Heterogeneity in Household Consumption Behavior in a Dynamic Panel Setting

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Table of contents

Background

A rational consumer optimizing over time is the cornerstone of general equilibrium models in macroeconomics.

- The consumer with rational expectation does not response to anticipated income changes.
- It is known well as the permanent income/Life cycle hypothesis (PI/LCH).

Background

Numerous empirical studies tested the PI/LCH. We ask

- Is this fundamental assumption consistent with household data?
- What do we learn from the household data if they reject the optimizing consumer model?

Explanation for excess sensitivity

A test on the benchmark model: Excess sensitivity with respect to anticipated change in income is evidence against optimal consumption smoothing, may suggest

- liquidity constraint;
- or more involved theories consistent with consumer optimization, e.g., household's choice of substitution, precautionary savings;
- or heterogeneity.

Existing studies

Recent empirical studies on excess sensitivity in household consumption

- Excess sensitivity to small and irregular variations in expected income:
  Parker (1999 AER) (CEX), Souleles (1999 AER) (CEX), Stephens (2003 AER) (CEX), Shea (1995 AER) (PSID).
- No excess sensitivity to regular and large variations in expected income:
  Browning and Collado (2001 AER) (Spanish data), Hsieh (2003 AER) (Alaska Oil Funds data).

Motivation

- The existing empirical tests of excess sensitivity are based on the restriction that the response to anticipated changes in income is homogenous across households.
- The present study examines heterogeneity in household consumption excess sensitivity using the panel data.

Motivation

Exploring heterogeneity household consumption

- Analysis of a model with household-specific parameters affords us the ability to examine dimensions of data inaccessible to models with homogenous parameters.
- A moderate excess sensitivity commonly found in previous studies is due to a substantial deviation from optimal consumption smoothing by a small fraction of households.
- Some households showing excess sensitivity tend to have certain features, but most households with those features do not exhibit excess sensitivity.

Korean household data

- The Family Income and Expenditure Survey on 5, 500 households.
- We use the sample from 1994 – 2003.
- Incomes from salary, allowance, and other incomes for each household member, earnings of financial assets.
- Expenditures on food, housing, utilities, apparel and shoes, education, and other items.

Perfect information on income of government employees

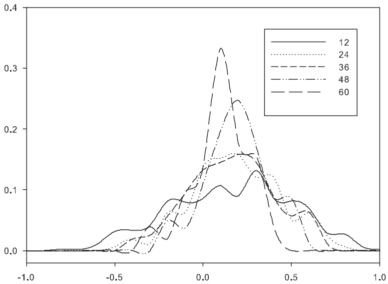
- We use a sub-sample of households headed by government employees.
- Government officials' salary and allowance are determined at the beginning of the year but monthly payments vary greatly.
- In each month, there is a substantial variation across government employees' income growth and household consumption growth.
- The head of the household income is the main source of family income.

Long panels

Each household is followed monthly for up to five years.
Sample for household panels:
12 months (477 households),
24 months (158 households),
36 months (109 household),
48 months (81 households),
60 months (51 households)

- Jenrrich's (1970) modified Kullback's (1967) χ^2 test statistic for equality of correlations is $1272.3 > \chi^2_{.01}(875) = 975.2$.
- The tests suggest heterogeneity in the income-consumption correlation.

Figure 1



Notes: The curves labeled 12, 24, 36, 48, 60 are densities of intra-household correlation of head-of-household labor income growth and household nondurable consumption growth with 12, 24, 36, 48, 60 months of observations, respectively.

3.1 The Empirical Model

A conventional model under the homogeneity household behavior

$$c_{it} = \mu + \psi y_{it} + \alpha c_{it-1} + \mathbf{x}'_{it}\theta + \epsilon_{it} \quad (1)$$

$i = 1, \cdots, N, t = 1, \cdots, T$. $c_{i,t}$ = consumption expenditure growth rate of household i from $t-1$ to t.

$y_{i,t}$ = expected income growth of the head of household i between $t-1$ and t

The vector $\mathbf{x}_{it}$: 1) unity, 2) demographic variables: age and age-squared of the head of the household, logarithm of family size, change in family size, dummy for head's college degree; 3) seasonal dummies and month dummies, nine year dummies, and holiday dummies. ψ measures excess sensitivity.

A dynamic panel regression model for household parameter heterogeneity

$$c_{it} = \mu_i + \psi_i y_{it} + \alpha_i c_{it-1} + \mathbf{x}'_{it}\theta + \epsilon_{it}. \tag{2}$$

Following Pesaran and Smith(1995) by rewriting model (2) as

$$c_{it} = \mu + \psi y_{it} + \alpha c_{it-1} + \mathbf{x}'_{it}\theta + \eta_{it}. \tag{3}$$

where
$\eta_{it} = \mu_i - \mu + (\psi_i - \psi)y_{it} + (\alpha_i - \alpha)c_{it-1} + \epsilon_{it}.$

The residual η_{it} is correlated in regressors in (3) if $\psi_i \neq \psi$ and $\alpha_i \neq \alpha$ for all households.

3.2 Undesirable from econometric perspectives

- It is well known that erroneous homogeneity assumption leads to asymptotically biased estimates (see Perasan and Smith (1995 JE), and the biasness may result in seriously misguided economic conclusion (see e.g., Imbs et al. (2005 QJE) on test of the purchasing power parity theory).
- The OLS of fixed effect model on dynamic panel data has a number of deficiencies even for homogenous models, such as finite sample bias and inconsistency of within group estimate (see e.g., Nickell (1981 Ecomt), Kiviet (1995 JE) and surveys by Chamberlain (1984) and Arellano (2003)).
- Only empirical analysis of heterogeneous household model can answer these questions.

- The Bayesian inference enjoys several advantages when applied to dynamic panel models.

  1. It permits exact finite sample inference in dynamic models.
  2. A Bayesian estimators in such a setting may have desirable asymptotic frequentist properties.
  3. The Bayesian finite sample distributions are easy to compute.

3.3 Frequentist vs. Bayesian Inference

Example: We have two independent observations x_1 and x_2 from $N(\beta, 1)$, β is unknown.

The frequentist distribution of MLE for β ($\hat{\beta} = \frac{x_1+x_2}{2}$) is $f(\hat{\beta}|\beta)$ $\sim N(\beta, \frac{1}{2})$, conditioning on the true parameter β.

- No closed-from finite sample distribution for estimates of time series or dynamic panel data models (due to conditioning on parameter).
- May be inconsistent in N for fixed effect panel data: e.g., Neyman and Scott (1948) estimate common variance σ^2 from iid normal, T=2 obs from each unit i=1,2,..N with unobserved mean. MLE $\hat{\sigma}^2 \to \frac{\sigma^2}{2}$ as $N \to \infty$ (small T problem).

The Bayesian posterior for β under constant prior is $\pi(\beta|x_1, x_2) \sim N(\frac{x_1+x_2}{2}, \frac{1}{2})$, conditioning on the observed data.

- relevant for social science without controlled data replications
- exact finite sample posterior: conditioning on data is much easier than conditioning on parameters in a time series or dynamic panel data model
- allows for explicit incorporation of information about parameters $\Rightarrow$ sharper inference for heterogeneity

Adding prior information ⇒ consistent estimator of panel data model with heterogeneity. (Neyman and Scott 1948 problem solved with an informative prior on σ^2)

- convenient for model complications, e.g., measurement errors
- posteriors of complicated models can be drawn numerically using technics developed in recent decades, e.g., Markov Chain Monte Carlo and Gibbs Sampling.

3.4 The likelihood function and posterior

- Household consumption expenditure data contain substantial noise (e.g., see Runkle's [1991] study on PSID data.)
- In the Bayesian framework, we treat the unobserved 'true' consumption data as nuisance parameters.
- The measurement error in the logarithm of period t consumption expenditure C_{it} by household i as τ_{it}, and assume $\tau_{it} \sim N(0, \kappa^2)$. Then the observed logarithm of consumption is

$$C^*_{it} = C_{it} + \tau_{it}. \tag{4}$$

$c_{it} = C_{it} - C_{it-1}$, the regression model (2) can be written as

$$C_{it} - C_{it-1} = \mu_i + \psi_i y_{it} + \alpha_i(C_{it-1} - C_{it-2}) + \mathbf{x}'_{it}\theta + \epsilon_{it}. \quad (5)$$

control variables $u'_{it} = (1,\ y_{it},\ x_{i,t})$, with corresponding regression coefficients $\Theta_i = (\mu_i, \psi_i, \theta')'$,

$$C_i^* = C_i + \tau_i, \quad B_i C_i = U_i \Theta_i + \epsilon_i, \quad (6)$$

$C^* = \{C_1^*, \cdots, C_N^*\}$: the collection of observed consumption for all households
$C = C_1, \cdots, C_N$: latent 'true' consumption
$U = U_1, \cdots, U_N$: control variables
$B = \{B_1, \cdots, B_N\}$, $\Theta = \{\Theta_1, \cdots, \Theta_N\}$, and $\sigma^2 = \{\sigma_1^2, \cdots, \sigma_N^2\}$: parameter matrices

The normal likelihood of observed consumption for all households C^* conditional on latent consumption C and the variance of measurement error κ^2 is

$$f(C^* \mid C, \kappa^2) \propto \kappa^{-\sum_{i=1}^{N}(n_i+2)} \prod_{i=1}^{N} exp\Big\{-\frac{1}{2\kappa^2}(C_i^* - C_i)'(C_i^* - C_i)\Big\}. \tag{7}$$

The unobserved true consumption C can be viewed as a latent matrix parameter. We treat (2) as the prior of parameter C conditional on B, Θ, σ^2 and U:

$$g(C \mid B, \Theta, \sigma^2, U) \propto \prod_{i=1}^{N} \sigma_i{}^{-n_i} exp\Big\{-\frac{1}{2\sigma_i^2}(B_i C_i - U_i\Theta_i)'(B_i C_i - U_i\Theta_i)\Big\}. \tag{8}$$

$D = \{C^*, U\}$: all observed data
$\pi(.)$: the prior of parameters in the model

The posterior of unknown quantities $(C, B, \Theta, \kappa^2, \sigma^2)$ conditional on data D as

$$\pi(C, B, \Theta, \kappa^2, \sigma^2 \mid D) \propto f(C^* \mid C, \kappa^2) g(C \mid B, \Theta, \sigma^2, U) \pi(B, \Theta, \kappa^2, \sigma^2). \quad (9)$$

$\phi_i' = (\mu_i, \psi_i, \alpha_i)$: the vector of household-specific parameters
$z_{it}' = (1,\ y_{it},\ c_{i,t-1})$: the corresponding variables

4.1 Estimates of the homogenous household model and prior elicitation for the heterogenous household model

- The information from the homogenous parameter model is useful for eliciting priors of household-specific parameters.
- The OLS estimates for the whole sample of 18,636 observations are (with standard errors in parentheses)

$$c_{it} = 0.058(0.011)y_{it} - 0.458(0.009)c_{it-1} + \mathbf{x}'_{it}\theta + \epsilon_{it}. \quad (10)$$

- Under a diffuse prior Bayesian posterior mean of the regression coefficients is similar to the OLS.

4.2 Bayesian estimates of the heterogeneous household model

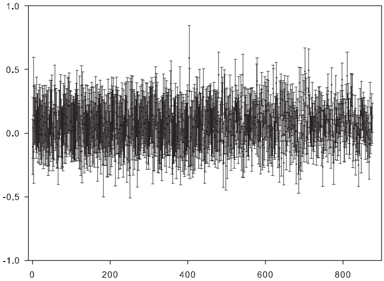
- Posterior mean of a parameter as its estimator, which can be justified by a quadratic loss function.
- The posterior mean and variance are computed from the numerical draws.
- We drew $10,000$ MCMC cycles with 5000 burn-in runs. The posterior mean of the variance of measurement error (κ^2) is 0.022, which corresponds to a standard deviation of 0.148, about forty percent of the sample standard deviation of consumption growth of 0.360.

Table I: Cross household average of posterior mean of household-specific parameters

Variable	Total	Sig1	Sig2	Sig3
μ_i	0.004 (0.019)	0.003 (0.016)	0.003 (0.013)	0.002 (0.013)
ψ_i	0.065 (0.125)	0.261 (0.083)	0.294 (0.082)	0.329 (0.079)
α_i	-0.459 (0.067)	-0.448 (0.078)	-0.439 (0.077)	-0.436 (0.083)
σ_i^2	0.074 (0.045)	0.070 (0.034)	0.072 (0.037)	0.075 (0.042)
Number of households	876	126	82	51

Note: The table reports cross-household averages (standard deviations) of posterior mean of parameters. 'Total' means the whole sample of 876 households. Sig1, Sig2, and Sig3 consist of households with the ratio of (posterior mean of ψ_i) / (posterior standard deviation of ψ_i) greater than 1.05, 1.30, and 1.65 respectively.

Figure 2



Notes: The posterior mean and posterior standard deviation bands of the excess sensitivity parameter ψ_i for 876 households. We have 12 months of observations on households labeled 1 to 477, 24 months of observations on households 478 to 635, 36 months of observation on households 636 to 744, 48 months of observations on households 745 to 825, and 60 months of observations on households 826 to 876.

Table II: Summary statistics

Sample mean (standard deviation)	Total	Sig1	Sig2	Sig3
Head of household salary income	1,875	1,760	1,741	1,777
	(598)	(554)	(532)	(528)
Head of household labor income	2,610	2,462	2,439	2,496
	(887)	(844)	(804)	(809)
Labor income of other household members	472	479	413	425
	(917)	(888)	(784)	(804)
Food	511	489	481	490
	(260)	(229)	(224)	(231)
Personal care and entertainment	482	480	473	473
	(504)	(443)	(462)	(503)
Transportation and communication	243	215	201	198
	(194)	(190)	(161)	(161)
Apparels	141	136	139	149
	(221)	(181)	(189)	(205)
Home keeping	133	124	123	131
	(130)	(117)	(122)	(141)
Non-durable consumption	1,510	1,444	1,417	1,442
	(860)	(700)	(687)	(733)
Number of observations	20,388	3,828	2,760	1,764
Non-durable consumption growth	0.003	0.006	0.005	0.006
	(0.360)	(0.377)	(0.384)	(0.399)
Head of household labor income growth	0.002	0.005	0.006	0.008
	(0.304)	(0.324)	(0.320)	(0.324)
Head of household salary income growth	0.009	0.007	0.008	0.011
	(0.205)	(0.208)	(0.205)	(0.203)

Table II: Summary statistics

Note: The unit of income and consumption is one thousand real Korean won (of base year 2000). Personal care and entertainment expenditures include items such as personal care, tobacco and smoking, reading materials but exclude entertainment equipments. Transportation excludes the purchase of new and used vehicles, and communication includes phone charges and cellular phone charges. Home keeping includes utilities, fuels, and public services, but excludes home furniture and major appliances. The column 'Total' pertains to the whole sample of 876 households, Sig1 includes 126 households, Sig2 includes 82 households and Sig3 includes 51 households exhibiting the most significant excess sensitivity. The growth rate numbers are not in percentage terms.

4.3 Empirical Findings

- The estimated coefficient of excess sensitivity is significant for about ten percent of the households (whom we call 'non-smoothers' throughout the paper for convenience.)
- Although the 'non-smoothers' make up a small fraction of the sample, they play a dominant role in shaping the estimates based on pooled household data.
- Households residing in the capital city Seoul, with high 'committed' expenditures on insurance and education, and after experiencing the Asian financial crisis, are less likely to be 'non-smoothers'.
- While 'non-smoothers' tend to have lower 'committed expenditures', the majority of households with low 'committed expenditures' are not 'non-smoothers'.

Table III: Pooled OLS estimates of excess sensitivity

Dependent	Whole Sample	Excluding Sig2	Sig2 Only
Nondurable	0.058***	−0.003	0.371***
	(0.011)	(0.012)	(0.032)
R^2	0.249	0.246	0.354
Number of observations	18,636	16,040	2,596
Food	0.052***	0.020	0.204***
	(0.012)	(0.013)	(0.031)
R^2	0.266	0.267	0.304
Number of observations	18,636	16,040	2,596
Personal Care	0.073***	−0.005	0.459***
	(0.022)	(0.023)	(0.061)
R^2	0.258	0.257	0.305
Number of observations	18,636	16,040	2,596
Transportation	0.018	−0.019	0.205***
	(0.020)	(0.021)	(0.057)
R^2	0.224	0.229	0.213
Number of observations	18,630	16,037	2,593
Apparel	0.117**	−0.006	0.835***
	(0.050)	(0.054)	(0.132)
R^2	0.266	0.266	0.289
Number of observations	14,915	12,891	2,024
Home keeping	0.001	−0.037	0.189***
	(0.024)	(0.026)	(0.068)
R^2	0.296	0.290	0.351
Number of observations	18,617	16,024	2,593

Table IV: OLS regressions of household-specific ESP

	OLS regression			Summary statistics	
Variable	Univariate	R^2	Multivariate	Whole	Sig2
Age	-0.005^{*} (0.003)	0.0033	-0.004 (0.004)	42.8 (8.8)	41.1 (8.5)
Year	-0.040^{***} (0.008)	0.0266	-0.039^{***} (0.012)	1999 (3)	1997 (2)
Jnum	-0.041^{***} (0.050)	0.0008	-0.042 (0.053)	1.5 (0.5)	1.4 (0.5)
Hnum	0.031 (0.026)	0.0016	0.019 (0.029)	3.8 (1.0)	4.0 (1.0)
Hinc	$-0.085 \times 10^{-3**}$ (0.034×10^{-3})	0.0071	-0.011×10^{-3} (0.055)	2,581 (738)	2,309 (609)
Cb	$0.209 \times 10^{-3*}$ (0.121×10^{-3})	0.0034	0.059×10^{-3} (0.134×10^{-3})	318 (208)	356 (204)
Lqa	0.005 (0.061)	0.0000	-0.033 (0.063)	0.235 (0.412)	0.265 (0.392)
Insurance	-0.103×10^{-3} (0.117×10^{-3})	0.0009	0.021×10^{-3} (0.122×10^{-3})	179 (215)	117 (108)
Education	-0.070×10^{-3} (0.104×10^{-3})	0.0005	0.091×10^{-3} (0.124×10^{-3})	268 (243)	225 (184)
Hownd	-0.069 (0.060)	0.0015	-0.023 (0.070)	0.769 (0.421)	0.707 (0.458)
Carownd	-0.138^{***} (0.051)	0.0083	-0.010 (0.061)	0.594 (0.491)	0.476 (0.502)
Seould	-0.157^{**} (0.073)	0.0054	-0.193^{***} (0.074)	0.139 (0.346)	0.049 (0.217)

Note: In the linear regression model, the dependent variable is the ratio of the posterior mean and posterior standard deviation of the excess sensitivity parameter ψ_i of household i ($i = 1, \cdots, 876$). The demographic variables of households are averaged over time. For example, age is averaged over four years if the household is observed for four years. A dummy variable is set at unity if the variable is true at least once for the household.

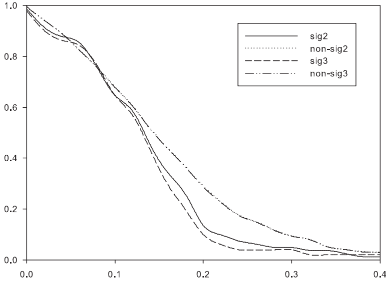
The abbreviated regressors are defined as follows: Jnum - Number of job holders, Hnum - Number of house members, Hinc - Labor income of head of the household, Cb - Cash-balance, Lqa - Ratio of liquid asset to average disposable income of household, Hownd - Dummy for home ownership, Carownd - Dummy for car ownership, Seould - Dummy for Seoul residency.

Table V: Estimates of logit regressions

	Logit regression		Marginal effect	
Variable	Univariate	Multivariate	Univariate	Multivariate
Age	-0.025^{*} (0.014)	-0.007 (0.021)	-0.002^{*} (0.001)	-0.000 (0.001)
Year	-0.281^{***} (0.048)	-0.295^{***} (0.062)	-0.019^{***} (0.003)	-0.017^{***} (0.003)
Jnum	-0.139 (0.234)	-0.148 (0.265)	-0.012 (0.020)	-0.009 (0.016)
Hnum	0.186 (0.116)	0.181 (0.135)	0.016 (0.010)	0.011 (0.008)
Hinc	$-0.602 \times 10^{-3***}$ (0.173×10^{-3})	-0.208×10^{-3} (0.298×10^{-3})	$-0.048 \times 10^{-3***}$ (0.013×10^{-3})	-0.012×10^{-3} (0.017×10^{-3})
Cb	$0.845 \times 10^{-3*}$ (0.485×10^{-3})	0.007×10^{-3} (0.615×10^{-3})	$0.071 \times 10^{-3*}$ (0.040×10^{-3})	0.000×10^{-3} (0.036×10^{-3})
Lqa	0.174 (0.246)	-0.033 (0.314)	0.015 (0.021)	-0.002 (0.019)
Insurance	$-2.500 \times 10^{-3***}$ (0.902×10^{-3})	-1.284×10^{-3} (0.847×10^{-3})	$-0.198 \times 10^{-3***}$ (0.066×10^{-3})	-0.076×10^{-3} (0.049×10^{-3})
Education	$-0.910 \times 10^{-3*}$ (0.538×10^{-3})	0.126×10^{-3} (0.696×10^{-3})	$-0.076 \times 10^{-3*}$ (0.044×10^{-3})	0.007×10^{-3} (0.041×10^{-3})
Hownd	-0.359 (0.257)	-0.258 (0.317)	-0.033 (0.025)	-0.016 (0.021)
Carownd	-0.527^{**} (0.233)	0.424 (0.287)	-0.046^{*} (0.021)	0.024 (0.016)
Seould	-1.225^{**} (0.522)	-1.483^{***} (0.544)	-0.071^{***} (0.020)	-0.058^{***} (0.014)

Note: In the logistic regression model, the dependent variable is the dummy that the household is in the Sig2 group. The demographic variables of households are averaged over time. For example, age is averaged over four years if the household is observed for four years. A dummy variable is set at unity if the variable is true at least once for the household.

Figure 3



Notes: Notes: One minus the cumulative distribution of households, which shows the fraction of households with committed expenditure / disposable income ratio greater than the value of the horizonal axis. The committed expenditure is defined as education plus insurance expenditures. The graph shows that compared to the rest of the households, 'non-smoothers' (Sig2 or Sig3 groups) tend to have lower 'committed expenditures'.

The role of liquidity constraint

Explore the role of liquidity constraint in discovered excess sensitivity in this study

- A common approach is examining whether excess sensitivity is associated with low liquid asset-income ratios (e.g., Hayashi (1985) and Zeldes (1989)).
- To test the symmetry of consumption response to positive and negative income growth, we denote $y_{it}^{+} = y_{it}$ if $y_{it} \geq 0$, and $y_{it}^{-} = y_{it}$ if $y_{it} < 0$ in the regression.

$$c_{it} = \psi_1 y_{it}^{+} + \psi_2 y_{it}^{-} + \alpha c_{it-1} + x_{it}' \theta + \epsilon_{it}. \tag{11}$$

The role of liquidity constraint

- The excess sensitivity to positive labor income growth (ψ_1) is .023 (standard error .018), while the excess sensitivity negative labor income growth (ψ_2) is a much larger .094(.018).
- For the 82 households that show excess sensitivity to labor income, the estimate of ψ_1 is 0.152(0.051), and that of ψ_2 is 0.266(0.050).
- These estimates indicate that consumption responds more to anticipated income decrease than to income increase.
- The balance of the evidence does not support the theory that liquidity constraint is the main cause of excess sensitivity.

- Conventional pooled regression approaches to examining whether certain household variables are related to excess sensitivity
- We examine the interaction of household characteristics w_{it} with the anticipated income.

$$c_{it} = \rho w_{it} y_{it} + \psi y_{it} + \alpha c_{it-1} + \theta' x_{it} + \epsilon_{it}. \tag{12}$$

Table VI: OLS estimates of pooled regression with interaction of household variables with anticipated income

Interactive Variable w	ρ	ψ	R^2
none		0.058 (0.011)	0.249
Age	-0.002 (0.002)	0.139^{**} (0.068)	0.2483
$\text{Year}_{>1997}$	-0.058^{**} (0.024)	0.072^{***} (0.018)	0.2484
Jnum	-0.066^{***} (0.025)	0.141^{***} (0.039)	0.2485
Hnum	0.013 (0.013)	-0.006 (0.052)	0.2482
Hinc	0.019×10^{-3} (0.017×10^{-3})	0.094^{**} (0.046)	0.2482
Cb	-0.077×10^{-3} (0.055×10^{-3})	0.070^{***} (0.022)	0.2483
Lqa	-0.028 (0.035)	0.052^{***} (0.015)	0.2482
Ins + Ed.	-0.032×10^{-3} (0.034×10^{-3})	0.059^{***} (0.021)	0.2482
Hownd	-0.039 (0.034)	0.076^{**} (0.031)	0.2483
Carownd	-0.079^{***} (0.025)	0.089^{***} (0.020)	0.2487
Seould	-0.087^{**} (0.036)	0.056^{***} (0.013)	0.2485

Concluding Remarks

- We find substantial heterogeneity in the response of consumption expenditures to anticipated income changes.
- We link a number of factors to excess sensitivity: Households exhibiting excess sensitivity are more likely to reside outside of the capital city Seoul, have low 'committed expenditures', and are clustered in the sub-sample period before the Asian financial crisis.
- We conclude that estimated excess sensitivity is largely due to households' inattention to consumption decision.

- The theory of cost-dependent inattentiveness reconciles mixed estimates of excess sensitivity in other studies.

  1. Household consumption respond to non-regular predictable windfall of income (such as tax rebates) and fail to smooth consumption optimally (e.g., Shapiro and Slemrod (1995 AER), Souleles (1999 AER), Parker (1999 AER), and Johnson et al. (2006 AER)).

  2. Household consumption does not respond to regular, large, and predictable changes in income (e.g.,Browning and Collado (2001 AER) and Hsieh (2003 AER)).

- The behavioral theory has a number of policy implications as the cost of inattentiveness varies with the macroeconomy.

  1. We predict that (controlling for other factors) the experience of the current worldwide financial crisis will make affected households more attentive and more likely to smooth consumption. $\rightarrow$ a lump-sum tax refund a less effective short-run stimulus to household consumption.

  2. It is of interest to examine whether households will become more efficient consumers in the long run in countries where a higher share of disposable income is spent on committed expenditures such as health insurance.