already belongs to the low-income households. It is also noted that baby-boomer households have significantly the possibility of falling into to the low-income households after retirement. It also suggests that the considerable amount of baby boomers is relatively poor even if their income levels stand in ahigher peak in their lives. Moreover, they have some difficulties to get the monthly incomebecause of their unstable income sources such as small or no amount of savings and pension benefits.

The home ownership of the general households is found in 1,679 households (64.63%) and the ownership rate of the low-income households is very low, that is 911 households (35.17%). It means that the low-income baby boomers have the difficulty to solve the housing welfare. The general households who lived in the city are 1,310 (50.88%) and 369 (14.25%) in the rural area. The low-income households is each 617 (23.82 %) in the city and 294 (11.35%) in the rural area.

In the gender aspect of household heads, the number of male general households is 1,426 (55.06%) and that of female ones is 253(9.99%). In summary 1,927 (74.40%) of baby boomers live in urban areas (Seoul, metropolitan, or urban) and others live in rural areas (rural and urban fringe). Among the baby boomers, 2,043 (78.88%) household heads are male and 547 (21.12%) are female.

2. Panel LogitAnlaysis

In panel data,there are multiple entities and each component has repeated measurement at the different time periods. Panel data models examine group (individual-specific) effects, time effects, or both. These effects can be regarded as either fixed or random, according towhether the “time-invariant” or permanent individual-specific effect (μ_i) is considered as a part of the fixed effect together with the constant (α) or as a part of the random effect together with “time-variant” idiosyncratic error(ϵ_{it}). A fixed effects

model, thus, examines if$\alpha + \mu_i$does not vary across individuals. A one-way model includes only one set of dummy variables (e.g., firm), while a two-way model considers two sets of dummy variables (e.g., firm and year).

The results in this type of regression analysis using the panel data also depend on the characteristics of dependent variables. The dependent variable defined in this article's panel data is binary rather than continuous for estimating the probabilistic characteristics of "relative" poverty properties, so panel logit analysis has been adopted. When the panel logitmodel assumes that the error term ($\mu_i + \epsilon_{it}$) follows the logistic distribution, whichcan be suitable for analysing the binary response variable's relationships to other discrete or continuous variables, it is a pooled logit model. When only the idiosyncratic error term (ϵ_{it})is assumed to follow the logistic distribution and μ_i follows normal distribution, it is a random effects logit model. When μ_i is approached a fixed or time-invariant individual effect, it is a fixed effects logit model.

Thegeneral type of panel logit models, which can be applied to either pooled or random effects logit analysis, is expressed as follows:

$$y_{it} = 1 \;\; y_{it}^{*} > 0,$$

$$y_{it} = 0 \text{ otherwise},$$

$$y_{it}^{*} = \alpha + \beta x_{it} + \mu_i + \gamma_t + \epsilon_{it},$$

where

y_{it}= *observed dependent variable,* y_{it}^{*}= *latent dependent variable*
$\alpha = constant, \beta = cofficients$
$x_{it} = independentvariable,\ \mu_i = parameterwhichrepresentsindividualeffects,$
$\gamma_t = parameterwhich\ representstimeeffects,\ \epsilon_{it} = idiosyncratic\ errorterm.$

In the fixed effects model,

$u_i = specific\ i^{th}\ object\ effects;\ \gamma_t(fixedt) = \ specifict^{th}timeeffects,$

In the random effects model,

$u_i = general\ object\ effects;\ \gamma_t(random\ t) = \ general\ time\ effects.$

In the respective case of adopting disposal income (*din*) or ordinary income (*oin*) as the particularly interested independent, their respective result of the likelihood-ratio test both did not reject the null hypothesis of *rho*=1 at the .01 level,which means that the individual characteristics of the panel is not necessarily to be considered. Based on this result, the fixed effects model needs not to be necessarily estimated and actually its coefficients could not be computed because of its log-likelihood not converged in iterations of maximum likelihood estimation. This non-convergence is due to the weak within-effects, which are too small to be calculated in the second order derivative of the log-likelihood function. In the case of excluding *ownership* from the model and adopting *din* as the dependent, the fixed effects analysis was possible to estimate and its estimates are not greatly different from pooled logit estimates. The Hausman test of the model with the same variables, however, indicated the systematic difference between fixed effects and random effects estimates.

The analysis, therefore, proceeded to the statistical comparison of pooled and random effects logit models. The Breusch Pagan Lagrange Multiplier (LM) test was not possible to apply to the model because of the same iteration problem above. In light of these procedural results, the next analysis directly compares the constant and coefficients of both pooled logit and random effect logit models each by each, considering the assumption of their error distribution.

Table 1 shows the results from pooled logit models when either *din* or *oin* was adopted as the independent. As indicated with asterisks, *din*, *nhousehold*, *ownership*, *workable*, and *age* were significant at the .01 level and *reg5* was significant at the .05 level in the pooled logit analysis with *din* as the dependent. In the pooled logit with *oin*, as the dependent, *oin*, *nhousehold*, *workable*, and *age* were significant at the .01 level

and *reg5* was significant at the .1 level. However, *housing price* turned out statistically significant at the .05 level whereas *ownership* turned out not significant. This suggests housing prices and homeownership are more closely and positively related to the ordinary income rather than the disposal income, which deducts personal interests from loans and taxes from ordinary income. Since a significant amount of personal loans is usually to buy or rent a house in Korea, this result is consistent with citizens' common observation and hypothesis in this article.

The most notable statistic in the table is described in the note in Table 1. In the case of *din* as the dependent, the logged value of *housingprice* turned out highly significant while *ownership*, which was significant, turned out not significant. In contrast, neither the logged value of *housingprice* nor *ownerhip* is statistically significant in pooled logit regression of *oin* as the dependent. This changed value and statistical significance are due to the probabilistic adjustment (e.g., an increase in the mean) by the logged value of housing price that relatively equates the differences in housing price. Figure 3 shows the change in probabilities of each ownership type's falling into either city or rural regions. It is clearly observed that less secured ownership is more likely to be found in urban areas. Figure 4 also illustrates probabilities of not falling into relative poverty in the urban-to-rural gradient, which is also consistent with the hypotheses.

Table 2 shows the estimated results of the random effects logit model. The statistical significance of each coefficient is overall consistent with the pooled logit model. It is notable that the pooled logit model, which assumes $\mu_i + \epsilon_{it}$ follows the logistic distribution, shows a more valid result. Comparing Tables 1 and 2 reveals both the overall coefficients and its standard errors in the pooled logit model are less than the ones in the random effects model. The smaller values are also found in the constant,

which contains the model's uncertainty or fixed effects, whereas as all the *t* values of the statistically significant variables in the pooled logit are much larger than ones in the random effects model. These values suggest the logistic distribution (not random plus logistic distribution) is more efficient and appropriate in the estimation of probabilities of (not) falling into relative poverty, and the signs and values of respective coefficients were consistent with the hypotheses.

Table 1. Results of the pooled logitmodel

Disposal Income Case	*Coefficient*	*Odds Ratio*	*Standard Error*	*t*	*Significance*
*din***	0.009	1.009	0.001	15.540	0.000
*nhousehold****	-2.813	0.060	0.220	-12.810	0.000
*ownership****	-0.340	0.712	0.129	-2.630	0.009
housingprice	0.000	1.000	0.000	1.290	0.196
*workable****	-0.831	0.436	0.178	-4.670	0.000
healthstat	0.024	1.024	0.122	0.200	0.844
*reg5***	-0.306	0.736	0.106	-2.890	0.004
gender	-0.315	0.730	0.275	-1.150	0.252
*age****	-0.340	0.712	0.056	-6.070	0.000
(*constant*)	15.412	4935158.000	3.214	4.800	0.000
Ordinary Income Case	*Coefficient*	*Odds Ratio*	*Standard Error*	*t*	*Significance*
*oin****	0.010	1.011	0.001	14.030	0.000
*nhousehold****	-3.683	0.025	0.301	-12.250	0.000
ownership	-0.117	0.890	0.141	-0.830	0.406
*housingprice***	0.000	1.000	0.000	-2.070	0.039
*workable****	-0.693	0.500	0.188	-3.680	0.000
healthstat	0.066	1.069	0.136	0.490	0.626
*reg5**	-0.218	0.804	0.118	-1.840	0.066
gender	-0.113	0.893	0.308	-0.370	0.714
*age****	-0.413	0.662	0.064	-6.430	0.000
(*constant*)	17.044	25200000.000	3.595	4.740	0.000

Note: In the case of "disposal income," the *t* statistic for the logged value of *housingprice* is 3.85 ($p = 0.000$) while *t* statistic for *ownership* is 0.60 ($p = 0.547$) in regressing the same except the logged value. In the case of "ordinary income," the *t* statistic for the logged value of *housingprice* is 1.07 ($p = 0.286$) while *t* statistic for

ownership is 0.14 (p = 0.888) in regressing the same except the logged value. * p< 0.10, ** p< 0.05, *** p< 0.01.

Table 2. Results of the random effects logit model

Disposal Income Case	*Coefficient*	*Standard Error*	*t*	*Significance*
*din****	0.010	0.001	10.680	0.000
*nhousehold****	-3.178	0.326	-9.750	0.000
*ownership***	-0.375	0.157	-2.390	0.017
housingprice	0.000	0.000	1.200	0.231
*workable****	-0.938	0.224	-4.200	0.000
healthstat	0.037	0.144	0.260	0.796
*reg5**	-0.297	0.133	-2.240	0.025
gender	-0.427	0.348	-1.230	0.221
*age****	-0.435	0.085	-5.120	0.000
(*constant*)	20.120	4.655	4.320	0.000

Ordinary Income Case	*Coefficient*	*Standard Error*	*t*	*Significance*
*oin****	0.012	0.001	9.480	0.000
*nhousehold****	-4.131	0.459	-9.000	0.000
ownership	-0.135	0.166	-0.810	0.416
*housingprice**	0.000	0.000	-1.760	0.078
*workable***	-0.769	0.229	-3.350	0.001
healthstat	0.075	0.156	0.480	0.631
reg5	-0.202	0.143	-1.410	0.158
gender	-0.168	0.374	-0.450	0.653
*age****	-0.512	0.101	-5.070	0.000
(*constant*)	21.733	5.299	4.100	0.000

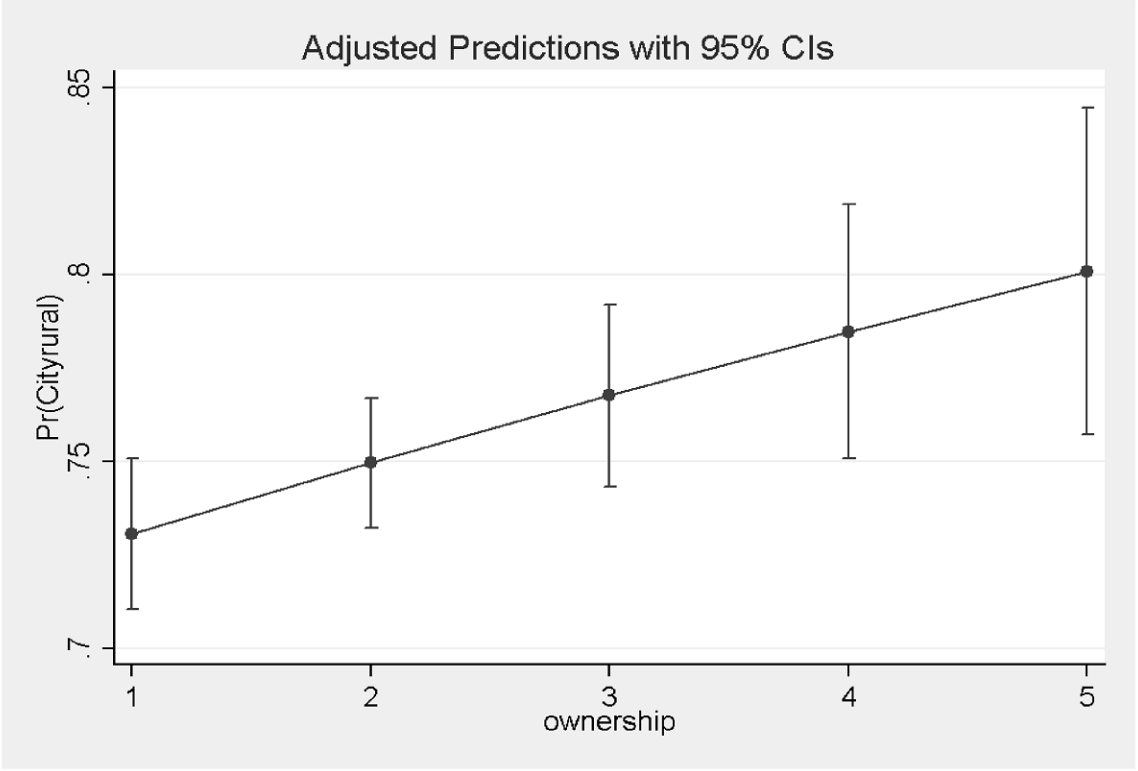

Figure 3. Probabilities of Each Ownership Type's belonging toan Urban Region

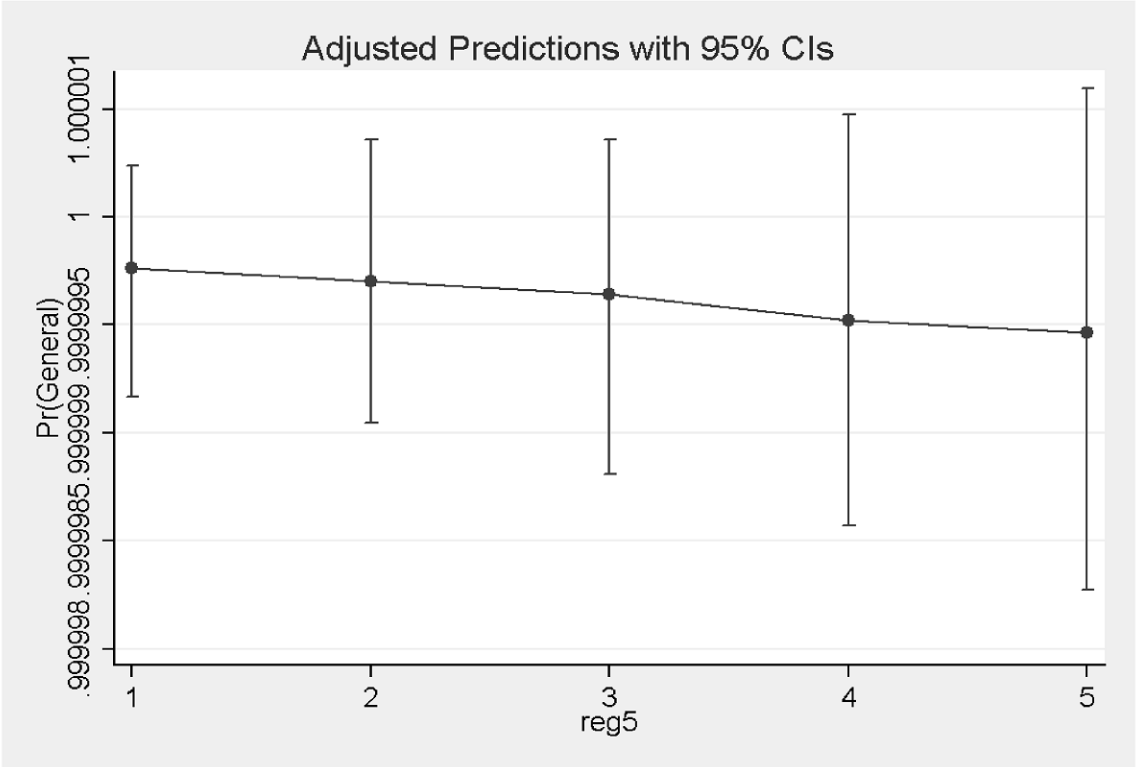

Figure 4. Probabilities of Not Falling into Relative Poverty in the Urban-to-Rural Gradient

Conclusion and Policy Implications

The ‘potential’ poverty of the baby boomers is a critical social issue and directly related with the poverty problems. However, most of the previous studies focused on the elderly households instead of the baby boomers who are likely to need potential poverty mostlywithin 10 years. This study implemented the procedural panel logit analysis in order to figure out the characteristics of baby-boomer poverty in urban and rural areas and some appropriate methods for using the well-constructed 5-year KWPD.

In theoretical aspects, the poverty of elderly households comes from several different factors such as individual, household, working circumstance, health condition, and sociological factors. However, the baby-boomer poverty differs from those of general households. Eventually the poverty level of urban and rural baby boomers turned out to be influenced from several different factors such as the ordinary income, number of households, ownership, health status, workable, urban-rural, gender, and age variables.

This study concludes as follows. First, in order to prevent that the baby boomers fall into low-income households, the government should create the job opportunity to increase the ordinary income and to provide the workplace because job itself is one of the best alternatives to guarantee the baby boomers welfare. Homeownership and sex are also important factor in the urban and rural baby-boomer poverty. The governmental policy should provide the baby boomers with dwelling stabilisation policy and dwelling support system like vouchers for female households along with the supplement of the public pension system.

In methodological aspect, this paper suggests a new research method to handle the mega panel data cross-sectionally and longitudinally. Until now, most of research methods focus on the cross-sectional analysis such as regression analyses and logistic ones depending upon the characteristics of available data. However, these methodologies cannot consider the time-effects of data. The cross-sectional analysis such as regression only measures the static relation among the variables at the specific time because it surveys several objectives at the designated time. Time series models cannot handle the several explanatory variables and only trace the effects by the time change on the one or two variables longitudinally.

Consequently, welfare policy is directly related with the job opportunity, especially for baby boomers. Moreover, poverty characteristics also differ from the age cohorts. Therefore, the government should create the diverse welfare system in order to prevent the poverty of the baby boomers because their social welfare need are about to increase. In terms of methodology, the panel analysis model can handle the cross-sectional and longitudinal statistic mega data. It also implements the individual and group effect analysis following the time change. However, this analysis also has some weakness. It cannot handle the cross-sectional and longitudinal aspects simultaneously. It also has some weakness to handle the category dependent variable. In order to do that, the detailed and systematic logistic panel analysis methods should be elaborated for the welfare policy and research in Korea and many “ageing” countries from now on.

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