

Economic inequality and economic growth*

Qi Su
Humboldt-University Berlin

Abstract

The paper enquires into the relationship between economic inequality and economic growth, but different from others, it also studies the relationship between inequality and economic growth in the situation where consideration of effect of factor movement is included. The paper tends to answer the questions such as whether inequality should be eradicated completely. Panel data models are used for the empirical study. Through the study, we aim to find out more clearly what are the effects of economic inequality on economic growth of the world, the developing countries, and the developed countries respectively, and what factors are helpful for economic growth and effectively cope with economic inequality.

JEL Classification: F22, F40

Key words: inequality, economic growth

* This is a preliminary version. Contact address: Qi Su, Humboldt-University Berlin, Institute of Management, Spaudauer Str. 1, D-10178, Berlin, Germany. Tel.: +49-30-2093-5672; Fax: +49-30-2093-5629. Email address: suqi@wiwi.hu-berlin.de.

1. Introduction

As well as in other sociological sciences, inequality is also discussed in economics. Inequality should be an economic problem first, and it can also be a political or a social problem in modern society. As one of different natures of inequality, the nature coming from economic sector should be the most important and determinant. It is natural that economists concern inequality more from its economic perspective. Insights from studying economic inequality are mainly obtained from research about structure of income distribution, its effect on economic growth, social stability and the like. In fact, these studies are far from providing an overall understanding to what inequality means to economic growth with distinct factors and time periods, within which, to the best of our knowledge, factor movement is seldom analyzed along with inequality and economic growth. That is to say, scientific knowledge about inequality and economic growth is still incomplete. In the paper, our aim rests on the relationship between economic inequality and economic growth, but different from others, we will also study the relationship between inequality and economic growth in the situation where consideration of effect of factor movement is included. Our paper also tends to answer the questions such as whether inequality should be eradicated completely.

We would study empirically the relationship between economic inequality and economic growth involved with factor movement. Through the study, we aim to find out more clearly what are the effects of economic inequality on economic growth of the world, the developing countries and developed countries respectively; what factors are helpful for economic growth and effectively fight against economic inequality. We hope the paper can provide intuition for further research and policy-making.

The rest of the paper is organized as follows: section 2 is theoretical review; section 3 is empirical studies; section 4 is summary and discussion and section 5 is conclusion.

2. Theoretical review

Theoretical attention in economic inequality has a long history. The thought of fair distribution can be dated back to classical economists like David Ricardo and left-wing theoretical masters like Karl Marx. These theorists have already recognized the importance of distribution in the society, and among different classes. Especially the latter strand points out extreme unfairness of distribution in productive materials and income is the root of severe confrontation between classes and social conflict. The strand believes a complete equity of

income distribution should be realized when the social welfare then can be maximized and social friction can be minimized. Its theory implies that economic growth would be sustained with the strict equal distribution.

A relatively moderate theory which has prevailed in the mainstream academia for about half a century is attributed to Kuznets (1955), which argues that income inequality would change as economic growth changes or more precisely, income inequality would rise first and then decline with economic growth. This theory is related with factor movement between sectors where there is inequality, which permits income distribution does not need to be fully equalized. This theory implies that fairer distribution may lead to higher productivity.

Theory of economic growth also has its rich theoretical background which can be dated back to Adam Smith. According to his point of view, economic inequality is unavoidable with no doubt, since he appreciates an economy with social division as much as possible. Higher social division leads to higher productivity and the income gap between classes with higher productivity and those with lower productivity has to widen naturally. It is obvious that Smith does not view economic inequality a key issue. Along the neoclassical tradition, even the main-stream growth theory since 1950s does not have manifest linkage with distribution. The reason may be neoclassical assumption leads to no welfare implication in income distribution dynamics (see Bertola, 2000).

The studies on the relationship between economic inequality and economic growth have reinvigorated gradually since the past twenty years. It is fairly obvious that this is because the analysis in this area has deviated from simple neoclassical framework by taking into account more realistic economic, political and social elements. Besides traditional theoretical studies, more empirical work has been conducted. However, there is still discrepancy of recognition of the relationship between these two variables.

For example, Persson, and Tabellini (1994) shows that there is significantly negative relationship between inequality and growth in democratic countries¹. On the contrary, Barro (2000) concludes that there is a negative relationship for poor countries, but a positive relationship for rich countries. With the finding that inequality in China and India comes along with their economic growth, Quah (2001) raises that inequality can increase or decrease economic growth.

As mentioned in Knowles (2001), inequality would do harm to economic growth in four ways: “the first argument is that an unequal distribution of income will lead to pressure for

¹ Milanovic (1994) argues that inequality in richer countries decrease because those countries can be aware to build up a fairer social environment.

redistribution through distorting taxes, hence reducing growth.... the second argument is that inequality may lead to socio-political instability, which will in turn reduce investment and hence growth... The third argument is that in the presence of imperfect capital markets inequality will reduce investment in human capital, which will in turn reduce growth... the fourth is that as inequality increases, fertility is likely to rise and human capital investment fall, both reducing growth... ”

And according to the growth model provided in Su (2001), if inequality is regarded as a negative factor to social institution (or environment), then elasticities of substitution of productive factors of the developed and the developing countries would be larger, causing less aggregate production and slower economic growth in both developed and developing countries. In other words, inequality is negatively correlated with economic growth, which is not necessary in a linear way.

More recent studies have involved economic inequality and economic growth with social environment spillovers (see Durlauf, 1994); human capital investment and neighbourhood effects (see Durlauf, 1996); social unrest and conflict (see Alesina and Perotti, 1996) and political economy (see Chang, 1998).

However, literature of inequality and economic growth related with factor movement is rarely explored. That is a main motivation for the paper.

3. Empirical studies

The above-mentioned arguments reflect inequality does not always have negative or positive effect on economic growth directly. That is to say, there could be more complex repercussion within the factors through which economic inequality and economic growth can be correlated. But in the empirical studies of economic inequality and economic growth, it seems that the relationship between them has been straightly assumed to be direct. And economic growth is often supposed to be caused by inequality, though there are also studies on the causality between them.

Many studies follow a growth regression of Barro-style expressed as follows (see Knowles, 2001):

$$Growth_i = Constant + \phi_1 GDP_i + \phi_2 MSE_i + \phi_3 FSE_i + \phi_4 PPPI_i + \phi_5 Ineq_i + e_i \quad (1)$$

The equation includes the information of growth of GDP per capita (as the endogenous variable standing for economic growth), income per capita (GDP), education of male (MSE, i.e., average years of male secondary schooling) and female (FSE, average years of female schooling), economic inequality (Ineq, income inequality) and investment (PPPI, PPP value of the investment deflator).

The difference of these studies mainly lies in the variation of data set² and adjustment of the variables³.

Since we are interested in the effect of factor movement on economic growth, following the way of the empirical approach⁴, in the paper, we study the relationship between inequality and economic growth with a similar framework, i.e., economic growth is assumed to be a dependent variable, inequality as an independent variable and their linear relationship, which has the following functional form:

$$ECONOMIC\ GROWTH=f(\text{Constant, INEQUALITY, FACTOR MOVEMENT, other variables}) \quad (2)$$

As an endogenous growth model, economic growth is modelled to be a joint effect of inequality, factor movement and the like.

Not exactly as (1), in the left-hand side of function (2), among others, we add up three variables to denote factor movement and one for market opportunity on the basis of the data we have. They are inflow of FDI, labour immigration and labour outflow and MARKETCA (market capitalization) respectively. Increase of market capitalization is assumed to be higher level of marketization. The last variable we plan to use is PAGR standing for population growth. The variable has been well considered to be relevant to economic growth and studied in the academia.

With regard to the most important variables, inequality and economic growth, we continue to use the traditional GINI index for inequality and annual growth rate of GDP per capita for economic growth.

² For example, Barro (2000) applies a ten-year panel data set while some other authors using a five-year data set (see Knowles, 2001).

³ For more details, Knowles (2001) can be referred.

⁴ However, Quah (2001) argues that panel data analysis is “exactly the wrong approach” for the study of inequality and economic growth. The reason it provides is that panel data analysis only can account for the very low proportion (“9% or so”) of variation in inequality or economic growth with ignoring the major part (“over 90%”). We do not agree to the point of view of his paper. We argue that it is panel data analysis itself that helps find out there are heterogeneities among different countries, which can be intuitive to pinpoint the roots of difference of effects of inequality on economic growth in these countries.

3.1. Data and the model

We are observing the relationship between inequality and economic growth from 1995 to 1999. The original data for the variables in these five years are obtained from the following sources: data for inequality is from the WIID (World Income Inequality Database of UNDP) and *World Development Indicators* of World Bank; data for FDI and MARKETCA is from *World Development Indicators* of World Bank; and data for LABIMMIG and LABOUTFL is from ILM (International Migration Database of ILO). In the database, only 30 countries and areas supply data for immigrants (we name it “LABIMMIG”, i.e., labour immigration in the paper), while 27 countries supply data for national abroad (we name it “LABOUTFL”, i.e., labour outflows here) till we finish the study. The level form of LABIMMIG and LABOUTFL is converted into percentage change by the author.

The empirical study contains two layers: one is in the scope of a group of 21 countries including developing, transition and developed countries; the other one is in the scope of developing and transition countries and developed countries respectively. And we also study two other groups (10 countries) of countries which have the data information for factor movement. The names of the countries are given in the appendix. Panel data models are used for all these studies.

Before we introduce the elements of factor movement, we would first estimate the basic forms of the three panel data models expressed as follows:

$$GDP_{it} = Cons + \alpha_{1i}GINIINDE_{it} + \alpha_{2i}MARKETCA_{it} + \alpha_{3i}PAGR_t + \varepsilon_{it} + u_i \quad (3)$$

$$UDGDP_{it} = Cons' + \alpha'_{1i}UDGINIIN_{it} + \alpha'_{2i}UDMARKET_{it} + \alpha'_{3i}UDPAGR_{it} + \varepsilon'_{it} + u'_i \quad (4)$$

$$DGDP_{it} = Cons'' + \alpha''_{1i}DGINIIND_{it} + \alpha''_{2i}DMARKETC_{it} + \alpha''_{3i}DPAGR_{it} + \varepsilon''_{it} + u''_i \quad (5)$$

where in three cases, economic growth is a dependent variable, with “UD” denoting “developing countries” and “D” “developed countries”. The estimated results for these three equations from (3) to (5) are given in tables 1 to 3 below.

3.2. Empirical results

3.2.1. economic growth, inequality, marketization and population growth

(1) for the group of 21 countries

Table 1:

	<i>With Group Dummy Variables</i>	<i>without Group Dummy Variables</i>	<i>Random effects model</i>
Constant		-3.2522 (-0.859)	-3.0736 (-0.829)
GINIINDE	0.1451 (0.719)	0.1828 (1.851)	0.1607 (0.639)
MARKETCA	0.04234 (1.115)	0.002366 (0.159)	0.00102 (0.639)
PAGR	0.00295 (0.098)	0.03103 (0.972)	0.0144 (0.551)
Obs.	37	37	37
Adj. R-squared	0.5314	0.04331	0.12304*

LM test: 11.93

Hausman value: 1.69

*: R-squared value

In table 1, three results for equation (3) are given, which are estimated by fixed effects model with group dummy variables, fixed effects model without group dummy variables and random effects model methods. This is also the case from tables 2 to 5.

We can see directly economic growth is positively correlated with inequality in all these three methods of measure, which means the higher inequality, the higher economic growth, though the estimated coefficients in the first and the third are not significantly different from zero.

From the table, increase of marketization is observed to lead to higher economic growth. And growth of population is also positively correlated with economic growth. But the statistic values of them are not satisfying.

LM test (whose value is 11.93) shows panel data models are better than traditional regression models and Hausman value equalling to 1.69 implies that the fixed effects model is better than random effects model. In our sample countries, there are 13 developing and transition countries and 8 developed countries (including Russia), therefore, the results from a fixed effects model with group dummy variables would be more reliable.

In the appendix, parameter covariance matrices (PCM) for fixed effects model with group dummy variables and random effects models are provided. From the PCM for table 1, we can know there is little collinearity among the dependant variables. The values of the country effects are provided also in the appendix. There are only three positive effects among the 21 countries, where the one of Russia is 6.257 (0.77440). What if Russia is deleted from the dataset for the 21 sample countries?⁵ The results are given by table 1’.

(1)’ when Russia is excluded from the group of 21 countries

Table 1’:

	<i>With Group Dummy Variables</i>	<i>without Group Dummy Variables</i>	<i>Random effects model</i>
Constant		-2.7733 (-0.818)	-2.8048 (-0.843)
GINIINDE	-0.03348 (-0.125)	0.1356 (1.515)	0.1316 (1.525)
MARKETCA	0.04109 (1.037)	0.01175 (0.885)	0.01416 (1.047)
PAGR	-0.02546 (-0.609)	-0.04473 (-1.163)	-0.03585 (-1.055)
Obs.	34	34	34
Adj. R-squared	0.3675	0.07648	0.16044*

LM test: 6.05

Hausman value: 1.85

*: R-squared value

Contrasting to the case (1), the fixed effects model with random group variables in the case (1)’ changes the positive sign into a negative one for the estimated coefficients of inequality and population growth. But whether the fact that higher inequality would lead to less economic growth is also valid in smaller groups of sample countries? For example, on the base of the 20 sample countries (where Russia has already been withdrawn), what is the effect on the sign of the estimated coefficients we are interested in if one more country is cancelled out? Table 1’’ records the changes.

⁵ The sensitivity of changes of estimated coefficients also appear in other literature. For example, Lorgelly and Owen (1999) finds that results of Barro and Lee (1994) are not robust when Hong Kong, Taiwan, Singapore and South Korea are removed (see Knowels, 2001).

Table 1’:

<i>Removal of the sample countries</i>	<i>GINIIND</i>	<i>MARKETC</i>	<i>PAGR</i>	<i>Adj. R-squared</i>
Argentina	-0.01446 (-0.053)	0.04008 (0.990)	-0.02443 (-0.573)	0.35608
Australia	0.01736 (0.0607)	0.2058 (2.008)	-0.0527 (-1.214)	0.46955
Brazil	-0.03348 (-0.125)	0.04109 (1.037)	-0.02546 (-0.609)	0.38661
Bulgaria	-0.09497 (-0.319)	0.04035 (0.986)	-0.02337 (-0.539)	-0.08994
China	0.06402 (0.17)	0.04365 (0.996)	-0.02105 (-0.448)	0.1857
Germany	-0.03348 (-0.125)	0.04109 (1.037)	-0.02546 (-0.609)	0.38593
India	0.02579 (0.083)	0.04149 (1.007)	-0.02263 (-0.514)	0.33584
Japan	-0.03348 (-0.125)	0.04109 (1.037)	-0.2546 (-0.609)	0.38407
Malaysia	-0.3348 (-0.125)	0.04109 (1.037)	-0.02546 (-0.609)	0.36838
Mexico	-0.03348 (-0.125)	0.04109 (1.037)	-0.02546 (-0.609)	0.38251
Netherlands	-0.01092 (-0.037)	0.3774 (0.873)	-0.03473 (-0.625)	0.35081
New Zealand	-0.03348 (-0.125)	0.04109 (1.037)	-0.02546 (-0.609)	0.38557
Nigeria	-0.03348 (-0.125)	0.04109 (1.037)	-0.02546 (-0.609)	0.38653
Pakistan	-0.03348 (-0.125)	0.04109 (1.037)	-0.02546 (-0.609)	0.38656
Poland	-0.05821 (-0.191)	0.04152 (0.951)	-0.03337 (-0.636)	0.304
Romania	0.003351 (0.012)	0.04016 (0.98)	-0.008073 (-0.151)	0.3178

Thailand	-0.005722 (-0.036)	0.02145 (0.9)	-0.02384 (-0.964)	0.7278
US	-0.03424 (-0.122)	0.04142 (0.971)	-0.02551 (-0.582)	0.34025
Venezuela	-0.1694 (-0.635)	0.03901 (1.044)	-0.03183 (-0.804)	0.4535

All the estimation in table 1'' is from fixed effects models with group dummy variables. The table informs that a relatively stable relationship between inequality and economic growth in a group of countries including developing, transition and developed countries can not be found. On the contrary, that positive relationships between economic growth and marketization and a negative one between economic growth and population growth appear more constant.

(2) for the group of 13 developing and transition countries

Table 2:

	<i>With Group Dummy Variables</i>	<i>without Group Dummy Variables</i>	<i>Random values model</i>
Constant		-1.2985 (-0.285)	-1.1574 (-0.289)
UDGINIIN	-0.1044 (-0.42)	0.04889 (0.371)	0.03653 (0.331)
UDMARKET	0.4907 (2.905)	0.09285 (1.539)	0.104 (2.042)
UDPAGR	-0.02833 (-0.594)	-0.1079 (-1.786)	-0.07431 (-1.713)
Obs.	22	22	22
Adj. R-squared	0.6747	0.1768	0.2944*

LM test: 3.89

Hausman value: 8.79

*: R-squared value

Bulgaria, Poland and Romania are obviously transition countries. We do not and can not include Russia for this sample group, for we do not have enough data for the study in this case if Russia is included.

Looking at the first column of table 2, we can find economic growth is negatively correlated with inequality. Similarly, the statistic result is also not significant. We do not need to worry about the positive coefficients in column 2 and 3 since we have a high Hausman value and better statistic results for other dependent variables in column 1.

A significantly positive relationship between economic growth and marketization is given. Population growth has negative impact on economic growth in this case.

To see whether the sign relationship between economic growth and these dependent variables is still valid for the developing countries, we withdraw the three transition countries from the dataset. The corresponding result is given in table 2’.

Table 2’:

	<i>with Group Dummy Variables</i>	<i>without Group Dummy Variables</i>	<i>Random values model</i>
Constant		4.5831 (1.322)	2.8211 (0.326)
UDGINIIN	-0.2784 (-0.547)	-0.07761 (-0.813)	-0.153 (-0.674)
UDMARKET	0.5625 (1.795)	0.08324 (1.243)	0.2251 (1.449)
UDPAGR	-0.3698 (-0.089)	-0.503 (-1.800)	-0.535 (-0.535)
Obs.	15	15	15
Adj. R-squared	0.01633	0.04711	0.2513*

LM test: 0.06

Hausman value: 2.66

*: R-squared value

In table 2’, the negative relationships between inequality and economic growth and between population growth and economic growth are still true. Higher level of marketization links positively with higher economic growth, which is also similar to the result in table 2. In addition, we notice that the sign relationships shown in columns 2 and 3 are both consistent with that in column 1.

The inference from both table 2 and 2’ is that in the sample developing countries within the period from 1995 to 1999, lower inequality, higher level of marketization and lower population growth rate would do good do their economic growth.

(3) for the group of 7 developed countries

Table 3:

	<i>With Group Dummy Variables</i>	<i>without Group Dummy Variables</i>	<i>Random values model</i>
Constant		-2.4519 (-0.591)	-2.445 (-0.779)
DGINIIND	0.2543 (2.185)	0.2805 (2.335)	0.2142 (2.604)
DMARKETC	0.02724 (1.86)	-0.03123 (-2.309)	-0.008317 (-0.863)
DPAGR	0.02 (0.814)	0.04537 (1.938)	0.02657 (2.18)
Obs.	15	15	15
Adj. R-squared	0.9007	0.5244	0.6263*

LM test: 0.00

Hausman value: 19.05

*: R-squared value

Due to the reason of missing data, we replace New Zealand with Canada which is not contained in the group of 21 sample countries originally.

On the contrary, the table 3 tells economic growth in the sample developed countries (including Russia) is positively correlated with economic inequality and population growth. Compared to table 2 or table 2', we can see the magnitude of the effect of marketization on economic growth is stronger in the case for developing countries.

Still opposite to the result in tables 2 and 2', there is a positive relationship between economic growth and marketization in the sample developed countries.

From the results of the fixed effects listed in the appendix, it is solely Russia whose country effect is positive 1.86959 (0.41731) while those of the rest of the developed countries are negative. As in the way we adjust for the case (1), we delete Russia from the 7 sample developed countries, and table 3' reports the new results.

Table 3' (when Russia is excluded):

	<i>With Group Dummy Variables</i>	<i>without Group Dummy Variables</i>	<i>Random values model</i>
Constant		1.2457 (0.778)	1.826 (0.766)
DGINIIND	-0.3173 (-1.485)	-0.00528 (-0.091)	-0.2852 (-0.394)
DMARKETC	0.01646 (2.059)	0.1946 (2.461)	0.02171 (3.378)
DPAGR	-0.313 (-1.805)	-0.00969 (0.464)	-0.01182 (-1.143)
Obs.	12	12	12
Adj. R-squared	0.71758	0.4877	0.6274*

LM test: 0.56

Hausman value: 2.09

*: R-squared value

It can be seen from the column 1 that the sign of estimated coefficient of inequality becomes negative, though its t value is not significant. Meanwhile, the signs of those of marketization and population growth do not change.

To show whether the relationship between inequality and economic growth is robust in terms of sign, we continue the same analysis as above for the sample developed countries excluding Russia. We remove a country one by one from the sample group without Russia and get the estimated coefficients for the inequality, marketization and population growth and the report is in table 3''.

Table 3’:

<i>Removal of the sample countries</i>	<i>DGINIIND</i>	<i>DMARKETC</i>	<i>DPAGR</i>	<i>Adj. R-squared</i>
Australia	-0.2239 (-0.318)	0.3485 (0.442)	-0.3068 (-0.791)	0.4311
Canada	-0.3173 (-1.485)	0.1646 (2.059)	-0.313 (-1.805)	0.7229
Germany	-0.3173 (-1.485)	0.01646 (2.059)	-0.313 (-1.805)	0.6714
Japan	-0.4084 (-0.625)	0.01678 (1.685)	-0.3047 (-1.396)	0.6548
Netherlands	-0.3173 (-1.485)	0.01646 (2.059)	-0.0313 (-1.805)	0.7179
US	-0.3121 (-1.139)	0.01639 (1.662)	-0.03094 (-1.408)	0.4958

LM test: 24.97.

Hausman value: 16.74

*: R-squared value

Tables 3’ and 3’’ have depicted more clearly the relationship of inequality and economic growth within the sample developed countries. As the case in the sample developing countries, economic growth is also negatively correlated with inequality in the sample developed countries excluding Russia. Comparing tables 2’ and 3’, we can find that higher inequality would be do more harm to economic growth in the sample developed countries than in the sample developing countries, but it is another way around for population growth. Combining tables 2, 2’, 3’ and 3’’, we can further confirm that higher level of marketization would be more beneficial for the sample developing countries.

3.2.2. economic growth, inequality, population growth and factor movement

To study the relationship of inequality and economic growth considering the effect of factor movement, we would make some changes to the equation (3) and have the equation (6) by including three variables FDI, LABIMMIG and LABOUTFL.

$$GDP_{it} = Cons + \alpha_{1i}GINIINDE_{it} + \alpha_{2i}MARKETCA_{it} + \alpha_{3i}PAGR_t + a_{4i}LFDI_{it} + a_{5i}LABIMMIG_{it} + a_{6i}LABOUTFL_{it} + \varepsilon_{it} + u_i \quad (6)$$

After the changes, the dataset for equation (3) becomes smaller since some countries which do not have data for labour immigration or labour outflows⁶ and we have to give up the variable for marketization because of a similar reason. For estimation of equation (6), we only have data for 10 countries (details are given in the appendix). The results are shown in table 4.

Table 4:

	<i>with Group Dummy Variables</i>	<i>without Group Dummy Variables</i>	<i>Random values model</i>
Constant		-3.324 (-0.53)	-6.836 (-0.866)
GINIINDE	1.3757 (3.171)	0.16 (1.107)	0.3052 (1.638)
PAGR	-0.6215 (-2.906)	-0.3991 (-0.845)	-0.07892 (-4.616)
FDI	0.2386 (2.635)	-0.1382 (-0.151)	0.00198 (2.205)
LABIMMIG	0.3073 (7.995)	0.6489 (1.032)	0.2439 (7.2)
LABOUTFL	-0.09732 (-7.342)	-0.01573 (-0.551)	-0.08428 (-6.909)
Obs.	16	16	16
Adj. R-squared	0.99463	-0.0708	0.2861*

LM test: 0.03

Hausman value: 14.31

*: R-squared value

The table concludes that economic growth is significantly positively correlated with inequality in the group of 10 countries.

⁶ For example, we do not have data for the labour outflows of the US, then its other data for GDP, LABIMMIG and so on are henceforth not included in the dataset.

It is obvious that inflow of factors is helpful to economic growth. Both FDI and LABIMMIG are significantly positively correlated with economic growth. LABOUTFL is significantly positively correlated with economic growth. The negative relationship still holds true between economic growth and population growth.

Except for the low LM test value, statistic results are significant for the fixed effects model with group dummy variables.

Due to the reason of lack of data, we can not go deeper to inquire the relationship of inequality and economic growth for developing countries and developed countries alone with this dataset.

4. Summary and discussion

Based on our empirical studies, we can not find that there is an overall stable relationship between inequality and economic growth which is also argued in Barro (2000). It is also the case with regard to the relationship between economic growth and population growth⁷. But we do find that there is manifest constancy existing in the positive relationship between economic growth and marketization. Though constrained to a small dataset, we can not give much analysis in the effect of factor movement on economic growth, the exciting point is that we have found out empirically that factor inflow would do good to economic growth while factor outflow does the opposite and the results are significant.

What is needed to be stressed is that it seems more likely that economic growth is negatively correlated with economic growth and population growth in the group of developing and transition countries and the group of developed countries both, at least in the sample countries and the sample years. In particular, the negative relationships are strong in the case for the six developed countries as mentioned above.

Therefore, our study partially confirms the hypothesis of Kuznets (1955) since the negative relationship between inequality and economic growth shows up much strongly in developed countries, but less in less developed countries⁸. Because there presents a positive sign for the relationship between inequality and economic growth in most groups of sample countries, it appears to be correct of the implication of Kuznets (1955) that inequality would

⁷ Bloom and Freeman (1986) found that there is a negative relationship between economic growth and population growth (see Bloom, Canning and Malaney, 1999).

⁸ We also notice a contradictory finding from Burtless (2001) arguing Kuznets's "...theory seems relevant in present-day China and India, but not in post-war Canada or United States."

be more likely to have negative relationship with economic growth. A similar point about the negative effect of inequality on economic growth is also discussed in Knowels (2001).

How to cope with much better the relationship between inequality and economic growth? Obviously, there should be different ways in different countries. Since there still exists the situation reflected from the empirical results that higher or lower inequality can be possibly used to boost economic growth. Quah (2001) reads that “it has been remarked many times elsewhere that China’s fast-increasing per capita income came together with rises in inequality. ” If only based on Kuznets’s proposition, it seems to be a “certainty” that there should be more inequality in income distribution in developing countries. But is it justifiable enough or necessary to permit this kind of positive relationship? We notice a counter-example described in World Bank (2001) about pro-poor growth in India. The pro-poor growth successful in a country like India where agricultural population occupies the most proportion of the whole population should be paid attention to by other similar developing countries.

China is a country similar to India in population, whereas there are a lot of more other differences embodied in economic structure, religion, political system and other social institutions and natural resources.

In India, in World Bank (2001)’s words, “higher agricultural productivity is crucial for pro-poor economic growth”. But in China, the situation could be totally different. Higher agricultural productivity in China would lead to much more excessive farmers from the villages. Owing to various restriction policies on the population flows among cities and villages, these layoffs can not be well absorbed by employment markets in the cities and work placements in other areas. Unlike India, China’s current economic policy would be more biased to industry and service whose contribution to economic growth has far surpassed that of agriculture. China’s industrial and service output composes of 82.3⁹ percent of GDP. Raising industrial productivity is more crucial than raising agricultural productivity in China’s case. Therefore, increase of income in industries and service in China can not satisfactorily spread to those agricultural areas and thus, the gap of income distribution among people in China inevitably widens with economic growth over years.

Also unlike India, China does not have such many people living under poverty line as India does. According to *The World Factbook* (2001), “more than a third of the population (of India) is too poor to be able to afford an adequate diet. ” That is to say, India’s pro-poor economic model may not be exactly suitable for China’s economic growth and development,

⁹ See *China Statistic Yearbook* 2001.

at least for the past more than 20 years and now. In fact, China's policies of pro-industry and "opening to the outside world" have made outstanding economic achievements since 1978.

However, the pro-poor economic growth can be an important reference for China's future economic development, not only because of the more seriously widening inequality among social classes, or a stagnant trend of world economy, but also for the consideration of more sustainability in the future.

China still has 69.11%¹⁰ agricultural population. Measures to give more credit to economic growth in agricultural and remote areas does not necessarily mean there will be immediate substantial economic growth, but inequality between the areas and those coastal areas is expected to decrease which can be absolute or relative. In a period of foreseeable time, it is possible that inequality would be even higher between areas and between social classes since there is more formation of new markets for the industrial and service sectors, and the catch-up process is similar to the case among developing countries and developed countries, but it is inevitable that the measures would bring more or less opportunities to the people in those agricultural and remote areas. Attainment of more opportunities is also proposed in the World Bank (2001) which works as one of the four standards judging whether positive relationship between inequality and economic growth is viewed as a negative factor to a country¹¹.

These opportunities are certainly economical at first. Development of new markets is also a process for a higher level of marketization, which would benefit economic growth. But opportunities in non-economic sectors like religious, political ones and so on can be evolved from those in economic sectors. In fact, imperfection of rights and opportunities in the non-economic sectors causes should account for economic inequality to a large extent.

People should deserve to be given more opportunities, which are not necessary to be limited in the economic sector. To give people more opportunities is not only helpful for more excavation of productivity and encouraging innovation, but also for creating a more harmonious social environment. On the one hand, a sound social environment is beneficial to economic growth. On the other hand, hindrance of opportunities would be apparently or potentially detrimental to productivity, economic growth and social stability.

Barro (2000) argues that "inequality of wealth and income motivates the poor to engage in crime, riots, and other disruptive activities". It seems the assertion lacks of consideration of

¹⁰ See *China Statistic Yearbook* 2001.

¹¹ The other three include "the incomes at the bottom rise or at least do not fall"; "the observed trends are not the result of dysfunctional forces such as discrimination" and "the number of poor people falls".

endowment of opportunities for people in more social sectors. People do not need to intend to go in for activities damaging economic and social stability if they are treated more fairly and equally in non-economic sectors. If they really want to do so, they can seek a legal and peaceful channel rather than resort to violence and crimes. It is natural if poor people can equally voice their economic dissatisfaction or misery out to the society, and their righteous demand are treated fairly, they do not need to take extreme measures to pour out their dissatisfaction in the society. Without sanitary social framework, pure economic exchange and arbitrage can easily turn into excessive and disordered which would probably result in an enlarging gap of economic inequality and chaos. It is just the fault of ignorance of religious, political and other social rights and interests of those people who are at the margin of the society in terms of economic wealth that causes social instability¹².

From the empirical studies, we find that there is rather robust negative relationship between inequality and economic growth in the six developed countries. The fact is obviously associated with more opportunities provided and more mature economic and social environment in these countries. Compared to most developing countries, they are all mature market economy countries with almost free investment environment and better economic foundation. They also have relatively more perfect social institutions including social security, legal, and political systems. Even suppose everything is the same in all the developing and developed countries but economic power, the latter ones are more competent to fight against inequality through income redistribution.

The study also has the following findings noticing the estimated parameter covariance matrices in the appendix:

(1) marketization and inequality are more likely to have a negative relationship in developing and transition countries and a positive relationship in developed countries;

(2) population growth and inequality are more likely to have a positive relationship in developing countries and a negative relationship in developed countries;

(3) it seems that factor movement does not help reduce the level of inequality in the group of 10 countries comprising both developing and developed countries¹³;

¹² Similar arguments have also been raised in World Bank (2001), “institutional factors are also important for growth. ... there is evidence that strong rule of law and the absence of corruption contribute to growth—by providing a fair, rule-based environment in which firms and households can invest and grow”.

¹³ In fact, factor inflow sometimes may even weaken the endeavor of cutting the level of inequality. For example, Razin, Sadka, and Swagel (1998) raises unskilled immigration may reduce the amount of redistribution (see Facchini and Willmann, 2001).

(4) FDI inflow and labour outflow are all positively correlated with population growth, while a negative relationship lies within the pair of labour immigration and population growth.

These results are intuitive for macroeconomic policies also. The first one suggests that developing transition countries should not worry too much whether higher marketization would bring forth increase of inequality. At least, to the sample developing countries, marketization may not be a determinant factor causing divergence in income distribution.

The second one transfers a signal or another evidence that developing countries should care more the issue of fertility. Given the circumstances of current market opportunities, social security and the like, population growth without valid restriction may only lead to more economic and social problems. On the contrary, intriguing suitable population growth can be helpful in rendering less inequality.

The third one argues that introducing factors inflow may not be a good way against economic inequality, though it is helpful for economic growth.

The fourth one reflects the fact that a looser policy in immigration may be useful in dealing with a decreasing population.

In addition, our study conveys a piece of information that to fulfil absolute equity is hardly possible unless the goal of sustainable economic growth is given up or the process of pursuing higher marketization stops. This is particularly true in developed market economy countries.

Then we return to the question raised in the introduction of the paper, i.e., whether inequality should be eradicated completely. The answer has been given from the above analysis, which is of course negative! Mises (1955) has provided a theoretical support, obviously arguing against a full equalization of income distribution. It is senseless to force an absolute equity since it will only lead to destruction of the process of marketization, increase of productivity, and stagnation or inefficient growth of economy.

Inequality, or economic inequality once again, therefore, is expected to be existent for a long run. But inequality forcibly augmented by artificial elements should be eliminated beyond doubt in order for a better economic environment and sustainable social institutions.

5. Conclusion

Studies of inequality and economic growth have been well conducted by many other scholars and organizations. But there is still more work needed to be done in this research

area. Though this paper has brought factor movement to an issue, we have not taken into account what the reasons of driving the mobility are, which can contain economic and non-economic ones. Additionally, as in most of other literature, non-economic factors like political or social institution are not analyzed here. Involvement of these non-economic elements would constitute our further research in inequality and economic growth.

Reference:

- Alesina, A. and R. Perotti (1996), "Income distribution, political instability, and investment," *European Economic Review* 40, pp. 1203-1228
- Barro, R. J. (2000), "Inequality and growth in a panel of countries," *Journal of Economic Growth* 5, pp. 87-120.
- Barro, R. J. and J. W. Lee (1994), "Sources of economic growth," Carnegie-Rochester Conference Series on Public Policy, 40.
- Bertola, G. (2000), "Macroeconomics of income distribution and growth," in A.B. Atkinson and F. Bourguignon (eds.), *Handbook of income distribution*, Vol.1, Amsterdam: North-Holland.
- Bloom, D., D. C., and P. Malaney (1999), "Population change and economic development: the great debate revisited," CAER II Discussion Paper No. 46.
- Bloom, D. and R. B. Freeman (1986), "The effects of rapid population growth on labour supply and employment in developing countries," *Population and Development Review* 12, pp. 381-414.
- Chang, R. (1998), "Political party negotiations, income distribution, and endogenous growth," *Journal of Monetary Economics* 41, pp. 227-255.
- Durlauf, S. N. (1994), "Spillovers, stratification, and inequality," *European Economic Review* 38, pp. 836-845.
- Durlauf, S. N. (1996), "A theory of persistent income inequality," *Journal of Economic Growth* 1, pp. 75-93.
- Facchini, G., and G. Willmann (2001), "The political economy of international factor mobility," SIEPR discussion paper No. 00-20, Stanford University.
- Knowles, S. (2001), "Inequality and economic growth: The empirical relationship reconsidered in the light of comparable data," mimeo.
- Kuznets, S. (1955), "Economic growth and income inequality," *American Economic Review* 45, pp. 1-28.
- Lorgelly, P. K. and P. D. Owen (1999), "The effect of female and male schooling on economic growth in the Barro-Lee model," *Empirical Economics* 24, pp. 537-557.
- Milanovic, B. (1994), "Determinants of cross-country income inequality: An augmented Kuznets hypothesis," World Bank Policy Research Working Paper 1246.
- Mises, von Ludwig (1955), "Inequality of wealth and incomes," in *Ideas on Liberty*, published by FEE.

- Persson, T. and G. Tabellini (1994), "Is inequality harmful for growth? Theory and evidence," *American Economic Review* 84, pp. 600-621.
- Quah, D. (2001), "How income inequality and economic growth matter," mimeo.
- Razin, A., E. Sadka, and P. Swagel (1998), "Tax burden and migration: a political economy theory and evidence," NBER working paper No. 6734.
- Su, Q. (2001), "Factor movement and economic growth," working paper, Institute of Management, Humboldt University of Berlin.
- World Bank (2001), *World Development Report 2000/2001*.

Appendix:

1. Data sources:

GINIINDE (Gini index): from World Bank's *World Development Indicators*.

MARKETCA (market capitalization, % of GDP): from World Bank's *World Development Indicators*.

PAGR (population average annual growth rate %): from World Bank's *World Development Indicator*, which can be found from <http://devdata.worldbank.org/data-query>.

GDP (Gross domestic product average annual % growth): from World Bank's *World Development Indicators*, which can be found from <http://devdata.worldbank.org/data-query>.

LABIMMIG (inflows of [im]migrants by sex, citizenship) : from <http://www.ilo.org/public/english/protection/migrant/ilmdb/ilmdb.htm>.

LABOUTFL (outflows of nationals by sex, destination): from <http://www.ilo.org/public/english/protection/migrant/ilmdb/ilmdb.htm>.

2. Fixed effects

(1) for the group of 21 countries

Estimated Fixed Effects

Group	Coefficient	Standard Error	t-ratio
1	-1.38491	9.66760	-.14325
2	-10.03560	11.94689	-.84002
3	-.35599	7.70688	-.04619
4	-6.68884	12.62699	-.52973
5	-11.95451	5.25692	-2.27405
6	2.98261	7.25514	.41110
7	4.07832	-8.06150	-.50590
8	.00160	7.38839	.00022
9	-5.24028	7.51284	-.69751
10	-3.59667	11.44063	-.31438
11	-3.57369	11.30758	-.31604
12	-5.48075	7.75100	-.70710
13	-9.20769	10.33366	-.89104
14	-4.31632	10.87830	-.39678
15	-2.28946	7.29809	-.31371
16	-1.60151	7.32973	-.21849
17	-5.73926	6.59295	-.87052
18	6.25679	8.07950	.77440
19	-9.73847	8.90837	-1.09318

20	-6.76328	10.47098	-.64591
21	-4.36864	9.77249	-.44703

The twenty-one countries are: Argentina, Australia, Bangladesh, Brazil, Bulgaria, China, Germany, India, Japan, Malaysia, Mexico, Netherlands, New Zealand, Nigeria, Pakistan, Poland, Romania, Russian Federation, Thailand, United States and Venezuela.

(1)' when Russia is excluded from the 21 countries

Estimated Fixed Effects

Group	Coefficient	Standard Error	t-ratio
1	6.77468	12.54747	.53992
2	-1.90272	14.28164	-.13323
3	5.67549	9.74110	.58263
4	3.86533	16.3165	.23690
5	-7.43657	6.89437	-1.07864
6	8.94066	9.30934	.96040
7	.61668	9.33613	.06605
8	6.04106	9.45207	.63912
9	.30145	9.25727	.03256
10	5.33410	14.34020	.37197
11	5.38324	14.32370	.37583
12	.04122	9.39305	.00439
13	-3.01797	11.97595	-.25200
14	4.61865	13.99348	.33006
15	3.28775	9.14665	.35945
16	3.71463	9.02814	.41145
17	-.01022	8.67798	-.00118
18	-2.17596	11.54994	-.18840
19	.79039	12.75034	.06199
20	3.86213	12.67701	.30466

(2) for the 13 developing countries and transition countries

Estimated Fixed Effects

Group	Coefficient	Standard Error	t-ratio
1	2.97935	8.83247	.33732
2	-5.93073	15.04672	-.39415
3	-5.77708	6.24173	-.92556
4	2.18304	8.67949	.25152
5	-5.39111	9.26160	-.58209
6	-33.16996	18.45434	-1.79741
7	-4.55012	13.36893	-.34035
8	4.10436	12.80319	.32057
9	-.48073	8.31956	-.05778
10	1.94107	8.47451	.22905
11	1.72828	7.90578	.21861
12	-18.67761	11.68229	-1.59880
13	.21735	11.57319	.01878

The thirteen countries are: Bangladesh, Brazil, Bulgaria, China, India, Malaysia, Mexico, Nigeria, Pakistan, Poland, Romania, Thailand and Venezuela.

(2)' for the 10 developing countries

Estimated Fixed Effects

Group	Coefficient	Standard Error	t-ratio
1	8.21461	17.65747	.46522
2	1.64661	24.97672	.06593
3	5.42407	15.97417	.33955
4	-1.31760	17.71286	-.07439
5	-30.97697	27.86936	-1.11151
6	-1.88921	46.47636	-.04065
7	10.89433	21.12368	.51574
8	3.85547	14.30595	.26950
9	-12.25538	38.38826	-.31925
10	6.42015	18.90234	.33965

(3) for the 7 developed countries

Estimated Fixed Effects

Group	Coefficient	Standard Error	t-ratio
1	-12.17464	6.25029	-1.94785
2	-7.85231	4.17433	-1.88110
3	-6.70662	4.37676	-1.53232
4	-7.77005	3.96753	-1.95841
5	-6.94188	3.94876	-1.75799
6	1.86959	4.48013	.41731
7	-9.34564	5.60643	-1.66695

The seven countries are Australia, Canada, Germany, Japan, Netherlands, Russian Federation, and United States.

(3)' when Russia is excluded from the group of 7 developed countries

Estimated Fixed Effects

Group	Coefficient	Standard Error	t-ratio
1	15.08399	10.07378	1.49735
2	11.24423	7.07124	1.59014
3	10.59660	6.52816	1.62321
4	10.21860	6.70577	1.52385
5	10.78795	6.54829	1.64744
6	15.78835	9.30675	

The six countries are Australia, Canada, Germany, Japan, Netherlands, and United States.

(4) For table 4

Estimated Fixed Effects

Group	Coefficient	Standard Error	t-ratio
1	-42.88625	19.79743	-2.16625
2	-56.95508	19.25256	-2.95831
3	59.84973	-20.74155	-2.88550
4	-41.74461	15.56818	-2.68141
5	-76.26544	26.28978	-2.90095
6	-44.31157	15.12648	-2.92940
7	-27.51807	13.54861	-2.03106
8	-36.96319	12.44316	-2.97056
9	-59.26028	17.87259	-3.31571
10	-54.96919	17.45421	-3.14934

The ten countries are Armenia, Australia, Finland, New Zealand, Nicaragua, Poland, Romania, Slovenia, Thailand, United Kingdom,

3. Estimated parameter covariance matrix:

For all the 21 sample countries

1. with group dummy variables

	GINIINDE	MARKETCA	PAGR
GINIINDE	.4075109D-01	.7738338D-03	-.1210785D-02
MARKETCA	.7738338D-03	.1442593D-02	-.3381664D-05
PAGR	-.1210785D-02	-.3381664D-05	.9142537D-03

2. the random effects model

	GINIINDE	MARKETCA	PAGR	ONE
GINIINDE	.8756807D-02	-.1578860D-03	.1169457D-03	-.3288979D+00
MARKETCA	-.1578860D-03	.2519842D-03	.2118621D-04	-.5946427D-02
PAGR	-.1169457D-03	.2118621D-04	.6838489D-03	.3320784D-02
ONE	-.3288979D+00	-.5946427D-02	.3320784D-02	.1374158D+02

when Russia is excluded from the 21 countries

3. with group dummy variables

	GINIINDE	MARKETCA	PAGR
GINIINDE	.7153115D-01	.5542371D-03	.3419230D-02
MARKETCA	.5542371D-03	.1570078D-02	-.6273511D-04

PAGR	.3419230D-02	-.6273511D-04	.1745876D-02
------	--------------	---------------	--------------

4. the random effects model

	GINIINDE	MARKETCA	PAGR	ONE
GINIINDE	.7438077D-02	-.1935573D-03	.5049110D-03	-
MARKETCA	-.1935573D-03	.1828948D-03	-.2960925D-04	.2729781D+00
PAGR	.5049110D-03	-.2960925D-04	.1153944D-02	-.1501610D-01
ONE	-	-.1887322D-02	-.1501610D-01	.1107504D+02

For the developing countries and transition countries

1. with group dummy variables

	UDGINIIN	UDMARKET	UDPAGR
UDGINIIN	.6190929D-01	-.7456089D-02	.4288885D-03
UDMARKETC	-.7456089D-02	.2853517D-01	.7935838D-03
UDPAGR	.4288885D-03	.7935838D-03	.2277188D-02

2. the random effects model

	UDGINIIN	UDMARKET	UDPAGR	ONE
UDGINIIN	.1216864D-01	-.2617237D-02	.6016885D-03	-
UDMARKET	-.2617237D-02	.2591467D-02	-.9559574D-04	.4118710D+00
UDPAGR	.6016885D-03	-.9559574D-04	.1881294D-02	-.1873589D-01
ONE	-	.4337330D-01	-.1873589D-01	.1602394D+02

For the developing countries

1. with group dummy variables

	UDGINIIN	UDMARKET	UDPAGR
UDGINIIN	.2590939D+00	-.7920345D-01	.1252450D+01
UDMARKETC	-.7920345D-01	.9822925D-01	-.7558664D+00
UDPAGR	.1252450D+01	-.7558664D+00	.1743089D+02

2. the random effects model

	UDGINIIN	UDMARKET	UDPAGR	ONE
UDGINIIN	.1113862D+00	-.2009163D-01	.1317097D+00	-.4002892D+01
UDMARKET	-.2009163D-01	.2469661D-01	-.5759774D-01	.5130091D-01
UDPAGR	.1317097D+00	-.5759774D-01	.8661166D+00	-.2791373D+01
ONE	-.4002892D+01	.5130091D-01	-.2791373D+01	.1817780D+03

For developed countries

1. with group dummy variables

	DGINIIND	DMARKETC	DPAGR
DGINIIND	.1128338D-01	.2627038D-03	-.4751552D-03
DMARKETC	.2627038D-03	.1786731D-03	-.5332181D-05
DPAGR	-.4751552D-03	-.5332181D-05	.1522767D-03

2. the random effects model

	DGINIIND	DMAREKTC	DPAGR	ONE
DGINIIND	.3239562D-03	-.1555777D-03	-.1441105D-03	.5492661D-02
DMAREKTC	-.1555777D-03	.1406344D-03	.8572925D-05	-.6917258D-02
DPAGR	-.1441105D-03	.8572925D-05	.1388254D-03	.3815647D-02
ONE	.5492661D-02	-.6917258D-02	.3815647D-02	.3104817D+01

1' with group dummy variables (when Russia is excluded)

	DGINIIND	DMARKETC	DPAGR
DGINIIND	.4567922D-01	.6036573D-03	.3113946D-02
DMARKETC	.6036573D-03	.6395051D-04	.3784514D-04
DPAGR	.3113946D-02	.3784514D-04	.3005889D-03

2' random effects model

	DGINIIND	DMAREKTC	DPAGR	ONE
DGINIIND	.5250351D-02	-.1810204D-03	.3781814D-03	-.1636314D+00
DMAREKTC	-.1810204D-03	.4132398D-04	-.2008269D-04	.1958658D-02
DPAGR	.3781814D-03	-.2008269D-04	.1070287D-03	-.1082325D-01

ONE	-	.1958658D-	-	.5681624D+01
	.1636314D+00	02	.1082325D-	01

For factor movement

With group dummy variables

	GINIIND	PAGR	FDI	LABIMMIG	LABOUTFL
GINIIND	.1882711D+00	.5444185D-	.2939623D-	.4225388D-	.8145999D-
		02	04	02	04
PAGR	.5444185D-02	.4575317D-	.2315936D-	-.3016763D-	.1264348D-
		03	05	03	03
FDI	.2939623D-04	.2315936D-	.8198378D-	.9161749D-	-.3425269D-
		05	06	05	05
LABIMMIG	.4225388D-02	-.3016763D-	.9161749D-	.1477012D-	-.4836471D-
		03	05	02	03
LABOUTFL	.8145999D-04	.1264348D-	-	-.4836471D-	.1757146D-
		03	.3425269D-	03	03
			05		

Random effects model

	GINIINDE	PAGR	FDI	LABIMMIG	LABOUTFL	ONE
GINIINDE	0.0347328	0.00105769	3.90781e-	0.000411391	0.000153437	-1.428
			007			
PAGR	0.00105769	0.000292355	1.83871e-	-0.000318297	9.78856e-005	-0.0486789
			006			
FDI	3.90781e-007	1.83871e-006	8.065e-007	7.32288e-006	-3.02006e-006	6.33305e-005
LABIMMIG	0.000411391	-0.000318297	7.32288e-	0.00114722	-0.000402483	0.000654411
			006			
LABOUTFL	0.000153437	9.78856e-005	-3.02006e-	-0.000402483	0.000148781	-0.0125571
			006			
ONE	-1.428	-0.0486789	6.33305e-	0.000654411	-0.0125571	62.3094
			005			
