Examine the Correlation Between the Number of Higher Education Institutions And the Provincial GDP In China

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Abstract:

Economic inequality is a challenging affair influenced by various factors. Education has long been the topic usually raised when discussing economic inequality. This research investigates how secondary education impacts social status, mobility, and, most importantly, economic inequality nationally. This research has developed a unique methodology to investigate the relationship between the number of schools and economic inequality in China. By applying the indicator of the Gini coefficient, the distribution inequality of the number of schools in thirty-one provinces in China. This research combined studies by Liu. Y, Xu.M, and Gustafsson apply those theories to a more local context in different provinces. The results show that the number of higher education institutions positively correlates with the GDP per capita in each province, with some expectations caused by the flaw of the methodology.

Keywords: Higher education institutions, economic inequality, China, Gini coefficient, social mobility.

1. Introduction

Due to geography, family background, and unequal distribution of resources, there has always been a massive gap in China's educational opportunities and resources, resulting in unequal access to education for students nationwide. Since implementing the reform and opening-up policy in the late 1970s, China has maintained efficient economic development. Opening markets, promoting an entrepreneurial culture, and attracting foreign investment have created the conditions for China's economic growth. As the pace of development accelerates and opportunities increase, so does the demand for more experienced professionals and the awareness of the importance of learning. As a result, more and more people want access to better opportunities, and learning becomes what others call the most convenient "shortcut" to success. With increasing competition but a relatively limited education system, high school students must achieve high scores in the College Entrance Examination to have a chance to enter top universities. To compete, many students attend various remedial classes or off-campus training to prepare for the national college entrance examination or other important exams, thus intensifying the pressure of competition among students. Ironically, however, such extracurricular tutoring opportunities are not available in every region of China, nor are the same educational resources available in every area. Regional inequalities in the provision of public education have increased since the late 1970s [1]. If a child is born in the countryside, his education and living conditions are inferior to those in the cities. Despite an increase in years of schooling for the younger generation, there is still a vast difference in educational attainment between urban and rural parents and their children. Unless efforts are made to address the systemic barriers to education faced by the rural-born population, inequality of opportunity related to education will continue [2]. To fully understand the issues, we will conduct an in-depth study to compare and analyze the number of high schools in different regions. Through an in-depth investigation of these factors, we hope to identify the root causes of educational disparities and make informed recommendations to reduce them. Our conference will provide a detailed and comprehensive analysis of the current state of education, helping us to gain a deeper understanding of the factors contributing to inequality in educational opportunities and educational resources.

2. literature review

To alleviate educational inequalities across the region, the Chinese government has also developed and implemented various policies, such as the National College Entrance Examination Plus, designed to assist students from poorer areas who may not have access to the same quality of education as students from more developed areas. The policy aims to level the playing field and ensure all students have an equal opportunity to succeed. Another is the nine-year compulsory education policy, which children must complete regardless of geographic location or poor economic background. This policy is to help improve literacy and access to education in rural areas with limited resources. There is also increased funding for education at the district level to improve the quality

of teaching and resources for students in disadvantaged areas. These aim to redress educational opportunities and outcomes imbalances, especially in poorer areas. While China has made policy decisions accordingly, there is still room for progress in these policies. In a 2015 study, Liu Yu argued that the national gaokao bonus point policy, which favors eastern provinces and ignores poorer regions in the central and western parts of the country, legitimizes this geographic advantage in some areas but inadvertently exacerbates inequalities in educational opportunities and related social mobility between regions [3]. While the relevant policies have indeed reduced educational inequality in poor areas to some extent, the Chinese government still has the potential to make progress in addressing educational disparities in poor regions [4].

The popularization of higher education has narrowed the gap between the rich and the poor. Hence, the equitable distribution of educational resources aims to equip more people with skills and knowledge. Higher educational attainment reduces educational inequality, which, in turn, helps to reduce income inequality. Well-educated people may have access to better employment opportunities or higher incomes, thus breaking the cycle of low educational attainment and low individual or household income that results from poverty [5]. Access to higher education may also lead to a reduction in income inequality. Access to higher education is also likely to result in a more

knowledgeable workforce, which promotes economic growth and innovation and further reduces economic disparities.

3. Method

The Gini coefficient is the indicator for illustrating the degree of income inequality between countries. The Gini coefficient can be calculated by using the Lorenz curve. It is a curve containing the line of equality, which represents the income that is fully equally distributed, and another curve represents the country's condition. The Gini coefficient can be calculated by area A divided by the area entirely below the line of equality: Gini coefficient=A/(A+B). Through the study of the Gini coefficient, this paper finds that the Gini coefficient can not only show the income inequality within a country but also change income into any other variable to show inequality. For example, the topic that this article will discuss is inequality in the number of high schools. This work considers high schools. By gathering the number of high schools around the country for the past ten years, we can have a trend of the particular Gini coefficient of secondary education. By comparing the movement of the indices of educational inequality and the GDP per capita between provinces, we can know the correlation between economic inequality and the number of high school campuses.
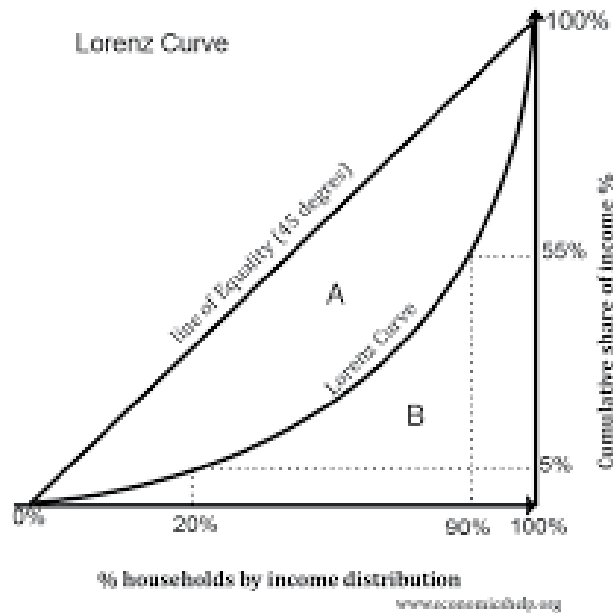

Figure 1. Lorenz curve illustration[2].

4. Analysis

Comparing the number of high schools in each region of China and the GDP (Gross Domestic Product), we find

a few things. Eastern areas of China, such as Beijing, Shanghai, Guangzhou, Shenzhen, Jiangsu, and Zhejiang, usually have a higher GDP. This can be attributed to the fact that these regions have an abundance of business

establishments, which contributes to the economy's strength. In the eastern area, many infrastructures, such as educational services, transportation systems, and medical facilities, are more technologically advanced. These infrastructures help to create a better education environment and thus improve education quality. In addition, the population density in such areas is usually higher, leading to an increased demand for quality educational resources. This demand usually pushes for private tuition organizations outside the school, thus improving the school's overall quality.

Compared to the eastern regions, the central areas of China, Henan, Hunan, and Hubei, are in the middle of the pack regarding GDP and educational resources compared to the rest of the country. However, these regions have great potential, with a growing middle class and investment industry and improving infrastructure. However, the distribution of educational resources in these provinces is unequal, with significant disparities between rural and urban areas. [6]. People in the cities tend to have access to better resources and infrastructure, and the rural regions have substantial challenges in terms of educational resources. Many schools lack basic facilities or have shortages of teachers, which can impact the region's future development.

Western China, including provinces such as Yunnan, Guizhou, and Tibet, tend to have lower GDPs and lower numbers of high schools than central and eastern China, with many factors contributing to the results. The population density in Western China is low compared to other regions, making education and infrastructure scarce resources [7]. Geography plays an integral part in the lower GDP, as the geography of the western region is complex with mountainous areas, high plateaus, and arid deserts, which makes infrastructure (agriculture, construction, etc.) expensive and challenging to build, resulting in a lower GDP. School facilities, investment in education, and cultural differences among ethnic minorities are also essential factors. Because the western part of China is huge, there are different ethnic groups living in this area. Therefore, if education is to be comprehensive, more special educational resources and methods are needed to meet the needs of the diverse ethnic minorities [8]. The number of high schools in Northeast China, like the problem in Central China, can lead to an uneven distribution of educational resources due to the difference between urban and rural areas. In urban areas, high schools will have better facilities, comprehensive curricula, teacher resources, and opportunities to provide students with an environment to better realize their aspirations. In contrast, rural areas have limited resources, outdated infrastructure, and a shortage of teachers [9].
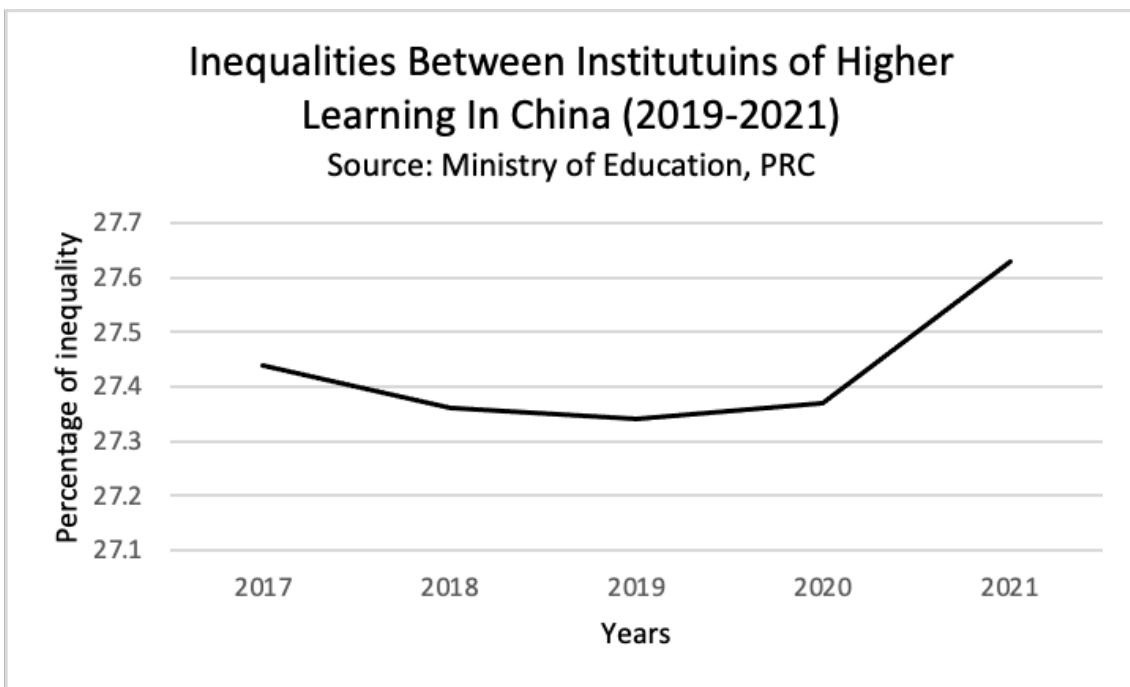

Figure 2. Inequalities Between Institutions of Higher Learning in China.

Also, comparing the GDP and the number of higher education institutions results in a clear positive correlation. Take the province of Shandong as an example. From 2015 to 2021, the GDP increased steadily from 56,205 yuan 2015 to 81510 yuan in 2021. An ongoing trend, a 25305 increase in GDP per capita, as shown in the diagram

below. Looking at the trend of the number of higher education schools in the province from 2015 to 2021, a clear increasing trend, from 143 to 153. It is a positive

correlation that when either of the variables changes, the other changes correspondingly in a positive way, which means one increases, another increases.
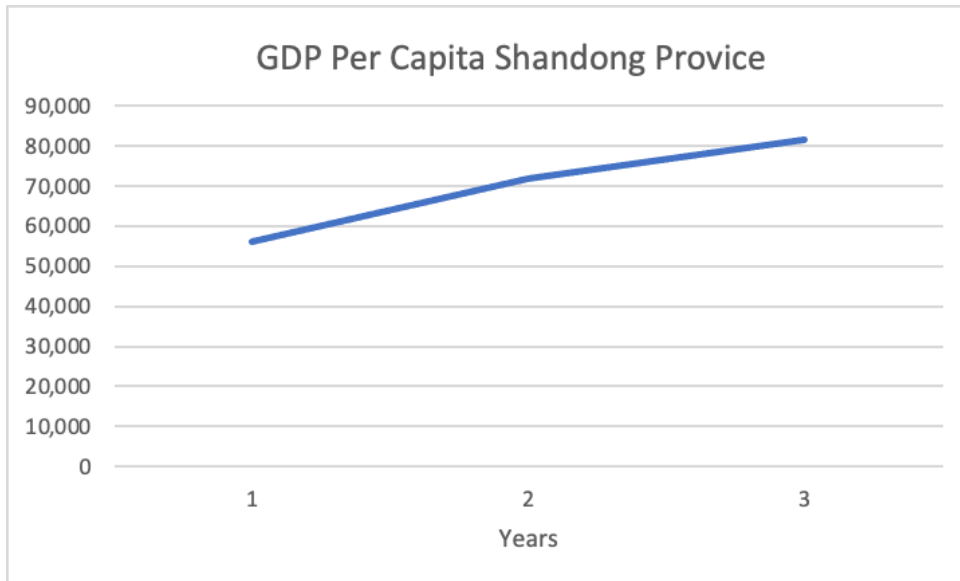
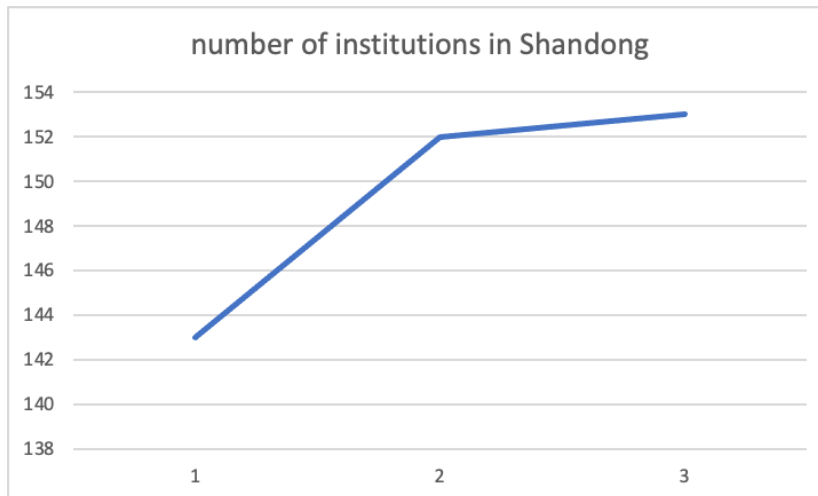

Figure 3. GDP Per Capita Shandong Province.

Figure 4. Number of Institutions in Shandong Province.

Shandong is in the northern region of the country. To make this phenomenon a generic scale, pick one more typical example in the southern region - Jiangsu. Jiangsu is a major province in southern China. In 2015, the GDP per capita, which means the country's total GDP divided by the total population, in this case, means the total GDP of the province divided by its population, was 85871 yuan. In 2021, it increased to 138255, a huge GDP increase. The number of institutions increased from 163 in 2015 to 167 in 2022, which also shows a positive correlation as mentioned above; as the number of schools increases, the GDP per capita also increases.

5. Conclusion

Since the 1980s, China's economy has risen dramatically. As a country with a large population and a vast geographic area, there have always been issues regarding income and economic inequality. Over the years, the Chinese government has issued policies to effectively help reduce the disparities in financial and educational resources between different regions. The study found that the GDP of each region in China is linked to the number of high schools in each region. We used the Gini coefficient to calculate the gap in the number of high schools in each region over the five years from 2017 to

2021. The conclusion is that the inequality in the number of high schools has risen over time. Comparing the GDP and the number of high schools in each province, we can conclude that there is a correlation between economic prosperity and educational equity. In the eastern part of China, where the economic output rate is higher, there will be more and more high schools. This is because these cities are located near the sea and have access to more investment and opportunities to start an economy. The central and northeastern parts of the country also have better education resources in the cities but often face significant challenges in providing adequate education resources if they are in rural areas, where many schools lack basic facilities and equipment, and teacher shortages are a common problem. In the West, due to geography and natural resources, the GDP is lower than that of other regions, so the education resources and environment are poorer than in other regions, leading to inequality. Although the government has made changes to reduce inequality, more must be done to address this range of issues and ensure that Chinese students have access to quality and equal education regardless of social status. The study believes that the government should invest more in education in poorer areas, improve education quality, and create targeted policies to support students from different backgrounds.

The limitation of this research is that the method we use is too generalized. Take the number of high schools in the province, as the income ignores the quality of each school, which is different. Thus, using the number of schools as the income of each province cannot represent the quality of education. The bias might result in misunderstanding the correlation between the number of institutions and the GDP. Also, the study only compares the number of institutions, which leads to the problem that the population density is different across the country. Some places may have fewer people, even though the province's area is big. Still, they do not need many schools to give everyone an opportunity for education. For example, in the province of Tibet, the total population, according to the Seventh National Census conducted by the Chinese government in 2020, is 3,648,100. It has seven schools, whereas Hebei province has a total population of 74.64 million with several schools of 125. Thus, just comparing the numbers

cannot fully present the connection.

Moreover, the study has considered the municipalities of Beijing, Tianjin, Shanghai, Chongqing, and Shenzhen on the same scale as the rest of the provinces. However, no matter the population, land area, or even salaries are different. Take Beijing as an example; it's just a city; however, in terms of administrative concept, it has the same status as a normal province. Comparing the number of schools in a city and the number of provinces in the same scale is biased. Thus, the methodology is flawed. The improvement could be that when examining the relationship between two variables, we could categorize them first into groups. By dividing them into the same scale, compare them easily and fairly.

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