

# On the Consumption Expenditure Distortion among Different Income Classes: Evidence from South Korea and Japan\*

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## Abstract

This paper aims at depicting the social problems in common between South Korea and Japan by comparing consumption behaviors between two countries. For that purpose, we utilize the Survey of Household Economy of both countries and try to find how these two countries are different or the same. Through our empirical analysis, we found the followings.

Firstly, although both countries are aging, the first quintile (the poorest in our definition in this paper) in South Korea has been rapidly getting older compared to Japan. Since the wages in these two countries used to increase as you are getting older, this quite large divergence of aging in the poorest quintile are a remarkable change and it suggests that income inequality has been more widely spreading out in South Korea than Japan. Furthermore, the education expenditure ratio in South Korea is statistically significant for higher income level while it is not so in Japan. If the opportunity for better education is dominant by richer households, an early policy implementation for breaking out of this vicious circle is entailed in South Korea.

## 1 Introduction

As a member of OECD, both South Korea and Japan are considered as one of the most developed countries in the world. At the same time, each country has some socio-economic problems in common such as an increase of unemployment rate and income disparity. This paper aims at trying to depict these social problems by comparing economic behaviors between two countries. Although these problems are broadly observed among developed countries, we believe that the comparison between Korea and Japan is helpful for both countries because Korea and Japan, only Asian member countries in OECD, share much more things than other developed countries. For example, the long-term influence from Confucianism has been widely

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pervasive in both countries, which makes a sharp contrast with the life and culture based on Christianity.

Furthermore, as far as authors know, quite limited existing literature with the comparison is available for the comparison of the two countries although there are lots of research papers which concentrate on one of the two countries. Given similar social and geological climate as well as many common features in its economy, the comparison of these two countries is very important and meaningful.

For that purpose, we utilize the Survey of Household Economy of both countries and try to find how these two countries are different or the same. Through the analysis, some policy implications are proposed. In the next section, we summarized the existing research for both South Korea and Japan. In section 3, we explain the data we use and outlines the features of the economic structure of each country by using the descriptive statistics. Based on it, panel data analysis is conducted in Section 4 to derive some policy implication which is explained in Section 5. Section 6 concludes.

## **2 Literature Review**

The income and its distribution has been a popular research topic among economists for a long time and thus there are many papers considering this issue. Limiting the scope only into the recent empirical work, which is more related to the present paper, Piketty and Saez (2006) provides with decent international comparison of income and wealth distribution among the rich nations from the macroeconomic point of view. They argue that top income share has been rapidly increasing in the United States and other English speaking countries although it has been rather stable in Europe and Japan. They mention that the rise among English speaking countries owes to increase in the top wages not to increase of capital income. Lemieux (2006) also discussed the wage inequality using human capital model with heterogeneous returns. The main finding of Lemieux (2006) is that the return to postsecondary Education is crucial for higher wage among higher educated workers.

As for Japan, many research has been published since the seminal work by Tachibanaki(1998). This solid but easy - to - access research attracted increasing attention from the public.

Recently Ohtake (2008) provided similar research in that it highly relied on the analysis based on the Gini coefficient. Ohtake (2008) showed income inequality has been consistently increasing in Japan though its degrees of increase are different when a different data source is used to compute. Makino (2007) concentrates on the effect of higher income against attending higher education such as a university. Makino (2007) concludes that there is a strong tendency of increasing angel ratio (ratio of education expenditure for total expenditure of a household) and statistically shows that higher income households tend to achieve better results in school exams. In our analysis, we take this evidence as given and try to figure out the other reason or mechanism that allow the society to more inequality. As for policy discussion, Makino (2007) states that the public expenditure for education must be increased at least to the level that is as the same as the average of OECD countries.

It seems that Korean people has been paying more attention to income inequality since the currency crisis in 1997. For instance, Yoon (2002) analyzed consumption patterns among urban workers in Korea and concluded that the amount of the expenditure on education is important to alleviate the inequality of household consumption. Yeo (2002) also pointed out the same story by using the Gini coefficient, which indicated the less inequality after democratization in 1987. Using a panel data among employees in South Korea, Shin and Cheon(2005) showed that income inequality in South Korea is rapidly growing and analyzed that this disparity has been caused by the decline of income among the poorest and income growth in the richest. Kim (2009) further tackled this problem and mentioned that there is a large difference in expense on private education among different social classes. Choi (2011) is most similar to the present paper in that it compares the consumption pattern among different income classes. Through the analysis, Choi (2011) revealed that there is 7 times more consumption differences between the first 10 % quintile and the last 10% quintile households and many household put their priority on having adequate educational expense. Yet most of the existing papers analyzing the consumption and its inequality concentrated on its own country while our motivation is to compare two similar countries.

### 3 Data

#### 3.1 Overview of the data used

Our analysis uses yearly data of household income and consumption from 1985 to 2007 for Japan and from 1990 to 2008 for South Korea. Each of them is divided into five classes in terms of annual income (The first quintile is the poorest class.). For Japanese data, we use *Annual Report on the Survey of Household Economy*, which contains about 8,000 sample households, because it is the only data available for each year. The one thing that we should mention is that the most part of *Annual Report on the Survey of Household Economy* excludes single person household. It causes some problem because a single person household on average earns less income compared to a bigger household. As indicated by Ohtake (2008), the Gini coefficient computed by *Annual Report on the Survey of Household Economy* tends to be smaller, which means that income inequality is underestimated. In what follows, therefore, we keep our potential bias towards alleviating inequality if possible.

South Korea's data is based on *Annual Income and Expenditure Trends of Nationwide Households*, which also excludes single person household from its scope. The sample households are more than 5,500 each year and cooperating households need to keep booking their daily expenditures in a proper manner. Most of the details of the consumption expenditure categories are the same as that of Japanese statistics. Table 1 is a summary of the common categorization of consumption expenditures between two countries.

Table 1: Data Definition

| variables      | definition  |
|----------------|---|
| persons        | Average number of people within a household.                        |
| ages           | Average age of the head of a household.                             |
| spouse         | Average percentage of spouse income in a total household income.    |
| dispincome     | Disposal income of a household (monthly).                           |
| education      | Ratio of education expenditure on total expenditure. Ratio of       |
| food           | food expenditure on total expenditure.                              |
| housing        | Ratio of housing expenditure on total expenditure.                  |
| transport / IT | Ratio of transport and IT related expenditure on total expenditure. |

### 3.2 Fact findings from descriptive statistics

Table 2 summarizes the descriptive statistics of our data. As is shown in the table, the average of some variable is quite similar but some are different between two countries. The average numbers of household members in both countries are about 3.6 while the average age of representative person in a household in Japan is 5 years higher than that of South Korea and his / her spouse's income ratio to total household income is almost the same at around 9%.

Table 2: Summary statistics

| Variable     | Japan  |             |        |        | South Korea |             |        |        |
|--------------|--------|-------------|--------|--------|-------------|-------------|--------|--------|
|              | Mean   | (Std. Dev.) | Min.   | Max.   | Mean        | (Std. Dev.) | Min.   | Max.   |
| persons      | 3.5856 | (0.244)     | 3.09   | 4.04   | 3.6147      | (0.3362)    | 2.87   | 4.49   |
| ages         | 45.408 | (3.1026)    | 39.5   | 50.8   | 40.745      | (2.6397)    | 35.23  | 46.93  |
| spouse       | 0.0993 | (0.0426)    | 0.0436 | 0.2414 | 0.0914      | (0.0321)    | 0.035  | 0.163  |
| dispincome   | 45.001 | (15.053)    | 22.039 | 75.982 | 23.927      | (16.113)    | 3.942  | 76.401 |
| education    | 0.0494 | (0.0123)    | 0.0251 | 0.0744 | 0.0994      | (0.0188)    | 0.0615 | 0.1432 |
| food         | 0.2364 | (0.0267)    | 0.1908 | 0.2982 | 0.29        | (0.0343)    | 0.2182 | 0.3777 |
| housing      | 0.0657 | (0.0244)    | 0.0311 | 0.1218 | 0.0391      | (0.0109)    | 0.0239 | 0.0723 |
| transport/IT | 0.1174 | (0.0174)    | 0.0926 | 0.1584 | 0.1422      | (0.0361)    | 0.0686 | 0.1902 |
| N            | 115    |             |        |        | 95          |             |        |        |

For educational expenditure, an average household in South Korea has borne more portion of the income compared to Japan. The data described in Table 2 says that the ratios of educational expenditure in Japan are approximately half of Korea's in most income classes.

On the other hand, the expenditure ratio on housing is almost double in Japan compared to South Korea. Despite the Japanese housing market has been falling down since 1990's, housing expenditure remains as a major burden for most of Japanese households compared to South Korea<sup>1</sup>.

### 3.3 Differences among income classes

We explain the major differences among each income classes between two countries. Note that the data sources are *Annual Report on the Survey of Household Economy* for Japan and *Annual Income and Expenditure Trends of Nationwide Households* for South Korea if there is no specific

<sup>1</sup> Note that one of the reason for smaller ration in South Korea stems from the exclusion of *Chunsegum* from the original data, which might underestimate the housing expenditure in South Korea.

information on each figures below. Figure 1 (above) depicts the changes in the representative person's age in each income class. Although it shows that both countries are aging, the first quintile in South Korea has been rapidly getting older compared to Japan. Since the wages in these two countries used to increase as you are getting older (age-indexed wage system), this quite large divergence of aging in the poorest quintile between the two countries are a remarkable change and it suggests that income inequality has been more widely spreading out in South Korea than Japan.

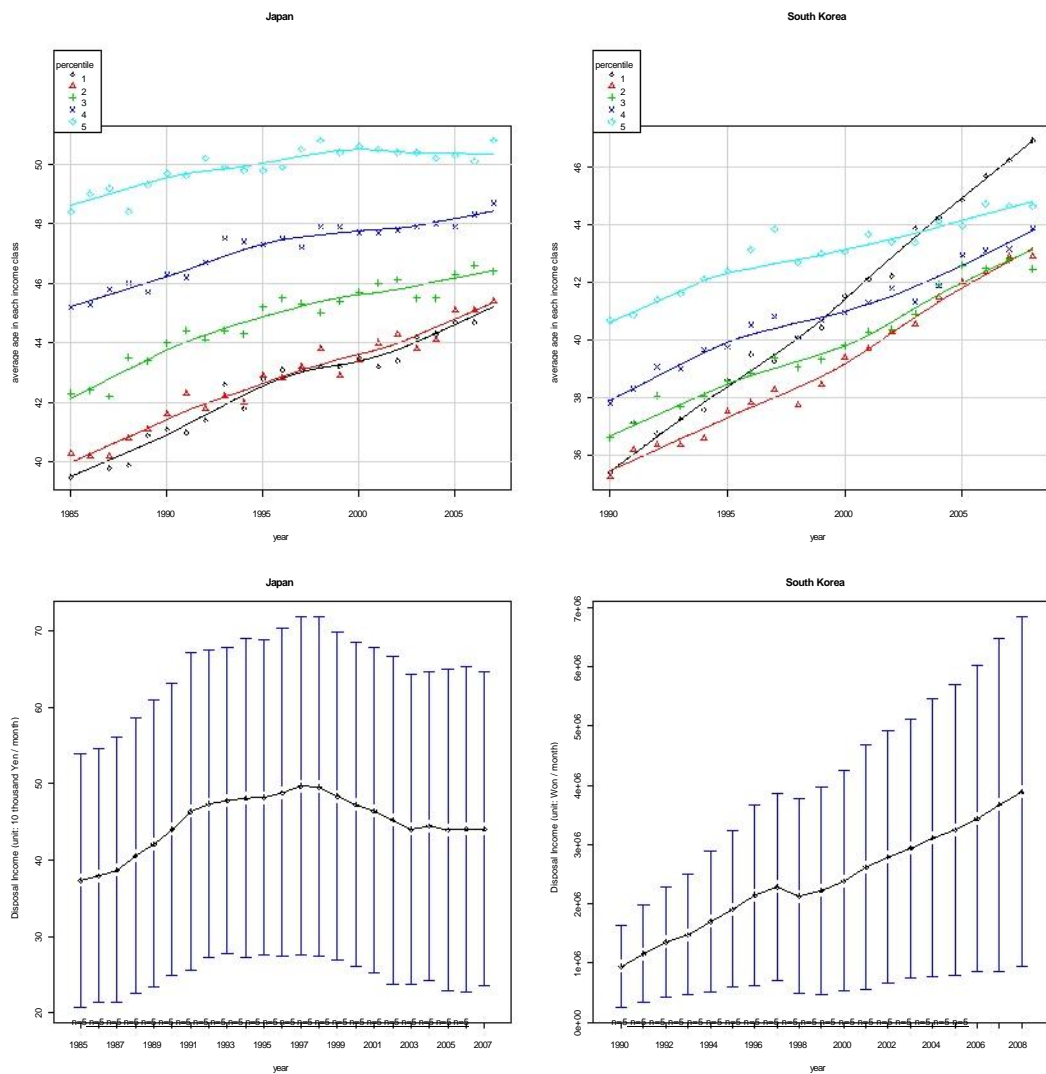


Figure 1: Changes in the Average Age in Each Income Class (above) and Changes in the Disposal Income (below)

From Figure 1 (below), we can understand that the disposal income is decreasing in Japan and increasing in South Korea while its variance is unchanged in Japan and getting larger in South Korea. Still having been increasing after the collapse of the bubble economy in early 1990s, Japanese disposal income was the highest towards the end of 1990s while it continues to decline after 1998 because of the sluggish economic development in the last decade.

As for South Korea, thanks to a result of stiff GDP growth in last few decades except the period of currency crisis households of South Korea continue to increase their disposal income, which is highly contrasting to the situation of Japan. However, it seems that the returns from the economic growth has not been equally redistributed. As is Figure 1 (below) shows, the variance of the disposal income keep increasing sharply throughout the period. This is a straightforward evidence of the pervasiveness of income inequality.

As for a housing expenditure in Figure 2 (above), it turns out that there was not so much difference in the late 1980s and early 1990s between the two countries. Since 1990s, Japanese increased the percentage of the spending for housing by early 2000s while Korean households decreased in the same period. Although most of Korean households (except richest quintile) have reduced their share in the total expenditure, Japanese households except richest quintile household have remained their shares partly due to less disposal income.

Figure 2 (below) depicts the spending ratios on Transport and IT by the households in each countries. According to the figure, all the class have had very similar ratios in both countries compared to other expenditure categories. It is worth mentioning that the ratio has been unchanged in South Korea since early 2000 while it is still going up in Japan. Recent changes in this category is mainly due to the change in IT related expenditure including the mobile phone. The stable ratio in South Korea from early 2000 simply reflects that Korean society has been well matured in terms of IT development compared to Japan. Note that this category has the least variances among different income classes in both countries. This means the consumption expenditure in this category, such as a cost to use mobile phone or mobile internet service, is a superior goods because almost the same ratio in all the income classes indicates that a household pays more as the income goes up.

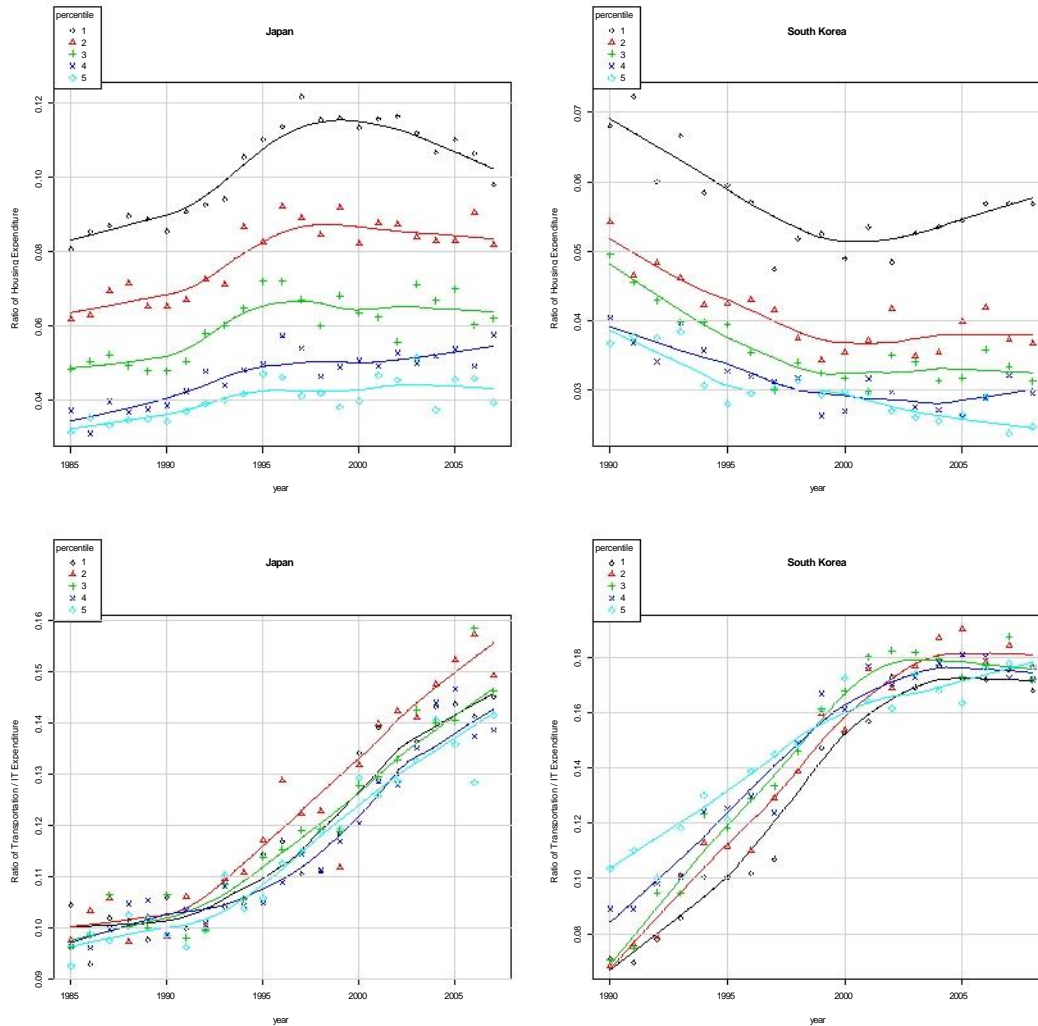


Figure 2: Housing (above) and Transport / IT (below) Expenditure Ratios among Income Classes

## 4 The Econometric Model

In this section, we analyze the effect of income against consumption behavior using panel data analysis. Our utilization of the panel data analysis is motivated by the assumption that each income class has a class specific property but it is usually very difficult to find a variable to control this property. To avoid this missing variable problem, we apply the panel data analysis in which we could offset the individual effect among different income classes.

More precisely, we conduct the panel data estimation as followed.



$$\ln Y_{ijt} = \beta_0^{jt} + \beta_1^{jt} \ln \text{persons}_{it} + \beta_2^{jt} \ln \text{ages}_{it} + \beta_3^{jt} \ln \text{spouse}_{it} + \beta_4^{jt} \ln \text{dispincome}_{it} + \beta_5^{jt} (\ln [\text{dispincome}_{it}])^2 + \epsilon_{ijt} \quad (1)$$

where  $i$  denotes income class,  $t$  as year. The dependent variable,  $Y_{jt}$ , denotes a consumption ratio of  $j$  (education or transport/IT) against total consumption, and  $b$  simply means each country (Japan and Korea). Note that we denote  $(\ln [\text{dispincome}_{it}])^2$  as `disincome2` in the tables below. finally  $\epsilon_{ijt}$  must have usual i.i.d. property.

Table 3 summarizes the estimation results of education expenditures for both countries. Table 4 is for transport / IT expenditure of both countries. We focus our analysis only for these two expenditures because of our interest. Each table contains the estimation results by fixed effect model and random effect model with Hausman Test statistic.

**Table 3: Estimated Results: Education**

| JAPAN                       |                     |             |               |             |
|-----------------------------|---------------------|-------------|---------------|-------------|
| Variable                    | Fixed Effect        |             | Random Effect |             |
|                             | Coefficient         | (Std. Err.) | Coefficient   | (Std. Err.) |
| persons                     | -0.3254             | (0.4037)    | 0.1424        | (0.2489)    |
| ages                        | 1.1851*             | (0.5008)    | 1.3202**      | (0.4488)    |
| dispincome                  | -0.2559             | (0.9563)    | 5.6927**      | (0.5942)    |
| dispincome2                 | 0.0731              | (0.1267)    | -0.7253**     | (0.0807)    |
| spouse                      | 0.1321 <sup>†</sup> | (0.0765)    | 0.1630*       | (0.0786)    |
| Intercept                   | -6.9067**           | (2.5141)    | -18.9340**    | (2.0384)    |
| ** 1% * 5% <sup>†</sup> 10% |                     |             |               |             |
| N                           | 115                 |             | 115           |             |
| R <sup>2</sup>              | 0.5527              |             |               |             |
| Hausman Test                | prob > chi2=0.0000  |             |               |             |

| KOREA                       |                    |             |               |             |
|-----------------------------|--------------------|-------------|---------------|-------------|
| Variable                    | Fixed Effect       |             | Random Effect |             |
|                             | Coefficient        | (Std. Err.) | Coefficient   | (Std. Err.) |
| persons                     | 0.1803             | (0.3242)    | -0.8686**     | (0.1137)    |
| ages                        | 0.0275             | (0.2562)    | -0.7970**     | (0.1954)    |
| dispincome                  | 0.3035**           | (0.1011)    | 0.5419**      | (0.0854)    |
| dispincome2                 | 0.0145             | (0.0146)    | -0.0414**     | (0.0127)    |
| spouse                      | 0.0053             | (0.0480)    | 0.1243*       | (0.0502)    |
| Intercept                   | -3.7042**          | (1.1021)    | 0.2475        | (0.7781)    |
| ** 1% * 5% <sup>†</sup> 10% |                    |             |               |             |
| N                           | 95                 |             | 95            |             |
| R <sup>2</sup>              | 0.9099             |             |               |             |
| Hausman Test                | prob > chi2=0.0001 |             |               |             |

Since the panel data treatment can offset all the individual effect caused by joining a particular income class, we can now discuss the impact of the change in income properly. In Table 3, the income variables are significant in random effect model but it is not significant in the fixed effect model. However, the result of the Hausman test is in favor of fixed effect model and thus we can say that Table 3 shows that the income level is not significant against the education expenditure model in Japan. Only when income level of spouse is higher, the education expenditure ratio rises. Furthermore the result of Japan rather has a positive significant relationship with ages. It virtually reflects that education expenditure becomes more burden as children are growing up.

As for the case of South Korea in Table 3, the null hypothesis of the Hausman test is again rejected and so we choose the fixed effect model as a proper specification. Table 3 says that the income is positively significant but not in convex manner while ages is not significant. These are sharp contrasts against the result of Japan. Whatever income classes you are in, Korean household are likely to spend more money to the education of their children than Japanese. We will come back to this point in the next section.

Table 4 is a summary of expenditure on Transport and IT. Checking the Hausman test statistic, the null hypothesis is rejected for the Japanese case but not rejected for South Korea. Based on this model selection decision, we should look upon the fixed model result for Japan and the random effect model for South Korea. Carefully looking into the data, it statistically turns out that the expenditure on transport and IT is significantly convex in Japan and significantly concave in South Korea. The fact that South Korea reached the saturation point rapidly might distort the consumption patterns of the poorer. In fact, Bank of Korea (2005) mentioned that there was a significant increase in the expenditure on IT communication and Park (2007) indicated that these upsurge demand mainly hit the young and the poorer households significantly. Inadequate access to the internet or a mobile communication could deprive of the chance to better employment even for longer term because now it is indispensable infrastructure for our everyday life, even for a job search. Therefore there should be an affordable cost selection for everybody in the telecommunication.

Table 4: Estimated Results: Transport / IT

| JAPAN           |                    |             |               |             |
|-----------------|--------------------|-------------|---------------|-------------|
| Variable        | Fixed Effect       |             | Random Effect |             |
|                 | Coefficient        | (Std. Err.) | Coefficient   | (Std. Err.) |
| persons         | -3.0414**          | (0.2975)    | -2.2630**     | (0.2058)    |
| ages            | 1.2521**           | (0.3691)    | 0.3374        | (0.3711)    |
| dispincome      | -2.0207**          | (0.7048)    | 4.0885**      | (0.4914)    |
| dispincome2     | 0.2049*            | (0.0934)    | -0.5712**     | (0.0668)    |
| spouse          | 0.0897             | (0.0564)    | 0.4131**      | (0.0650)    |
| Intercept       | 1.8374             | (1.8528)    | -6.8015**     | (1.6856)    |
| ** 1% * 5% †10% |                    |             |               |             |
| N               | 115                |             | 115           |             |
| R <sup>2</sup>  | 0.8916             |             |               |             |
| Hausman Test    | prob > chi2=0.0000 |             |               |             |

| KOREA           |                    |             |               |             |
|-----------------|--------------------|-------------|---------------|-------------|
| Variable        | Fixed Effect       |             | Random Effect |             |
|                 | Coefficient        | (Std. Err.) | Coefficient   | (Std. Err.) |
| persons         | -2.7947**          | (0.6606)    | -2.1345**     | (0.1699)    |
| ages            | 0.0053             | (0.5220)    | 0.0819        | (0.2920)    |
| dispincome      | 1.1630**           | (0.2061)    | 1.2292**      | (0.1276)    |
| dispincome2     | -0.1475**          | (0.0298)    | -0.1466**     | (0.0189)    |
| spouse          | 0.0378             | (0.0979)    | 0.0566        | (0.0749)    |
| Intercept       | -0.5970            | (2.2459)    | -1.9715†      | (1.1628)    |
| ** 1% * 5% †10% |                    |             |               |             |
| N               | 95                 |             | 95            |             |
| R <sup>2</sup>  | 0.899              |             |               |             |
| Hausman Test    | prob > chi2=0.9505 |             |               |             |

If not, establishing the equal access opportunity should be put the first priority in the public policy decision making.

## 5 Policy Implication

As is mentioned in the previous section, the education ratio in whole consumption expenditure is more related to the income level in South Korea because the estimation result in Table 3 indicates that no variables are significant except income. In Japanese case, however, a household expends more portion of money to education when the child advances higher education and when an importance of spouse income within a household is higher.

Looking into the change in the ratio of education expenditure, which is shown in Figure 3 (above), provides us with a clue to identify the differences. Figure 3 said that the average ratio of education expenditure among all income class is almost double in South Korea compared

to Japan. In addition to it, there was only 1 or 2 percent point increase in the ratio during the sample years throughout each income class while 4 or 5 percent point increase were observed in South Korea.

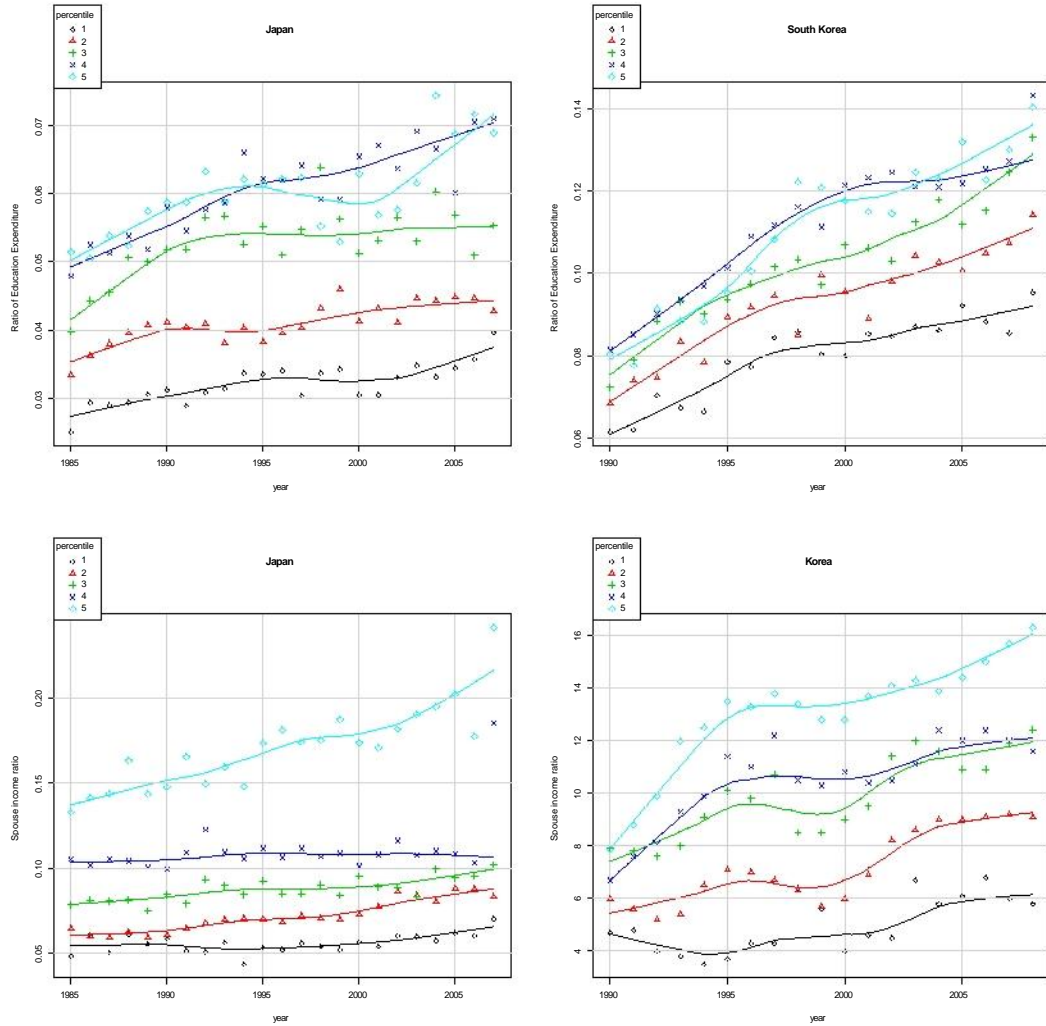


Figure 3: Education Expenditure Ratios (above) and Ratios of Spouse's Income (below) among Income Classes

One reason for this difference is that a private education opportunity, which is usually more expensive than public, is more common in South Korea. In fact, the spending in private education by a household living in an urban area of South Korea is about 332 thousand Won per month for those who are in top 20% in terms of income level while it is down to 42

thousand Won per month for those who are in below 20%<sup>2</sup>.

Combining this observation and the result from Figure 1 that income disparity has been widened in the last 20 years, it is likely that education expenditure has been an enormous burden for a poorer household. This might be able to explain the rise in the spouse's income level shown in Figure 3 while it is not going up in Japan except the richest quintile. In 2009, the Korea Development Institute published a report concerning the succession of social class between generations. This had not been controversial during the rapid economic growth period in South Korea since each class could share the outcome of income growth. Joining in the developed nations where the growth is usually slow and a distribution issue starts to matter, policy makers in South Korea should strongly pay attention to the relationship of income class and education opportunity so that society keeps its dynamism through fair competition wherever you are from in terms of income class.

Last but not least, we would like to mention the tendency of *conspicuous consumption* in South Korea. We need to pay attention to how each household finance its expenditure especially in South Korea because the rapid increase of debt among young and/or poorer people has been recognized as one of the most serious problem in South Korea after the recent financial deregulation. Since our data set does not include the debt, we have no information how each household finances. If the expenditure on education in poorer household which has been already in lower level compared to richer households is financed by any kind of debt, this would be more problematic. The analysis on the relationship between expenditure and its finance would be our next research topic.

## 6 Conclusion

We utilize the survey of household economy of South Korea and Japan, and try to find how these two countries are different or the same. We found that although both countries are aging, the first quintile in South Korea has been rapidly getting older compared to Japan. Since the wages in these two countries used to increase as you are getting older, this quite large

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<sup>2</sup> These figure are from *Annual Income and Expenditure Trends of Nationwide Households* in 2009.

divergence of aging in the poorest quintile are a remarkable change and it suggests that income inequality has been more widely spreading out in South Korea than Japan. Furthermore, the education expenditure ratio in South Korea is statistically significant for higher income level while it is not so in Japan. If the opportunity for better education is dominant by richer households, an early policy implementation for breaking out of this vicious circle is entailed in South Korea.

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