Does the National Wealth Increase its People's Welfare? East Asian 5 Countries Survey 1980-2004

論　説

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Mamoru Shirasaki

1. Introduction

What is an aim of economic growth? It depends on the political system and economic growth stage of the country. Regarding the former, perhaps it is maximization of the Establishment's utility in the autocracy, or complete economic impartiality in the communist society. As regards the economic growth stage, perhaps it is minimization of the people under the poverty line in the developing country, or feeding the retired old in the advanced country suffering from aging population combined with the diminishing number of children.

This article treats East Asian 5 countries, Malaysia, Philippines, Thailand, Indonesia, Korea, 1980-1996, 1997-2004. At the beginning of the former term, Philippines, Indonesia and Korea are virtually autocracy, while Suharto and Chun Doo-hwan cooperate with the Western bloc going after economic growth or national security, and Aquino who replaced Marcos in 1986 changed the Philippines regime. In Thailand, political intervention by the military had made the society unrest till the 1992 coup. Despite these undemocratic tide in the part of East Asia, The Establishment understood the people's welfare improvement through economic growth so as to le-

gitimate their governments. Aside from individual economic policies which the World Bank reported (World Bank,1993), They achieved great economic growth without Philippines, and democratic society 1980-1996.

In 1997, monetary and financial crisis suddenly struck these 5 countries, and had continued till about 2001 (Takagi,2002). Thus, the crisis might have altered the determinants of economic growth through the exchange rate and interest rate fluctuation, which might led the industrial structure transition or productivity transition through the credit crunch and diminution of consumption. Then, this econometric analysis treats the two terms separately.

This article aims finally at the determinants of people's welfare. However, whatever the contents that welfare has, that realization needs the capital which is a prerequisite for the trickle down (Hirota and Terasaki,2003). So, first I verify the determinants of that economic growth by using household final consumption expenditure per capita as a dependent variable, making allowance for the population.

Then, what is welfare concretely? Needless to say, the traditional economics of development attaches importance to inequality and poverty with many indices, the former includes the Gini coefficient or the Kuznets ratio and so forth, the latter includes the poverty gap ratio or the income gap ratio and the like (Ray,1998). With the reliable data about these 5 countries in the terms, I would make the most of those indices as a dependent variable representing welfare[1]. I gain the narrow variable, life expectancy at birth as a dependent variable representing welfare from WDI, which is one of the most dependable datum. The *Human Development Reports* of the United Nations Development Programme uses life expectancy at birth as one of the *Human development Indices* (UNDP, 2006)[2].

2. Data

The World Bank publishes the *World Development Indicators 2006* (WDI 2006). Taking missing values into account, I use the 1980-2004 data in the 5 countries. Beginning the East Asian monetary crisis in 1997, I analyze the data 1980-1996 and 1997-2004 separately. After the second oil crisis in 1979, it was not until 1996 that any serious shock happened, which makes that data division appropriate.

I proportionally interpolate the values of life expectancy at birth between the existent values so as to execute the panel survey. The missing values take place about every other year[3].

3. Survey

3.1 Determinants of the national wealth per capita

3.1.1 Variables

These variables have their number ① ～ ⑳ , which coincide with the number in the result tables in 3.1.3 and 3.1.4.

A. dependent variable

①. Household final consumption expenditure per capita (constant 2000 US$)

B. Independent variable

Labor and employment

②. Employment in agriculture (% of total employment)

③. Employment in industry (% of total employment)

④. Employment in services (% of total employment)

National accounts (US$)

⑤. Agriculture, value added (constant 2000 US$)

⑥. Exports of goods and services (constant 2000 US$)

⑦. General government final consumption expenditure (constant 2000 US$)

⑧. Gross capital formation (constant 2000 US$)

⑨. Industry, value added (constant 2000 US$)

⑩. Manufacturing, value added (constant 2000 US$)

National accounts (derived)

⑪. Gross savings (% of GDP)

Trade

⑫. Agricultural raw materials exports (% of merchandise exports)

⑬. Computer, communications and other services (% of commercial service exports)

⑭. Fuel exports (% of merchandise exports)

⑮. Insurance and financial services (% of commercial service exports)

⑯. Manufactures exports (% of merchandise exports)

⑰. Ores and metals exports (% of merchandise exports)

Monetary

⑱. Deposit interest rate (%)

⑲. Lending interest rate (%)

Investment and trade

⑳. Foreign direct investment, net inflows (% of GDP)

3.1.2 Estimation method

Taking advantage of the 5 countries panel analysis, I follow the procedure every data term. First, I estimate the fixed effects model and random

effects model with robust standard error[4], and Hausman test is carried out so as to decide which model is appropriate. This random effects model is estimated by GLS. When the fixed effects model is the most appropriate one, I report the coefficients of the variables including the country dummy variables estimated by LSDV, next to the result table of fixed effects model with robust standard error. As a matter of course, the coefficients of fixed effects model and LSDV are same. However, the difference of the standard errors between these two models may lead the different judgment on the significance of variables. The country dummy variables are *idummy1-5* in the result tables, which corresponds to Malaysia, Philippines, Thailand, Indonesia, Korea, respectively.

Second, on the case that Hausman test rejects the null hypothesis, the fixed effects model is more appropriate than the random effects model. On the case that F test rejects the null hypothesis, which means the fixed effects model is more appropriate than the pooled regression model, then the fixed effects model is the most appropriate among three models. On the case that the F test does not reject the null hypothesis, the pooled regression model is the most appropriate among three models. then, I estimate that model.

Third, on the case that Hausman test does not rejects the null hypothesis, which means the random effects model is more appropriate than the fixed effects model, Breusch-Pagan test (BP test) is carried out so as to decide which is more appropriate, random effects model or pooled regression model. On the case that BP test rejects the null hypothesis, which means the random effects model is more appropriate than the pooled regression model, then the random effects model is the most appropriate among three models. On the case that the BP test does not reject the null hypothesis, the pooled regression model is the most appropriate among three

models. Then, I estimate that model[5].

This is formulation of each model (Greene, 2003).

Fixed effects model

$y_{it} = X'_{it}\beta + \alpha_i + \varepsilon_{it}$

α_i is a group-specific constant term, which does not vary over time.

ε_{it} is normally distributed.

$E(\alpha_i X'_{it}) = Cov(\alpha_i\ X'_{it}) \neq 0$

Random effects model

$y_{it} = X'_{it}\beta + \alpha + u_i + \varepsilon_{it}$

u_i is a group-specific random element, which does not vary over time.

ε_{it} and u_i are normally distributed.

$E(u_i X'_{it}) = Cov(u_i\ X'_{it}) = 0$

$E(\varepsilon_{it} u_i) = 0$

$E(u_i u_j) = 0$ if $i \neq j$

Pooled regression model

$y_{it} = X'_{it}\beta + \alpha + \varepsilon_{it}$

ε_{it} is normally distributed.

The following outputs are the most appropriate models in each term.

3.1.3 The estimation results 1980-1996

Null hypothesis at the Hausman test is rejected at the 5% significance level, which means the fixed effects model is more appropriate than random effects model. Null hypothesis at the F test is rejected at the 1% significance level, which means the fixed effects model is the most appropriate among

three models. Then, the fixed effects estimators are BLUE.

General government final consumption expenditure (constant 2000 US$) and fuel exports (% of merchandise exports) are positively significant at the 1% level, employment in industry (% of total employment) and employment in service (% of total employment) are negatively significant at the 5% level in table1. General government final consumption expenditure and fuel exports are positively significant at the 1% level, employment in industry and gross capital formation (constant 2000 US$) are negatively significant at the 5% level, and country dummies without Indonesia's are positively significant at the 5% level in table2.

General government final consumption expenditure has the biggest positive effect on household final consumption expenditure per capita. Generally in the developing countries, it is not the private sector but the official one that cannot help leading economic growth. Oil in Indonesia and Malaysia, natural gas in Indonesia are main exports in both countries, which makes the fuel exports variable very significant. Gross capital formation has the biggest minus effect on household final consumption expenditure per capita, which turns out increasing of the stock restricts the economy (Dornbush and Fischre,1987). Both percentage of the employment in industry and service variables have the minus effect on household final consumption expenditure per capita, which may imply the low productivity of these business types compared to others including agriculture in the developing countries. At last, these 5 countries had improved their household final consumption expenditures per capita smoothly from the raw data, however Indonesia had looked to be behind from the coefficients of the idummy variables.

Table1 : Fixed effects model with robust standard error

Number of obs = 62

Number of groups = 5

F (19,38) = 18.05 (Prob > F = 0.0000)

corr (u_i, Xb) = 0.2937

R-sq: within = 0.9946

between = 0.6638

overall = 0.8688

	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
②	-26.85578	14.40258	-1.86	0.070	-56.01227	2.300719
③	-31.79304	14.67289	-2.17	0.037	-61.49675	-2.089324
④	-32.2281	14.85433	-2.17	0.036	-62.29912	-2.157081
⑤	-1.92e-08	1.51e-08	-1.27	0.212	-4.99e-08	1.14e-08
⑥	3.60e-09	2.82e-09	1.27	0.210	-2.12e-09	9.31e-09
⑦	6.83e-08	1.14e-08	6.01	0.000	4.53e-08	9.14e-08
⑧	-9.49e-09	5.23e-09	-1.81	0.078	-2.01e-08	1.10e-09
⑨	2.18e-08	1.67e-08	1.31	0.198	-1.19e-08	5.55e-08
⑩	-1.75e-09	2.11e-08	-0.08	0.934	-4.44e-08	4.09e-08
⑪	-.9451277	6.763895	-0.14	0.890	-14.63792	12.74766
⑫	-15.91478	11.16083	-1.43	0.162	-38.5087	6.679137
⑬	-.151283	2.42392	-0.06	0.951	-5.058253	4.755687
⑭	13.60299	4.795534	2.84	0.007	3.894934	23.31104
⑮	-6.673859	29.80224	-0.22	0.824	-67.00534	53.65762
⑯	-3.174003	2.006538	-1.58	0.122	-7.236026	.8880204

⑰	5.919662	4.689848	1.26	0.215	-3.574439	15.41376
⑱	-4.398934	10.22254	-0.43	0.669	-25.09339	16.29552
⑲	5.342164	9.185909	0.58	0.564	-13.25374	23.93806
⑳	19.36477	12.70147	1.52	0.136	-6.348002	45.07755
cons	3212.127	1326.441	2.42	0.020	526.8881	5897.365

sigma_u	741.36622
sigma_e	57.549704
rho	.99401021

u_i: group error

Xb: independent variables

sigma_u: estimator of the group error

sigma_e: estimator of the group and time error

rho: fraction of variance due to the estimator of the group error

F test that all $u_i = 0$: F (4,38) = 10.60 (Prob > F = 0.0000)

Table2 : LSDV

Source	SS	df	MS	Number of obs = 62
				F (24,38) = 3245.23
Model	257954754	24	10748114.8	(Prob > F = 0.0000)
Residual	125854.8	38	3311.96842	R-squared = 0.9995
				Adj R-squared = 0.9992
Total	258080609	62	4162590.47	Root MSE = 57.55

	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]

②	-26.85578	15.07581	-1.78	0.083	-57.37516	3.663608
③	-31.79304	15.46932	-2.06	0.047	-63.10905	-.4770273
④	-32.2281	15.97226	-2.02	0.051	-64.56225	.1060481
⑤	-1.92e-08	1.42e-08	-1.35	0.185	-4.80e-08	9.61e-09
⑥	3.60e-09	2.80e-09	1.28	0.207	-2.07e-09	9.26e-09
⑦	6.83e-08	9.40e-09	7.27	0.000	4.93e-08	8.74e-08
⑧	-9.49e-09	4.30e-09	-2.21	0.033	-1.82e-08	-7.92e-10
⑨	2.18e-08	1.31e-08	1.66	0.105	-4.79e-09	4.84e-08
⑩	-1.75e-09	1.61e-08	-0.11	0.914	-3.44e-08	3.09e-08
⑪	-.9451277	5.419154	-0.17	0.862	-11.91563	10.02538
⑫	-15.91478	9.299481	-1.71	0.095	-34.7406	2.911032
⑬	-.151283	2.44901	-0.06	0.951	-5.109045	4.806479
⑭	13.60299	4.886242	2.78	0.008	3.711306	23.49467
⑮	-6.673859	22.98797	-0.29	0.773	-53.21057	39.86285
⑯	-3.174003	1.526969	-2.08	0.044	-6.26519	-.0828153
⑰	5.919662	4.84923	1.22	0.230	-3.897091	15.73641
⑱	-4.398934	9.125164	-0.48	0.633	-22.87186	14.074
⑲	5.342164	8.475105	0.63	0.532	-11.81479	22.49912
⑳	19.36477	12.76442	1.52	0.138	-6.475451	45.20499
idummy1	3701.072	1484.569	2.49	0.017	695.7182	6706.426
idummy2	3024.448	1494.562	2.02	0.050	-1.13579	6050.031
idummy3	3147.301	1513.542	2.08	0.044	83.29574	6211.306
idummy4	1877.608	1374.249	1.37	0.180	-904.4132	4659.629
idummy5	3679.653	1484.947	2.48	0.018	673.5348	6685.771

3.1.4 The estimation results 1997-2004

Null hypothesis at the Hausman test is not rejected at the 5% significance level, which means the random effects model is more appropriate than fixed effects model. Null hypothesis at the BP test is not rejected at the 5% significance level, which means the pooled regression model is the most appropriate among three models. Thus, the OLSE are BLUE.

Only general government final consumption expenditure is positively significant at the 5% level in table3. This variable is positively significant in 3.1.3 too.

Table3 : Pooled regression model

Source	SS	df	MS	Number of obs = 32
				F (19,12) = 1074.97
Model	136503126	19	7184375.03	(Prob > F = 0.0000)
Residual	80200.2575	12	6683.3548	R-squared = 0.9994
				Adj R-squared = 0.9985
Total	136583326	31	4405913.74	Root MSE = 81.752

	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
②	790.2557	504.3102	1.57	0.143	-308.5418	1889.053
③	843.5716	505.9806	1.67	0.121	-258.8654	1946.009
④	804.3232	501.8227	1.60	0.135	-289.0545	1897.701
⑤	-1.89e-08	3.00e-08	-0.63	0.539	-8.42e-08	4.63e-08
⑥	-4.02e-09	3.74e-09	-1.08	0.303	-1.22e-08	4.12e-09
⑦	4.30e-08	1.45e-08	2.96	0.012	1.13e-08	7.46e-08

⑧	1.01e-08	5.13e-09	1.96	0.073	-1.12e-09	2.12e-08
⑨	-6.31e-09	1.58e-08	-0.40	0.697	-4.08e-08	2.82e-08
⑩	2.23e-08	1.38e-08	1.62	0.132	-7.77e-09	5.25e-08
⑪	1.03695	6.585903	0.16	0.878	-13.3125	15.3864
⑫	-46.17833	53.96221	-0.86	0.409	-163.7519	71.39524
⑬	-.3234103	2.778397	-0.12	0.909	-6.377018	5.730197
⑭	-8.009657	16.96365	-0.47	0.645	-44.97027	28.95095
⑮	-.5835692	30.6752	-0.02	0.985	-67.41909	66.25196
⑯	-3.650002	10.04128	-0.36	0.723	-25.52808	18.22807
⑰	-57.1605	76.35138	-0.75	0.468	-223.5159	109.1949
⑱	-3.264247	30.315	-0.11	0.916	-69.31495	62.78645
⑲	9.228703	41.10334	0.22	0.826	-80.32779	98.78519
⑳	-7.06466	17.74792	-0.40	0.698	-45.73406	31.60474
cons	-79793.94	50192.92	-1.59	0.138	-189154.9	29567.05

3.2 Determinants of life expectancy at birth

3.2.1 Variables and estimation method

The dependent variable is life expectancy at birth, total (years). Independent variables and estimation method are the same as 3.1.

3.2.2 The estimation results 1980-1996

Null hypothesis at the Hausman test is rejected at the 5% significance level, which means the fixed effects model is more appropriate than random effects model[6]. Null hypothesis at the F test is rejected at the 1% significance level, which means the fixed effects model is the most appropriate among three models. Then, the fixed effects estimators are BLUE.

General government final consumption expenditure, and ores and metals exports (% of merchandise exports) are significant at the 1% level, the former is positive, the latter is negative both in table4 and table5. Agriculture, value added (constant 2000 US$) is positively significant at the 1% level in table4 and at the 5% level in table5. Employment in industry and manufactures exports (% of merchandise exports) are significant at the 5% level, the former is negative, the latter is positive both in table4 and table5. Insurance and financial services (% of commercial service exports) is positively significant at the 5% level in table4. All dummies are positively significant at the 1% level in table5.

Needless to say, general government final consumption expenditure includes public health expenditure, which data WDI has only from 1998. Had public health expenditure increased with general government final consumption expenditure, that estimation result is reasonable. Other than public health expenditure, there are many public expenditure items, which seem to improve life expectancy at birth, for instance, expenditures about sanitation facilities or improving water, and saving the poor. However, there is no enough data to take them into consideration. General government final consumption expenditure increased with household final expenditure per capita at 3.1.3. Then, had private health expenditure, which data WDI has only from 1998, increased with household final expenditure per capita, the significance of general government final consumption expenditure is reasonable. Of course, Other than private health expenditure, there are many household expenditure items, which seem to improve life expectancy at birth as well as public expenditure items. Unfortunately, there is no enough data to take them into consideration as well as public expenditure items.

Employment in industry has minus effect on life expectancy at birth by means of the background that the preceding paragraph describes, because this independent variable has minus effect on household final expenditure per capita at 3.1.3.

Apart from dummies, because the other four significant variables do not have effect on household final expenditure per capita at 3.1.3, succinct explain for them is difficult. Roughly speaking, life expectancy at birth had tended to extend every year, then, significance of these four variables may be no more than the mirror of the industrial structure transition or productivity transition. In a word, agricultural productivity had improved, and the transition from natural resources export country to manufactures export country or insurance and financial services export country had occurred[7].

Table4 : Fixed effects model with robust standard error

Number of obs = 62

Number of groups = 5

F (19,38) = 10.35 (Prob > F = 0.0000)

corr (u_i, Xb) = -0.5160

R-sq: within = 0.9635

between = 0.1531

overall = 0.4350

	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
②|	-.1441796	.0852503	-1.69	0.099	-.3167597	.0284005
③|	-.2418466	.097137	-2.49	0.017	-.4384902	-.0452029

④	-.1218222	.0810161	-1.50	0.141	-.2858307	.0421864
⑤	3.09e-10	1.13e-10	2.75	0.009	8.16e-11	5.37e-10
⑥	-4.13e-11	2.09e-11	-1.98	0.055	-8.37e-11	9.71e-13
⑦	.3036849	.0832206	3.65	0.001	.1352135	.4721563
⑧	-7.55e-12	3.09e-11	-0.24	0.808	-7.00e-11	5.49e-11
⑨	5.02e-11	8.42e-11	0.60	0.555	-1.20e-10	2.21e-10
⑩	4.74e-11	1.07e-10	0.44	0.659	-1.69e-10	2.64e-10
⑪	.0467599	.0433434	1.08	0.287	-.0409842	.134504
⑫	-.05844	.0763317	-0.77	0.449	-.2129654	.0960853
⑬	.0286626	.02654	1.08	0.287	-.0250649	.0823901
⑭	-.0667526	.0346734	-1.93	0.062	-.1369452	.00344
⑮	.3564646	.1556218	2.29	0.028	.0414248	.6715044
⑯	.0282153	.0113991	2.48	0.018	.005139	.0512916
⑰	-.2011297	.0531994	-3.78	0.001	-.3088262	-.0934332
⑱	-.0937148	.0744685	-1.26	0.216	-.2444683	.0570387
⑲	.0723158	.0711323	1.02	0.316	-.0716841	.2163156
⑳	.1165862	.1167191	1.00	0.324	-.1196993	.3528718
cons	71.48616	7.941558	9.00	0.000	55.40932	87.56301

sigma_u	4.1497702
sigma_e	.46349574
rho	.98767863

F test that all $u_i = 0$: F (4,38) = 5.51 (Prob > F = 0.0013)

Table5 : LSDV

Source	SS	df	MS	Number of obs = 62
				F (24,38) = 54347.56
Model	280209.452	24	11675.3938	Prob > F = 0.0000
Residual	8.16347555	38	.214828304	R-squared = 1.0000
				Adj R-squared = 1.0000
Total	280217.616	62	4519.63896	Root MSE = .4635

	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
②	-.1441796	.1171408	-1.23	0.226	-.3813188	.0929596
③	-.2418466	.1173153	-2.06	0.046	-.4793389	-.0043542
④	-.1218222	.1230478	-0.99	0.328	-.3709194	.1272751
⑤	3.09e-10	1.16e-10	2.66	0.011	7.36e-11	5.45e-10
⑥	-4.13e-11	2.30e-11	-1.80	0.080	-8.78e-11	5.13e-12
⑦	.3036849	.0974693	3.12	0.003	.1063685	.5010013
⑧	-7.55e-12	3.53e-11	-0.21	0.832	-7.89e-11	6.38e-11
⑨	5.02e-11	9.94e-11	0.50	0.617	-1.51e-10	2.52e-10
⑩	4.74e-11	1.27e-10	0.37	0.711	-2.10e-10	3.05e-10
⑪	.0467599	.0448545	1.04	0.304	-.0440433	.1375631
⑫	-.05844	.0749555	-0.78	0.440	-.2101795	.0932994
⑬	.0286626	.0213613	1.34	0.188	-.014581	.0719062
⑭	-.0667526	.037933	-1.76	0.086	-.143544	.0100388
⑮	.3564646	.1850925	1.93	0.062	-.0182356	.7311649
⑯	.0282153	.012307	2.29	0.027	.0033011	.0531296
⑰	-.2011297	.038838	-5.18	0.000	-.2797532	-.1225063

⑱	-.0937148	.0768087	-1.22	0.230	-.2492058	.0617762
⑲	.0723158	.0730623	0.99	0.329	-.0755912	.2202227
⑳	.1165862	.1013343	1.15	0.257	-.0885544	.3217268
idummy1	77.89411	11.29223	6.90	0.000	55.03419	100.754
idummy2	71.23302	11.42313	6.24	0.000	48.10809	94.35794
idummy3	73.00417	11.54256	6.32	0.000	49.63749	96.37085
idummy4	67.22359	10.62765	6.33	0.000	45.70903	88.73815
idummy5	68.76975	10.92922	6.29	0.000	46.6447	90.8948

3.2.3 The estimation results 1997-2004

Null hypothesis at the Hausman test is rejected at the 1% significance level, which means the fixed effects model is more appropriate than random effects model. Null hypothesis at the F test is rejected at the 1% significance level, which means the fixed effects model is the most appropriate among three models. Then, the fixed effects estimators are BLUE.

Employment in services is significant at the 1% level in table6. Agriculture, value added is significant at the 5% level in table6. Gross capital formation is significant at the 1% level in table7. Industry, value added (constant 2000 US$) is significant at the 5% level in table7. Their signs are all positive.

Because these significant variables do not overlap the significant one at 3.1.4 at all unlike 3.2.2, I cannot suppose that independent variables in the preceding paragraph improve the life expectancy at birth by increasing household final expenditure per capita. Then, I conjecture the industrial structure transition or productivity transition in 3.2.2 have continued after 1997, which keeps pace with the life expectancy extension. That is to say,

industrial productivity in addition to agricultural productivity have improved with capital formation, and service industry has been rising.

Table6 : Fixed effects model with robust standard error

Number of obs = 32

Number of groups = 5

F (19,8) = 6.33 (Prob > F = 0.0059)

Corr (u_i, Xb) = -0.8599

R-sq: within = 0.9878

between = 0.0005

overall = 0.0004

	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
①	-1.394377	1.049914	-1.33	0.221	-3.815482	1.026728
②	-1.641753	1.111694	-1.48	0.178	-4.205324	.9218178
③	-1.254277	1.009653	-1.24	0.249	-3.58254	1.073985
④	3.12e-10	5.99e-11	5.21	0.001	1.74e-10	4.50e-10
⑤	-1.42e-12	4.45e-12	-0.32	0.758	-1.17e-11	8.85e-12
⑥	-.0317369	.082689	-0.38	0.711	-.2224181	.1589442
⑦	-3.18e-12	9.74e-12	-0.33	0.753	-2.56e-11	1.93e-11
⑧	8.53e-11	2.86e-11	2.98	0.018	1.93e-11	1.51e-10
⑨	-5.47e-11	3.63e-11	-1.51	0.170	-1.38e-10	2.90e-11
⑩	.0129193	.0169495	0.76	0.468	-.0261663	.0520048
⑪	.0498111	.0926317	0.54	0.605	-.1637979	.2634201
⑫	-.0009635	.0063044	-0.15	0.882	-.0155016	.0135745

⑬	.1046278	.0690818	1.51	0.168	-.0546752	.2639307
⑭	.0146974	.0616121	0.24	0.817	-.1273804	.1567752
⑮	.0590663	.0336116	1.76	0.117	-.0184423	.1365749
⑯	.1985265	.1363379	1.46	0.183	-.1158692	.5129222
⑰	-.0025345	.0531966	-0.05	0.963	-.1252061	.120137
⑱	.0601444	.081264	0.74	0.480	-.1272507	.2475396
⑲	.0149756	.0382231	0.39	0.705	-.0731669	.1031182
cons	193.6764	102.3282	1.89	0.095	-42.29281	429.6456

sigma_u	7.2143276
sigma_e	.13646664
rho	.99964231

F test that all $u_i = 0$: F (4,8) = 10.66 (Prob > F = 0.0027)

Table7 : LSDV

Source	SS	df	MS	Number of obs = 32
				F (24,8) = .8
Model	160666.801	24	6694.45003	Prob > F = 0.0000
Residual	.148985152	8	.018623144	R-squared = 1.0000
				Adj R-squared = 1.0000
Total	160666.95	32	5020.84218	Root MSE = .13647

	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
②	-1.394377	1.406706	-0.99	0.351	-4.638246	1.849493

③	-1.641753	1.466352	-1.12	0.295	-5.023167	1.73966
④	-1.254277	1.362063	-0.92	0.384	-4.395201	1.886646
⑤	3.12e-10	9.08e-11	3.44	0.009	1.03e-10	5.22e-10
⑥	-1.42e-12	7.10e-12	-0.20	0.847	-1.78e-11	1.50e-11
⑦	-.0317369	.0891874	-0.36	0.731	-.2374035	.1739296
⑧	-3.18e-12	1.20e-11	-0.26	0.798	-3.08e-11	2.45e-11
⑨	8.53e-11	3.31e-11	2.58	0.033	9.11e-12	1.62e-10
⑩	-5.47e-11	3.86e-11	-1.42	0.194	-1.44e-10	3.44e-11
⑪	.0129193	.0166806	0.77	0.461	-.0255463	.0513849
⑫	.0498111	.1072472	0.46	0.655	-.1975015	.2971236
⑬	-.0009635	.0061187	-0.16	0.879	-.0150733	.0131462
⑭	.1046278	.0737703	1.42	0.194	-.0654869	.2747425
⑮	.0146974	.0569455	0.26	0.803	-.1166191	.1460139
⑯	.0590663	.0335639	1.76	0.116	-.0183321	.1364647
⑰	.1985265	.1492331	1.33	0.220	-.1456055	.5426586
⑱	-.0025345	.0565696	-0.04	0.965	-.1329842	.1279151
⑲	.0601444	.0883929	0.68	0.515	-.14369	.2639789
⑳	.0149756	.0429537	0.35	0.736	-.0840757	.114027
idummy1	201.9726	138.6532	1.46	0.183	-117.7623	521.7075
idummy2	195.031	138.1627	1.41	0.196	-123.5726	513.6347
idummy3	197.5182	138.8922	1.42	0.193	-122.7678	517.8043
idummy4	182.702	136.1124	1.34	0.216	-131.1737	496.5778
idummy5	192.0941	136.8516	1.40	0.198	-123.4863	507.6746

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4. Conclusion

Does the national wealth increase its people's welfare? On the case that they recognize life expectancy at birth representing the welfare, the answer depends on a term. The increasing of the national wealth increases its people's welfare, and the factor checking the national welfare increase also prevents the extend of life expectancy at birth 1980-1996. In the term, it is general government final consumption expenditure that increases both national welfare and life expectancy at birth, or it is employment in industry that checks both national welfare and life expectancy at birth. Countries' dummies without Indonesia have positive effect both on the national welfare and life expectancy at birth too. In short, the existence of the variable which has the same sign in 3.1.3 and 3.2.2, in addition to the absence of the variable which has the counter sign in 3.1.3 and 3.2.2, verifies that answer. On the other hand, I can say nothing but there is no evidence which denies my hypothesis that the national wealth increase increases its people's welfare 1997-2004, because there is no variable which has the same sign in 3.1.4 and 3.2.3, only I find the absence of the variable which has the counter sign in 3.1.4 and 3.2.3.

Kondo, who studies the relationship between health and income disparity in Nihon Fukushi university, indicates that GDP per capita increase extends life expectancy at birth up to 5000 dollars and has little effect on life expectancy at birth over the sum, from then on, life expectancy at birth comes to depend on income disparity indices, including the Gini coefficient (Kondo, 2007). They call this insight *relative income hypothesis*. Korea in 1986, Malaysia in 1991, Thailand in 1994 went beyond the sum, Philippines and Indonesia have not reached the sum yet. The increase of general gov-

ernment final consumption expenditure which keeps pace with that of GDP per capita, positively affects life expectancy at birth in the term 1980-1996, and has no effect in the next term in which three countries have gone beyond the 5000 dollars GDP per capita as the relative income hypothesis tells. The result of my data analysis looks to accord with this hypothesis, leaving the survey of income disparity in the term 1997-2004. Of course as Kondo recognize that, they have not solved the causal relation between income disparity and life expectancy at birth.

Is there any other finding? Because life expectancy at birth is not a typical variable which relates to the micro or macro economic analysis unlike the independent variables, besides life expectancy at birth had tended to extend every year as I pointed up that at 3.2.2, the interpretation of table4-table7 is more difficult than that of the other tables. Nevertheless, when I bother to indicate anything, there are two points, keeping away from the interpretation of trade structure transition.

First, the added values have the positive effect on life expectancy at birth in both terms, while have no effect on household final consumption expenditure per capita. Of course, I cannot explain the direct relationship between the increase of added value and life expectancy at birth extension. However, even though the increase of added value is no more than the reflection of industrial structure transition or productivity transition as I described so at 3.2.2, that result suggests that the industrial advances with people's welfare improvement can be achieved not only by the increase of general government final consumption expenditure but by the improvement of productivity which does not always affect the national wealth.

Second, gross capital formation that restricted the economy rather than was made the most of in the first term as I pointed out at 3.1.3, has turned

into the factor extending life expectancy at birth in the second term. There is no data how much that capital formation has occurred in each industrial sphere, but at long last, the capital that has contributed to agricultural and industrial added values, which have extended life expectancy as I indicated at the preceding paragraph, would have been taken advantage of. I can suppose the other case, when private savings funding the capital formation has increased, which may suggest people have prepared the savings for their life that have made them able to live longer.

References

Bardahn, Pranab and Christopher, Udry., 1999. *Development Microeconomics*. Oxford University Press.

Dornbusch, Rudiger., and Stanley, Fischer., 1987. *Macroeconomics*. 4th ed. McGraw-Hill, Inc.

Greene, William.H., 2003. *Econometric Analysis*. 5th ed. Pearson Education, Inc.

Hirota, Masakazu and Katsushi, Terasaki., 2003. *International Economic Development*. Gakubunsha Cooperation.

Kitamura, Yukinobu., 2005. *Panel Data Analysis*. Iwanami Shoten Publishers.

Kondo, Katsunori., 2007. Health Disparities in Japan. *The Nihon Keizai Shimbun Newspaper* 1/28/2007.

Mukherjee, Chandan., Howard, White, and Marc Wuyts., 1998. *Econometrics and Data Analysis for Developing Countries*. Routledge Press.

Ray, Devraj., 1998. *Developing Economics*. Princeton Press.

Shirai, Sayuri., 2005. *Macro Development Economics : Recent Trends in*

Foreign Aid. Yuhikaku Publishing Cooperation.

Tajima, Tetsuya., 2004. *Readings in Developing Country*. University Education Press.

Takagi, Yasuoki., 2002. *Retrospect and Prospect of Development Economics*. Yuhikaku Publishing Cooperation.

Tanaka, Takuo., 2000. *Development Path of Asian Economy : An Metric Analysis*. Bunshindo Cooperation.

United Nations Development Programme., 2006. *Human Development Report* 2006.

World Bank., 1993. *The East Asian Miracle : Economic Growth and Public Policy – A World Bank Policy Research Report*. Oxford University Press.

Warr, Peter. G., 2000. Poverty Incidence and Economic Growth in Southeast Asia. *Journal of Asian Economics* 11(4).

Footnotes

[1] For example of these days, Bardhan and Udry discuss the way of poverty indices improvement through the economic growth (Bardhan and Udry, 1999). About Southeast Asian countries of these days, Warr verifies that the rate of growth increase improves the headcount measure of poverty incidence (Warr, 2000).

[2] Shirai presents a lucid example to calculate the Human Development indices (Shirai, 2005).

[3] The correct values are in WDI.

[4] Much current practice favours the heteroscedastic consistent standard errors in order to yield a consistent estimate of the standard errors (Mukherjee, White, and Wuyts, 1998).

[5] There can be a test to decide whether I should use a panel survey or time series survey, however insufficient sample size prevents me from time series survey (Kitamura, 2005).

[6] This is true of the test using estimators without robust standard error. The test using estimators with robust standard error results in negative chi-square.

[7] Tajima points out the import substituting industrialization has been so dependent on the developed countries' markets that East Asian crisis occurred in 1997 (Tajima, 2004).