A Research Note on the Regional Trend of Income Inequality in Asia : Kuznets Hypothesis Revisited

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https://doi.org/10.15017/15746

出版情報：經濟學研究. 74 (2), pp.83-100, 2007-10-30. 九州大学経済学会
バージョン：
権利関係：

A Research Note on the Regional Trend of Income Inequality in Asia

—Kuznets Hypothesis Revisited[1]—

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1. Introduction

Many Asian countries have experienced the rapid economic growth. The rapid economic growth in this region has been initiated by Japan, followed by the Asian newly industrialized countries (NICS) and the Southeast Asian countries. Recently, China and India follow this path and indicate the remarkable growth rates. The regional economic development, in terms of the increase of income level, is shown to be the historical achievement, however we also need to pay attention to the other side of the story: the issue of income distribution. Many studies have been conducted for this old and still now consequent topic. Simon Kuznets, for example, suggests the well-known inverted U curve hypothesis, hereafter the Kuznets hypothesis, for the income-inequality relationship associated with economic development.[2] According to this Kuznets hypothesis, income inequality aggravates in the initial stage of economic development but it will gradually improve afterwards. The examination of this Kuznets hypothesis may provide the consequent policy implications in developing countries. If the Kuznets hypothesis is universally confirmed, developing countries may emphasize the development strategies which mainly focus on the increase of income level since income inequality will be gradually improved over time upon development. On the other hand, additional policies toward the equal society will be sought if income inequality is not automatically improved over time with development.

In this paper, we examine the Kuznets hypothesis with using the recently renewed database of World Income Inequality Database version 2 (WIID2)[3] by UNU-WIDER (United Nations University, World Institute

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1) This paper is the English version of Osaka (2002, 2005) with major revisions and new estimates. Moreover, it is submitted without formal English editing. The earlier version of this paper (Osaka, 2007) was presented at the workshop among Kyushu University (Japan), Renmin University of China, and Nanjin University (China), which was held in 21 September 2007 at the Renmin University of China, Beijing, China. It should be also noted that the financial assistance is from the Japan Society for the Promotion of Science (JSPS, No: 17530215).

2) For example, see Kuznets (1955).

3) In this paper, WIID2 is equal to WIID2b of UNU-WIDER (2007).

for Development Economics Research, 2007). In Chapter 2, we briefly overview the relevant literature for the Kuznets hypothesis. In Chapter 3, we first note our previous empirical studies and then conduct the regression analysis with WIID2. In Chapter 4, we additionally observe the supplemental data for the regional trend of income inequality in Asia and the Pacific, followed by the concluding remarks in Chapter 5.

2. Literature Review: A Brief Overview

Kuznets (1955) observes that income inequality initially worsens and later improves in the process of economic development. This Kuznets hypothesis stimulates the large volume of researches both for theories and applied analyses.

Many empirical analyses, for example, have been conducted for the Kuznets hypothesis, however the results are various and do not always support the hypothesis.[4] These empirical studies employ the cross-country data analysis for the examination as the sufficient time-series data of income inequality might be difficult to obtain.[5] Moreover, some researchers such as Person-Tabellini (1992,1994), Alesina-Rodrik (1994), and Alesina-Perotti (1996) pay attention to the impacts of income inequality on economic growth in the framework of political economics, and suggest that the larger income inequality may make the society instable which have the negative impacts on the investment activities and hence for the lower economic growth. In addition, Sarel (1997) highlights the macroeconomic variables which potentially improve income distribution.

3. Empirical Analysis

3.1 Previous studies for the Kuznets hypothesis: Osaka (2002, 2005)

We first briefly review Osaka (2002, 2005) which examine the Kuznets hypothesis with the cross-country data such as the databases of Deininger-Squire (1996) and UNU-WIDER (2000). The cross-country data analysis is dominant for the examination of Kuznets hypothesis perhaps due to the unavailability of the sufficient time-series data in the long-run.[6] However, as Deininger-Squire (1996) points out, the comparability among the cross-country data is crucial for the meaningful outcomes derived from such databases. In order to overcome the data comparability issue, Deininger-Squire (1996) selects 682 data over 108 countries from their surveys of about 2600 literature. The data selection of Deininger-Squire (1996) is based

4) See Osaka (2005) for the details of literature review. For example, Paukert (1973), Ahluwalia (1976), Leicallon *et al* (1984), Randolph-Lott (1993) and Jha (1996) support the Kuznets hypothesis whilst Saith (1983), Anand-Kanbur (1993), Deininger-Squire (1996) and Bruno-Ravallion-Squire (1998) do not support it.

5) For example, see Deininger-Squire (1996), p.565.

6) For example, see Deininger-Squire (1996), p.565.

upon mainly 3 categories such as the income receiving unit of household, person and family, the covered area and population, and the income definition such as income or expenditure. Among the selected data by Deininger-Squire (1996), there are 206 data over 22 countries for the Asian and Pacific region for 1950s-1990s: however, relatively less data for 1950s and 1990s, and more data available for 1970s and 1980s.

Osaka (2002) conducts the cross-country analysis for the Asian and Pacific countries based on the database of Deininger-Squire (1996), and obtains 3 main conclusions. First, the Asian NICS and the second generation of Asian NICS, *i.e.* the Southeast Asian countries, tend to exhibit the relatively higher Gini coefficients whilst both of the higher income countries and the lower income countries show the lower Gini coefficients. It appears to support the Kuznets hypothesis but it is not statistically supported. The econometric analysis shows that the regression results depend on the model specification, and it is not statistically robust.

Second, the common regional trend of income inequality for the Asian and Pacific countries is difficult to be observed. Moreover, income inequality is relatively increasing over time for Hong Kong, Singapore, Thailand, China, Australia, and New Zealand whilst it is declining over time for other countries, including Indonesia, Malaysia, India and Sri Lanka. Additionally, that for Japan, Taiwan, Pakistan, and the Philippines is rather stable during the sample period. Third, from the regression results which analyze the determinants of income inequality, the population growth rate, trade openness and the labor productivity difference between agriculture and industry are the variables which enlarge income inequality whilst the GDP growth rate improves income inequality whose results are in line with other literature.[7)]

Moreover, Osaka (2005) revisits the Kuznets hypothesis with the UNU-WIDER database(2000). UNU-WIDER(2000) expands the income inequality database of Deininger-Squire (1996). The version 1 of World Income Inequality Database (WIID1) by UNU-WIDER (2000) indicates 5067 data in total and counts for 2185 data among them as the highly reliable data with the whole population coverage. The classifications of WIID1 are based on the income sharing unit of household, family and person, and the definition of income which means income or expenditure.[8)] Osaka (2005) reports several findings in line with the previous studies and indicates that the Kuznets hypothesis is not supported, or conditionally supported at best since the regression results are model-dependent and not statistically robust. Moreover, the statistical significances of several explanatory variables also appear to

7) See Osaka (2002, pp.43-49) for details of the regression results.
8) See UNU-WIDER (2000) for details of classifications.

be model-dependent. Especially in the Asian and Pacific region, the higher trade openness and investment ratio worsen income inequality whilst the more industrial output and the higher economic growth lead to more equal distribution. In addition, the dummy variable for the income classification exhibits the statistical significance at 1%, and it suggests that the classification of income also matters. The dummy variable for the former Soviet and East European countries also tends to show the lower income inequality.[9]

3.2 Regression analysis with the UNU-WIDER database (WIID2, 2007)

In this Section, we re-examine the Kuznets hypothesis with the renewed database for income inequality by UNU-WIDER (2007), the version 2 of World Income Inequality Database (WIID2). UNU-WIDER (2007) constructs WIID2 upon the databases of Deininger-Squire (1996) and WIID1.[10] It implies that the construction of WIID2 is inspired by the researchers who are critical for the use of secondary data in studying income distribution, including Atkinson-Brandolini (2001).[11] Compared to WIID1, UNU-WIDER (2007) pays more attention to the conceptual base and the underlying data in order to construct WIID2. They indicate the conceptual base as the definitions of income or consumption / expenditure, the statistical units to be adopted, the use of equivalence scales and weighting.[12] UNU-WIDER (2007) initially reviews WIID1, and adds new estimates to the database of WIID2. It is noted that some previously selected data are reportedly deleted and replaced with updated estimates, and new estimates are also added. Moreover, the data duplication is avoided.[13] UNU-WIDER (2007) finally reports the total number of 4981 data for the database of WIID2. It further classifies the selected data into 4 categories of quality rating[14] upon the details of data information.

In our regression analysis, we employ the income inequality data of WIID2 up to

9) See Osaka (2005, pp.61-65, and Table 3-5) for details.
10) Please note that WIID1 itself includes Deininger-Squire (1996) database.
11) UNU-WIDER (2007), p.4.
12) Ibid.
13) See UNU-WIDER (2007) for the details of the construction of WIID2.
14) UNU-WIDER (2007, p.15) describes 4 quality ratings as given bellow.
Rating 1: for observations where the underlying concepts are known, and where the quality of the income concept and the survey can be judged as sufficient according to the criteria described.
Rating 2: for observations where the quality of either the income concept or the survey is problematic or unknown or UNU-WIDER has not been able to verify the estimates.
Rating 3: for observations where both the income concept and the survey are problematic or unknown.
Rating 4: for observations classified as memorandum items: the data lying behind the observations often are unreliable.
Moreover, the number of data for each rating from Rating 1 to Rating 4 is 1314, 1459, 1808, and 400, respectively. Please refer to UNU-WIDER (2007) and its database for details.

top 3 quality ratings since the quality rating 4 data appear to be possibly the highly unreliable observations among 4 ratings. Prior to the regression analysis, we moreover pay attention to the conceptual base and the underlying data as being suggested by UNU-WIDER (2007).

Upon the above procedure, we initially focus on 4581 income data[15] out of 4981, which are ranked as the top 3 quality ratings. We then select 2838 income data from 4581 data which cover all area, all population and all age of each sample country. Table 1 shows the details of the classification for selected 2838 income data upon the data information such as the income sharing unit, the statistical unit of analysis, and the equivalence scales as reported in UNU-WIDER (2007).

Based on Table 1, the combination of the household unit for income sharing, the personal base for the unit of analysis, and household per capita for the equivalence scale indicates 1356 data, whose number is the largest among various combinations of the data information. Moreover, 1356 data are further classified into the different concepts of income: 279 for consumption, 64 for earnings, 98 for expenditure, 902 for income, and 13 for other income classifications.[16] Since "income" among the different concepts of income indicates the largest number, we focus on the income-based data of this classification for our regression analysis. Therefore, we finally select 902 income data which are classified as the household unit for income sharing, the personal base for the unit of analysis, household per capita for the equivalence scale, and the income-based data for the income definition. By doing such data classification, we believe that the following regression analysis is conducted among the highly comparable income data across countries. Moreover, our regression equation is specified as follows based on Osaka (2002, 2005).

$$Y = c + \alpha_x X + \alpha_i I + \alpha_d Dum$$

Here, the dependent variable, Y, is the income inequality data of LGINI (the Gini coefficents, log). The explanatory variables of X signify the income level data which are LGDPH and SLGDPH (GDP per capita in log and its squared value) whose data are often included for the examination of the Kuznets hypothesis. Other explanatory variables of I are also included in the regression in order to clarify the determinants of income inequality as being suggested by the previous literature. These data are LINDAGR (the share of industrial output relative to agricultural output, log), GDPGRLAG (the lagged GDP growth rate), POPGR (the population growth rate), LOPEN (trade openness, log), and LINV (the investment ratio, log).[17] We also

15) Please note that income data mainly mean the Gini coefficients in this analysis.
16) See the database of WIID2 for details (UNU-WIDER, 2007).

Table 1: Classification of Income Inequality Data
(WIID2: Quality Rating 1-3, Coverage of All Population, All Area and All Age)

IncomeSU	Obs	(Noc)	UnitAna	Obs	(Noc)	Equiv	Obs	(Noc)
Household	2415	(142)	Household	675	(71)	Household ①	19	(4)
						No adjustment	656	(70)
			Person ②	1740	(133)	Household ③	361	(34)
						Household per capita	1356	(131)
						Other Household ④	23	(3)
Family ⑤	223	(25)	Family	88	(10)	Family ⑥	7	(1)
						No adjustment	81	(10)
			Family and unrelated individuals	23	(1)	No adjustment	23	(1)
			Family unit	11	(1)	Family unit ⑦	10	(1)
						No adjustment	1	(1)
			Person	101	(18)	Family eq ⑧	60	(3)
						Family per capita ⑨	41	(17)
Person and others	200	(43)	Household	82	(19)	No information	82	(19)
			Family	4	(1)	No information	4	(1)
			Person	100	(25)	Person	7	(4)
						No adjustment	11	(3)
						No information	80	(19)
						Tax unit ⑩	2	(1)
			Tax Unit	1	(1)	No adjustment	1	(1)
			No information	13	(3)	No information	13	(3)
Total	2838	(146)		2838			2838	

Source: Author's arrangement based on UNU-WIDER (2007)
Note: the definitions for IncomeSU, UnitAna, Equiv and IncDefine are based on UNU-WIDER (2007). Moreover, see UNU-WIDER (2007) for details and the following information.
IncomeSU: income sharing unit
UnitAna: unit of analysis
Equiv: equivalence scale used
Obs: number of observations
Noc: number of countries
① : including "household eq" and "household sqrt"
② : including "person eq"
③ : including various "household eq"
④ : including "household adult eq" and "household, head of"
⑤ : including "census family", "economic family", "family unit"
⑥ : including "family eq"
⑦ : including "family unit eq"
⑧ : including "census family eq", "economic family eq", various "family eq"
⑨ : including "family per capita" and "family unit per capita"
⑩ : including "tax unit eq" and "tax unit per capita"

include 2 different sets of dummy variables in the regressions: one for the definitions of income and the other for the regions.[18] Consequently, the inclusion of various explanatory variables and dummy variables can be also regarded as for the robustness check of the regression whilst they are expected to provide the useful information for the determinants of income inequality. Moreover, our regression analysis for the Kuznets hypothesis is based on OLS with the pooling data. It is also noted that income data are averaged and used for the regression analysis if income data with the same classification show more than 2 observations for the same sampling year.

Tables 2 and 3 exhibit the regression results. Models 1-5 employ all available data.[19] Moreover, we attempt to test the robustness of the regressions of Models 4 and 5 by changing the number of observations in Models 6-11. As noted before, we only select the comparable income data for the regressions upon the data information by UNU-WIDER (2007) whose data availability for each sample country are various: for example, from 35 observations for Brazil to 1 observation for Sweden. We thus see how the different sample of observations may affect the regression results. In particular, Models 6 and 7 exclude the observations of HIC whilst Models 10 and 11 focus only on the countries in Asia and the Pacific including the Asian HIC. Moreover, Models 8 and 9 exclude the observations of the top 10 countries in terms of the number of observations.[20] By doing so, we may avoid the regression results which are influenced by the particular countries with the large observations.

From the regression results in Tables 2 and 3, we get the following 5 findings. First, the regression results do not strongly support the Kuznets hypothesis, which are more model-dependent. Models 1 and 2 appear to support the Kuznets hypothesis, but the inclusion of the regional dummies in Model 3 does not provide the same result and the statistical significances of both parameters of LGDPH and SLGDPH are declined. The signs of these parameters also changed. Figure 1 moreover exhibits the income-inequality relationship. Second, LINDAGR appears to be mostly statistically significant among the explanatory variables except LGDPH and SLGDPH. Since the higher income countries tend to produce more industrial output relative to the agricultural output, the negative parameters of LINDAGR

17) For example, the lagged GDP growth rate is used by Jha (1996), population growth rate by Ahluwalia (1976), and the investment ratio by Sarel (1997).

18) See Table 2 for the details of each dummy variable.

19) It should be noted that the inclusion of the explanatory variables reduces the total number of observations from 902 to 679 due to the data availability problem. See Tables 2 and 3 for details of the regression.

20) In our sample, we have 2 countries as the 10th largest sample country. We thus exclude 242 observations of 11 countries in Models 8 and 9.

Table 2: Regression Result 1 (Dependent variable: LGINI)

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
C	2.980	3.506	4.551	3.228	4.825
(SE)	**(0.352)	**(0.329)	**(0.347)	**(0.299)	**(0.353)
LGDPH	0.309	0.175	−0.125	0.446	−0.066
(SE)	**(0.089)	*(0.082)	(0.088)	**(0.076)	(0.088)
SLGDPH	−0.027	−0.017	0.004	−0.031	0.002
(SE)	**(0.006)	**(0.005)	(0.006)	**(0.005)	(0.006)
LINDAGR				−0.054	−0.035
(SE)				**(0.020)	*(0.016)
GDPGRLAG				0.006	0.002
(SE)				**(0.002)	(0.001)
POPGR				0.074	0.001
(SE)				**(0.007)	(0.006)
LOPEN				−0.077	−0.025
(SE)				**(0.016)	*(0.013)
LINV				−0.139	−0.095
(SE)				**(0.035)	**(0.027)
Dummy 1					
DumDisp		−0.258		−0.155	
(SE)		**(0.029)		**(0.026)	
DumMon		0.125		0.067	
(SE)		**(0.023)		**(0.020)	
DumGross		0.004		−0.010	
(SE)		(0.032)		(0.028)	
Dummy 2					
HIC			−0.304		−0.354
(SE)			**(0.109)		**(0.111)
EASIA			−0.097		−0.085
(SE)			(0.103)		(0.103)
SASIA			−0.300		−0.343
(SE)			*(0.118)		**(0.117)
LACAR			0.178		0.136
(SE)			+(0.100)		(0.100)
EUCASIA			−0.381		−0.389
(SE)			**(0.100)		**(0.102)
SSAF			0.170		0.139
(SE)			(0.106)		(0.105)
Obs	679	679	679	679	679
Noc	100	100	100	100	100
R2	0.224	0.371	0.731	0.532	0.741
σ	0.291	0.263	0.172	0.228	0.170
F-test	**97.53	**79.24	**227.5	**76.02	**146.3

Data Source: World Bank (2007) and UNU-WIDER (2007)
Note: **, *, +: 1%, 5%, 10% statistical significance, respectively
Obs: number of observations
Noc: number of countries
R2: goodness of fit
σ : standard error of regression

LGINI: Gini coefficient (%, log)
C: constant
LGDPH: GDP per capita (US$, 2000 price, log)
SLGDPH: squared value of LGDPH
LINDAGR: the share of industrial output relative to agricultural output (= ((industrial sector GDP)/(agricultural sector GDP))*100, %, log)
GDPGRLAG: lagged GDP growth rate (%, 1 lag)
POPGR: population growth rate (%)
LOPEN: trade openness ratio (= ((export + import)/GDP)*100, %, log)
LINV: investment ratio (= ((gross capital formation)/GDP)*100, %, log)
(SE): standard error
Dummy 1: income classification dummy (based on UNU-WIDER, 2007)
  DumDisp: disposable income
  DumMon: monetary income (strong indication that in-kind incomes, imputed rents and home production are not included)
  DumGross: gross income (before the deduction of taxes and social contributions)
Dummy 2: regional dummy (based on World Bank classification, 2007)
  HIC: high income countries (2004 GNI per capita was $10066 or more)
  EASIA: East Asian and Pacific countries (excluding HIC)
  SASIA: South Asian countries
  LACAR: Latin American and Caribbean countries (excluding HIC)
  EUCASIA: European and Central Asian countries (excluding HIC)
  SSAF: Sub-Saharan African countries

may indicate that the Gini coefficients tend to be lower in the higher income countries, whose observation is also supported by the statistical significances of the regional dummies of HIC in Models 3, 5 and 9. Interestingly, Models 10 and 11, the regressions only with the data of the Asian and Pacific countries, do not share this result. Third, explanatory variables of POPGR and LINV are also important for income inequality. Though these results are more model-dependent, we can find that the higher population growth tends to worsen income inequality whilst the higher investment ratio lowers income inequality across countries. However, these findings are not supported by the regressions for the Asian and Pacific countries in Models 10 and 11. Fourth, LOPEN also exhibits the contrasting results for the Asian and Pacific countries. Its parameters show the statistically significant positive signs in Models 10 and 11, but other regressions do not support it. It means that the increase of international trade worsens income inequality for the Asian and Pacific countries whilst it tends to improve income inequality for other countries. Fifth, two different sets of dummy variables validate these inclusions in the regressions. Especially, the parameters of the regional dummies possibly suggest the relatively lower income inequality for HIC, SASIA and EUCASIA, and the higher inequality for SSAF among sample countries. Interestingly, SASIA implies its lower income inequality across countries whilst it tends to be higher compared to EASIA, which is indicated in Tables 2 and 3.

In a nutshell, it should be noted here again that the Kuznets hypothesis is not sup-

Table 3: Regression Result 2 (Dependent variable: LGINI)

Variable	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11
C	2.720	2.777	2.948	4.278	0.389	−3.067
(SE)	**(0.641)	**(0.532)	**(0.316)	**(0.358)	(1.593)	+(1.763)
LGDPH	0.610	0.479	0.440	−0.011	0.685	1.490
(SE)	**(0.181)	**(0.143)	**(0.082)	(0.090)	+(0.406)	**(0.426)
SLGDPH	−0.039	−0.036	−0.031	0.003	−0.049	−0.107
(SE)	**(0.013)	**(0.010)	**(0.005)	(0.006)	(0.030)	**(0.032)
LINDAGR	−0.124	−0.051	−0.046	−0.068	−0.032	0.044
(SE)	**(0.025)	**(0.019)	*(0.022)	**(0.018)	(0.072)	(0.076)
GDPGRLAG	0.005	0.002	0.002	−0.0005	−0.010	−0.012
(SE)	**(0.002)	(0.001)	(0.002)	(0.002)	(0.006)	+(0.007)
POPGR	0.069	−0.004	0.054	0.012	−0.048	−0.003
(SE)	**(0.008)	(0.006)	**(0.007)	+(0.006)	(0.058)	(0.058)
LOPEN	−0.084	−0.004	−0.026	−0.006	0.160	0.184
(SE)	**(0.020)	(0.015)	(0.020)	(0.017)	*(0.069)	*(0.070)
LINV	−0.090	−0.059	−0.119	−0.037	0.183	0.227
(SE)	*(0.039)	*(0.030)	**(0.038)	(0.033)	(0.148)	(0.155)
Dummy 1						
DumDisp	−0.147		−0.121		−0.082	
(SE)	**(0.028)		**(0.029)		(0.073)	
DumMon	0.068		0.045			
(SE)	**(0.026)		+(0.024)			
DumGross	−0.007		0.055		0.139	
(SE)	(0.030)		+(0.033)		**(0.051)	
Dummy 2						
HIC				−0.414		
(SE)				**(0.112)		
EASIA		−0.079		−0.057		
(SE)		(0.103)		(0.102)		
SASIA		−0.259		−0.250		0.277
(SE)		*(0.118)		*(0.115)		**(0.075)
LACAR		0.166		0.120		
(SE)		+(0.100)		(0.099)		
EUCASIA		−0.378		−0.267		
(SE)		**(0.102)		**(0.101)		
SSAF		0.210		0.216		
(SE)		*(0.106)		*(0.103)		
Obs	524	524	437	437	50	50
Noc	78	78	89	89	11	11
R2	0.431	0.720	0.532	0.709	0.748	0.720
σ	0.241	0.170	0.211	0.167	0.122	0.127
F-test	**38.88	**109.2	**48.41	**79.41	**13.20	**13.17

Data Source: World Bank (2007) and UNU-WIDER (2007)

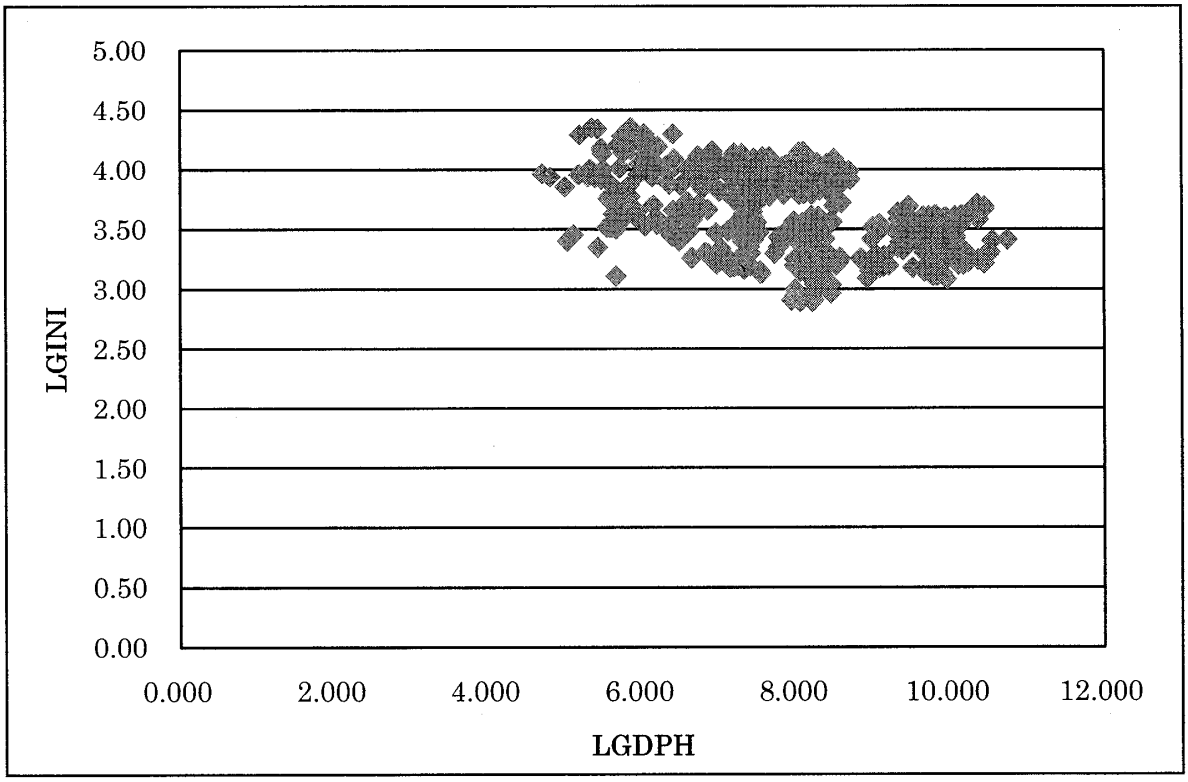
Note: same as Table 2, and additionally,

Model 6 and Model 7: HIC countries are excluded from the regression

Model 8 and Model 9: 11 countries are excluded from the regression due to their large sample size (those countries are Brazil, Chile, Hungary, Finland, Slovak Rep., Costa Rica, Bulgaria, Poland, Mexico, Italy, and Panama whose number of income data are the top 10 among countries. Moreover, there are two 10th countries)

Model 10 and Model 11: EASIA and SASIA are only sample countries

Figure 1: Income-inequality Relationship (Obs: 679)



Source: Author's arrangement based on UNU-WIDER (2007) and World Bank (2007)
Note:
Obs: number of observations
LGINI: Gini coefficient (%, log)
LGDPH: GDP per capita (US$, 2000 price, log)

ported, or conditionally observed at best. Moreover, the regional regressions for the Asian and Pacific countries may highlight the significance of LOPEN. In particular, many East Asian economies are well-known as being rapidly developed and the increase of international trade has been regarded as the engine of growth. However, our regression results suggest that the increase of international trade also may worsen income inequality in the region.

4. Supplementary Descriptive Data Analysis

The Kuznets hypothesis should be tested with the time-series data since it suggests the transition of income inequality in the process of economic development. However, as noted before, the sufficient time series data for income inequality are not easily available, especially for the longer period. Many researchers therefore employ the cross-country data instead. Our regression results show the statistical significances of some regional dummies which may indicate the regional peculiarities and imply that the cross-country analysis should be taken as suggestive at best. In this regard, we now turn to each country's income data for the Asian and Pacific countries in order to

supplement to our previous regression analysis.

Table 4 shows the details of income data for each sample country. We initially select 491 income data for 21 Asian and Pacific countries from 2838 data in WIID2 (quality ratings 1-3 with the coverage of all population, all area and all ages). We then focus on income data which provide the largest number of observations for each country with the longer period among various classifications. Since the classifications for each country's income data are various, we are not able to make the meaningful comparison across countries here. Instead, we just see the trend of income inequality for each sample country over time.

Table 4 and Figure 2 indicate the increasing trend of inequality across the region since 1980s with the exceptions of Malaysia, Indonesia and Japan whose income inequality are relatively stable over time. Thailand is the only country which shows the decreasing trend since 1980s. China, in particular, shows the rapid aggravation of income inequality since 1980s followed by Singapore, Taiwan and India. It is coincident with the rapid economic growth during the same period. Especially, it is along with the expansion of international trade especially for the East Asian countries, whose negative impacts on income inequality is also suggested in our regressions.

Moreover, we briefly review income disparity among the East Asian countries. The economic powers of East Asia are increasing over time. As noted in Maddison (2002), the United States stands as the most powerful economy in terms of real GDP (1990 PPP-based) in 1998, followed by China, Japan and India. Moreover, 5 East Asian countries enter the world top 20 largest economies as Indonesia is ranked as the 12th, South Korea as the 14th and Taiwan as the 20th in 1998.[21] The country-wide economic strength is influenced by the size of population of each country since the aggregate GDP tends to be larger for the country with large population. We thus review the income level per person.

Table 5 exhibits GDP per capita at the constant international dollar in 2000 (PPP-based) for selected East Asian countries and the United States over 1975-2004. We find some observations as follows. First, the income level of the Philippines increases very slowly over time, and it stays at almost same level. Second, China rapidly increases its income level and the current figure is now more than 9 times higher than that of 1975. Third, the income level of Hong Kong is now more than that of Japan and it is ranked higher in 2004. Moreover, Table 6 supplements the above observations, and indicates the income disparity between US and other East Asian countries is rapidly narrowing with the exceptions of the Philippines, and possibly Japan and Indonesia as well.

In a nutshell, Tables 5 and 6 indicate that

21) Maddison (2002), pp.1-2.

Table 4: Income Inequality Data in Asia (WIID2: Quality Rating 1-3, Coverage of All Population, All Area and All Age)

Country	IncomeSU	UnitAna	Equiv	IncDefine	Period	AVG	MIN	MAX	Year
Cambodia (4, 4)	Household	Person	Household per capita	Consumption	1990s	44.7	40.0	48.3	94, 97, 99
China (11, 35)	Household	Person	Household per capita	Income, disposable	1970s	31.7	–	–	78
					1980s	29.7	22.4	38.2	83, 85, 88
					1990s	36.8	29.0	45.2	91, 95-96
					2000s	43.1	39.0	45.4	00, 02-03
					All	36.1	22.4	45.4	
Fiji (2, 5)	Household	Person	Household per capita	Income, gross	1970s	43.8	–	–	77
					1990s	49.0	–	–	91
					All	46.4	43.8	49.0	
Hong Kong (10, 16)	Household	Household	No adjustment	Monetary income, gross	1960s	50.3	49.0	50.9	66
					1970s	43.0	42.0	43.8	71, 73, 76
					1980s	43.4	42.2	44.6	81, 86
					All	45.3	42.0	50.9	
Indonesia (15, 21)	Household	Person	Household per capita	Expenditure	1970s	35.5	34.0	37.0	76, 78
					1980s	33.2	30.8	35.7	80-81, 84, 87
					1990s	33.6	30.8	36.5	90, 93, 96, 99
					All	33.7	30.8	37.0	
Japan (28, 45)	Household	Household	No adjustment	Income, gross	1950s	34.1	32.2	36.0	56, 59
					1960s	37.0	34.8	39.1	62-65, 67-69
					1970s	37.2	34.6	41.9	70-79
					1980s	34.6	33.4	35.7	80-82, 85
					1990s	35.0	–	–	90
					All	36.4	32.2	41.9	
South Korea (6, 24)	Household	Person	Household eq, sq root	Monetary income, gross	1990s	33.7	31.7	37.2	92-93, 95-98
Lao (1, 1)	Household	Person	Household per capita	Consumption	1990s	36.5	–	–	97
Malaysia (8, 21)	Household	Person	Household per capita	Income, gross	1980s	49.8	48.0	51.5	84, 87, 89
					1990s	49.9	49.9	50.0	92, 95, 97
					All	49.9	48.0	51.5	
Mongolia (2, 2)	Household	Person	Household per capita	Consumption	1990s	38.6	33.2	44.0	95, 98
PNG (1, 1)	Household	Person	Household per capita	Expenditure	1990s	50.4	–	–	96
Philippines (8, 40)	Family	Family	No adjustment	Income, gross	1970s	46.6	–	–	75
					1980s	45.2	44.7	45.7	85, 88
					1990s	48.1	46.2	50.1	91, 94, 97
					2000s	48.6	47.9	49.4	00, 03
					All	47.3	44.7	50.1	
Singapore (6, 12)	Household	Household	No adjustment	Earnings, gross	1990s	44.7	43.6	46.7	90, 95, 97-99
					2000s	48.1	–	–	00
					All	45.3	43.6	48.1	
Taiwan (32, 57)	Household	Household	No adjustment	Income, disposable	1960s	33.0	32.8	33.1	64, 68
					1970s	28.9	28.1	29.9	70, 72, 74, 76-79
					1980s	29.0	27.7	30.1	80-89
					1990s	31.4	30.6	32.0	90-99
					2000s	34.2	33.9	34.5	01-03
					All	30.5	27.7	34.5	

Country	IncomeSU	UnitAna	Equiv	IncDefine	Period	AVG	MIN	MAX	Year
Thailand (18, 46)	Household	Household	No adjustment	Income, gross	1960s	42.5	40.8	43.8	62, 69
					1970s	45.9	42.8	48.9	71, 75
					1980s	47.3	45.2	48.8	81, 86, 88
					1990s	45.0	43.0	49.8	90,92,94,96,98-99
					2000s	43.8	42.7	44.8	00-01
					All	44.8	40.8	49.8	
Viet Nam (3, 4)	Household	Person	Household per capita	Consumption	1990s	35.9	34.4	37.3	93, 98
					2000s	36.8	—	—	02
					All	36.2	34.4	37.3	
Bangladesh (9, 30)	Household	Person	Household per capita	Consumption	1980s	27.0	25.9	28.8	83, 86, 88
					1990s	32.9	28.2	38.2	92, 96
					2000s	31.7	—	—	00
					All	29.6	25.9	38.2	
India (36, 54)	Household	Person	Household per capita	Consumption	1950s	34.9	33.8	36.9	51-59
					1960s	31.4	30.4	32.9	60-69
					1970s	30.7	28.9	31.9	70, 73-74, 77
					1980s	31.2	30.1	32.0	83, 86-89
					1990s	32.4	29.6	36.0	90-92, 99
					All	32.6	28.9	36.9	
Nepal (2, 7)	Household	Household	No adjustment	Income, gross	1970s	52.6	52.2	53.0	76, 77
Pakistan (23, 41)	Household	Household	No adjustment	Income	1960s	34.7	33.4	36.5	63, 66-69
					1970s	33.8	32.1	36.9	70-72, 79
					1980s	35.4	34.6	36.9	84-87
					1990s	40.9	40.7	41.0	90, 92
					All	35.1	32.1	41.0	
Sri Lanka (13, 24)	Household	Household	No adjustment	Income, gross	1950s	46.7	46.0	47.3	53
					1960s	45.8	45.0	46.6	63
					1970s	39.4	35.0	44.0	73, 79
					1980s	41.6	27.6	46.0	80, 82, 86
					All	42.3	27.6	47.3	

Source: Author's arrangement based on UNU-WIDER (2007)

Note: the definitions for IncomeSU, UnitAna, Equiv and IncDefine are based on UNU-WIDER (2007). Moreover, see UNU-WIDER (2007) for details.

IncomeSU: income sharing unit

UnitAna: unit of analysis

Equiv: equivalence scale used

IncDefine: income/expenditure definition

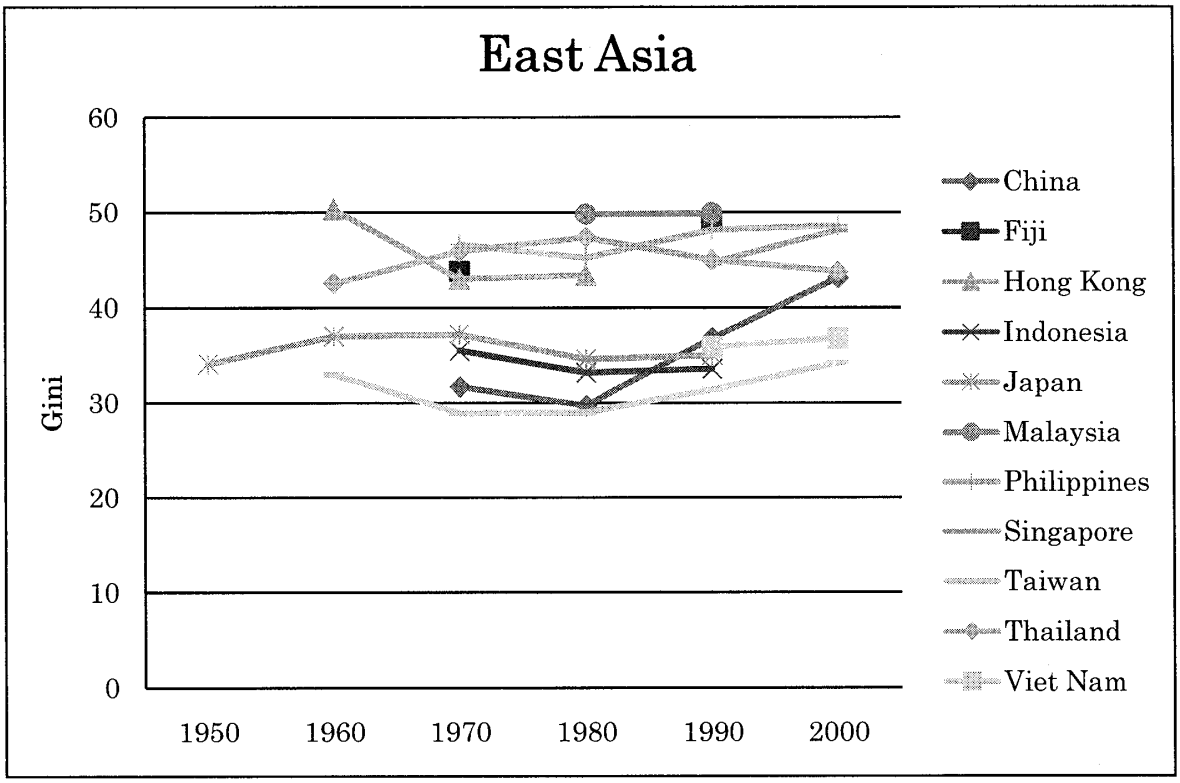
AVG: averaged Gini coefficient

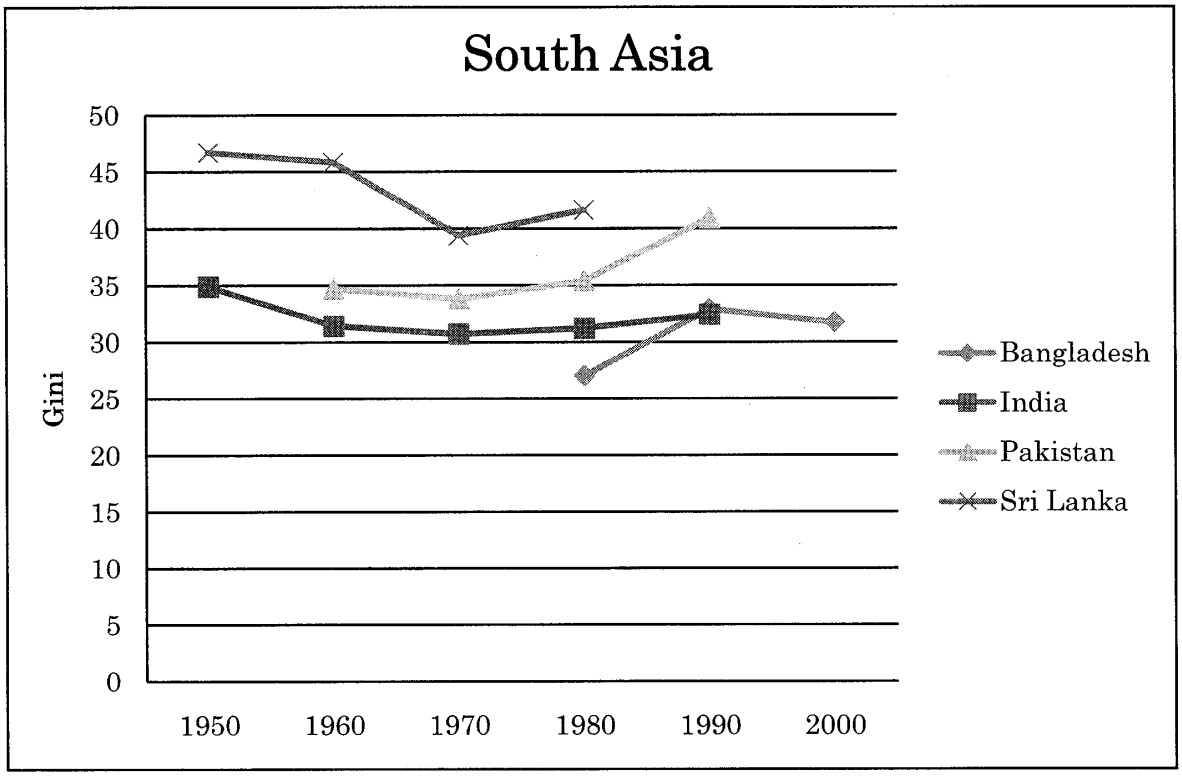
MIN: minimum value of Gini coefficients

MAX: maximum value of Gini coefficients

(A, B): A is the number of data used in this table, and B is the total number of available Gini coefficients for each country among 2838 data, including those used in this table

Figure 2: Gini Coefficients in Asia (Decade average)





Source: Author's arrangement based on UNU-WIDER (2007) and Table 4 (AVG data)
Note: The above table excludes the countries which provide only 1 AVG data in Table 4.

Table 5: Income Level in East Asia (1975-2004)

	1975	1985	1995	2004
US	19831 (1)	25167 (1)	30166 (1)	36465 (1)
Japan	14369 (2)	19136 (2)	25019 (2)	26884 (3)
Hong Kong	7683 (3)	14602 (3)	23471 (3)	28327 (2)
Singapore	6536 (4)	10826 (4)	19445 (4)	25804 (4)
South Korea	3722 (5)	6649 (5)	13597 (5)	18840 (5)
Philippines	3543 (6)	3573 (7)	3732 (8)	4241 (9)
Malaysia	2954 (7)	4660 (6)	7664 (6)	9444 (6)
Thailand	1903 (8)	3022 (8)	6471 (7)	7435 (7)
Indonesia	1099 (9)	1769 (9)	3011 (9)	3316 (10)
China	595 (10)	1181 (10)	2734 (10)	5419 (8)

Source: World Bank (2006)
Note: GDP per capita (constant 2000 international dollar, PPP). ( ) indicates the ranking of income level among countries in Table 5.

Table 6: Income Disparity in East Asia (1975-2004)

	1975	1985	1995	2004
US	1.0	1.0	1.0	1.0
Japan	1.4	1.3	1.2	1.4
Hong Kong	2.6	1.7	1.3	1.3
Singapore	3.0	2.3	1.6	1.4
South Korea	5.3	3.8	2.2	1.9
Philippines	5.6	7.0	8.1	8.6
Malaysia	6.7	5.4	3.9	3.9
Thailand	10.4	8.3	4.7	4.9
Indonesia	18.0	14.2	10.0	11.0
China	33.3	21.3	11.0	6.7

Source: Author's calculation based on Table 5
Note: the figures show how many times the income level is different from the United States.

the catching-up process is somewhat evident among most selected Asian countries. It is also interesting to note that we have seen the increasing trend of income inequality for many countries in Asia and the Pacific in our previous analysis.

5. Concluding Remarks

In this paper, we attempt to reexamine the Kuznets hypothesis with the renewed database of WIID2 by UNU-WIDER (2007). According to Kuznets, income inequality aggravates in the initial stage of economic development but it will gradually improve afterwards. Our empirical analysis however suggests that the Kuznets hypothesis is not supported, or conditionally supported at best, which is in line with our previous studies. Our results thus imply that the policymakers need to consider alternative polices toward the equal society along with

the development strategies which intend to increase the income level. Especially in Asia and the Pacific, we observe the increasing trend of income inequality for many countries since 1980s. Interestingly, it seems to be coincident with the period of the rapid economic growth in the region. Our regression analysis moreover suggests that the increase of trade may worsen income inequality in the Asian and Pacific region.

Finally, our analysis should be taken with cautions. WIID2 includes the large volume of income data from various sources. However, as noted in UNU-WIDER (2007), availability and quality of income data for each sample country are somewhat various so that this regression analysis with WIID2 should be also regarded as suggestive at best. Moreover, many issues remain as our future research, including the time-series data analysis and the analysis for the factors toward the equal society. Especially in the Asian region, the issues of the coexistence of rapid economic growth and increasing income inequality need to be further analyzed and the meaningful policy implications should be also considered.

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