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Abstract

We have analyzed the determinants of the Gini coefficient for income and expenditure. In both cases, we do not find support for the Kuznets inverted-U hypothesis. From economic globalization viewpoint, the opening of goods markets reduces income inequality both in the short run (the Gini coefficient for income) and in the long run (the Gini coefficient for expenditure). On the other hand, the opening of capital markets increases income inequality both in the short and long run, but the latter is not statistically significant. These results suggest that the effect of economic globalization has two routes and two different speeds to affect income inequality.

Running Title: Globalization and Economic Inequality

Keywords: Globalization, Economic inequality, Gini coefficient, South Korea

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1. Introduction

Barro (1991) conducted an empirical investigation into stable economic growth and its determinants, estimating a so-called "growth regression" by pooling data from many countries in the world. His empirical findings suggest that political stability is necessary for stable economic growth. Excess inequality in income distribution is considered to be a major threat to political instability. Regarding another aspect of the relationship between economic growth and income inequality, the inverted-U hypothesis proposed by Kuznets (1955) is a famous hypothesis, and most empirical researchers have attempted to find empirical evidence supporting its existence. This hypothesis tells us that at early stages of economic growth income inequality is large, however during later stages income distribution becomes more equitable. Although there are many empirical studies, for example by Papanek and Kyn (1986), Deininger and Squire (1998), Dawson (1997), Vanhoudt (2000), Gelan and Price (2003), and Lee (2006), the results are mixed, with both advantages and disadvantages being identified. Furthermore, when we investigate the relationship between economic growth and income inequality in developing countries, we cannot neglect the effects of globalization of the economy. Of course, globalization of the economy includes the liberalization of trade and capital mobility. There are several empirical studies on the effects of trade liberalization on income distribution and inequality, for example by Beyer, Rojas, and Vergara (1999), Feenstra and Hanson (1997), and Yao (2006) and Choi (2006). Most of them have pointed out the increases in income differences caused by economic globalization.

In this study we conduct regression analysis on the determinants of income and expenditure inequality. Because household expenditure is a proxy variable for life cycle income, Fukushige (1989) and Deaton and Paxson (1994) proposed measuring life cycle income inequality based on household expenditure. Empirical studies on the determinants of income or expenditure inequality are conducted by Blejer and Guerrero (1990), Fukushige (1996), Park (1998), and Heshmati (2006).

In this paper, we investigate the determinants of income and expenditure inequality for South Korea because it not only achieved remarkable rates of economic development recently but also promoted trade liberalization and foreign direct investment. Of course, studies on the determinants of inequality in South Korea already exist, *e.g.*, Mah (2003) and Fields and Yoo

(2000). In particular, Mah (2003) investigated the effect of globalization and tested for the Kuznets inverted-U hypothesis, using the same dependent variables as in our study, which were obtained from Park and Kim (1998). Although Mah investigated the determinants of expenditure inequality, he does not consider expenditure inequality as a proxy for life cycle income inequality. In this paper, we focus on this relationship and regard the income inequality in each year as income inequality in the short run and the expenditure inequality as income inequality in the long run. We can investigate the difference in the effects of globalization in the short and long run to compare the determinants of income and expenditure inequalities.

This paper is organized as follows. In Section 2, we describe the data used in this study. In Section 3, we conduct our empirical analysis on the determinants of income and expenditure inequality. In Section 4, we summarize the empirical results.

2. Data

In general it is difficult to obtain time series data about income inequality or income distribution in developing countries, but for South Korea there is a suitable study by Park and Kim (1998). In this paper, we use Park and Kim's (1998) data set containing Gini coefficients for income and expenditure. They reported Gini coefficients between 1975 and 1995 (21 years). To investigate the determinants of the Gini coefficients in regression analysis, we use the following independent variables: the growth rate of GDP denominated in South Korean won as a variable representing business conditions in the South Korean economy, per capita GDP in US dollars and its squared value as variables for testing the Kuznets inverted-U hypothesis, the won/US$ exchange rate and its squared value as variables for adjusting the nomination of the economic growth rate (on a won basis) or per capita GDP (on a US dollars basis) and reflecting the international evaluation of the Korean economy. Furthermore, we add the following independent variables in the regression analyses with respect to the globalization index: the total of exports and imports divided by GDP is a measure of openness of goods markets, and net direct investment inflows and its accumulated value, both of them denominated in US dollars, as measures of the openness of capital markets. To estimate the accumulated values of foreign direct investment on a US dollar basis, we take the following four steps. Firstly, we convert annual

foreign direct investment inflows denominated in US dollars into Korean won starting in 1962 using the exchange rate between US dollars and Korean won. Secondly, we deflate annual direct investment inflows by the consumer price index using 2000 prices as the base year. This process constructs a real time series of foreign direct investment in South Korea (FDI-FL). Thirdly, we sum up the real foreign direct investment flows from 1962 with depreciation rate (δ) fixed seven percent in each year:

$$\left(\mathrm{FDI}-\mathrm{AC}_{\mathrm{t}}\right)=(1-\delta)\times\left(\mathrm{FDI}-\mathrm{AC}_{\mathrm{t}-1}\right)+\left(\mathrm{FDI}-\mathrm{FL}_{\mathrm{t}}\right)$$

Following this, we estimate the accumulated amounts of foreign direct investment denominated in won in each year. Finally, we convert the total value of foreign direct investment on a US dollar basis to won, using the exchange rate between US dollars and Korean won in each year. Before discussing the regression analyses, we examine trends in the data. In Figure 1, we graph the Gini coefficients for income and expenditure by Park and Kim (1998). The graphs show that income inequality is always larger than expenditure inequality, and that the fluctuations in both inequalities seem to be connected over the period 1975 to 1995. To investigate the Kuznets inverted-U hypothesis visually, we construct a scatter diagram of the Gini coefficient for income and per capita income measured in Korean won or US dollars in Figure 2. Both graphs suggest that we could apply the Kuznets inverted-U hypothesis to the data only until around 1992, but it is difficult to determine if the hypothesis holds after 1992.

3. Empirical results

In this section, we investigate the determinants of the Gini coefficients for income and expenditure in South Korea by Park and Kim (1998). The dependent variable and the candidates for the independent variables in the regression analysis and their abbreviations are listed in Table 1. Table 2 shows the regression results of the Gini coefficient for income, and Table 3 shows the results of the Gini coefficient for expenditure. Furthermore, Table 4 shows the results of the Gini coefficient for expenditure that included the Gini coefficient for income as an explanatory variable. This regression removes the short-run effects on the income inequality of each variable from the life cycle inequality and makes the differences of the short- and long-run effects clear (see Fukushige (1996)). In each table, we report two sets of results: one model that includes all

explanatory variables, and another model that includes only those variables that maximize the adjusted r-squared value. In view of the exchange rate regimes, the exchange rate was fixed to the US dollar in the first five years, so we also report the results from 1980 to 1995 in each table.

From the result for the Gini coefficient for income, first, we find no support for the Kuznets inverted-U hypothesis because the coefficient for squared per capita GDP is positive. In Figure 3, including the abovementioned result for the Gini coefficient for expenditure, we graph the marginal effects of per capita GDP on the Gini coefficient for income (an increase of one US dollar) from the result for 1980 to 1995. When per capita GDP is in the range 800 to 10 000 US dollars, the marginal effect gradually approaches zero, but it always has a negative effect. This means that an increase in per capita income reduces income inequality. With regard to the exchange rate, the coefficient of the exchange rate is positive and the coefficient of its squared variable is negative. Figure 3 shows the marginal effects of the exchange rate when the won depreciates by one won to the US dollar, using the result from 1980 to 1995. It indicates that the exchange rate has a positive effect when the US dollar is worth more than 850 won, and it has a negative effect when it is lower than this. As for the effect of globalization, the greater the openness of goods markets, the lower the income inequality. However, both of the direct investment inflows and their accumulated values indicate that the degree of openness of capital markets causes higher income inequality. This result might indicate that the opening of goods markets increases the chance of wealth for everybody, however the opening of capital markets provides benefits only to specific industries or corporations.

The Gini coefficient results for expenditure indicate that using data commencing in 1975 or 1980 has little effect. Considering the effect of exchange rate regimes, we investigate the result with data commencing in 1980 in this section. Furthermore, we do not obtain results supporting the Kuznets inverted-U hypothesis in this case (see the marginal effect in Figure 3). As for the exchange rate, its squared value is not significant, so its marginal effect is always positive. This result is different from that of the Gini coefficient for income. With regards to globalization, the opening of capital markets raises expenditure inequality and the opening of goods markets reduces expenditure inequality. These are the same results as for income inequality.

From the result in Table 4 where we included the Gini coefficient for income as an

independent variable, a rise in the openness of goods markets reduces the inequality in the data commencing in 1975 and in 1980. It also shows that a rise in the openness of capital markets has the effect of raising inequality, although select variables are slightly different according to the data period. Considering that this case includes the Gini coefficient for income as an independent variable, the results suggest that each selected variable has an additional effect on long-run income inequality.

In particular, the fact that the coefficient on the variable for the openness of capital markets is not significant and that for the goods markets is significant and negative is important. This result indicates that the opening of capital markets affects short-run income inequality however its effects do not continue, while the opening of goods markets affects not only short-run income inequality but also long-run income inequality. Furthermore, the former increases inequality and the latter decreases inequality, so that the effect of economic globalization has two routes and two different speeds in affecting income inequality.

As for the marginal effects of per capita GDP, Figure 3 shows that the direct effect of per capita GDP on expenditure inequality from Table 4 is negative and its absolute value is smaller than the estimated effect from Table 3, however the absolute value of the total effect, which includes the indirect effect through the Gini coefficient for income calculated from Tables 3 and 4, is larger than the estimated effects from Table 3. This result suggests that the increase in per capita GDP makes income inequality lower both in the short and long run.

4. Conclusion

In this study, we have econometrically analyzed the determinants of the Gini coefficient for income and expenditure. In both cases, we do not find support for the Kuznets inverted-U hypothesis. This is a different result to Mah (2003). As for economic globalization, the opening of goods markets reduces income inequality both in the short run (the Gini coefficient for income) and in the long run (the Gini coefficient for expenditure). On the other hand, the opening of capital markets increases income inequality both in the short and long run, but the latter is not statistically significant. These results suggest that the effect of economic globalization has two routes and two different speeds to affect income inequality.

Finally, we have to mention a remaining problem with this research. The time period we used in this study is less than 20 years: from 1975 or 1980 to 1995. We are therefore unable to consider the robustness of the empirical results. Hopefully, in the near future, sufficient data will be accumulated to allow a historical data analysis similar to Heshmati (2006).

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Table 1. The Data

Variables	Definition
GINI-IN	×1000
GINI-EX	×1000
GROWTH	Growth rate of GDP on won basis
GDP	Per capita GDP on US$ basis (in thousand 1000US$)
EXRATE	US$/won exchange rate
OPENNESS	×100 (Sum of export and import / GDP)
FDI-FL	Foreign direct investment inflows on a US$ basis (in billion US$)
FDI-AC	Accumulated amounts of foreign direct investment flows (in billion US$)

Table 2. Results for GINI-IN

	Period		
	1975–1995	1980–1995	
			Maximum $\overline{R}^2$
Const.	–2.46726	–417.811	–480.672
	(–0.039)	(–0.793)	(–1.714)
GROWTH	1.22027	0.187126	
	(2.265)	(0.145)	
GNP	–79.9319	–100.958	–102.717
	(–6.327)	(–4.563)	(–5.926)
GNP^2	3.84534	4.57839	4.62554
	(5.082)	(4.498)	(5.119)
EXRATE	1.72903	2.54723	2.68373
	(5.644)	(2.118)	(3.830)
$EXRATE^2$	–0.00104636	–0.00150287	–0.00158336
	(–5.040)	(–2.065)	(–3.589)
OPENNESS	–48.71810	–43.8579	–43.2526
	(–6.024)	(–4.301)	(–4.963)
FDI-FL	27.9810	24.4411	24.6278
	(3.710)	(2.466)	(2.675)
FDI-AC	1.14166	1.83738	1.89829
	(5.171)	(2.919)	(4.323)
Adjusted R-squared	0.8759	0.8127	0.8356
Log Likelihood	–61.0468	–46.0008	–46.0248
SBIC	74.7471	58.4775	57.1152
RESET	0.5511	0.0354	0.0468
LM hetero	2.6195	0.9152	0.7666
Jarque–Bera	1.0625	0.4728	0.5185
Durbin–Watson	2.400	2.248	2.218

RESET, LM hetero, Jarque–Bera and Durbin–Watson are RESET test, LM test for heteroskedasticity, Jarque–Bera test for normality and Durbin–Watson Ratio for serial correlation, and t-value for each coefficient is in parenthesis..

Table 3. Results for GINI-EX: Without GINI-IN

	Period			
	1975–1995		1980–1995	
		Maximum $\overline{R}^2$		Maximum $\overline{R}^2$
Const.	239.480	264.701	111.149	365.884
	(4.003)	(1.651)	(0.334)	(5.606)
GROWTH	0.214297		–0.313597	
	(0.421)		(–0.384)	
GNP	–25.0880	–16.3207	–47.6714	–40.0920
	(–2.100)	(–2.273)	(–3.408)	(–4.143)
GNP^2	1.16801	0.697530	2.03421	1.72864
	(1.633)	(1.375)	(3.16112)	(3.371)
EXRATE	0.675864	0.617638	0.729614	0.100668
	(2.333)	(2.307)	(0.960)	(2.652)
$EXRATE^2$	–0.000422711	–0.000397446	–0.000387780	
	(–2.154)	(–2.192)	(–0.843)	
OPENNESS	–29.9869	–28.5016	–25.0296	–24.7966
	(–3.922)	(–3.937)	(–3.883)	(–4.657)
FDI-FL	19.1527	20.7925	10.4918	9.90349
	(2.686)	(3.153)	(1.675)	(1.707)
FDI-AC	0.189748		0.960533	0.772477
	(0.909)		(2.414)	(2.967)
Adjusted R-squared	0.5973	0.6254	0.8175	0.8404
Log Likelihood	–59.8698	–60.7307	–38.6636	–39.6000
SBIC	73.5701	71.3865	51.1403	49.3041
RESET	0.5955	0.5448	0.0232	0.0935
LM hetero	2.1054	5.104*	0.0365	0.1970
Jarque–Bera	1.5360	1.4742	0.1420	0.1097
Durbin–Watson	2.094	2.117	2.380	2.131

RESET, LM hetero, Jarque–Bera and Durbin–Watson are RESET test, LM test for heteroskedasticity, Jarque–Bera test for normality and Durbin–Watson Ratio for serial correlation. * means statistically significant at 5%, and t-value for each coefficient is in parenthesis.

Table 4. Results for GINI-EX: Including GINI-IN

	Period			
	1975–1995		1980–1995	
		Maximum $\overline{R}^2$		Maximum $\overline{R}^2$
Const.	240.505	241.655	180.277	226.559
	(4.284)	(8.371)	(0.497)	(4.093)
GINI-IN	0.415585	0.362266	0.165453	0.222264
	(1.623)	(5.478)	(0.664)	(1.880)
GROWTH	–0.292829		–0.344557	
	(–0.513)		(–0.404)	
GNP	–8.13044		–30.9677	–25.2049
	(–0.348)		(–1.065)	(–1.893)
GNP^2	–0.430055		1.27670	1.03435
	(–0.361)		(0.965)	(1.633)
EXRATE	–0.042693		0.308168	0.076902
	(–0.082)		(0.304)	(1.754)
$EXRATE^2$	0.0000121413		–0.000139124	
	(0.037)		(–0.229)	
OPENNESS	–9.74041	–11.5205	–17.7732	–14.2616
	(–0.677)	(–4.678)	(–1.386)	(–2.883)
FDI-FL	7.52421	7.47000	6.44794	
	(0.768)	(1.509)	(0.772)	
FDI-AC	–0.284706	–0.121700	0.656533	0.596010
	–0.809	(–2.232)	(1.063)	(1.754)
Adjusted R-squared	0.6456	0.7372	0.8017	0.8484
Log Likelihood	–57.6156	–58.4101	–38.0960	–39.1932
SBIC	72.8383	66.0214	51.9589	48.8973
RESET	0.2988	0.0445	0.0326	0.3611
LM hetero	2.3196	0.6688	0.0883	0.0911
Jarque–Bera	1.2842	0.7794	0.8744	0.3611
Durbin–Watson	2.370	2.223	2.503	2.367

RESET, LM hetero, Jarque–Bera and Durbin–Watson are RESET test, LM test for heteroskedasticity, Jarque–Bera test for normality and Durbin–Watson Ratio for serial correlation and t-value for each coefficient is in parenthesis..

Figure 1. Gini coefficients for income and expenditure

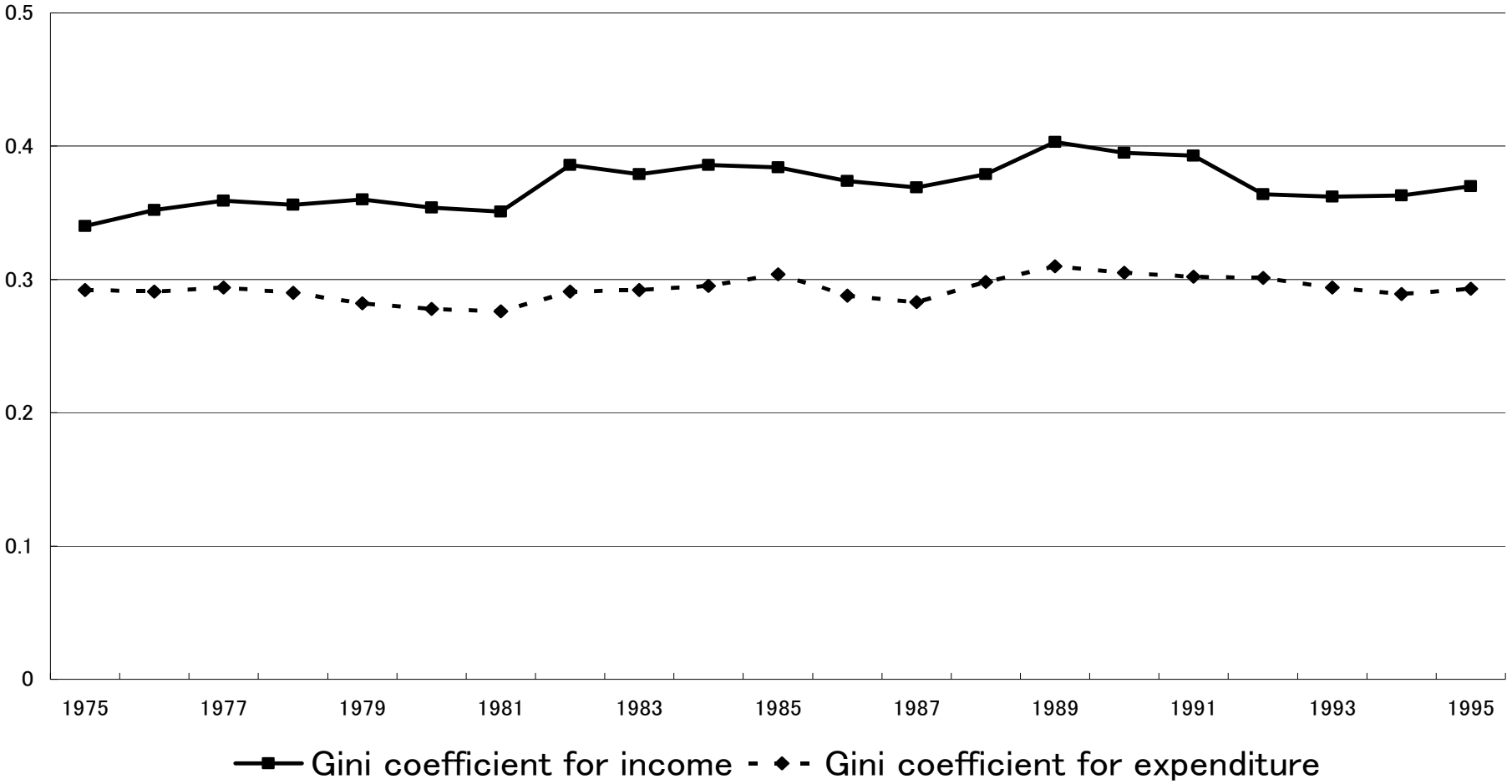
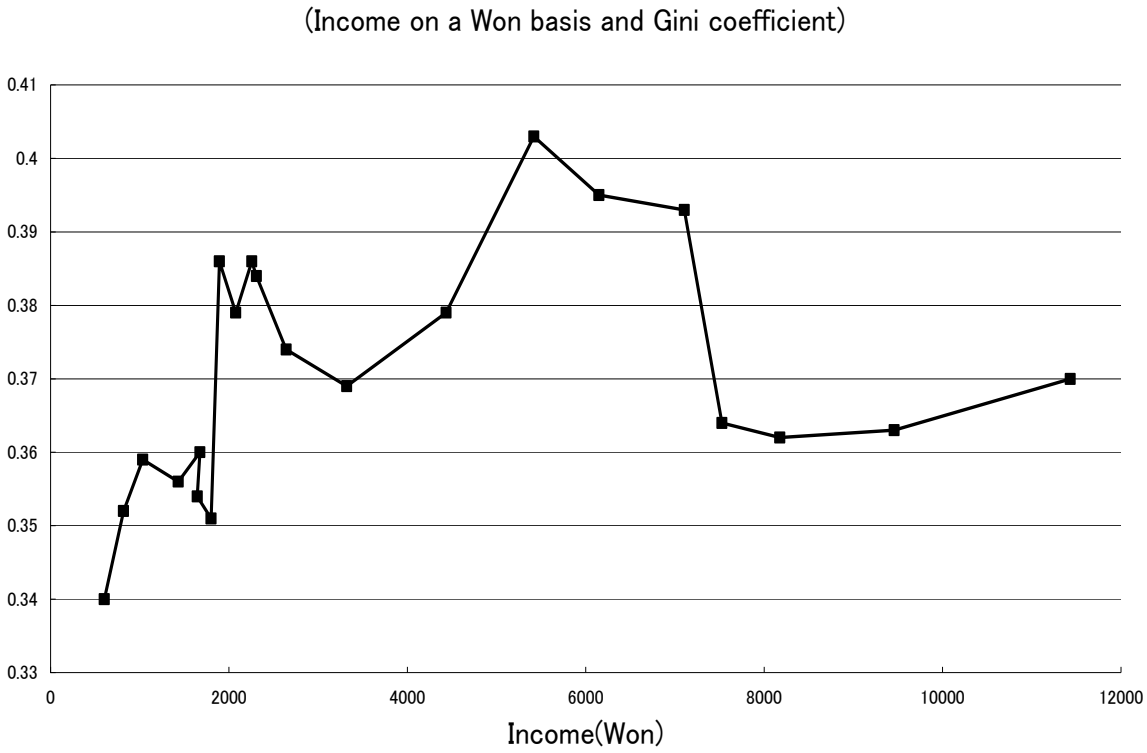


Figure 2. Per Capita Income and Gini coefficient for Income



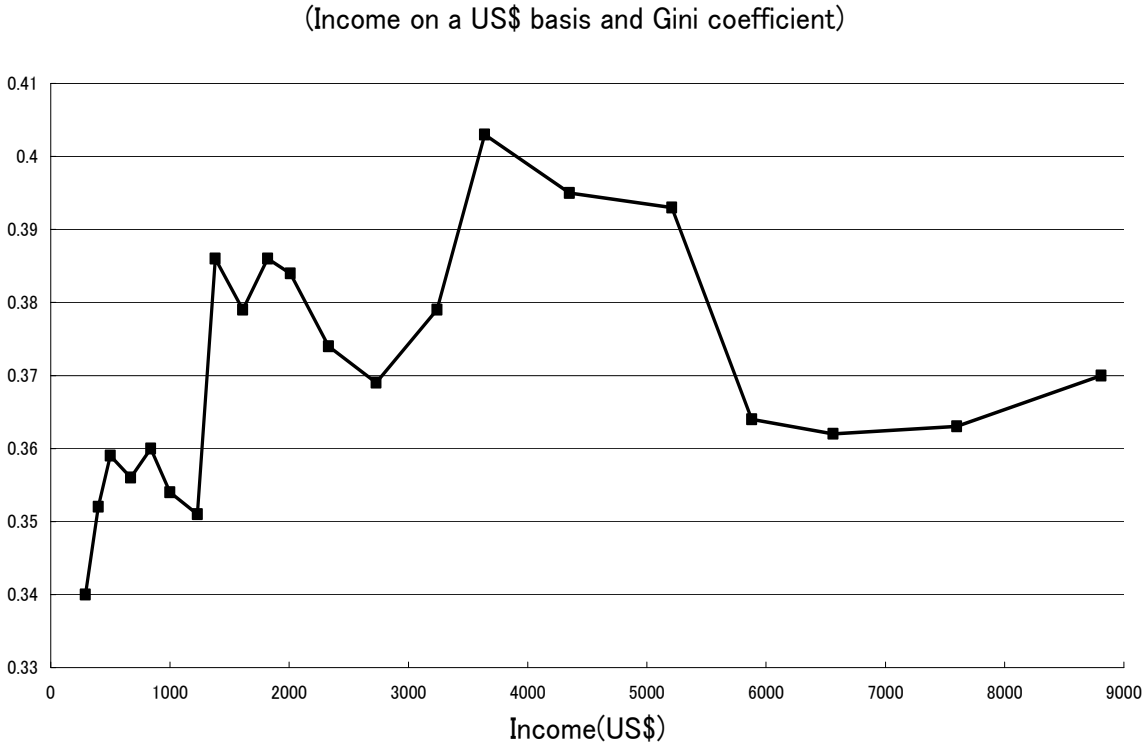


Figure 3 Marginal effects of per capita GDP (1US$)