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The Impact on Consumption of the Household Indebtedness in Korea

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Abstract

This paper examines what impact the increasing indebtedness of Korean households has had on consumption. For the analysis, the Korea Labor and Income Panel Study (KLIPS), a household panel data compiled every year since 1998, is used.

The estimation of the consumption function using panel data for the period of 2000～2007 shows that indebtedness has affected household consumption positively in Korea. This implies that the expansion of consumer credit has contributed to boosting consumption in the country by reducing the extent of liquidity constraints facing households. The debt service ratio (DSR), on the other hand, has not exerted the expected negative influence on consumption, which seems to verify that the low real interest rates prevailing during the period have lessened the actual debt burden of the Korean households.

The role of debt with regard to household consumption, however, may have changed recently, as the estimation of the consumption function using yearly data reveals that the coefficient of debt became negative in 2007 although its statistical significance is not high. To locate the sources for the change, we estimate the consumption function for the year with subsamples regrouped by income or by the ratio of financial assets to total assets held by each household. By income class, we can still identify the positive role of debt on consumption for the first and second income quintiles. For the third income quintile, however, the coefficient of debt becomes negative, and that of DSR changes from positive to negative at a point where DSR increases to be 26% and higher. In addition, for the fourth and fifth income quintiles, which hold more than two thirds of total household debt in Korea, the coefficient of DSR is negative although not highly significant. Meanwhile, for the households whose ratio of financial assets to total assets is lower than the

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sample average, both debt and DSR have had a significantly positive impact on consumption. Both variables, however, lose explanatory power in the consumption function for the group with a more-than-average ratio of financial assets to total assets.

Based on the results, we can conclude that the role of debt in boosting consumption has been significant in Korea since 2000, and this is particularly so for the households with lower income or those holding fewer financial assets. Since 2007, however, indebtedness seems to have started affecting household consumption negatively in Korea, especially for the middle or high income groups. Such a negative impact of indebtedness on consumption may have been reinforced since 2008 due to economic recession with the household debt level still hovering at a high level.

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Keywords: Household Debt, Consumption, Life Cycle and Permanent Income Hypothesis, Korea Labor and Income Panel Study

I. Introduction

Household debt in Korea has snowballed rapidly since the Asian Currency Crisis. The size of household debt has expanded dramatically relative to the scale of the economy, being mainly driven by enlarged availability of consumer credit due to financial deregulation, low interest rates and the rise in housing prices. According to the household credit data of the Bank of Korea, the size of household debts increased from 214 trillion won in 1999 to 733 trillion won at the end of 2009. And the size of personal financial debts in the flow of funds tables skyrocketed from 243 trillion won to 854 trillion won over the same period. The growth pace of household debt was much faster than that of personal disposable incomes or GDP. Nominal GDP and personal disposable income rose by 6.8% and 5.6%, respectively, per annum for the period of 2000～2009, while the household debts and the personal financial debts grew by 13.1% and 13.4%, respectively. As a result, the ratio of personal financial debts to nominal GDP rose significantly from 49% in 2000 to 80% in 2009 and personal financial debts to personal disposable income ratio increased from 81% to 143% for the same

period.

When compared to other advanced economies, the level of household debts in Korea seems quite high. Even though the ratio of personal financial debts to nominal GDP in Korea is somewhat lower than that of heavily-indebted countries such as the U.S., the U.K. or Australia, where the ratios were close to 100% in 2007, it is higher than the OECD average of 64%. Furthermore, the ratio of personal financial debts to personal disposable income in Korea is higher than that of the U.S. which peaked at 136% before the subprime mortgage crisis broke out.

The Korean economy has been in difficulties from the second half of 2008 due to the global financial crisis that originated in the U.S. This raised concerns over the recurrence of a household debt crisis triggered by the weakened financial soundness of households as a result of falling household incomes and declining assets prices. Furthermore, keen attention is paid to how the increase in the household debt affects consumption, since consumption would be a key element in the recovery from the world-wide economic slowdown.

Personal and social welfare can be enhanced by indebtedness via consumption smoothing over the course of a person's life. The life cycle and permanent income hypothesis, a foundation of consumption theory, shows that household consumption is made on the basis of not only current income, but also the expectations of future income streams. Thus, at the early stage of life, income level is usually lower than consumption level. The gaps between income and consumption can be filled by borrowing. More advanced capital markets and lower uncertainty over future income would enhance the consumption smoothing function of debt. On the other hand, an excessive increase in household debt compared to income level could rather hamper the consumption of households because of the growing burden of debt repayments, as has already been observed in Korea as well as in other countries.

Because of high dependency of the Korean economy on the global market, the economy suffered severe damage from the recent global recession. This is why it is impossible to stress the importance of domestic consumption too greatly in the country, given the current global economic slowdown. Therefore, an analysis of the relationship between consumption and household debt is essential in gauging the future recovery pace and in establishing corresponding policy measures. In the context, this study tries to analyze the effect of household debt on consumption using a household level micro panel data, the Korea Labor and Income Panel Study (KLIPS).

To this end, the remainder of the paper is organized as follows. Chapter Ⅱ

reviews the literature for a theoretical basis of our empirical analysis, including empirical studies that examine the effect of debt on consumption. In Chapter Ⅲ, we provide the model for the empirical analysis and report the estimation results of the consumption function. This chapter presents both panel estimation results and yearly cross-section estimation results to detect any changes in the relationship between consumption and detect variables over time. Additionally, estimation results for sub-sample groups classified by income level or by the extent of financial asset holdings will be presented. Finally, in Chapter Ⅳ, we summarize our findings and discuss some policy implications.

II. Related Literature

1. Permanent Income Life-Cycle Hypothesis and Consumption Function

Much of households' economic behavior including consumption, saving, asset portfolio, and indebtedness can be explained by the Permanent Income and Life-Cycle (PI-LC) Hypothesis. Keynesian economists used to believe that changes in income through, say, revision of taxation schemes can lead to prompt responses in consumption. If this is the case, fiscal policy would be highly effective. In contrast, according to the hypothesis suggested by Modigliani and Brumberg (1954) and Friedman (1957, 1963), government policy, which is readily predictable, is already reflected in household decision-making before its actual implementation. This is because consumers optimize their utility over a relatively long horizon and change their consumption behavior only when the change in their incomes is perceived as permanent. That is, they form their expectations of income flow over a long period of time by using all available information in their decision-making and determine their future consumption plans based on their income projections.

Since Modigliani and Brumberg (1954) and Friedman (1957, 1963), the Permanent Income and Life-Cycle (PI-LC) Hypothesis has been developed into mathematical models incorporating inter-temporal utility maximization. However, at the early stage of the theoretical modeling, the models were based on unrealistic assumptions such as perfect foresight or perfect capital market, which inevitably lacked explanatory power for reality. Unlike these theoretical attempts, Modigliani and Brumberg or Friedman tried to describe the behavior of

consumer by adequately taking uncertainty and the precautionary motives into[1] account.

The reason why the early theoretical models assume perfect foresight while intentionally neglecting uncertainty is partially because it is impossible to directly derive the consumption function from the maximization conditions of a more general form of utility function (i.e., constant relative risk aversion, CRRA) when income uncertainty exists (Zeldes 1989, Carroll 2001). As this paper has the purpose of directly estimating the consumption function, however, we first look into the consumption function derived from the maximization condition under perfect foresight.

With perfect foresight, the consumer chooses his or her consumption level (C_t) in order to maximize life time utility as in equation (1) at time t.

$$\max E_t \sum_{\tau=t}^{T} \left(\frac{1}{1+\beta} \right)^{\tau-t} U(C_t, \Phi) \tag{1}$$

where T indicates the end of the lifetime, β a discount rate, and Φ the vector of household characteristics such as age, occupation and educational background of household head, the size of household, the number of children, etc. which can affect household preferences and human capital accumulation. The decision of consumption at time t is constrained by the sum of a household's net assets at the beginning of time t and labor income Y_t earned during time t. And the household's net assets evolve as in equation (2),

$$A_{t+1} = (1+r)(A_t - D_t + Y_t - C_t) \tag{2}$$

where A stands for total assets, r interest rate, D financial debt and Y labor income. In addition, in period T, the last period of a household's lifespan, the following equation (3) should hold.

$$A_T + Y_T \geq C_T. \tag{3}$$

When a utility function has a standard characteristic of CRRA and if the effect of preference and that of consumption level on utility can be separable, the

1) For more details on differences between the model by Friedman (1957) and the early theoretical models developed in the 1960s and 1970s, please refer to Carroll (2001).

utility function can be expressed as in equation (4).

$$U(C_t, \Phi) = \frac{C_t^{1-\rho}}{1-\rho} exp[\Phi] \tag{4}$$

where ρ is a relative risk aversion parameter.

According to Zeldes (1989) and Carroll (2001), in an economy under perfect foresight, an optimal consumption function can be derived as in equation (5) from the lifetime utility maximization problem through equation (1) to (4)

$$C_t = k(A_t - D_t + Y_t + H_t) \tag{5}$$

where k indicates a constant determined by the parameters in the model. H_t represents human capital, which is the present value of future labor incomes after time $t+1$ over a remaining lifespan and can be expressed as $H_t(\Phi)$. A_t, D_t, Y_t and H_t all determine the amount of available resources for consumption at period t in which the three variables other than H_t can be observed as these are realized at t, while H_t cannot. It is confirmed from equation (4) that it is optimal for consumer to consume a fixed rate of all available resources at every period. This is the main thrust of the traditional PI-LC hypothesis.

Based on the discussion so far, we can generalize the consumption function of a household as in equation (6) where consumption is a function of total resources at hand and household characteristics which influence the unobservable human capital and preference.[2)]

$$C_t = \alpha_0 + \alpha_1(A_t - D_t + Y_t) + \theta'\Phi_t + \epsilon_t \tag{6}$$

where θ represents a coefficient vector for household characteristics and ϵ_t an error term. It is noteworthy that debt affects consumption always negatively in equation (6) based on the standard PI-LC hypothesis.

On the other hand, many empirical studies have examined whether the PI-LC hypothesis is consistent with the consumption behaviors observed in real life and find that this is not the case. Hall (1978) argues that the consumption in the current period consumption takes the form of random walk which is predictable only by the consumption in the previous period just as expressed in equation (7).

2) Heo (2005) also estimates the consumption function which is similar to equation (6).

$$\Delta c_t = \mu + e_t, \quad e_t \sim iid(0, \sigma_e^2) \tag{7}$$

That is, other previous period economic variables such as income (y_{t-1}) or asset prices (s_{t-1}) at time $t-1$ are already reflected in c_{t-1} so that they have no predictability of c_t.

Many empirical results using time-series data show that the coefficients of the income variable at time $t-1$ and before that have no statistical significance, which complies with the theory. In contrast, asset prices in the previous periods often turn out to have some effect on consumption. Hall (1978) proposes that this stems from the fact that there exists a time lag until the shift in asset prices is perceived as a shift in permanent income. In addition, he argues that a change in income at time t, could affect c_t and this fact has nothing to do with the validity of this hypothesis.

According to the empirical results of Hall and Mishkin (1982) using PSID (Panel Study of Income Dsynamics), current consumption responds to temporary changes in current income even though current period consumption responds more strongly to a change in permanent income. They also found that the PI-LC hypothesis accounts for about 80% of the change in consumption coming from the change in current income, while the remaining 20% cannot be accounted for by the hypothesis.

Zeldes (1989) calibrates a consumption function from the CRRA utility function with income uncertainty using household panel data and compares it with the consumption function under perfect foresight. He finds that consumption under uncertainty is always less than that under perfect foresight for each asset level. The gap between the two consumption levels, he argues, can be regarded as precautionary saving. He also shows that with uncertainty the marginal propensity to consume is not constant as in a model with perfect foresight: that is, the smaller the amount of assets, the greater the marginal propensity to consume. He also finds out that, when accumulated assets reach an amount equivalent to 4 to 5 years' annual income, the marginal propensities to consume in the two different models are almost the same.

Carroll (2001) also estimates the consumption function using a similar method to that of Zeldes and discovers that the consumption function under perfect foresight is a straight line while the consumption function under uncertainty is concave with the asset level. He also finds that the lower the level of a household's assets is, the greater its marginal propensity to consume becomes. This implies that the level of asset holdings could be a factor affecting consumption and that lower asset holdings could lead to a greater propensity to

consume when temporary incomes increase. Furthermore, the smaller the size of financial assets is, the more likely households are to be under liquidity constraints, and, as a consequence, the more sensitively they respond to a temporary increase in income. Thus, consumption behavior under liquidity constraints and that under precautionary motives due to income uncertainty are almost similar in practice.[3)]

The studies of Hall and Mishkin (1982), Zeldes (1989), and Carroll (2001) imply that consumption by households is basically made in accordance with the PI-LC hypothesis, but also that for better explanations of a real world more practical assumptions, such as imperfect capital markets or income uncertainty, are required. With the introduction of the realistic assumptions, we can explain why the current-period consumption responds rather sensitively to current-period income change and why this propensity gets stronger when asset holdings get smaller. It is noteworthy that these phenomena are not contradicting with rational behaviors underlying the PI-LC hypothesis.

2. Debt and Consumption

The studies focusing on the forms of the consumption function under the simple PI-LC hypothesis assume that household consumption is based on a combination of net assets and current period income-i.e., $A_t - D_t + Y_t$. Therefore, debt can influence consumption only as a part of net assets. However, empirical studies that pay attention to the individual economic variables affecting consumption seek to explain the direct effect of debt on consumption more specifically.

Studies including Campbell and Mankiw (1990) explicitly examine how debt affects consumption using macro-data by adding variables such as current period income and financial debt to equation (7). The results reveal that the relationship between debt and consumption is mixed. Bacchetta and Gerlach (1997) show that the expected growth in mortgage and consumer credit, as well as the difference between lending and borrowing rates, has a positive impact on the growth of nondurable goods and services expenditures. Ludvigson (1999) estimates a model where a household's borrowings are constrained by its income level, and finds that current period income and financial debt have statistically significant positive effects on consumption. On the other hand, Johnson (2007)

3) Carroll (2001) points out that, in practice, the consumption behavior of the household with liquidity constraints are almost similar with that of the household without the constraints, but with precautionary savings motives.

cannot find a significant relationship between household borrowings and total expenditures, whereas credit card loans are negatively correlated with total expenditures.

As total amount of indebtedness has been rising in many countries, notably in the U.S., the impact not only of the level of debt, but also that of debt service ratio (DSR) on consumption, has been gaining increasing attention. Micro-level data becomes more popular in the studies analyzing the impact of DSR on the consumption level even though macro-level data are also used. Most of the studies using macro data conclude that debt service ratio does not have a statistically significant effect on consumption. McCarthy (1997) finds that DSR is not a statistically significant explanatory variable while household credits have a significantly positive correlation with nondurable goods and services expenditures. Maki (2000) also finds that consumer credits have a significantly positive effect on consumption, but that DSR does not. In contrast, some Korean studies including Han and Hwang (2003) and Kim et al. (2009), find that debt is positively correlated to consumption, while DSR is negatively correlated.

Many studies using household level micro data report that DSR has a negative effect on consumption. Stephens (2005) finds that a 10% increase in disposable income resulting from the completion of car payment causes non-durable consumption to increase by 2 to 3%. Similarly, Coulibaly and Li (2006) observe that paying off a mortgage leads to an increase in the consumption of durable goods. Ogawa and Wan (2007), using Japanese data for the 1990s after the burst of assets bubbles, find that the ratio of mortgage loans to real assets is negatively correlated with household consumption. Based on this result, they argue that not only corporate liabilities but also household debts contributed to the prolonged recession in Japan. Analyzing the U.S. micro data, Johnson and Li (2007) observe that DSR does not change consumption behavior to a statistically significant degree because the households with a high DSR tend to have large amount of liquid assets. At the same time, they also observe that the consumption behavior of the households with a high DSR and few liquid assets can differ from the rest as the income elasticity of consumption of the former group is estimated to be higher by 50% than the latter, showing that the households facing liquidity constraints are likely to reduce their consumption more than the other groups when income decreases.

III. Empirical Analysis of the Effects of Household Debt on Consumption

1. Model and Data

In equation (6) based on the standard PI-LC hypothesis, current period consumption is a function of available assets and income at time t, $A_t - D_t + Y_t$, and demographic characteristics (Φ) that affect human capital and the preference of the household. In the model, A_t, D_t and Y_t are assumed to have the same scale effect on consumption. In reality, however, the effects of different resources such as real assets, financial assets and labor incomes on consumption can differ. Especially, debt is always negatively correlated to consumption by reducing net worth, in the model. However, some types of debt such as credit card loans can have a positive effect on consumption. Consumer credit is a way to expand the ability to consume on the basis of future repayment capacity or human capital and can contribute to consumption smoothing, given the existence of incompleteness of the capital market and liquidity constraints in the real world.

Therefore, our empirical model is set up to measure the effect of each financial variable on consumption, separately. In addition, to take a more detailed look at the effect of indebtedness on consumption, the model includes DSR as well as debt amount, as in the existing literature. Although the effect of debt or DSR on consumption cannot be precisely predicted in advance, we expect debt to be positively correlated to consumption and DSR to be negatively correlated. Also, to take into account the possibility of nonlinear relationships between financial variables and consumption, our model includes the quadratic terms of financial variables as in equation (8).

$$C_t = \lambda_0 + \lambda_1 Y_t^2 + \lambda_2 Y_t + \lambda_3 RA_t^2 + \lambda_4 RA_t + \lambda_5 FA_t^2 + \lambda_6 FA_t + \lambda_7 D_t^2 + \lambda_8 D_t + \lambda_9 DSR_t^2 + \lambda_{10} DSR_t + \theta' \Phi_t + \epsilon_t \quad (8)$$

where RA and FA indicate real and financial assets, respectively. In equation (8) the dependent variable C represents expenditures on non-durable goods and services, which is calculated by subtracting the expenditures on durable goods from total expenditures. More specifically, C includes expenses on food, dining-out, education, car maintenance, health care, education, culture and leisure, communication, clothing, public transport and other miscellaneous goods and services. As the Korean Labor and Income Panel Study surveys the average

monthly consumption in the previous year of the survey, the consumption figures contained in the 2007 data actually represent the consumption expenditures made in 2006.[4] Income Y is disposable income obtained by subtracting tax, national pension payments and health insurance payments from total income which consists of earned income, financial income, real estate income, transfer income and other incomes. The income is also the annual income for the year previous to each survey. Real assets, RA, include the house of residence and other real estates and financial assets, FA, include various types of savings with banks or non-banking institutions and other privately-held savings like Gye (traditional private funds popular among the Koreans). Debt, D, includes liabilities to financial institutions as well as personal loans. As assets and debts reported are outstanding sum as of the year when the survey is conducted, we use one-year previous data for assets and debts. Constructing the dataset like this, we can assume that households make decision on consumption observing these stock variables.[5] We also estimate a modified version of equation (8) in which real asset variable is included as a dummy indicating its ownership. This is because there is a possibility that real assets may be difficult to use as a consumption resource due to their low liquidity and that they may be highly correlated with debt through their role of collateral when household loans are made.

All variables expressed in current prices are converted into real prices and then logged. Consumption, income, financial assets and debt are deflated using CPI (2005 = 100), while real assets are deflated using the house price index released by the Kookmin Bank.[6] The vector(Φ) of household characteristics includes the age of the household head, its squared term, the education level, the occupational type and the marital status of the household head, the number of household members, the number of working members, a dummy for children's educational level, a dummy for residential area, and year dummies in order to control for the common annual factors for the households. Table 1 shows the definitions of the key variables in the model.

4) Despite this fact, the year index corresponds to the survey year in order to avoid confusion.

5) As seen in <Appendix Table 1> the correlation between consumption and income is very high while the consumption is not so highly correlated with asset or debt.

6) We use the house price index as of June in each year considering that the surveys are usually conducted between May and September each year. The house price of Jan. 2005 is set to 100.

Table 1	**Variables**
C	Consumption (expenses on food; beverages and tobacco; clothing and footwear; restaurants; education; recreation and culture; health; transport; communications; and other miscellaneous goods and services)
X	Household characteristics, including age of household head and its quadratic term, educational level, marital status and occupational status of household head, the number of household member, the number of working member of household, educational stage of children and residential area, and year dummies
Y	Disposable income (= labor income + income from financial assets + income from real assets + transfer income + other incomes − tax − pension payment − health insurance payment)
RA	Real assets (residential house or other real estates)
FA	Financial assets including privately held savings
D	Financial debts including private loans
DSR	Debt payment to disposable income ratio

2. Estimation Results

For the estimation of equation (8), we use a general panel model as follows:

$$C_{it} = \beta X_{it} + \eta_i + \epsilon_{it} \tag{9}$$

In the above equation, C_{it}, X_{it} and ϵ_{it} denote dependent variable, vector of explanatory variables and error term, respectively, and η_i represents the unobserved heterogeneity of the household characteristics. In the estimation, we use Random Effect model that treats η_i as a random variable, which is independent from explanatory variables. This is because fixed effect estimation brings incidental parameters problem due to too many fixed effects (dummies) to be estimated with the Korea Labor and Income Panel Study which have less than ten year time series that is quite short compared to the cross section size.[7)]

The results of the estimation are presented in <Table 2>. The first column (model①) shows the result when real asset variable is included in value, while the second column (model②) reports the result when the variable is included as a dummy variable indicating whether a household owns any real assets. The results demonstrate that the variables of household characteristics have highly significant effects on the level of household consumption. The age of household

7) When η_i is not independent from explanatory variables, IV estimation or GMM is used due to its endogeneity. However, we consider η_i independent from explanatory variables in this paper considering the difficulties in finding adequate instrumental variables.

Table 2 **Consumption Function: Estimation Result of Panel Models**

	Model①		Model②	
	Coefficient	z-statistics	Coefficient	z-statistics
Quadratic Term of Age of Household Head	-0.0003***	-9.80	-0.0003***	-10.15
Age of Household Head	0.0224***	8.26	0.0239***	8.89
Education Level of Household Head (years)	0.0296***	19.68	0.0322***	21.69
Marriage Status of Household Head (Singles as the reference)				
Married	0.1242***	5.16	0.1160***	4.86
Separated, Divorced, or Widowed	0.0564**	2.23	0.0454*	1.81
Number of Household's Members	0.1174***	25.36	0.1180***	25.85
Number of Working Members	0.0231***	4.60	0.0218***	4.37
Children at				
Primary School	0.0264***	3.51	0.0213***	2.84
Middle School	0.0712***	9.42	0.0722***	9.57
High School	0.1058***	12.92	0.1060***	13.04
College or Graduate School	0.1720***	19.69	0.1728***	20.11
Type of Employment of Household Head (Unemployment as the reference)				
Wage Earner	0.0202*	1.89	0.0196*	1.86
Self-employed	0.0354***	2.94	0.0417***	3.51
Unpaid Family Workers	0.0589	1.56	0.0550	1.48
Residential Area (Local City as the reference)				
Seoul	0.0348***	3.34	0.0462***	4.47
Metropolitan Cities	0.0215**	2.35	0.0195**	2.15
Quadratic Term of Household's Income (log)	0.0178***	5.98	0.0194***	6.63
Household's Income (log)	-0.0176	-0.40	-0.0334	-0.7
Quadratic Term of Real Estate Asset (log)	0.0077***	7.62		
Real Estate Asset (log)	-0.0245***	-4.50		
The Status of Real Estate Holding (Dummy)			0.0457***	6.35
Quadratic Term of Financial Asset (log)	0.0025***	6.41	0.0029***	7.49
Financial Asset (log)	-0.0157***	-5.08	-0.0179***	-5.89
Quadratic Term of Debt (log)	0.0017***	3.15	0.0026***	4.81
Debt (log)	-0.0134***	-3.11	-0.0198***	-4.64
Quadratic Term of DSR	0.0028	0.56	0.0016	0.31
DSR	0.0128	0.47	0.0204	0.77
Year Dummy (Year 2001 as the reference)				
2002	-0.0707***	-7.82	-0.0688***	-7.82
2003	-0.0187**	-2.00	-0.0206**	-2.27
2004	-0.0130	-1.45	-0.0160*	-1.82
2005	-0.0218**	-2.45	-0.0233***	-2.67
2006	-0.0132	-1.44	-0.0129	-1.44
2007	0.0019	0.20	-0.0007	-0.08
Number of observations	17,868		18,571	
R^2	0.693		0.688	

Note: *, **, *** indicate statistically significant at the 10%, 5% or 1% significance level, respectively.

head and its squared term are all significant, leading the consumption function in relation to age to take an inverted U shape. When all other conditions except the age of household head are equal, the peak point of consumption is estimated to be at the age of 44. With a higher education level, the consumption level is higher and the households with married household heads consume more than those with unmarried ones. Consumption of larger households in term of the number of members and with more working members is higher. Households having children who are in a regular education course have higher consumption than those that do not.

And the coefficients of the dummies of children's educational stage are estimated to increase monotonically in proportion to the stage, revealing that households with college students have the highest consumption level. For occupations of the household heads, consumption by households with employed status is higher than that of those being unemployed and it is noteworthy that the significance of the dummy for being self-employed is higher than that for wage earners. Regionally, households living in Seoul or other metropolitan area consume more than those in local cities do and the significance in the case of Seoul is higher than that for other metropolitan cities.

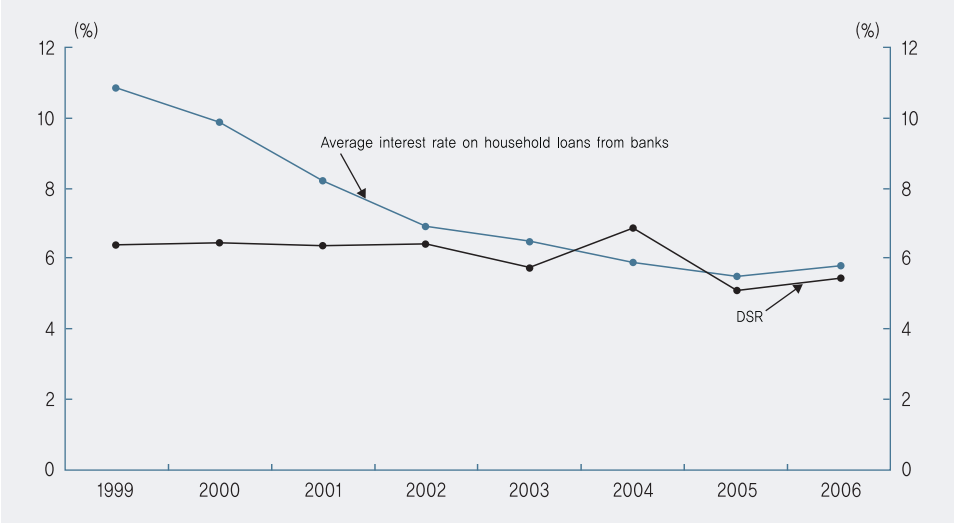
The effects of income, debt and asset variables show that the squared terms of most variables are all significant, whereby the relationships between consumption and financial variables are found to be non-linear. Even considering this non-linearity, income, real assets and financial assets are analyzed to be generally in a positive relationship with consumption.[8] When real asset variable is included as a dummy indicating the ownership of houses or other real estates (model②), the result is almost the same.

And it is notable that debt and consumption are in an obvious positive relationship while the coefficients of DSR are not significant. In other words, the burden of debt repayment does not act as a factor that hampers consumption. As displayed in <Figure 1>, this seems to stem from the relatively light burden of debt payment on households in that the average DSR of the Korean households has tended to decline since 2000 thanks to the credit easing financial environment like low interest rates.

In order to examine whether the effects of debt and DSR variables change over time, we estimate consumption function using yearly cross sectional data. The

8) The lowest points of the U shape consumption functions in relation to real or financial assets are located around at ten thousand or more wons or a few hundred thousand wons, which implies that the assets and consumption are generally in positive relationship within an economically meaningful range.

Figure 1 **Banks' Interest Rates on Household Loans and Average DSR in Korea**



Notes: 1. Bank's interest rate is for the household loans newly extended and weighted average.
2. DSR is calculated as sample average of debt payments divided by sample average of disposable incomes from the KLIPS data in each year.
Sources: ECOS of the Bank of Korea, Korea Labor and Income Panel Study

result is shown in <Table 3>. It is confirmed from the Table that income, financial assets and real estate assets have constantly positive effects on consumption. That is, households with much more income and assets tend to cosume more. In contrast, the effects of debt and DSR on consumption are significant only in 2003 and 2007. Taking a closer look at these effects based on the estimation result of model② that controls for the relationships between debt and real assets, DSR, rather than debt is in a positive relationship with consumption in 2003 and 2007. This seems to be because DSR represents not only the burden of debt servicing, but also the accessibility to credit. What is notable, however, in <Table 3> is that the coefficient of debt for consumption in 2007 has a negative sign despite its low significance level of 15%. This implies that, all conditions being equal, households with more debts are likely to consume less and that debt may have recently started to affect consumption negatively.

Table 3 **Estimation Result of Consumption Function By Year (Only financial variables are reported)**

year 2007	Model①		Model②	
	Coefficient	t-statistics	Coefficient	t-statistics
Quadratic Term of Household's Income (log)	0.0105	2.40	0.0143*	3.41
Household's Income (log)	0.1890	2.28	0.1488	1.87
Quadratic Term of Real Estate Asset (log)	0.0097***	47.76		
Real Estate Asset (log)	-0.0345***	-22.05		
The Status of Real Estate Holding (Dummy)			0.0323	1.88
Quadratic Term of Financial Asset (log)	0.0027	1.59	0.0036	2.15
Financial Asset (log)	-0.0189	-1.17	-0.0249	-1.49
Quadratic Term of Debt (log)	0.0003	0.24	0.0026	1.89
Debt (log)	-0.0027	-0.31	-0.0189	-2.25
Quadratic Term of DSR	0.0230*	3.29	0.0232*	3.27
DSR	-0.0604	-1.16	-0.0647	-1.19
Number of observations	2,738		2,806	
R^2	0.7483		0.7454	
year 2006	Model①		Model②	
	Coefficient	t-statistics	Coefficient	t-statistics
Quadratic Term of Household's Income (log)	0.0226*	3.82	0.0247**	5.61
Household's Income (log)	0.0152	0.13	0.0027	0.03
Quadratic Term of Real Estate Asset (log)	0.0138***	12.69		
Real Estate Asset (log)	-0.0578***	-15.97		
The Status of Real Estate Holding (Dummy)			0.0176	1.74
Quadratic Term of Financial Asset (log)	0.0023*	3.64	0.0042*	3.34
Financial Asset (log)	-0.0186**	-4.32	-0.0306*	-3.60
Quadratic Term of Debt (log)	-0.0003	-0.40	0.0011	1.97
Debt (log)	0.0029	0.60	-0.0083	-2.01
Quadratic Term of DSR	-0.0014	-0.10	-0.0134	-0.75
DSR	0.0906	1.26	0.1377	1.87
Number of observations	2,721		2,788	
R^2	0.7212		0.7162	

year 2005	Model①		Model②	
	Coefficient	t-statistics	Coefficient	t-statistics
Quadratic Term of Household's Income (log)	0.0037	0.28	0.0056	0.43
Household's Income (log)	0.2926	1.39	0.2809	1.42
Quadratic Term of Real Estate Asset (log)	0.0069**	7.13		
Real Estate Asset (log)	-0.0231*	-3.69		
The Status of Real Estate Holding (Dummy)			0.0247	2.70
Quadratic Term of Financial Asset (log)	0.0046*	4.20	0.0054*	4.08
Financial Asset (log)	-0.0312*	-3.78	-0.0361*	-3.76
Quadratic Term of Debt (log)	0.0013	0.80	0.0024	1.89
Debt (log)	-0.0056	-0.44	-0.0140	-1.33
Quadratic Term of DSR	0.0068	0.92	0.0057	0.83
DSR	0.0371	0.79	0.0487	1.09
Number of observations	2,726		2,798	
R^2	0.7270		0.7270	
year 2004	Model①		Model②	
	Coefficient	t-statistics	Coefficient	t-statistics
Quadratic Term of Household's Income (log)	0.0235***	13.65	0.0264***	14.74
Household's Income (log)	-0.0472	-1.60	-0.0719	-2.20
Quadratic Term of Real Estate Asset (log)	0.0122***	12.73		
Real Estate Asset (log)	-0.0462**	-5.82		
The Status of Real Estate Holding (Dummy)			0.0366***	15.16
Quadratic Term of Financial Asset (log)	0.0032***	9.98	0.0038***	15.06
Financial Asset (log)	-0.0219***	-25.97	-0.0254***	-16.63
Quadratic Term of Debt (log)	0.0007	0.69	0.0023	1.84
Debt (log)	-0.0055	-0.69	-0.0178	-1.93
Quadratic Term of DSR	-0.0039	-0.43	-0.0050	-0.54
DSR	0.0455	0.59	0.0544	0.71
Number of observations	2,714		2,786	
R^2	0.6860		0.6822	

year 2003	Model①		Model②	
	Coefficient	t-statistics	Coefficient	t-statistics
Quadratic Term of Household's Income (log)	0.0250	2.86	0.0288*	3.76
Household's Income (log)	-0.0700	-0.49	-0.1034	-0.81
Quadratic Term of Real Estate Asset (log)	0.0139**	5.45		
Real Estate Asset (log)	-0.0527**	-4.03		
The Status of Real Estate Holding (Dummy)			0.0467**	4.44
Quadratic Term of Financial Asset (log)	0.0031	2.46	0.0041**	5.02
Financial Asset (log)	-0.0173	-2.67	-0.0230**	-6.98
Quadratic Term of Debt (log)	0.0007	0.24	0.0020	0.71
Debt (log)	-0.0029	-0.13	-0.0142	-0.62
Quadratic Term of DSR	-0.0347**	-5.26	-0.0351**	-5.13
DSR	0.1598**	9.12	0.1777***	11.78
Number of observations	2,334		2,473	
R^2	0.6829		0.6746	
year 2002	Model①		Model②	
	Coefficient	t-statistics	Coefficient	t-statistics
Quadratic Term of Household's Income (log)	0.0199	2.12	0.0254*	3.62
Household's Income (log)	0.0138	0.10	-0.0503	-0.58
Quadratic Term of Real Estate Asset (log)	0.0086**	4.36		
Real Estate Asset (log)	-0.0328	-2.67		
The Status of Real Estate Holding (Dummy)			0.0333*	3.88
Quadratic Term of Financial Asset (log)	0.0036	2.81	0.0043*	3.23
Financial Asset (log)	-0.0180	-2.20	-0.0231	-2.77
Quadratic Term of Debt (log)	0.0044	1.82	0.0052	2.12
Debt (log)	-0.0250	-1.24		-1.57
Quadratic Term of DSR	0.0164	1.74	0.0377	2.51
DSR	-0.0691	-1.15	-0.0861	-1.42
Number of observations	2,322		2,452	
R^2	0.6959		0.6896	

Notes: 1. *, **, *** indicate statistically significant at the 10%, 5% or 1% significance level, respectively.
2. Shaded cell indicates statistically significant at the 15% significance level.

In this regard, we estimate the consumption function by income level in order to find out where this change comes from. <Table 4> exhibits the results of consumption function estimated by three income classes in the year 2007 samples; that is, 1st and 2nd quintiles; 3rd quintile; and 4th and 5th quintiles.

For households in the first or second income quintiles, the coefficients of debt variables are not significant, but DSR is in a significantly positive relationship with consumption. These results are similar with the estimation results of the whole sample. In the third income quintile estimation, the effects of debt on consumption are negative at the significance level of 11% in model② and the positive effects of DSR on consumption turn negative, when the ratio is 26% or higher.[9] In the fourth and fifth income quintile estimation, it is observed that DSR and consumption are in a negative relationship despite the low significance level of 15%.[10] The above results of estimation imply that the repayment of debt including principal started to have negative effects on consumption from 2007, largely for the households in the third or higher income quintiles which hold 85% of total household debt.[11] Notably, the households in the third income quintile with higher debt to income and higher debt to asset ratios than those in the fourth and fifth income quintiles respond more sensitively to the burden of debt repayment. Thus, we can conclude that debt has come to have more obvious negative effects on consumption recently.

Table 4 **Estimation Result of Consumption Function by Income Quintile (Year 2007)**

[The First and Second Income Quintile]

	Model①		Model②	
	Coefficient	t-statistics	Coefficient	t-statistics
Quadratic Term of Age of Household Head	3.7e-6	0.08	-5.4e-6	-0.09
Age of Household Head	-0.0070	-1.00	-0.0057	-0.72

9) The squared term of DSR has negative coefficients at a significant level of 5% and DSR has positive coefficients at a significant level of 11%, showing that they are in inverted U shaped relationship with consumption.

10) In the 4th and 5th income quintile estimation, DSR is in negative relationship with consumption until debt payment to disposable income increases up to 2 times in model① or 2.2 times in model②.

11) According to the estimation results by income quintile in other years, the effects of debt-related variables on consumption were not significant or positive as a whole, even in the 3rd or higher income quintiles. But in the estimation results of 4th and 5th income quiltiles in 2006, the squared term of DSR has negative coefficients at a significance level of 15%.

	Model①		Model②	
	Coefficient	t-statistics	Coefficient	t-statistics
Education Level of Household Head (years)	0.0139*	4.16	0.0151**	7.46
Marriage Status of Household Head (Singles as the reference)				
Married	0.1376	2.03	0.1593	2.12
Separated, Divorced, or Widowed	0.0919	1.60	0.0822	1.83
Number of Household's Members	0.1140**	5.55	0.1091**	4.71
Number of Working Members	0.0338**	6.30	0.0152	1.86
Children at				
Primary School	-0.0791	-0.94	-0.1092	-1.24
Middle School	0.0139	0.60	0.0179	0.55
High School	0.1365*	3.26	0.1108*	2.91
College or Graduate School	0.1753	1.97	0.1919*	3.02
Type of Employment of Household Head (Unemployment as the reference)				
Wage Earner	-0.0843**	-6.92	-0.0820***	-16.45
Self-employed	-0.0879	-2.00	-0.0787	-1.92
Unpaid Family Workers	-0.2302	-0.98	-0.2057	-0.93
Residential Area (Local City as the reference)				
Seoul	0.0186**	7.14	0.0509**	7.14
Metropolitan Cities	0.0388*	3.70	0.0447**	5.14
Quadratic Term of Household's Income (log)	0.0985**	5.13	0.1059**	6.33
Household's Income (log)	-0.8633*	-3.26	-0.9455*	-4.02
Quadratic Term of Real Estate Asset (log)	0.0180	2.89		
Real Estate Asset (log)	-0.0817	-2.80		
The Status of Real Estate Holding (Dummy)			-0.0267	-0.96
Quadratic Term of Financial Asset (log)	0.0045*	3.04	0.0061**	5.52
Financial Asset (log)	-0.0325	-1.94	-0.0409*	-2.93
Quadratic Term of Debt (log)	-0.0039	-1.24	-0.0025	-0.60
Debt (log)	0.0217	0.87	0.0122	0.39
Quadratic Term of DSR	-0.0051	-0.78	-0.0074	-1.08
DSR	0.1499*	3.85	0.1677*	3.16
Number of observations	939		984	
R^2	0.6073		0.5990	

[The Third Income Quintile]

	Model①		Model②	
	Coefficient	t-statistics	Coefficient	t-statistics
Quadratic Term of Age of Household Head	-0.0001	-0.61	-0.0001	-0.68
Age of Household Head	0.0018	0.11	0.0032	0.21
Education Level of Household Head (years)	0.0164**	4.63	0.0180**	5.34
Marriage Status of Household Head (Singles as the reference)				
Married	0.1776**	4.57	0.1904*	3.98
Separated, Divorced, or Widowed	0.0626	1.12	0.0720	1.08
Number of Household's Members	0.0917**	8.63	0.0931**	8.20
Number of Working Members	0.0004	0.02	-0.0084	-0.32
Children at				
Primary School	0.0715	1.33	0.0706	1.36
Middle School	0.0567	1.68	0.0576	1.82
High School	0.0940	2.21	0.0924	1.97
College or Graduate School	0.2776**	6.21	0.2779**	6.38
Type of Employment of Household Head (Unemployment as the reference)				
Wage Earner	-0.0797**	-4.45	-0.0749**	-4.94
Self-employed	-0.0556	-0.89	-0.0426	-0.80
Unpaid Family Workers	-0.1884***	-21.41	-0.1907***	-17.89
Residential Area (Local City as the reference)				
Seoul	0.0661**	9.12	0.0687***	11.06
Metropolitan Cities	0.0556**	8.80	0.0482**	9.02
Quadratic Term of Household's Income (log)	-0.7870	-0.49	-0.9660	-0.69
Household's Income (log)	12.9261	0.51	15.7644	0.72
Quadratic Term of Real Estate Asset (log)	0.0059**	6.51		
Real Estate Asset (log)	-0.0071	-0.93		
The Status of Real Estate Holding (Dummy)			0.0776*	3.69
Quadratic Term of Financial Asset (log)	0.0010	0.81	0.0014	1.20
Financial Asset (log)	-0.0015	-0.23	-0.0036	-0.62
Quadratic Term of Debt (log)	0.0006	0.63	0.0022	2.00
Debt (log)	-0.0109	-1.70	-0.0228	-2.87
Quadratic Term of DSR	-1.5940**	-5.20	-1.6255**	-5.36
DSR	0.8230	2.42	0.8359	2.70
Number of observations	542		545	
R^2	0.4838		0.4769	

[The Fourth and Fifth Income Quintile]

	Model①		Model②	
	Coefficient	t-statistics	Coefficient	t-statistics
Quadratic Term of Age of Household Head	2.8e-5	0.95	4.9e-5	1.64
Age of Household Head	-0.0055*	-3.27	-0.0069**	-4.39
Education Level of Household Head (years)	0.0237**	5.42	0.0261**	5.47
Marriage Status of Household Head (Singles as the reference)				
Married	0.0066	0.07	0.0113	0.13
Separated, Divorced, or Widowed	-0.0264	-0.75	-0.0143	-0.39
Number of Household's Members	0.1193**	9.20	0.1205***	9.82
Number of Working Members	-0.0134	-0.91	-0.0138	-1.02
Children at				
Primary School	0.0786	2.32	0.0722	1.98
Middle School	0.1121***	10.61	0.1190**	7.59
High School	0.2287**	8.98	0.2282***	10.52
College or Graduate School	0.1912***	21.19	0.2024***	15.35
Type of Employment of Household Head (Unemployment as the reference)				
Wage Earner	-0.0005	-0.01	-0.0063	-0.13
Self-employed	0.0256	0.72	0.0227	0.73
Unpaid Family Workers	0.0455	0.35	-0.0173	-0.10
Residential Area (Local City as the reference)				
Seoul	0.0335**	5.29	0.0478**	8.90
Metropolitan Cities	0.0400**	6.48	0.0257**	4.78
Quadratic Term of Household's Income (log)	-0.1661*	-3.01	-0.1713	-2.87
Household's Income (log)	3.2266*	3.24	3.3428*	3.11
Quadratic Term of Real Estate Asset (log)	0.0094*	4.17		
Real Estate Asset (log)	-0.0400*	-3.14		
The Status of Real Estate Holding (Dummy)			0.0280	2.87
Quadratic Term of Financial Asset (log)	0.0027	1.60	0.0036	1.94
Financial Asset (log)	-0.0253	-1.67	-0.0307	-2.04
Quadratic Term of Debt (log)	0.0023	1.04	0.0046	2.72
Debt (log)	-0.0160	-0.98	-0.0340	-2.67
Quadratic Term of DSR	0.0615	2.47	0.0571	2.35
DSR	-0.2520	-2.31	-0.2507	-2.29
Number of observations	1,257		1,277	
R^2	0.4923		0.4837	

Notes: 1. *, **, *** indicate statistically significant at the 10%, 5% or 1% significance level, respectively.
2. Shaded cell indicates statistically significant at the 15% significance level.

In addition, we classify the samples of 2007 into two groups by the fraction of financial assets out of total assets to examine whether the effects of debt on consumption differ by the extent of financial asset holding. On average, the share of financial assets is 14.4% of total assets of a household. The households with financial asset ratio lower than the average are classified as Group 1 and the rest as Group 2. The estimation results are presented in <Table 5>. The effects of debt and DSR on consumption are significantly positive for the households in Group 1 while for those in Group 2 they have no or only a little significance. This implies that the volatility of consumption could be bigger for the households with little financial assets. And such results are in line with the argument by Zeldes (1989) and Carroll (2001) that the less financial assets a household holds, the higher the marginal propensity to consume is for a change in resources available for consumption. Thus, when lending attitudes by financial institutions become conservative and consumer credit contracts under the economic recession, households with less financial assets are more likely to be affected by this economic situation.

Table 5 **Estimation Result of Consumption Function by the Extent of Financial Asset Holding (as of 2007)**

[Group1: Less than Average (<14.4%)]

	Model①		Model②	
	Coefficient	t-statistics	Coefficient	t-statistics
Quadratic Term of Age of Household Head	-0.0001	-2.16	-0.0001	-1.98
Age of Household Head	0.0036	0.70	0.0044	0.80
Education Level of Household Head (years)	0.0219***	24.11	0.0231***	54.45
Marriage Status of Household Head (Singles as the reference)				
Married	0.0509	1.54	0.0536	1.75
Separated, Divorced, or Widowed	-0.0071	-0.10	-0.0051	-0.08
Number of Household's Members	0.1246***	13.43	0.1231***	12.00
Number of Working Members	-0.0011	-0.08	-0.0041	-0.28
Children at				
Primary School	0.0303	0.86	0.0236	0.77
Middle School	0.0647*	3.77	0.0660*	3.93
High School	0.1790**	5.09	0.1790**	5.43
College or Graduate School	0.1992**	9.05	0.2038**	8.89

	Model①		Model②	
	Coefficient	t-statistics	Coefficient	t-statistics
Type of Employment of Household Head (Unemployment as the reference)				
Wage Earner	-0.0116	-1.34	-0.0174	-1.73
Self-employed	-0.0039	-0.14	-0.0073	-0.22
Unpaid Family Workers	-0.0043	-0.03	-0.0707	-0.33
Residential Area (Local City as the reference)				
Seoul	0.0145*	3.13	0.0258**	5.20
Metropolitan Cities	0.0385**	6.76	0.0335***	10.50
Quadratic Term of Household's Income (log)	0.0135	0.92	0.0160	1.10
Household's Income (log)	0.1584	0.68	0.1362	0.58
Quadratic Term of Real Estate Asset (log)	0.0076**	4.51		
Real Estate Asset (log)	-0.0289*	-3.12		
The Status of Real Estate Holding (Dummy)			0.0168	0.97
Quadratic Term of Financial Asset (log)	0.0033	2.18	0.0042	2.84
Financial Asset (log)	-0.0223	-1.53	-0.0274	-1.90
Quadratic Term of Debt (log)	0.0015	1.73	0.0035*	3.12
Debt (log)	-0.0140	-2.79	-0.0288*	-3.96
Quadratic Term of DSR	0.0220***	9.96	0.0224***	13.60
DSR	-0.0489	-1.50	-0.0520	-1.37
Number of observations	1,841		1,873	
R^2	0.7581		0.7569	

[Group2: Above Average (≥14.4%)]

	Model①		Model②	
	Coefficient	t-statistics	Coefficient	t-statistics
Quadratic Term of Age of Household Head	0.0001	2.33	0.0001	2.35
Age of Household Head	-0.0187**	-4.40	-0.0161**	-4.43
Education Level of Household Head (years)	0.0154**	5.54	0.0181*	3.93
Marriage Status of Household Head (Singles as the reference)				
Married	0.1827	1.69	0.1695	1.49
Separated, Divorced, or Widowed	0.0865	0.89	0.0493	0.55

	Model①		Model②	
	Coefficient	t-statistics	Coefficient	t-statistics
Number of Household's Members	0.0957**	6.43	0.0976**	5.76
Number of Working Members	0.0288	1.63	0.0173	0.97
Children at				
Primary School	0.0740	2.03	0.0500	1.13
Middle School	0.1064*	3.91	0.1124**	5.15
High School	0.2179**	8.35	0.1954**	9.54
College or Graduate School	0.2080***	18.09	0.2248***	19.60
Type of Employment of Household Head (Unemployment as the reference)				
Wage Earner	-0.0908	-1.71	-0.0981	-1.79
Self-employed	-0.0690	-1.75	-0.0744	-1.65
Unpaid Family Workers	-0.1712	-1.53	-0.1603	-1.46
Residential Area (Local City as the reference)				
Seoul	0.0591**	4.12	0.0807***	9.80
Metropolitan Cities	0.0491***	14.19	0.0522**	9.12
Quadratic Term of Household's Income (log)	0.0037	0.32	0.0097	0.75
Household's Income (log)	0.2749	1.91	0.2047	1.27
Quadratic Term of Real Estate Asset (log)	0.0131	2.81		
Real Estate Asset (log)	-0.0438	-1.78		
The Status of Real Estate Holding (Dummy)			0.0365	1.01
Quadratic Term of Financial Asset (log)	0.0027	2.10	0.0047	2.32
Financial Asset (log)	-0.0173	-1.11	-0.0318	-1.42
Quadratic Term of Debt (log)	-0.0036	-1.93	-0.0023	-1.80
Debt (log)	0.0297	2.19	0.0205	2.47
Quadratic Term of DSR	0.0272	0.41	0.0083	0.13
DSR	-0.0604	-0.19	0.0014	0.00
Number of observations	897		933	
R^2	0.7396		0.7355	

Notes: 1. *, **, *** indicate statistically significant at the 10%, 5% or 1% significance level, respectively.
2. Shaded cell indicates statistically significant at the 15% significance level.

V. Summary and Implications

The size of personal financial debt has trebled over the last decade, having expanded to 1.4 times personal disposable income. On top of this, the eruption of the global financial crisis epicentered in the U.S. and the world wide economic recession thrust the Korean economy into difficulties such as a dramatic decline in exports and in employment. There remains uncertainty about the robust recovery of the world economy. In these difficulties, the importance of domestic demand including consumption and investment has been spotlighted more than at any other time. Thus, we conducted a micro level examination into the effects of household debt, which has sharply increased in Korea, on domestic consumption using the Korea Labor and Income Panel study compiled for the period of 2000 ~ 2007.

According to the estimation results of the panel model, debt has positive effects on consumption, implying that the overall easing of liquidity constraints such as the expansion of household credit has contributed to the increase in consumption in Korea. In contrast, DSR, contrary to our expectations, was revealed not to have any obvious effect on consumption, which seems to result from the fact that, during the corresponding period, the burden of debt repayment has been tending to decline thanks to the credit easing financial environment including low interest rates.

The results of yearly cross-sectional analysis showed that the coefficients of debt in 2007 were negative even though the significance is not that high, demonstrating the recent changing pattern from positive to negative in the effects of debt on consumption. For a closer look at the source of changed relationship between debt and consumption, we additionally estimated the consumption function for each income quintile for year 2007. The estimation results showed that, while the effects of debt on consumption in the first and second quintile still remained positive, the coefficients of debt for the third income quintile had negative values although with only a low level of significance. And, more importantly, in the third income quintile, the effects of DSR became negative when the ratio reached 26% or above. And for the households in the fourth and fifth income quintiles, negative effects of DSR on consumption were also observed.

Lastly, we analyzed the effects of debt on consumption by the extent of financial asset holdings. The results indicate that, for the group having lower than average financial assets to total assets ratio, DSR was in a positive

relationship with consumption while, for the group having more than average ratios, these two variables had no significant relationship with each other. This implies that the debt owned by the households under more serious liquidity constraints has positive effects on consumption with greater significance.

Bringing this all together, household debt in Korea seems to have affected consumption positively overall and, this has become more apparent in the low income quintiles and for the households with less financial assets. For the households in the third or higher income quintiles, which hold about 85% of total household debt,[12] the effects of debt on consumption have started to change in a negative direction only recently. This implies that the negative effects of debt on consumption could increase in 2008 or more recently as the size of household debt has steadily increased in the country.

Household debt in Korea in the future is predicted to increase only to a limited degree due to the uncertainty over the economic recovery, while the burden of debt servicing on households will increase thanks to the increasing burden of debt repayment caused by the end of grace periods, the decline in asset prices, and the sluggish improvement in employment. During the economic slowdown, financial institutions tend to strengthen their conservative attitudes in lending, thereby bringing about a contraction of credit to low income households who are short of financial buffer. As a result, during the course of the current economic recession, the conservative practices of financial institutions could lead to a decrease in consumption across all income quintiles. Therefore, measures are needed to mitigate the negative effects of debt on consumption in the short-term and, furthermore, policies should be put in place to avoid sharp fluctuations in consumption due to the high level of debt in the mid to long term.

12) Refer to the <Appendix Table 2>.

<References>

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[Appendix]

Appendix 1 **Correlation between Financial Variables (Panel Data)**

	Total Income	Debt	Real Estate Asset	Financial Asset	Consumption[1]
Total Income	1.0000				
Debt	0.2421	1.0000			
Real Estate Asset	0.3652	0.2224	1.0000		
Financial Asset	0.2692	0.0148	0.3431	1.0000	
Consumption[1]	0.5773	0.2638	0.3793	0.2591	1.0000

Note: 1. Expenditures on non-durable goods and services

Appendix 2 **Financial Position of Indebted Households by Income Quintile**

	1st Quintile	2nd Quintile	3rd Quintile	4th Quintile	5th Quintile	Total
Number of Total Households	966	967	967	967	967	4,834
Number of Indebted Households	234	383	462	516	508	2,103
Share of the Indebted (%)	24	40	48	53	53	44
Distribution of Debt Holding (%)	5	10	16	23	46	100
Distribution of Total Asset Holding (%)	3	7	13	24	52	100
Debt/Disposable Income (Ratio)[1]	3.22	1.64	1.33	1.21	1.19	1.29
Debt/Financial Asset (Ratio)[1]	12.37	10.97	6.06	4.23	2.76	3.80
Debt/Total Asset (Ratio)[1]	0.37	0.30	0.26	0.21	0.19	0.22
DSR (%)	28	14	12	11	11	12

Note: 1. Average debt of each group divided by average disposable income or asset of the group.