The Effect of Income Inequality on Economic Growth in China

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Abstract: The analysis that follows tests the regression model of Income Inequality by examining the relation among Gini coefficient, GDP growth rate, saving rate and so on within the same country. The purpose of this study is to test out the relation between income inequality and economic growth rate, and the result suggests that income inequality has a negative impact on economic growth rate in the case of Chinese economic condition and situation. It is less clearly, however, whether the unfair wealth distribute in this case is necessarily the inherent potential power to boost the surprisingly high economic growth rate.

Introduction

Since China implemented the reform and open policy in 1978, the economy of China has developed faster and faster, and the economic growth rate has increased tremendously in recent years. Based on the data of the National Bureau of Statistics of China, the average growth rate in the last 10 years reached 9.15%, which makes it the third largest economic entity in the world.

However, along with economic growth, the income inequality has also grown a lot. In the 1980's, China had a very low income inequality; nevertheless, the income inequality has become the largest problem in China. The income inequality, which is measured by the Gini coefficient, increased from 0.25 in 1980 to 0.57 in 2009. While at the same time, the rate of income in the top 10% and in the lowest 10% has increased to 6.8% and 18.4% respectively. According to a report of Chinese Statistic Government published in 2006, 0.4% of the population owns 70% of the total wealth in China.

More and more people in China begin to notice this issue, some of them even start to show hostility toward the government and doubt with the reform and open policy. However, consider the rapid economic growth in recent years, some of the economists of China stated that the

short term income inequality is doing a great job in dealing with the current economic situation in China.

The purpose of this study is to find the relation between high income inequality and economic growth in China. The objective of this study is to provide the empirical evidence to examine if high income inequality contributes to a high economic growth rate, and to give a new perspective on how to arouse a country's potential economic power.

Given the objective of this study, one would expect to see that a high income inequality would indeed have a negative impact on economic growth in the long run. To achieve this goal, it will be necessary to look at the history of other countries' economic growth and previous studies about the relation between income inequality and economic growth.

Literature Review

The purpose of this study is to show how income inequality impact on economic growth rate. To achieve this objective, this section will address the important findings and problems from previous studies about the relation between income inequality and economic growth..

Strassmann (1956) used shares of national income of upper and lower income groups and per capita income in selected countries to determine the relationship between economic growth and income inequality. By comparing the shares of the top 20 and the lowest 60 percent of family spending units between different countries in roughly 10 years, the data shows an inverse correlation between income inequality and per capita income in different countries. Furthermore, the author compared the per capita productivity and per capita income between Argentina and Australia in 1948-1949 and showed that per capita productivity was less than half of Australia while the income of Australia is 3 times higher than that of Argentina. The author's results indicate that a small income inequality is not important in a developed country; however, when the income inequality goes up, it will finally decrease the efficiency of capital in mass-production. Based on these findings, one would expect that a country which has high income equality and lower wage levels will end up with a lower economic growth rate.

García-Peñalosa and Turnovsky (2006) applied a canonical growth model and a numerical measurement method to determine the relation between growth and income inequality. The authors used mathematic inference to find out that the relation between growth and income inequality could be either positive or negative. If capital endowments are more unequally distributed than the labor endowments, when the supply of labor rises, there could be a positive effect in the growth rate. The authors also indicated that the relation between income inequality and economic growth is negative in the long run and positive in the short run. Based on these findings, one could expect that the country which has higher income equality will have rapid growth for the present, but end up with a lower growth rate in the long run. However, there is a shortcoming in this model: the authors chose a framework that eliminates the effect of wealth on growth, which cannot address some problems associated with wealth and income inequality.

Scully (2003) used an equity equation regression model to find out the statistical relation between income inequality and the economic growth rate. This equation is defined as: EQ = h(S, FLR, U, t, gy) where EQ is income inequality, S is the mean level of schooling, FLR is female labor force, U is unemployment rate, t is a trend variable and gy is growth rate. The author concluded

that there is a clear trade-off between income inequality and the growth rate. Every one point increase in the economic growth rate will add 0.00075 points to the Gini coefficient, which means that the difference between these two variables is statistically significant. Based on these findings, one could expect that the income inequality would have a positive impact on the economic growth rate, meaning the higher the income inequality the higher the growth rate.

Nel (2003) uses the household-expenditure data to estimate the effect of income inequality on growth rate in sub-Saharan African states. In the period of 1986-1997, the author applied ordinary least squares (OLS) to test the impact of income inequality in a standard reduced-form growth regression for a set of cross-section data. The author found the relation between income inequality and growth rate is indeed negative. However, the effect tends to be relatively small and weak. Furthermore, when interprets the relationship, Nel found it is not a straight negative line, but a more curvilinear line, which shows that not every level of income inequality results in a downward slope for growth rate. In addition, he also found that a high level of income inequality induce assessors of political risk has a higher expectation of larger degree of inequality than it actually has, which will be harmful to the economic growth. Based on these findings, one would expect that the relation between income equality and growth rate is mostly negative, and will harm the health of economic growth in the long run.

Gomez and Foot (2003) use comparative analysis first to find the relation between income inequality and high growth rate of three countries: Japan, South Korea and Philippines. They found that during the early 1960s, these three countries had a similar economic indicator (i.e. GDP, population growth, primary and secondary school enrolment), however, two decades later, GDP per capital of Japan is much higher than South Korea and Philippines. At the same time, the Gini ratio of income inequality is roughly the same as South Korea but lower than Philippines. Based on these findings, the authors then describe four different models (fiscal political channels, social conflict channels, agency cost model, and capital market imperfection models) to link inequality to slower growth, the authors found that age structure has a very direct impact on economic performance. In addition, they also indicate that the efficiency will decrease significantly when a country insists on keeping their high income inequality in the long run.

Veeck and Pannell (1989) surveyed 167 farm-family samples in four agriculture regions in Jiangsu of China from 1986-1987 in order to identify the source of total income of a rural family, and to find the significance of activity types. Based on this data, the authors ran a cross-correlation on all the variables (i.e. income, family size, etc.). The authors indicate that a large proportion of farmers left farms to work full time in the factory or suburban industries near the big city, and at the same time, their family members often helped farm. In Suzhou province of China, the average net agriculture income is less than 15 percent of the average total income of 34 families surveyed. While in Huaiyin, which has fewer factories than Suzhou, among the 64 families surveyed, around 40 percent had less net agriculture income. The authors conclude that as modernization increases, the farmers are taking more non-farms jobs to support their low total income. However, more and more farmers want to get a job with a high income in a factory or suburban industries, the agriculture product will be negatively impacted, and this is not a good thing for a large agricultural country.

Hadler (2005) investigated 35000 respondents in 30 countries. The purpose of this survey is to examine how much income inequality people will accept before they start to fight

against the government. The author applies three different approaches at the beginning: the structural position thesis, the reflection thesis and the dominant ideology thesis. The structural position thesis addresses the individual's belief in society; the reflection thesis points out the relation between the real world and the individual's belief; and the dominant ideology thesis approaches the influence of societal beliefs. Based on these three models, the author found the Gini coefficient index was not substantial. However, the more homogeneous and stronger the people hold to societal beliefs in functionalist aspects of inequality, the less frequently people would feel a large gap in income inequality. In addition, in the more developed country, fewer individuals feel income inequality critically. According to these findings, one would expect that if a country's economy is highly developed, the people will feel less income inequality even if this is not the case, and the society will still maintain stability. Nevertheless, the problem of this study is that the model cannot be joined together with three approaches, and also be restricted by a small number of countries.

In conclusion, the previous study has shown the impact of income inequality on economic growth rate either positively or negatively rely on different specific independent variables that the authors use (i.e. Gini rate, political impact, fixed investment rate, etc.). However, a common sense of these studies and other countries' economic paths found that income inequality will have a positive impact on a country which is highly developing. Nevertheless, this impact starts to diminish, and finally pulls the economy down. This corresponds with one's hypothesis that income inequality would decrease the economic growth rate in the long run.

Data and Methods

Given the objective of this study, this section will introduce three important theories related to the relation between income inequality and economic growth. A regression model has been developed to test the relation in a case of Chinese data.

When income inequality climbs up, three possible problems would appear to cause economic growth fall off. The first of them occurs when most of the wealth and assets was distributed to few people, and the poor class would have less money to save or invest follow by that, while at the mean time, the wealth remain a constantly low interest to keep their money in the bank. This phenomenon will lead to a decrease in average investments in the whole country, thus pulling down the economic growth in the long run. The second problem is related to consumer demand, generally speaking, with more wealth, people have a higher ability to save, so the marginal propensity to consumer for each class would have a huge gap. The Marginal propensity to consumer is very low for the rich, and much higher for the poor. However, since the income is badly distributed, the average of the consumer demand will decrease, and so will the economic growth rate. The last problem related to the increase in income inequality concerns the poor. They would find there are too many obstacles to live and might start to fight against the government in different ways, such as going on strike. Along with this problem, some of them will even turn to crime, as a result, the criminal rate will rise as well and have a negative impact on social stability, resulting in a decrease in the country's long run development.

Based on these theories, a regression model with all effective variables is developed as follows.

$GR = a_0 + b_1 SR + b_2 CF + b_3 GINI + b_4 PG + b_6 TI$
Where:
GR=GDP growth rate (%)
SR=saving rate (%)
CF=Capital formation rate (%)
GINI=Gini coefficient (%)
PG=population growth rate (%)
TI=total investment (%)

GDP growth rate is used to measure economic well-being in China and is calculated as the percent change in GDP between year t and year t − 1. The savings rate (SR) represents the amount of savings as a proportion of income and is calculated as 1 − consumption rate. It is expected to enter the model with a positive coefficient as an increase in the savings rate means banks have more money to lend which in turn encourages business and government investment and increases growth in GDP.

The capital formation rate (CF) stands for gross fixed capital formation as well as the increase in the value of the various inventories of assets held, it is calculated as percentage of gross domestic product by expenditure approach. The increase capital is a big component of investment, which expects to have positive coefficients as an increase in investment increase growth in GDP.

The Gini coefficient (Gini) is used to measure income inequality, the higher the rate, the higher the income inequality. One expects to see a negative coefficient as the negative relationship between income inequality and GDP growth rate.

The population growth rate (PG) stands for the population growth and is calculated as percent change in population between year t and year t-1. The total investment (TI), represents for the business and government investment in a particular year and is calculated as percentage of gross domestic product. Consider it is one of the biggest component in calculate GDP, it is expect to enter the model with a positive coefficient.

All the data will be obtained from the National Bureau of Statistics of China from 1985-2007 to estimate the linear relationship between a dependent variable (Growth rate) and the relevant independent variables (i.e. Gini rate, saving rate, etc.).

In conclusion, this model would examine if income inequality has a positive impact on economic growth in the long run. The next section will state the result after the 22 years data has been applied into this OLS model.

Empirical Results

From previous sections, the purpose of this study is to find the true relation between high income inequality and economic growth in China. The historical and previous study has revealed that income inequality would have a positive impact on economic growth in the short run, but a negative impact on long run. This section, however, intend to use empirical results to prove the model one has built on data and methods section: $GS = a_0 + b_1 SR + b_2 CF + b_3 GINI + b_4 PG + b_6 TI$ (where

GS is GDP growth rate, SR is saving rate, CF is capital formation rate, GINI is Gini coefficient, PG is population growth rate, TI is total investment)

Overall, after apply a regression data analysis to this model, we find that the R^2 and the adjusted R^2 is 0.4280 and 0.2597 respectively. In addition, the F-statistic (2.543) is greater than the critical F-statistic (1.75), which concludes that the overall statistical fit of the estimated model is adequate.

Next, one examined the coefficients and p value of each independent variable at the following tables to see if these results conform to prior expectations and whether the coefficients are statistically significant.

Table 1: Ordinary least squares results for dependent variables Growth Rate

Independent variables	Coefficients	P-value	t-statistic
Gini (%)	-0.4678	0.2011	3.7813
Saving rate (%)	0.0224	0.8355	1.9793
Population growth (%)	-0.6714	0.3036	1.6841
Capital formation rate (%)	0.0172	0.7479	1.2830
Total investment (%)	0.6965	0.1269	3.6979

Note: Data were obtained from China's most recent year's statistical report from 1985-2007.

From table 1, it is easy to see that all the p values of independent variables are greater than α, which means it failed to reject the assumptions. In other words, these variables are statistically significant. The CF, SR, and TI have positive coefficients which correspond with our prior expectation and economic theory. However, from table one, the coefficient of saving rate is only 0.0128, which represents every one point increase in saving rate only increase GDP growth rate 0.0128. This result helps to interpret one's hypotheses: in the long run, when income inequality keeps increasing every year, large quantity of wealth would distributed to fewer and fewer people of the growing population. This would cause the majority of people have less income to save and saving rate would decrease, thus bank has less money to lend. The negative coefficient of Gini is absolutely conforming to one's prior expectations that income inequality has a negative impact on GDP growth rate in the long run. Furthermore, the t-statistic of Gini and TI is greater than 2, and it represents the coefficients of these two variables which are statistically significant. However, the t-statistic for the rest of the variables is between 1 and 2, so one is concerned to still retain them in the model.

From 2000-2007, the income inequality measures by Gini coefficient increased rapidly. To support the idea more clearly, a t-test table from two periods is display as follows to see the significant impact of income inequality on growth rate in the short run.

Table 2: T-test of two periods's growth rate		
	1985-2000	2000-2007
Mean	0.0979	0.1051
variance	0.0009	0.0003
t-statisitc	-0.7308	
P(T<=t) one-tail	0.2367	
t Critical one-tail	1.7247	
P(T<=t) two-tail	0.4734	
t Critical two-tail	2.086	

Note: Data were obtained from China's most recent year's statistical report.

In this supplemental t-test, the p values are all greater than α regardless one or two tails and the mean value between 1985-2000 and 2000-2007 are not significant different from each other. However, the mean value in 2000-2007 is slightly greater than that in 1985-2000, which can be interpret that the in 2000-2007, along with the rapid increase of income inequality the economic growth rate also increased, from which one would conclude that the income inequality has a positive impact on GDP growth rate in the short run.

In conclusion, after truly apply the model in the China's data report, it is easily to see that income inequality has a positive impact on growth rate in the short run but would decrease it in the long run.(negative coefficient of GINI, PG, SR,) It completely corresponds with our hypothesis at the first place. However, there is still some shortcomings need to address in this model, such as R Square (0.4280) is not very close to 1. In addition, our frame work also eliminates the wealth impact on growth; some problems cannot be solved associates with wealth distribution.

Summary and Conclusion

The purpose of this study is to find the how income inequality impact on economic growth rate in China. To achieve this objective, after review the previous relative study's findings and models, one used OLS to estimate the relationship between income inequality and China's GDP growth rate.

The China's most recent 22 years (1985-2007) data were applied in this regression model. The results showed that for the time periods examined, Gini coefficient which as a measurement of income inequality has negative impact on economic growth rate. Along with this effect, it achieved the prior expectation that increased income inequality results decreased saving rate and decreased GDP growth rate. Generally speaking, the model performed well and variables entered the equation with expected sign.

These findings not only revealed the relationship between income inequality and GDP growth rate in China but also caused other developed and developing countries to consider how to use income inequality efficiently to speed up their GDP growth rate. To achieve this objective, countries may need to pursue policies that balance the desire for strong GDP growth with maintaining lower levels of income inequality. The weakness of this study is that it did not

capture the unfair wealth distribution impact and the stability of a society associated with income inequality.

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