well to show the percentage change that can be caused by each factor.

#### 4.2.2. Independent Variables

Some variables would affect the education, income and pension, which would be involved in the OLS regression functions.

- **Experience:** The number of years the individual has worked and accumulated experience.
- Square of experience: The square of the independent variable "experience".
- **Gender:** This dummy variable is included to indicate whether the individual is male or female, with 1 being in that gender and 0 meaning not.
- **Health status:** This variable is self-reported. Participants are required to choose from excellent, good, fair and poor. A dummy variable has been used to show each individual's option, with 1 being in that states and 0 meaning not.
- **Province:** This variable is self-reported. Participants are required to pick the province that they are currently living in, and I divide them into coastal province and inland province. A dummy variable has been used to show each individual's option.
- Occupation: This variable is self-reported. Participants are required to pick the types jobs, employment positions, working units, etc. I divide them into

## Table 1. Descriptive statistics.

		2	000				2004					
Variable	Observation	Mean	Std.Dev.	Min.	Max.	Observation	Mean	Std.Dev.	Min.	Max		
Income yearly	9232	8309.79	9637.92	0	1	7261	10205.84	12227.93	0	225000		
Education and experience												
Years of schooling	12374	7.04	4.11	0	18	11340	7.39	4.24	0	18		
Experience (in years)	11453	26.31	19.78	0	94	10619	30.76	19.51	0	91		
Access to higher education	14759	0.07	0.25	0	1	11346	0.1	0.3	0	1		
No access to higher education	14759	0.77	0.42	0	1	11346	0.9	0.3	0	1		
Access to higher education missing	14759	0.16	0.37	0	1	11346	0.0005288	0.02	0	1		
Gender												
Being a male	15698	0.51	0.59	0	1	12099	0.49	0.5	0	1		
Being a female	15698	0.49	0.5	0	1	12099	0.51	0.5	0	1		
Health status												
Missing	12636	0.19	0.39	0	1	11915	0.11	0.31	0	1		
Excellent	12636	0.13	0.33	0	1	11915	0.13	0.34	0	1		
Good	12636	0.41	0.49	0	1	11915	0.41	0.49	0	1		
Fair	12636	0.23	0.42	0	1	11915	0.29	0.45	0	1		
Poor	12636	0.04	0.2	0.2 0		11915	0.06	0.24	0	1		
Province												
Costal province	9232	0.46	0.5	0	1	7261	0.47	0.5	0	1		
Inland province	9232	0.54	0.5	0	1	7261	0.53	0.5	0	1		
Occupation												
Working at a labour intensive industry	12452	0.55	0.5	0	1	9823	0.4	0.49	0	1		
Working at a brain intensive industry	12452	0.06	0.23	0	1	9823	0.05	0.22	0	1		
Working at other industries	12452	0.12	0.33	0	1	9823	0.1	0.31	0	1		
Occupation missing	12452	0.27	0.45	0	1	9823	0.45	0.5	0	1		
Additional information												
Age	15694	34.92	19.84	0	100	12099	40.04	20.52	0	97		
Pension						1171	787.72	636.75	30	9600		
Urban	12637	0.33	0.47	0	1	11971	0.33	0.47	0	1		
		2	.006				20	09				
Variables	Observation	Mean	Std.Dev.	Min.	Max.	Observation	Mean	Std.Dev.	Min.	Max.		
Income yearly	6946	13410.18	18477.09	0	366671.4	7472	20075.69	30505	0	730000		
Education and experience												
Years of schooling	10960	7.42	4.58	0	18	11208	7.5	4.46	0	18		

X. Y. Du		

Continued										
Experience (in years)	10308	32.71	19.42	0	90	10538	34.12	19.24	0	92
Access to higher education	10984	0.12	0.33	0	1	11220	0.12	0.33	0	1
No access to higher education	10984	0.88	0.33	0	1	11220	0.88	0.33	0	1
Access to higher education missing	10984	0.002185	0.05	0	1	11220	0.0010695	0.03	0	1
Gender										
Being a male	11683	0.49	0.5	0	1	12102	0.49	0.5	0	1
Being a female	11683	0.51	0.5	0	1	12102	0.51	0.5	0	1
Health status										
Missing	11564	0.12	0.32	0	1	11853	1	0	1	1
Excellent	11564	0.12	0.32	0	1	11853	0	0	0	0
Good	11564	0.42	0.49	0	1	11853	0	0	0	0
Fair	11564	0.29	0.45	0	1	11853	0	0	0	0
Poor	11564	0.06	0.25	0	1	11853	0	0	0	0
Province										
Costal province	6946	0.47	0.5	0	1	7472	0.48	0.5	0	1
Inland province	6946	0.53	0.5	0	1	7472	0.52	0.5	0	1
Occupation										
Working at a labour intensive industry	9751	0.41	0.49	0	1	10097	0.41	0.49	0	1
Working at a brain intensive industry	9751	0.05	0.22	0	1	10097	0.05	0.22	0	1
Working at other industries	9751	0.12	0.32	0	1	10097	0.12	0.33	0	1
Occupation missing	9751	0.42	0.49	0	1	10097	0.42	0.49	0	1
Additional information										
Age	11682	42.02	22.56	0	99	12102	43.12	20.81	0	98
Pension	1155	916.27	617.81	65	7603	1281	1499.29	1110.32	20	9999
Urban	11565	0.34	0.47	0	1	11853	0.33	0.47	0	1
		20	)11				20	15		
Variables	Observation	Mean	Std.Dev.	Min.	Max.	Observation	Mean	Std.Dev.	Min.	Max.
Income yearly	9958	24609.72	29128.02	0	714285.7	10303	34077.68	74836.08	0	4528302
Education and experience										
Years of schooling	14575	8.15	4.64	0	18	15471	8.7	4.58	0	18
Experience (in years)	13687	34.05	19.21	0	94	14327	34.83	19.26	0	94
Access to higher education	14603	0.17	0.37	0	1	15497	0.2	0.4	0	1
No access to higher education	14603	0.83	0.37	0	1	15497	0.8	0.4	0	1
Access to higher education missing	14603	0.0019174	0.04	0	1	15497	0.0016777	0.04	0	1

Gender										
Being a male	15662	0.48	0.5	0	1	16552	0.49	0.5	0	1
Being a female	15662	0.52	0.5	0	1	16552	0.51	0.5	0	1
Health status										
Missing	15573	1	0	1	1	16229	0.07	0.25	0	1
Excellent	15573	0	0	0	0	16229	0.13	0.33	0	1
Good	15573	0	0	0	0	16229	0.39	0.49	0	1
Fair	15573	0	0	0	0	16229	0.36	0.48	0	1
Poor	15573	0	0	0	0	16229	0.06	0.23	0	1
Province										
Costal province	9958	0.36	0.48	0	1	10303	0.34	0.47	0	1
Inland province	9958	0.45	0.5	0	1	10303	0.47	0.5	0	1
Occupation										
Working at a labour intensive industry	13067	0.35	0.48	0	1	13949	0,26	0.44	0	1
Working at a brain intensive industry	13067	0.07	0.26	0	1	13949	0.07	0.26	0	1
Working at other industries	13067	0.15	0.35	0	1	13949	0.13	0.34	0	1
Occupation missing	13067	0.43	0.49	0	1	13949	0.53	0.5	0	1
Additional information										
Age	15662	43.4	21.29	0	100	16552	44.35	21.63	0	100
Pension	2156	1809.41	946.13	7	9280	2401	2634.27	1199.49	1	9999
Urban	15576	0.4	0.49	0	1	15221	0.38	0.49	0	1

labour-intensive occupation and brain-intensive occupation. A dummy variable has been used to show each individual's option.

• Urban: This variable is self-reported. Participants are required to pick their settlements from city, suburban, county capital city and village. A dummy variable has been used to show each individual's option, with 1 being in urban area and 0 meaning not.

## 4.3. Method

This study used Ordinary Least Square (OLS) regression for analysis of selected data from the most up-to-date survey years: 2000, 2004, 2006, 2009, 2011 and 2015. The OLS formulas of education, income and pension are shown below:

Education =  $\beta_0 + \beta_1 \text{ costal province} + \beta_2 \text{ experience} + \beta_3 \text{ square of experience} + \beta_4 \text{ gender} + \beta_5 \text{ excellent or good health} + \beta_6 \text{ fair health}$ (1) +  $\beta_7 \text{ health missing} + \beta_8 \text{ urban} + u_i$   $\ln(\text{Income}) = \beta_0 + \beta_1 \text{ costal province} + \beta_2 \text{ access to higher education}$  $+ \beta_3 \text{ experience} + \beta_4 \text{ square of experience} + \beta_5 \text{ gender}$  $+ \beta_6 \text{ exceellent or good health} + \beta_7 \text{ fair health} (2)$  $+ \beta_8 \text{ health missing} + \beta_9 \text{ urban} + \beta_{10} \text{ labor intensive work}$  $+ \beta_{11} \text{ brain intensive work} + \beta_{12} \text{ unknown occupation} + u_i$  $ln (Pension) = \beta_0 + \beta_1 \text{ costal province} + \beta_2 \text{ access to higher education}$  $+ \beta_3 \text{ experience} + \beta_4 \text{ square of experience} + \beta_5 \text{ gender}$  $+ \beta_6 \text{ exceellent or good health} + \beta_7 \text{ fairhealth} + \beta_8 \text{ healthmissing} (3)$  $+ \beta_9 \text{ urban} + \beta_{10} \text{ labor intensive work} + \beta_{11} \text{ brain intensive work}$  $+ \beta_{12} \text{ unknown occupation} + \beta_{13} \text{ income} + u_i$ 

Natural logarithm of income and pension has been applied to show the percentage change that can be caused by each factor. Results of the regression analysis could be used to illustrate how different provinces and other independent controlled variables (e.g., urban, health status, gender, etc.) affect the years of schooling, income, and pension of individuals.

Although the large coefficients of provinces prove that territorial inequality has significant correlations with education, income and pension, these coefficients do not indicate inequality of opportunities. Therefore, to measure income level and inequality of opportunity, this report uses the ratio of Gini coefficient from regression and the Gini coefficient from the sample (Zhang & Erikson, 2010). If there is no inequality of opportunities, the Gini coefficient from regression should be the same as the one from the sample. The existence of discrimination, family backgrounds, and other issues can result in inequality of opportunities.

The same method is used to measure the inequality of opportunities in terms of education and pension levels. Then, a robust check could be done to elicit measures of inequality of opportunities. Theil Index and the Mean Logarithmic Deviation Index have been applied to compute the decomposable effects of independent variables and determine how these inequalities contribute to the unequal distribution of opportunities in different provinces (Zhang & Erikson, 2010). The Theil Index is a statistical index used to measure regional disparity while the Mean Logarithmic Deviation Index is used to measure income inequality (OECD, 2016).

The calculation of Theil Index uses the following equation:

Theil Index = 
$$\sum_{k=0}^{W} f_k \frac{k}{\mu} \ln\left(\frac{k}{\mu}\right)$$
 (4)

In this equation,  $f_k$  is the population percentage of people with income k and W is the total income of the population.  $\mu$  is the average income of the population:

$$\mu = \sum_{k=0}^{W} k f_k \tag{5}$$

The calculation of MLD is as follows:

Mean Log Deviation = 
$$\frac{1}{N} \sum_{i=1}^{N} \ln \frac{\overline{x}}{x_i}$$
 (6)

In this equation, *N* stands for the number of individuals,  $x_i$  for the individual individual  $\vec{x}$  for the average individual income.

## **5. Results**

This section is a discussion of the results from OLS regression, Theil index and ratio between Gini coefficients.

At pre-working age, the dependent variable is years of schooling (edu-conti). In China, longer education time can be indicative of the competitiveness of graduates in the labor market (Spence, 1973).

In the regression model of education, the independent variables are province, experience, gender, health status, and urban. Regression results indicate that the coefficient of the urban location variable indicates a high level of significance that is much higher than that of other variables. This indicates that, from 2000 to 2015, those living in urban locations had 1.887 more years of education than those living in villages on average.

In coastal provinces, education level is proportionally correlated with more years of education. Although the data from 2000, 2004, and 2011 lack significance, the general coefficient (0.162) still proves the argument. Some policies might be useful in explaining this trend. For instance, in 2009, the Chinese government implemented a conscription policy, where grants of up to 24,000 RMB per person are provided to undergraduate students to continue their academic studies after completing military service (Administrator, 2009). It is an attractive policy for students in the inland provinces who are under financial constraints. This might explain why the high-significance coefficients of the coastal provinces in 2009 are very high (see Table 2).

Moreover, in 2014, the Ministry of Education of the People's Republic of China announced that postgraduate scholarship applications would be more complicated and only valid for a year instead of paying for two- or three-years of school fees (Administrator, 2013). As mentioned in the interpretation of the income regression model, those who live in inland provinces earn less than persons in coastal provinces. Thus, further studies for postgraduate or doctoral degrees can be more challenging.

At working age, inequality of opportunities in terms of income due to territorial inequality is a key point. Income is one of the key factors that promote individual development and family well-being. Higher income often means better education, healthcare, and higher endowment insurance (Hahn & Truman, 2015). In the regression analysis of income, the independent variables are province, access to higher education, experience, gender, health status, and urban, while the dependent variable is yearly income.

Results indicate how different independent variables affect income inequality with high significance. First, people who live in coastal provinces such as

	2000		2004		2006		2009		2011		2015		General (With Time Effect Eliminated)	
Variable	Coef	P-value	Coef	P-value										
Costal Province	0.173		0.244		0.526	**	0.699	***	0.163		1.008	***	0.162	***
Experience (in Years)	0.076		0.326	***	0.517	***	0.491	***	0.485	***	1.239	***	0.283	***
Experience, Square	-0.024	***	-0.039	***	-0.055	***	-0.049	***	-0.062	***	-0.105	***	-0.015	***
Being a Female	0.012		0.192		0.269		0.144	***	0.559	***	0.537	**	-0.284	***
Health: Excellent or Good	0.478		-0.75	**	0.659						0.73		0.535	***
Health: Fair	0.244		-0.743	*	0.236						0.32		0.371	**
Health: Missing	-0.483		-6.316	***	-5.275	***					-2.051		-1.497	***
Urban	1.724	***	2.298	***	2.685	***	2.801	***	2.109	***	1.528	***	1.887	***
Constant	9.459	***	10.115	***	8.797	***	8.716	***	10.761	***	7.906	***	8.349	***

Table 2. Ordinary Least Square Regression Results by Years (Education in year).

\*\*\**p* < 0.01, \*\**p* < 0.05, \**p* < 0.1.

Shanghai, Jiangsu, and Shandong earn 33.9% more than people living in inland provinces. From 2000 to 2015, the coefficient of coastal provinces continuously decreased from 33.9% to 5.4% (see **Table 3**).

Some policies from the Chinese government can explain this decreasing trend. For instance, from 2000, the government started the project called Development of China's Vast Western Regions, which focused on building larger and more efficient railways and high-speed transport systems to stimulate economic growth in the middle and western regions of China (Wang et al., 2021). This policy enabled the inland provinces to benefit from territorial advantages such as ports and sea freight in coastal provinces.

Moreover, since 2000, new taxation policies in inland provinces have decreased territorial income inequality. As a policy related to DCVWR, foreign direct investment firms in strategic industries such as electricity, transportation, hydraulics, etc., could enjoy a two-year tax-free policy and three-years tax-half policy (State Taxation Administration, 2011). From 2011, corporate income taxes were reduced by 15% to encourage industries in the western region, particularly those using appropriate technology and whose main business is specified in the Catalogue of Encouraged Industries in the Western Region (National Development and Reform Commission, 2020). Moreover, revenue generated from these businesses is higher than 70% of the total revenue.

In terms of income distribution, the urban could also be a key indicator of territorial inequality. For instance, in 2000, the average yearly income of workers in the urban area was 30.7% higher than those who work in rural areas.

From 2000 to 2015, gender was also a significant contributor to income inequality. Female workers earn 27.5% less than male workers, which indicates

	2	000	2	004	2	006	2	009	2	011	2	015	Genera Time Elimi	al (With Effect inated)
Variable	Coef	P-value	Coef	P-value										
Costal Province	0.339	***	0.169	***	0.254	***	0.111	***	0.146	***	0.054	*	0.171	***
Access to Higher Education	0.596	***	0.76	***	0.678	***	0.648	***	0.599	***	0.425	***	0.616	***
Experience (in Years)	0.061	***	0.045	***	0.039	***	0.054	***	0.034	***	0.026	***	0.044	***
Experience, Square	-0.001	***	-0.001	***	-0.001	***	-0.001	***	-0.001	***	-0.001	***	-0.001	***
Being a Female	-0.194	***	-0.31	***	-0.388	***	-0.266	***	-0.268	***	-0.213	***	-0.275	***
Health: Excellent or Good	0.327	***	0.119		0.271	***					0.559	***	0.337	***
Health: Fair	0.169		-0.022		0.189	***					0.409	***	0.205	***
Health: Missing	0.381	***	0.29		-0.095						0.096		0.193	**
Urban	0.307	***	0.31	***	0.389	***	0.227	***	0.22	***	0.225	***	0.278	***
Working at a labor intensive Industry	-0.481	***	-0.492	***	-0.235	***	-0.191	***	-0.105	***	-0.036		-0.238	***
Working at a brain intensive industry	0.060		0.067		0.166	***	0.176	***	0.175	***	0.153	***	0.141	***
Unknown Occupation	-0.605	***	-0.674	***	-0.775	***	-0.605	***	-0.555	***	-0.853	***	-0.676	***
Constant	7.821	***	8.492	***	8.474	***	8.93	***	9.362	***	9.314	***	7.948	***

Table 3. Ordinary Least Square Regression Results by Years (Income in percent change).

\*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1.

relatively serious gender discrimination that minimizes the development and potential of female workers.

In addition, the occupation is also a key factor of income inequality. For instance, in the entire time interval selected for the model, the results of the regression analysis indicate that workers in labor-intensive industries are paid less than working in a brain-intensive industry.

Pension inequality is higher than to income inequality, as poor people may pay less for their pension insurance. It is also related to access to higher education, as more educated people may pay more attention to their retirement financial security (Davis, 1988). The results from the regression prove the argument above, as the coefficients of income and access to higher education are 0.020 and 0.247 in general respectively (see **Table 4**).

**Figure 1** shows education level inequality of opportunities (ELIO). Real Gini coefficient represents the income distribution of sample, and the predicted Gini coefficient coms from the regression. As the educational resources are increasingly tilted towards the rich ones (Guo et al., 2020), the ELIO increases from 2000 to 2015.

Figure 2 shows income-level inequality of opportunities (ILIO) based on the

ratio between the Gini coefficient from regression and the Gini coefficient from the sample. From 2000 to 2015, the ILIO fluctuated between 0.5 to 0.7, which remained high in the entire time interval and showed no clear tendency to change. This may indicate that policies aimed to reduce ILIO between different provinces in China are not as effective as expected.

Table 4. Ordinary Least Square Regression Results by Years (Pension in Percent change).

	2004		2006		2009		2011		2015		General (With Time Effect Eliminated)	
Variable	Coef	P-value	Coef	P-value								
Income (in thousand yuan)	0.046	***	0.040	***	0.025	***	0.028	***	0.012	*	0.020	***
Access to Higher Education	0.230	***	0.191	***	0.191	***	0.134	***	0.203	***	0.247	***
Costal Province	-0.001		0.014		-0.045	*	-0.148	***	-0.132	***	-0.093	***
Experience (in Years)	-0.021		-0.041	***	-0.031	***	-0.013		-0.028	**	0.001	
Experience, Square	0.000		0.000	***	0.000	**	0.000		0.000	**	0.000	
Being a Female	-0.138	***	-0.090	***	-0.098	***	-0.046	**	-0.068	*	-0.085	***
Health: Excellent or Good	0.086	*	-0.009						0.187	***	0.097	***
Health: Fair	0.059		-0.011						0.14	**	0.063	**
Health: Missing			0.236	***					0.085		0.026	
Urban	0.05	*	0.016		0.093	***	0.105	***	0.079	***	0.078	***
Working at a labor intensive Industry	-0.08		0.036		-0.241		-0.22	*	-0.267	**	-0.149	**
Working at a brain intensive industry	-0.087		0.06		-0.237		-0.154		0.156		-0.021	
Unknown Occupation	0.525	***	0.859	*	0.581	***	0.462	***	0.374	***	0.426	***
Constant	5.875	***	6.381	***	6.881	***	6.676	***	7.656	***	6.228	***

\*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1







Figure 2. Income level inequality.



Figure 3. Pension level inequality.

**Figure 3** shows pension-level inequality of opportunities (PLIO). It remains stable all over the time interval (between 0.25 and 0.35).

**Figure 4** shows the contributions of each factor to the ELIO. As shown, the urban variable is most significant. In 1986, China implemented a compulsory education policy and law. Students in costal and inland provinces have free access to nine years of compulsory education. However, high school and higher education students in costal provinces may have less financial pressure and are more likely to have more years of education.

However, the inequality of education opportunities between urban and rural areas is much more significant than other variables. This is because, although the compulsory education law requires every student to complete middle school at least, students in rural areas may be under greater financial pressure and more



**Figure 4.** Contributions to the Gini of inequality of opportunity of Education of Each Factor.

unequal distribution of better education resources (Ayoroa et al., 2010); teachers may prefer to work in urban areas that provide better living standards and work environments. In addition, gender contributes to opportunity inequality in terms of education level. Females have less access to higher education as well as longer education time. These factors comprise the inequality of opportunity in terms of education level.

**Figure 5** shows the extent that independent variables contribute to the ILIO. First, costal province, access to higher education, and urban are the three most significant variables. This means that discriminations in costal or inland provinces, access to higher education, and urban-rural area could exacerbate the issue of limited income-level opportunities. People in costal regions or urban area would have more access to high-paid jobs like IT engineering, analyst or investor, as these firms would rarely run their business in a rural area or in a inland province with less developed infrastructure, insufficient skilled human capital and less economic activities.

In addition, gender is a relatively significant factor that affects opportunity inequality. Although less related territorial factors, gender is worth mentioning here, as it is also a background element causing discrimination and inequality of opportunities. Although gender is less significant than the other three variables, it is still vital when analyzing inequality of opportunities.

Being a female contributes more to the PLIO. Urban variable also shows great



Figure 5. Contributions to the Gini of inequality of opportunity of lncome of Each Factor.

significance (see **Figure 6**). Reason behind this might be that urban citizens usually earn a higher income, pay more to their pension insurance, and have stronger opinions toward their retirement financial security.

## 6. Extension

**Figure 7** shows the correlation between the three dependent variables. Theoretically, inequality in the length and quality of a person's education is likely to impact income inequality, which in turn leads to inequality in pensions under China's welfare system. However, the data in the database does not seem to support this argument entirely. The correlation coefficient between education and income, pension and education, is below 0.5 throughout the 14 years, especially the correlation between education and income is very weak. In 2004, there was a strong correlation between income and pensions, but the correlation continued to weaken over the next decade. This may be because more factors affect the change in pension and income change, such as retirement age and life expectancy change.

## 7. Conclusion

This article evaluates coastal and inland provinces and uses simple OLS regression,



Figure 6. Contributions to the Gini of inequality of opportunity of pension of Each Factor.



Figure 7. Correlation between dependent variables.

Theil index and the ratio between the Gini coefficients to exemplify opportunity inequality caused by territorial inequalities. The quantitative research uses continuous data from 2000 to 2015, alongside relevant analyses of the effectiveness of government policies in reducing the inequalities across different regions. Data is evaluated and summarized. The research framework examines life chances in three stages to explore the inequality of opportunities in China's coastal vs inland and urban vs rural areas in terms of education, income, and pension.

Results indicate that education and income data are highly significant variables. While factors such as gender also affect opportunity inequality, geographic factors (coast versus inland, urban versus rural) are more strongly correlated with eventual inequality of opportunity at education and income levels. An extension test about the correlation between education, income and pension is conducted, and the result supports a weak correlation between education and income, pension and education. It indicates a strong correlation between income and pension, while the coefficient decreases throughout the period.

It is concluded that discrimination and unfair opportunity distribution due to regional inequality existed between 2000 and 2015. People who live in coastal provinces and cities would have greater access to high-quality education resources and high-paid jobs, resulting in better individual development. Problems at the education level increased yearly, indicating the relative ineffectiveness of China's policies for education fairness and balanced development. The reason behind this might be the time lag of implementing policies. Also, in terms of income distribution, opportunity inequality (aside from income inequality) remains significant.

The research also suggests that as China has completed building a moderately prosperous society in all respects in early 2022, the government could allocate more resources and focus on reducing territorial inequality. From an education aspect, remote teaching could enable students in all regions to enjoy top-quality education. From an income aspect, more infrastructure, transportation, and ease of restriction in the transfer of residence could result in greater labour mobility. Some vocational training programs could also improve the competitiveness of labour from less developed regions. Furthermore, at the business level, some welfare policies, like tax reduction, would attract more firms to set up an office in less developed regions, providing more job opportunities to the labour there. Currently, the pension in Chine comes from the insurance paid during the working age and family members' support. Therefore, improving the opportunity equality for higher-income could positively impact the pension.

## Acknowledgements

Throughout the writing of this essay I have received a great deal of support and assistance. I would first like to express my deepest gratitude to my supervisor, Muyan Xie, whose expertise was invaluable in formulating the research questions and methodology. Your insightful feedback pushed me to sharpen my thinking and brought my work to a higher level.

I would also like to thank my teacher, Hairon Xu, for her valuable guidance throughout my studies. You provided me with the tools that I needed to choose the right direction and successfully complete my dissertation, and also the productive critics that led to the completion of this essay.

In addition, I would like to appreciate the associate editor and the reviewers for their useful feedback that improved this paper

Finally, I would like to recognise the biggest support that came from my family and friends throughout the whole process. I am sincerely grateful for their wise counsel and sympathetic ear.

## **Conflicts of Interest**

The author declares no conflicts of interest regarding the publication of this paper.

#### References

- Administrator (2009, September 11). *The State Has Issued a Major Policy: College Graduates Are Given Priority to Enlist in the Military for Compulsory Military Service.* Ministry of Education of the People's Republic of China.
- Administrator (2013, February 28). Opinions of the Ministry of Finance, the National Development and Reform Commission, and the Ministry of Education on Improving the Input Mechanism for Postgraduate Education. Ministry of Education of the People's Republic of China.
- Atkinson, R., & Kintrea, K. (2004). Opportunities and Despair, It's All in There. Sociology, 38, 437-455. <u>https://doi.org/10.1177/0038038504043211</u>
- Ayoroa, P., Bailey, B., Crossen, A., & A Geo-JaJa, M. (2010). Education in China: The Urban/Rural Disparity Explained. In J. Zajda (Ed.), *Globalisation, Ideology and Education Policy Reforms* (pp. 89-113). Springer. <u>https://doi.org/10.1007/978-90-481-3524-0\_7</u>
- Davis, D. (1988). Unequal Chances, Unequal Outcomes: Pension Reform and Urban Inequality. *The China Quarterly*, 114, 223-242. <u>https://doi.org/10.1017/S0305741000026771</u>
- Guo, Y.-Z, Zhou, Y., & Liu, Y.-S. (2020). The Inequality of Educational Resources and Its Countermeasures for Rural Revitalization in Southwest China. *Journal of Mountain Science*, *17*, 304-315. <u>https://doi.org/10.1007/s11629-019-5664-8</u>
- Hahn, R. A., & Truman, B. I. (2015). Education Improves Public Health and Promotes Health Equity. *International Journal of Health Services: Planning, Administration, Evaluation, 45*, 657-678. <u>https://doi.org/10.1177/0020731415585986</u>
- Hu, S. U. N., Yansui, L. I. U., & Keshuai, X. U. (2011). Territorial Inequality of Net Income per Peasant in Shandong Province and Its Mechanism. *Journal of Northeast Agricultural University (English Edition), 18*, 70-76. <u>https://doi.org/10.1016/S1006-8104(12)60028-2</u>
- Iammarino, S., Rodriguez-Pose, A., & Storper, M. (2018). Regional Inequality in Europe: Evidence, Theory and Policy Implications. *Journal of Economic Geography*, 19, 273-298. <u>https://doi.org/10.1093/jeg/lby021</u>
- National Development and Reform Commission (2020). *Catalogue of Encouraged Industries in the Western Region.*
- OECD (2016). *Indexes and Estimation Techniques. OECD Regions at a Glance* (pp. 174-177). https://doi.org/10.1787/reg\_glance-2016-50-en
- Pearce, J. (2012). The "Blemish of Place": Stigma, Geography and Health Inequalities. A Commentary on Tabuchi, Fukuhara & ISO. *Social Science & Medicine*, *75*, 1921-1924. https://doi.org/10.1016/j.socscimed.2012.07.033

- Schneider, C., & Cottineau, C. (2019). Decentralisation versus Territorial Inequality: A Comparative Review of English City Region Policy Discourse. *Urban Science*, *3*, Article 90. <u>https://doi.org/10.3390/urbansci3030090</u>
- Sewell, W. H. (1971). Inequality of Opportunity for Higher Education. American Sociological Review, 36, 793-809. <u>https://doi.org/10.2307/2093667</u>
- Spence, M. (1973). Job Market Signaling. *The Quarterly Journal of Economics, 87*, 355-374. https://doi.org/10.2307/1882010
- State Taxation Administration (2011, November 2). Announcement on Tax Policy Issues Concerning the In-Depth Implementation of the Development of China's Vast Western Regions.

http://www.chinatax.gov.cn/n810341/n810765/n812156/n812474/c1186395/content.ht

- Tsui, K.-Y. (1993). Decomposition of China's Regional Inequalities. Journal of Comparative Economics, 17, 600-627. <u>https://doi.org/10.1006/jcec.1993.1045</u>
- United Nation (2020). *World Social Report 2020: Inequality in a Rapid Changing World*. Department of Economic and Social Affairs, United Nation. https://www.un.org/development/desa/dspd/world-social-report/2020-2.html
- Uzzoli, A. (2016). Health Inequalities Regarding Territorial Differences in Hungary by Discussing Life Expectancy. *Munich Personal RePEc Archive, 6*, 139-163. <u>https://mpra.ub.uni-muenchen.de/74504/</u> <u>https://doi.org/10.15196/RS06108</u>
- Van Kempen, E. V. A. T. (1997). Poverty Pockets and Life Chances. American Behavioral Scientist, 41, 430-449. <u>https://doi.org/10.1177/0002764297041003010</u>
- Wang, H., Rodríguez-Pose, A., & Lee, N. (2021). The Long Shadow of History in China: Regional Governance Reform and Chinese Territorial Inequality. *Applied Geography*, 134, Article ID: 102525. <u>https://doi.org/10.1016/j.apgeog.2021.102525</u>
- Zhang, Y., & Eriksson, T. (2010). Inequality of Opportunity and Income Inequality in Nine Chinese Provinces, 1989-2006. *China Economic Review*, 21, 607-616. <u>https://doi.org/10.1016/j.chieco.2010.06.008</u>