Inequality, Polarization and Growth:

Empirical Issues of China

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1 Introduction

In the last decades, income distribution problems attracts more and more attention from worldwide. Theoretical and empirical literature on income distribution emerged in large number, which focused on indexes describing income distribution and relationship between them and economic growth or other social issue, for example, crime rate. Income distribution problems could be described by income inequality and polarization.

The relationship between income distribution and economic growth is one of important issues of economics research in recent decades. The theoretical literature has proposed numerous transmission channels through which income distribution may affect growth both positively and negatively. Particularly, discussion about inequality began earlier than polarization. The effect of income inequality has attracted a lot of attention of scholars since Kuznets (1955) made a groundbreaking contribution by proposing his famous inverted-U hypothesis, called Kuznets curve. Polarization is considered as a factor affecting growth in a negative way, because of the significance of the middle class which is related directly to polarization.

However, the substantive conlusions of empirical studies seem to be very sensitve to the quality or comparability of data, to the sample coverage, and to the econometric specification (de Dominicis et al. , 2008). Scholars use different indicators basing on dataset from different countries and regions to report evidence that inequality and polarization may affect economic growth positively or negatively (Moriram and Sarma, 2011; Brzezinski, 2013; Chen and Sun, 2014, and so on). In this article, the GINI and ER coefficients are adopted as indices describing inequality and polarization. The dataset used in this article is panel data of 24 provinces from 1996–2010. In order to make the results more valid, the indexes used in the article are calculated by using multiple original indexes from China National Statistical Yearbook.

2 Literature Review

As summary in the paper of Kochanowicz et al. (2008), inequality is not only a result but also a reason of economic growth. Scholars try to explain the channels of inequality-growth interaction by accumulation, skills differences and argumets of political economy, stability or credit constraints. According to Barro (2000), these theories can be calssified into four categories: credit-market imperfections, political economy, social instability and saving rates. Concerning incentives is added as a category by Benabou (1996), and others. The effects

of inequality on growth are ambiguous through the mechanisms above. A rise in inequality tends to raise aggregate rate of saving and enhance economic growth at least in a transitional sense. And skill differences in certain range could improve the productivity. The explanations of political economy are various. As one of them, fiscal channel is a important line of argument link inequality and growth, proposed by Alesina and Rodrik (1994) and others. Esteban and Ray (2011) propose a behavioral theory of conflict across social groups, which implies that the conflict is linearly related to polarization. This link between economic polarization and conflicts has direct and negative consequences for growth.

From another point of view, polarization has often been associated with the "disappearing of the middle class" (Wolfson, 1994). Various economic theories suggest that a stable and sizable middle class is a source of new entrepreneur, by increasing saving and promoting human capital, and creating demand for quality consumer goods (Banerjee and Duflo, 2008). Therefore, polarization may affect growth in a negative way.

Since 1958, the urban-rural barrier based on the household registration system has formated. After the reform and opening-up, the rural labor force begun to flow into urban area. But because of the different resource allocation, the gap between rural and urban area is aggressive, representing in development of agriculture and other industries (industry and services), education and public facilities, income level, and consumption capacity. It has become a consensus that "urban-rural" dual development structure is a serious obstacle of development in China.

The results of empirical researches are various, and sensitive to quality of data, the sample coverage, and the econometric specification. Michat Brzezinski (2013) prove that income polarization measured by DER and Wolfson index has a negative impact on growth in the short term, while the impact of income inequality on growth is statistically insignificant, using an unbalanced panel of more than 70 countries of EU during the 1960-2005 period. Using the panel data of EU similarly, Barro (2000) conclude that the negative effect of inequality on growth shows up for poor countries, but that the relationship for rich countries is positive, and the overall effects of inequality on growth are weak.

In the empirical research about India, Motiram and Sarma (2011) argue that there is a weakly negative relationship between increase of polarization and growth. Based on data in prefecture level of Japan, the effect of inequality measured by the third quintile on growth is significantly positive, while the effect of inequality measured by GINI is negative sometimes (MASAKO OYAMA, 2014).

In the research about China, inequality is increasing in both rural and urban area, particularly, in urban area (Nong ZHU, Xubei LUO, Cuizhen ZHANG. 2007). There is a coincident process of inequality and growth (Kenneth S. Chan, Xianbo Zhou, Zhewen Pan. 2014). The urban-rural income polarization measured by ER index in certain level may improve economic growth in the region.

3 The Evolution of Inequality and Polarizaton

The empirical study on inequality begin from about 1890's. Pareto (1895) focus on statistical method of inequality issue firstly. Income is disposed as a variable with statistical distribution function in Pareto's paper. Lorenz (1905) propose famous "Lorenz curve" base on correcting income logarithmic curves by Pareto, and GINI coefficient is defined by measures the area between the Lorenz curve and a hypothetical line of absolute equality. Then GINI coefficient is generally recognized and applied. Scholars (Cowell, 1980; Shorrocks, 2013; Theil, 1967, 1972; Atkinson, 1907, et al.) explore lots indexes to describe income and measure inequality, showed in Table 1.

Table 1 The measurement of inequality

Indexes	Calculation	Illustration	Type
GINI coefficient	$\mathrm{GINI} = \frac{1}{2n^2Y}\sum_{i=1}^{n}\sum_{j=1}^{n}\lvert Y_i - Y_j\rvert$ or $\mathrm{GINI} = 1 - 2\int_0^1 Q(p)dp$	p is proportion of population, Q is income.	Relative
Cofficient of Variation	$\mathrm{CV} = \frac{1}{Y}\sqrt{\frac{\sum_{i=1}^{n}(Y_i-Y)^2F_i}{n}}$ or $\mathrm{CV} = \frac{\sqrt{\int_0^1 (Q(p)-\mu)^2dp}}{\mu}$	F is population weight.	Relative
Atkinson Index	$\mathrm{At} = 1 - [\frac{1}{n}\sum_{i=1}^{n}\left(\frac{Y_i}{Y}\right)^{1-\varepsilon}]^{\frac{1}{1-\varepsilon}}$ or $\mathrm{At} = \begin{cases} 1 - \frac{(\int_0^1 Q(p)^{1-\varepsilon}dp)^{\frac{1}{1-\varepsilon}}}{\mu}, \varepsilon \neq 1 \\ 1 - \frac{\exp(\int_0^1 lnQ(p)dp)}{\mu}, \varepsilon = 1 \end{cases}$	ε is aversion parameter.	Relative
Theil Index (Generalized Entropy Index)	$\mathrm{GE}(\theta) = \frac{1}{\theta^2-\theta}[\frac{1}{n}\sum_{i=1}^{n}(\frac{Y_i}{Y})^{\theta} - 1]$	θ is aversion parameter.	Relative
Kolm-Pollak Index	$\mathrm{KP} = \lambda(x) + \frac{1}{\beta}log\frac{1}{n}\sum_{i=1}^{n}(\exp(-\beta x_i))$	λ is unit translatable.	Absolute

The history of study on polarization is shorter than inequality, and over the last 15 years or so, the study on polarization has become quite important. One notion of income polarization, which we refer to as bipolarization, is concerned with the decline of the middle class. According the paper of Estaban and Ray (1994), the definition of polarization: the population is grouped into significantly-sized “clusters”, such that each cluster is “very similar” in terms of the attributes of its members, but different cluters have members with very “dissimilar” attributes.

As Esteban and Ray (2012) assume, all measures of polarization share some basic characteristics: a) The impact of single individuals on polarization measures is negligible, since polarization describes the features and relative positions of social groups. b) With two or more groups, polarization increases when intragroup inequality is reduced. c) Polarization rises when distances between groups are increased. Several measurements of polarization have been proposed by scholars. The most frequently uses are showed in Table 2.

The conceptual difference between polarization and inequality is most evident when considering property b). Compared to inequality, polarization emphasizes the distance between income groups and densities in income groups, which is defined as “identification-alienation” framework (Duclos et al. 2004). An example from the paper of Esteban and Ray (1994) is quoted to explain the difference between polarization and inequality visually.

There are two kinds of income distribution S1 and S2, showed in Figure 1 and Figure 2. For S1, there are 4 levels of income, and the gap between groups is 1. For S2, there are 2 levels of income, and the gap between 2 groups is 2. Assuming S1 and S2 have same size of population, it is showed in Figure 3 that the Lorenz curve of S1 is farer from absolute equality line than S2. It means the inequality of S2 is lower than S1, although S2 presents a distribution which can reflect the characters of polarization.

Table 2 The measurements of polarization

Indexes	Calculation	Grouping	Reference
Wolfson Index	$W = \frac{2\mu}{m}\left(\frac{\mu_H - \mu_L}{\mu} - G\right)$	Above and below average	Wolfson (1994)
Bipolarization Index	$B = \frac{\left(\frac{1}{n}\sum_{i=1}^{n}\lvert m - x_i\rvert^{\varepsilon}\right)^{\frac{1}{\varepsilon}}}{m}, 0 < \varepsilon < 1$	Above and below average	Chakravarty (2007)
Relative Bipolarization Curve	$RB(x,j/k) = \begin{cases} \frac{1}{km}\sum_{j\le i\le k}(m - x_i) \ if x_j \le m \\ \frac{1}{km}\sum_{k\le i\le j}(x_i - m) \ if x_j \le m \end{cases}$	According to percentiles. (j/k)	Chakravarty and Majumder (2001)
ER Index	$ER(\alpha) = K\sum_{i=1}^{n}\sum_{j=1}^{n} p_i^{\alpha+1} p_j \lvert y_i - y_j\rvert$	Defined by authors	Esteban and Ray (1994)
DER Index	$DER(\alpha) = \frac{1}{2\mu^{1-\alpha}}\iint f(x)^{1+\alpha} f(y)\lvert y - x\rvert dydx$	No	Duclos, Esteban and Ray (2004)

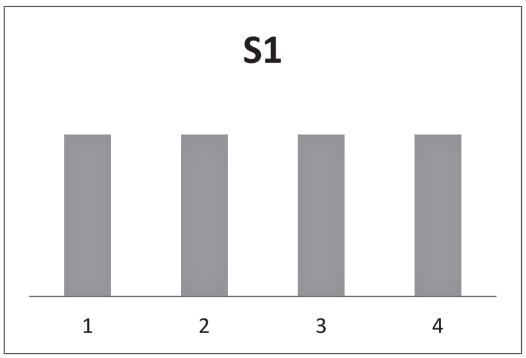

Figure 1 The distribution of inequality

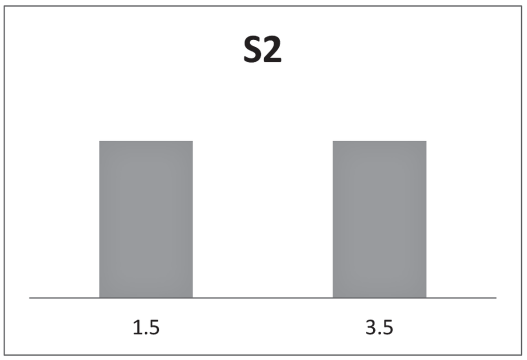

Figure 2 The distribution of polarization

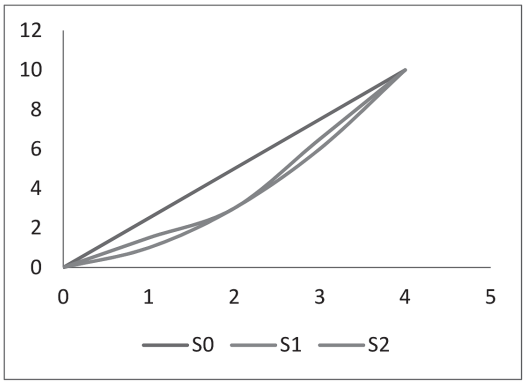

Figure 3 The lorenz curve of S1 and S2

***Figure 1, Figure 2 and Figure 3 are quoted from Esteban and Ray. 1994. "On the Measurement of Polarization".**

4 Indexes and Data

The dataset used in this article is panel data of 24 provinces from 1996-2010. The data for main indexes in the model used in this article are from China National Statistical Yearbook. In order to make the results more valid, the indexes used in the article are calculated by using multiple original indexes from yearbooks.

4. 1 Inequality and polarization

About inequality, urban-rural theil coefficient (Jacek Kochanowicz, Joanna Rymaszewska and Joanna Tyrowicz, 2008), two-stage nested theil coefficient (Takahiro Akita, 2001), third quintiles (Masako Oyama, 2014) and other indexes are adopted. However, GINI coefficient is most widely used in literatures (Robert J Barro, 2000; Michat Brzezinski, 2013. et al.).

Because the original data is unavailable, we adopt GINI coefficient, the result of literature. GINI coefficient is from Weimin Tian (2012), calculated by

$$\mathrm{GINI} = 1 - \frac{1}{PW}\sum_{i=1}^{n}(W_{i-1} + W_i)P_i .$$

Where P is population, W is income, W_i is accumulated income until group i. The equation group the population with incomelevel, avoiding the issue of equally and unequally grouping.

About polarization, various indexes are adopted by scholars, like relative bipolarization (Sripad Motiram and Nayantara Sarma, 2011), DER index (Michat Brzezinski, 2013) and ER coefficient (F. Chen and X. Sun, 2014). Urban-rural ER coefficient is used in this article, measured

$$\mathrm{ER}\,(\alpha) = \mathrm{K}\sum_{i=1}^{n}\sum_{j=1}^{n} p_i^{\alpha+1} p_j |y_i - y_j| .$$

Where K is population standardization constant, K=1/2. is sensibility parameter, and there is no obvious change in the value of the ER index with different=1.3 simply (F. Chen and X. Sun, 2014). p_i is population share of group I, y_i is per capita income of group I. In this article, group i is urban group, group j is rural group.

It should be noted that the index “per capita total income of urban household” is adopted to describe income level of urban. The Total Household Income refers to the sum of wage income, net business income, property income, transfer income given to all family members living together in the investigation of the resulting during the household surveys not including the sale of property and lending revenues. It can reflect the ability to improve the quality of life and afford a variety of social insurance.

While the index “per capita net income of rural household” is adopted to describe income level of rural. Net income of rural household refers to the total income of rural households from all sources minus all corresponding expenses. It can reflect the income level of rural and ability to expand reproduction and improve the quality of life in a given area. In “urban-rural” dual economic structure, the income level of two sectors should be calculated by different indicators. Data and explaination of both of two indicators are from China National Statistical Yearbook 2003–2011.

Table 3 Provinces in descending order of GINI and ER in 2010

GINI	ER
GUIZHOU	ZHEJIANG
QINGHAI	GUANGDONG
GANSU	FUJIAN
GUANGXI	JIANGSU
NINGXIA	GUANGXI
SHANXI	CHONGQING
XINJIANG	NEIMENGGU
NEIMENGGU	SHAANXI
GUANGDONG	NINGXIA
SHAANXI	LIAONING
CHONGQING	ANHUI
HENAN	SHANXI
SICHUAN	HUBEI
FUJIAN	SICHUAN
ANHUI	QINGHAI
HUBEI	HEBEI
JIANGSU	HENAN
ZHEJIANG	BEIJING
HEBEI	GUIZHOU
JIANGXI	JIANGXI
LIAONING	XINJIANG
HEILONGJIANG	GANSU
SHANGHAI	SHANGHAI
BEIJING	HEILONGJIANG

Figure 4 Distributions of GINI regionally in 2010

Figure 5 Distributions of ER regionally in 2010

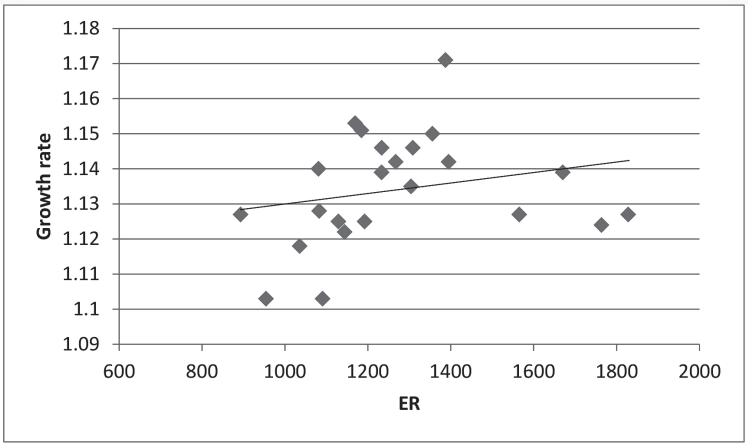

Figure 6 (1) The scatter of ER and growth rate of provinces in 2010

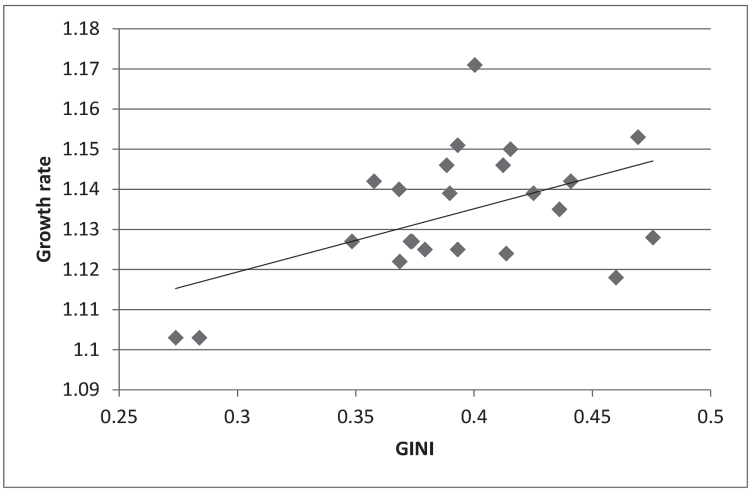

Figure 6 (2) The scatter of GINI and growth rate of provinces in 2010

In Table 3, it shows provinces in descending order of GINI and ER in 2010. In Figure 4 and Figure 5, they show the geographical and sequential position of provinces. It is shown in Table 3, Figure 4 and Figure 5 that distributions of GINI and ER are not totally same regionally.

4. 2 Independent variables

For the independent variables, economic growth, per captia GDP or GDP is most commonly used to represent economic growth when analysis the relationship between income distribution and economic growth. Real GDP (1996 constant prices) is calculated to be the dependent variable. In order to make the results more valid, the logarithm to GDP data is adopted in this paper.

Because of regional method used in this paper, it does not need to calculate growth rate of real GDP. In order to observe the trend of income distribution and growth rate directly, it is shown in Figure 6 that

there is the positive relationship between real GDP growth rate and GINI of the provinces in 2010, while the relationship between real GDP growth rate and ER of the provinces in 2010 is negative. It is shown that the trend line of relationship between GINI and growth rate is sharply upward while the trend line of relationship between ER and Growth rate is mild. It should be noted that the charts just show institution only in the year of 2010.

4. 3 Dependent variables

For the control variables, investment is chosen as one of engines of economic growth. The variable of investment is measured by the logarithm of real total fixed asset investment (1996 constant prices) and the input-output ratio of the province, and the former represents the absolute amount, while the latter represents the efficiency of production. The two indicators are used in different regression to ensure the robustness.

The other important control variable is urbanization rate. Urbanization is a population shift from rural to urban areas, meaning occupational shift of population, shift of the way land capital used on, and shift of industrial structure. It has been one of the main reasons for economic and income growth in China, since reform and opening-up.

The variable of urban residents' disposable income growth rate is adopted to describe growth of urban development and income level. The impact of the degree of urban-rural income polarization on economic growth is closely related to the actual urban-rural income level. (Chen and Sun, 2014)

Education is an important factor affecting regional development. The average years of schooling in the population aged 25 and over are adopted in research of Brzezinski (2013), but because of the unavailability of data at the provincial level, the index of literacy rate is adopted in this article. The gap of literacy rate of provinces is not very clear, except the backward class.

The natural population growth rate was also added to the control variables. Population growth rate means not only the growth of labors but also the burden of economic.

Table 4 shows the variables used in the article and Table 5 presents the descriptive statistics of all of variables in 1-year interval panel and 3-year interval panel data. All the raw data is from publications of the National Bureau of statistics of China. The correlation matrix is shown in Table 6. ER and GINI are not correlative closely in two panels. The independent variables of the panels are in a low level colinearity, assuring the validity of the regression.

5 Models

Panel data models are used in this article, similar to models used in the inequality-growth literature (Robert J. Barro, 2000; Michat Brzezinski, 2013).

In the model of inequality-growth, the estimated equation takes the following form:

$$y_{it} - y_{i,t-1} = (\alpha - 1)y_{i,t-1} + \beta x_{it} + \mu_{it}.$$

Where i =1, ⋯ , N denotes a province and t=1, ⋯, T is time with t and t-1 one-year or three-year interval. The variable y is the log of real GDP per capita. The approximate growth rate of a province between t and t-1 is given by the left-hand side of estimated equation. The $y_{i,t-1}$ on the right-hand side controls for convergence,

Tabel 4 Other variables used estimation

Index	Description	Data source
GDP	Log (real GDP) *1996 constant prices	China National Statistical Yearbook 1996–2011
Investment	Log(Real total fixed asset Investment) *1996 constant prices	China National Statistical Yearbook 1996–2011 The Gross Domestic Product of China 1952–1995
Input-output ratio	Real Investment/Real GDP	China National Statistical Yearbook 1996–2011
Urbanization rate	The percentage of urban population	China National Statistical Yearbook 1996–2011
Education	The ratio of people who can read and write in the legal labors over the age of 15	China National Statistical Yearbook 1996–2011
UDGR	Urban residents disposable income growth rate	China National Statistical Yearbook 1996–2011
P	Natural population growth rate	China National Statistical Yearbook 1996–2011

Table 5 (1) Descriptive statistics of variables (annual)

Variables	Mean	Std.Dev	Min.	Max.
GDP	8.149014	1.028857	5.215859	10.46528
GINI	0.380665	0.058160	0.227500	0.490700
ER	618.6543	369.8888	135.6068	1827.946
Investment	7.288522	1.085636	4.278054	9.733855
Input-output ratio	0.451246	0.169465	0.205235	1.139656
Education	88.44654	6.769325	56.38000	98.30000
Urbanization rate	0.417122	0.162316	0.138600	0.893000
UDYR	1.094903	0.044259	1.000000	1.246041

Table 5 (2) Descriptive statistics of variables (3-year)

Variables	Mean	Std.Dev	Min.	Max.
GDP	8.256891	1.035836	5.390000	10.47000
GINI	0.382141	0.056804	0.229300	0.490700
ER	690.2842	401.3899	152.1559	1827.946
Investment	7.470088	1.091222	4.627946	9.733855
Input-output ratio	0.486736	0.185133	0.228221	1.139656
Urbanization rate	0.430641	0.161544	0.140400	0.893000
P	1.005937	0.003346	0.998200	1.014480

Table 6 (1) Correlation matrix of independent variables (annual)

	GINI	ER	Investment	Input-output ratio	Education	Urbanization rate	UDYR
GINI	1	0.346619	–0.095924	0.380601	–0.145045	–0.287195	0.315586
ER	–	1	0.723413	0.611739	0.502769	0.478009	0.478452
Investment	–	–	1	0.299470	0.685315	0.442675	0.377110
Input-output ratio	–	–	–	1	0.177591	0.215757	0.360824
Education	–	–	–	–	1	0.532616	0.309138
Urbanization rate	–	–	–	–	–	1	0.283000
UDYR	–	–	–	–	–	–	1

Table 6 (2) Correlation matrix of independent variables (3-year)

	GINI	ER	Investment	Input-output ratio	Urbanization rate	P
GINI	1	0.295157	–0.136757	0.380722	–0.329569	0.404073
ER	–	1	0.734729	0.622644	0.475703	–0.209873
Investment	–	–	1	0.296451	0.449186	–0.560261
Input-output ratio	–	–	–	1	0.171793	0.042786
Urbanization rate	–	–	–	–	1	–0.554540
P	–	–	–	–	–	1

while the vector x_{it} includes current or lagged values of a number of control variables. It include GINI coefficient at t-1, investment index at t, and the Natural population growth rate at t-1. μ_{it} is an error term.

In the model of polarization-growth, the estimated equation takes the following form:

$$y_{it} = \alpha y_{i,t-1} + \beta x_{it} + \mu_{it}$$

Where i=1, ⋯ , N denotes a province and t=1, ⋯, T is time with t and t-1 one-year apart. The variable y is real GDP per capita growth rate. The vector x_{it} includes current or lagged values of a number of control variables. It include ER coefficient, GINI coefficient and the Natural population growth rate at t-1, investment growth rate, consumption growth rate and UDGR at t. μ_{it} is an error term.

The standard estimation methods (like OLS, fixed-effects or random-effects model for panel data) do not account for the dynamic structure of the estimated equation. The presence of a lagged dependent variable means that the OLS estimator is biased and inconsistent. The main approach in estimating equation is to use the generalized method of moment (GMM) estimator (Michat Brzezinski, 2013). Moreover, in GMM model, the requirement on random erro term is relatively loose than other method, allowing the heteroscedasticity and dependence. In this article, EVIEWS 6.0 is adopted to esitmate the equation.

6 Result and discussions

Results of estimation are shown in Table 7. The first part of the table contains the usual information, including estimation method, time and the number of cross-section. The results are apart to two tables according to time interval. It is shown in Colum Coefficient (prob.) in both of Table 7(1) and (2) that the

Table 7 Estimation Results of Inequality (GINI index) and Polarization (ER index)

Dependent variable: GDP
Periods: 1996–2010
Cross-section: 24
Method: panel generalized method of moments
Effects specification: cross-section fixed

(1) Time interval: Annual

Variable	Coefficient (Prob.)		
GDP(-1)	1.054303 (0.0000)	0.993479 (0.0000)	0.957616 (0.0000)
GINI(-1)	1.414619 (0.0850)	0.501891 (0.0000)	0.344758 (0.0000)
ER(-1)	–0.000393 (0.0337)	–2.68E-05 (0.0136)	–3.93E-05 (0.0428)
Input-output ratio(-1)	–0.239147 (0.5229)	0.104038 (0.0012)	–
Investment(-1)	–	–	0.057138 (0.0000)
Education(-1)	0.001853 (0.2813)	–	–
UDYR	–0.024431 (0.7904)	–	0.032906 (0.1073)
Urbanization rate(-1)	–	0.021589 (0.1128)	–

(2) Time interval: 3-year

Variable	Coefficient (Prob.)		
GDP(-1)	1.138270 (0.0000)	1.139973 (0.0000)	1.093330 (0.0000)
GINI(-1)	0.962901 (0.0305)	1.004129 (0.0003)	0.957857 (0.0002)
ER(-1)	–0.000249 (0.0003)	–0.000252 (0.0312)	–0.000238 (0.0364)
Input-output ratio(-1)	0.132513 (0.0720)	0.134807 (0.0684)	–
Investment(-1)	–	–	0.046255 (0.1625)
Urbanization rate(-1)	0.300651 (0.0000)	0.295451 (0.0000)	0.291523 (0.0000)
P	–	2.551796 (0.4323)	0.764713 (0.8060)

coefficients of ER index and GINI index is inverse. The impact of inequality on economic growth is positive and the impact of polarization on economic growth is negative. The results of ER and GINI are significant in both annual and 3-year time interval. However, the invest indicators are almostly significant in annual time interval while the urbanization rate is significant in 3-year time interval. The education and population growth

indicators are insignificant in the models using them.

The coefficients of GINI are significant and positive in both annual and 3-years time interval at significance level of 10%, while the coefficients of ER are significant and negative in both annual and 3-year time interval at the same significant level. And the coefficients are aggressive over the subsequent 3-year period in long-term model. The results about negative impact of income polarization are similar with the results of Brzezinski's research (2013) using DER index and Wolfson index. The middle class plays an important role in linking distribution and growth through modelling the level of redistribution and stressing the size of domestic demand for manufactured goods (Zweimüller, 2000 and so on). And polarization can bring negative consequences for growth by leading to crime, social discontent and creating social conflicts (Esteban and Ray, 1994, 1999, 2011). The results about positive impact of income inequality are similar with the results of the research of Kochanowicz et al. (2013) using Theil index of China's data. They believe that inequality is inebitable and in some way also positive as motivating for work and innovation, then positively related to growth.

In the regression with annual time interval, the significant coefficients of investment and input-output ratio are positive. Investment and productivity in one-period lag is important factor of economic growth, however, investment index of absolute vaule lost its statistical significance over the subsequent 3-year period while the effect of input-output ratio is still positive and significant. In a long-term model, production efficiency has sustainable driving force for the regional development. The variables of urbanization and UDYR do not have significant coefficients in short-term model, while the coefficient of urbanization rate become significant and positive in long-term model. Rural surplus labor could be transferred to urban, leading to the increase of rural income level and regional demand size. The effect of urbanization on economic growth is valid in long-term model. The education variable in one-period lag is used in the short-term model, but insignificant. As the explaination in Section 5, the quality of data may lead to unsatisfactory result, although it is proved in literatures that education is a important factor to improve economic growth. The natural population growth rate in one-period lag is used in the long-term model, and insignificant.

7 Conclusions

The effects of inequality on growth are ambiguous through the mechanisms of accumulation, skills differences and arguments of political economy, stability or credit constraints. Polarization may affect growth in a negative way by leading to conflict and reducing of middle class which is related to increasing saving and promoting human capital, and creating demand for quality consumer goods.

GINI index and urban-rural ER index is adopted in this article. And the distributions of GINI and DER are not totally same regionally, which presents the different of inequality and polarization in definition.

The result of GMM regression on panel data of 24 provinces during 1996-2010 period shows that the impact of inequality on economic growth is positive and significant while the impact of polarization on economic growth is negativein and significant in both short-term model and long-term model. Intra-provincial inequality is a factor to promot economic growth, but the gap of "urban-rural" is harmful. The "urban-rural" development struction should be changed in the future, and the lives of labors who are from rural region should be improved.

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