Consumption Smoothing and Borrowing Constraints: Evidence from Household Surveys of Iran

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MOTIVATION

- Implications of Permanent Income Hypothesis:
  - Other than current consumption, nothing helps predict future consumption
- Evidence in Data: Excess Sensitivity
- Excess Sensitivity: Current income / income changes helps predict future consumption change.

MOTIVATION

- Explanations:
  - Extend Theoretical Model: Durable Goods, Consumption Habits, Envy, ...
  - Econometrics: Macro vs. Micro Data, linear estimation vs nonlinear GMM
  - Borrowing Constraints
- Importance of Excess Sensitivity:
  - Optimal vs. Sub-Optimal Consumption Profile
  - Welfare Effects of Business Cycles
  - Policy Implications

CONTRIBUTION

- We provide evidence of excess sensitivity in a cohort pseudo-panel of Iranian households (1997-2012).
- Excess sensitivity due to borrowing constraints: absent for government employees.
- Credit in Iran: Government employees vs. others
  - Procedures to get a loan from a bank in Iran.
  - Higher credit of government workers in market:
    - "Government employee check is accepted."
  - Housing cooperation companies for government workers

CONTENTS

- What are we looking at: Euler equation
- Loans and Working sector
- Data
- Results

AN EULER EQUATION

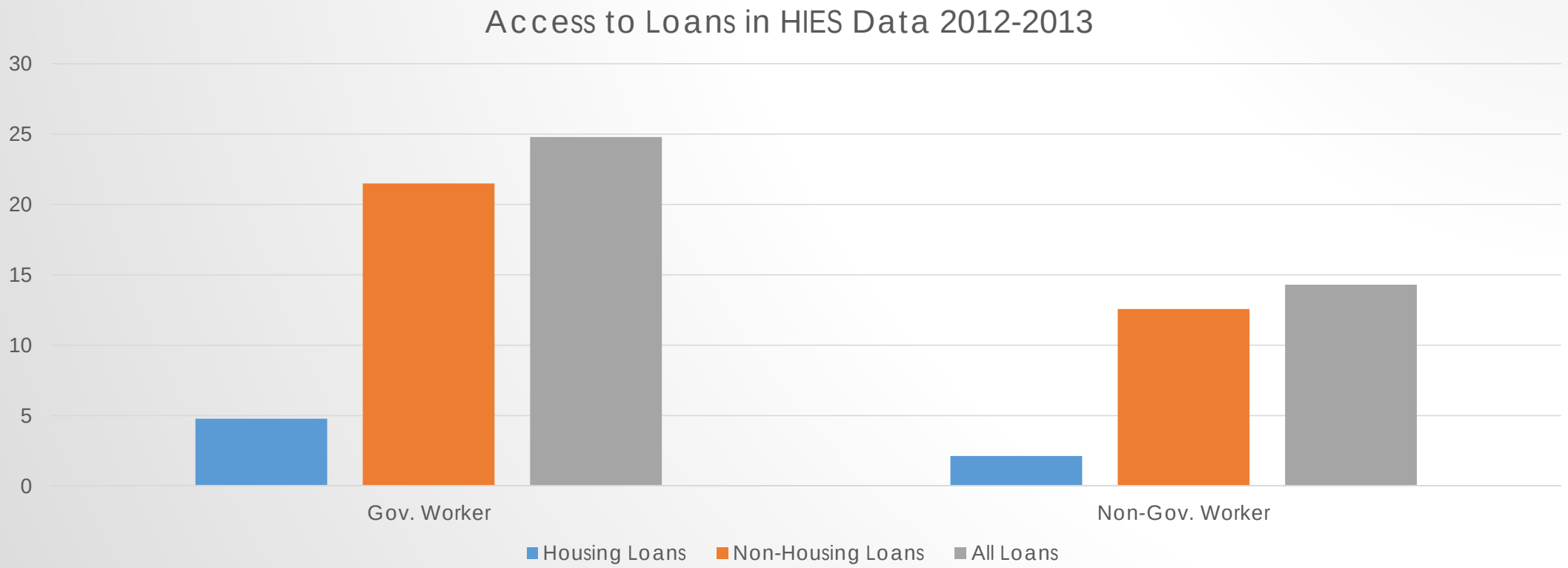
$$E_t\left[\frac{U_c(C_{t+1},\boldsymbol{z}_{t+1},\nu_{t+1})}{U_c(C_t,\boldsymbol{z}_t,\nu_t)}\beta R_{t+1}-1\right]=0 \qquad (1)$$

$$U(C_t,\boldsymbol{z}_t,\nu_t)=\frac{C_{\mathrm{t}}^{1-\gamma}-1}{1-\gamma}\times e^{\boldsymbol{\theta}\mathbf{z}_{\mathrm{t}}+\nu_t} \qquad (2)$$

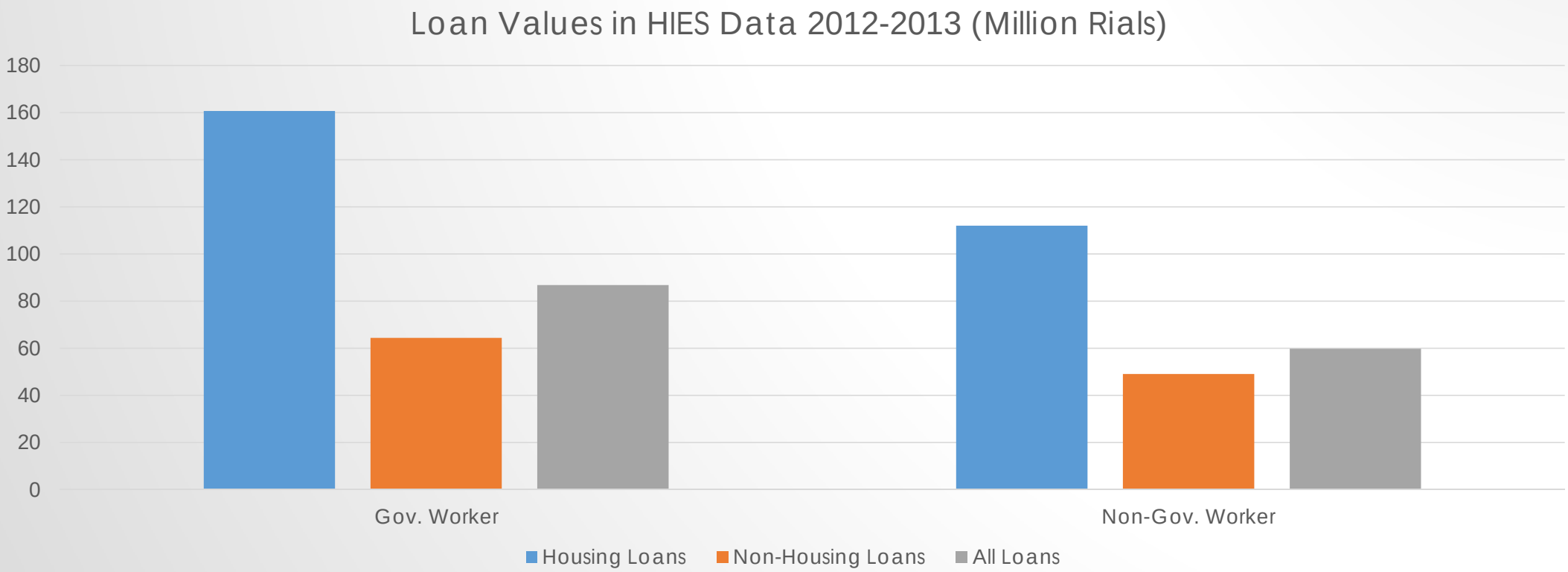
$$\Delta c_{i,t}=\alpha+\sigma r_t+\boldsymbol{\vartheta}'\boldsymbol{\Delta z}_{i,t}+\varepsilon_{i,t} \qquad (3)$$

$$\Delta c_{i,t}=\alpha+\sigma r_t+\zeta\Delta y_{i,t}+\boldsymbol{\vartheta}'\boldsymbol{\Delta z}_{i,t}+\varepsilon_{i,t} \qquad (4)$$

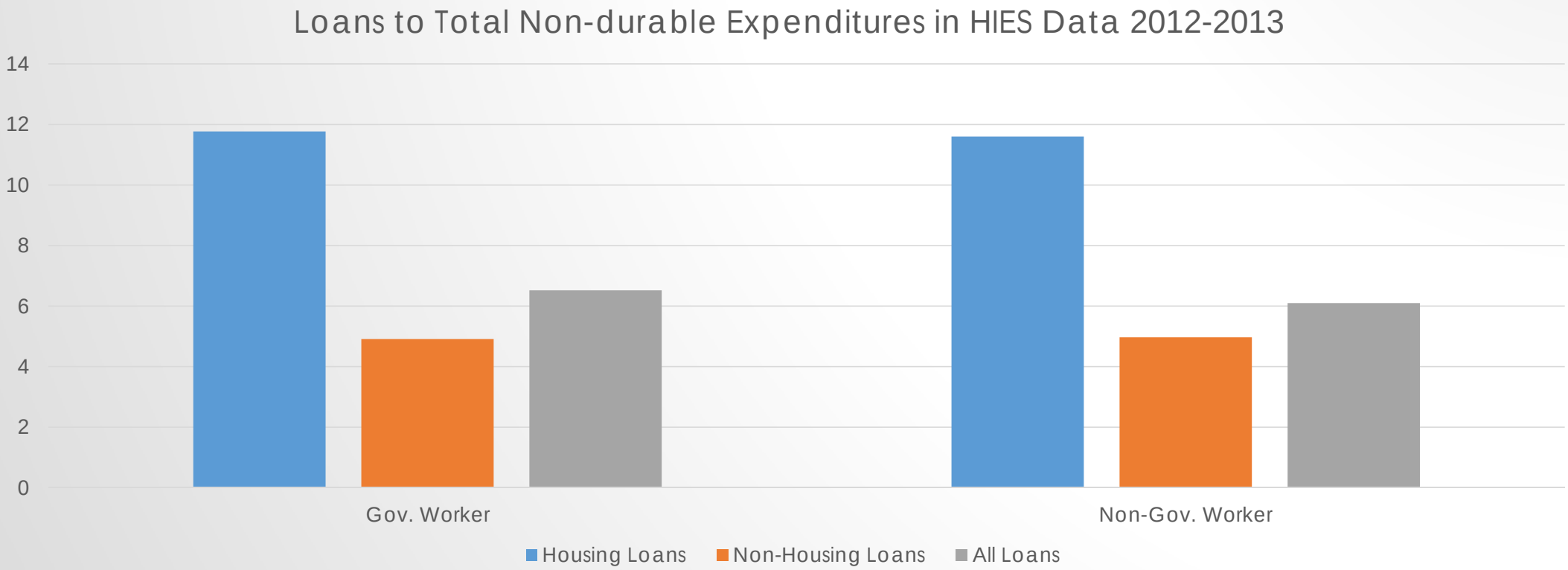
LOANS IN SCI HEIS DATA



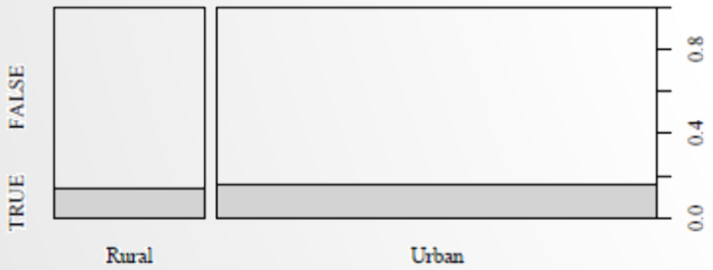
LOANS IN SCI HEIS DATA



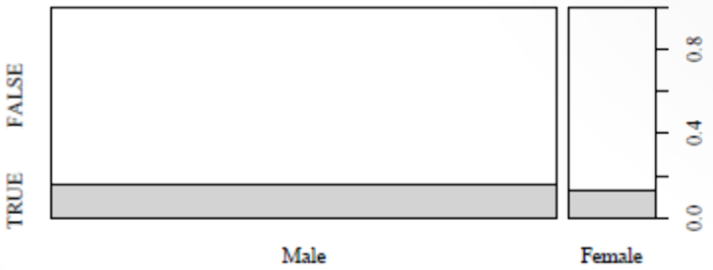
LOANS IN SCI HEIS DATA



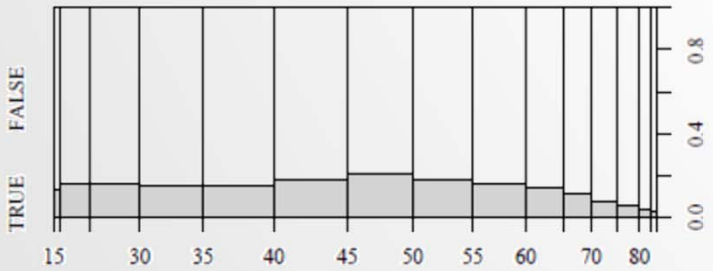
DETERMINANTS OF ACCESS TO LOAN



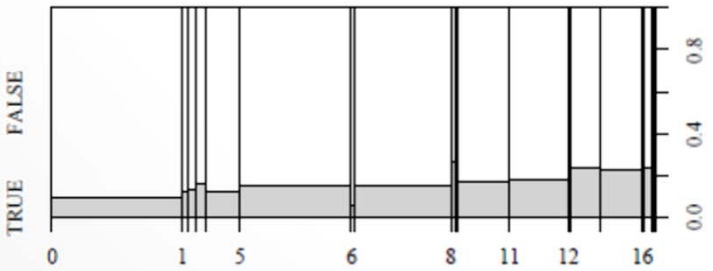
(a) Region



(b) Head's Gender

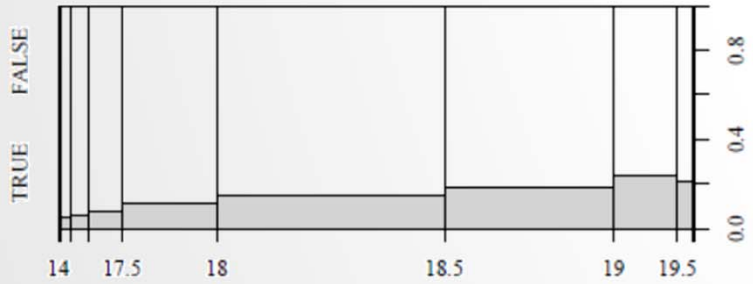


(c) Head's Age

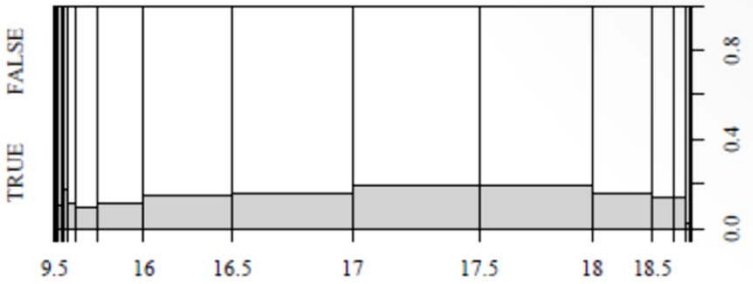


(d) Head's Education

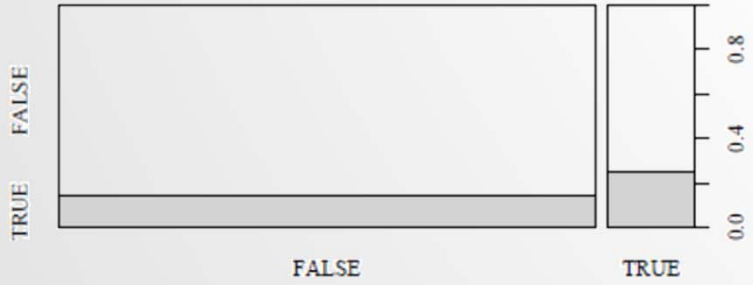
DETERMINANTS OF ACCESS TO LOAN



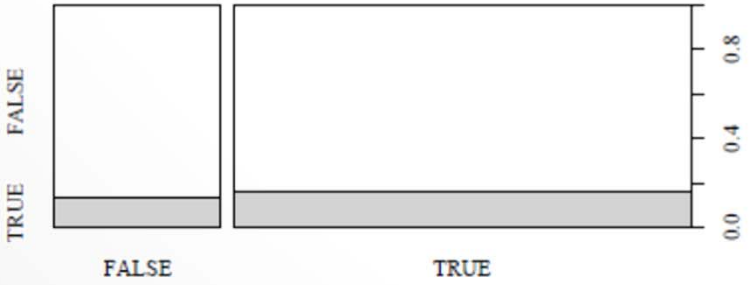
(e) log of Monetary Income



(f) log of Non-Monetary Income



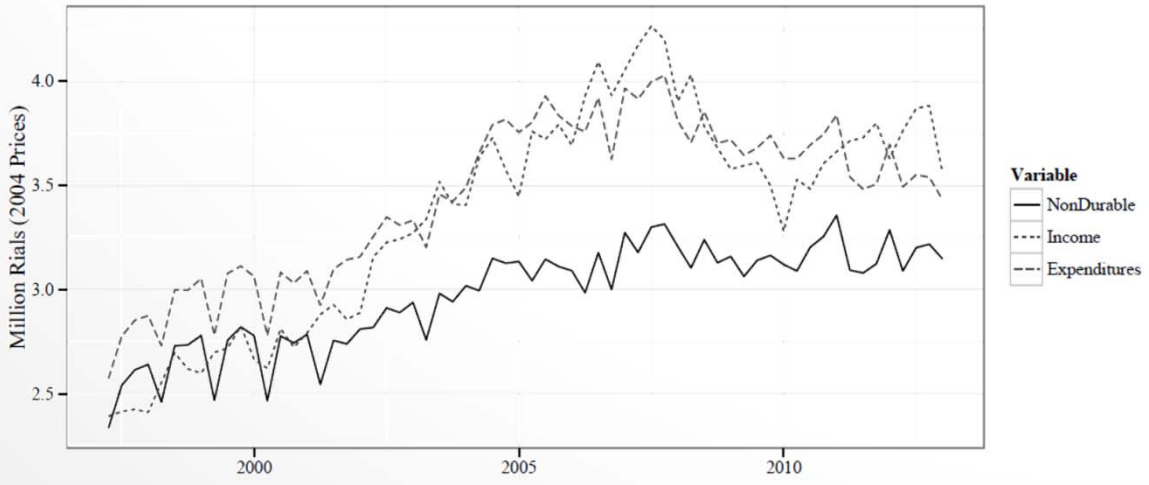
(g) Is Government Employee?



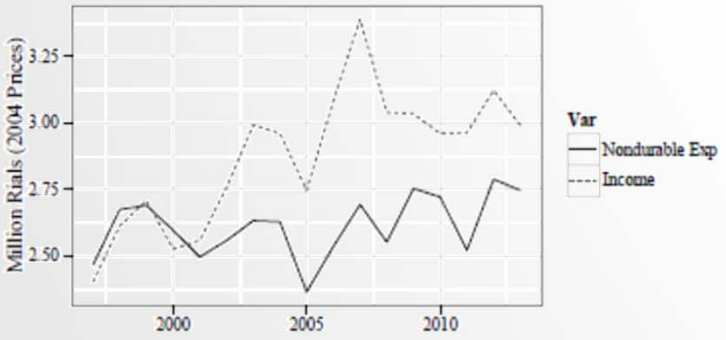
(h) Owns House?

DATA

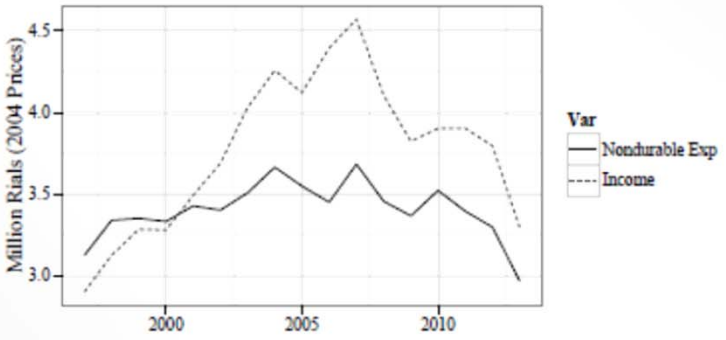
- Household expenditures and income surveys by SCI
  - Household head redefined to be the person with higher income
  - 480712 household samples in 16 years
- Consumer Price Index data from CBI and SCI
- Calculated real income and non-durable expenditures



NONDURABLE EXPENDITURES AND INCOME

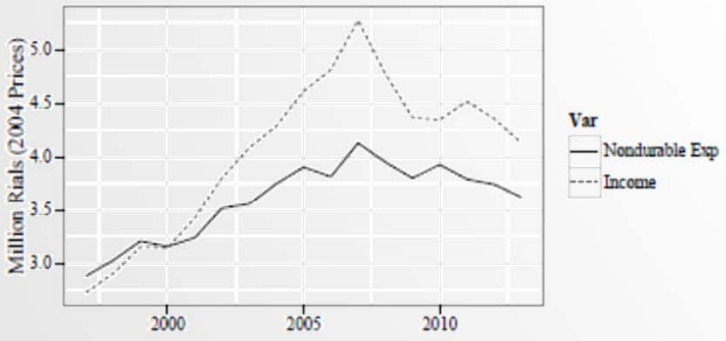


(a) Cohort 1931–40

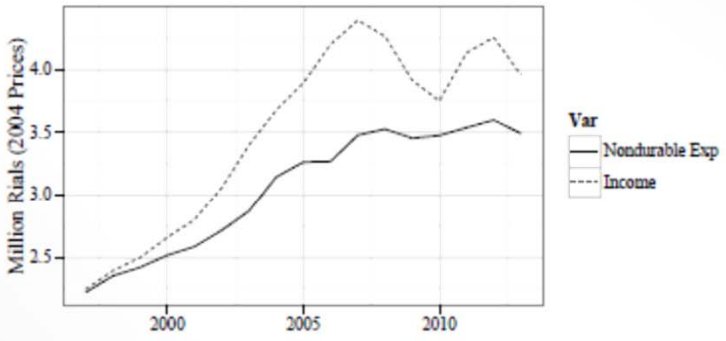


(b) Cohort 1941–50

NONDURABLE EXPENDITURES AND INCOME

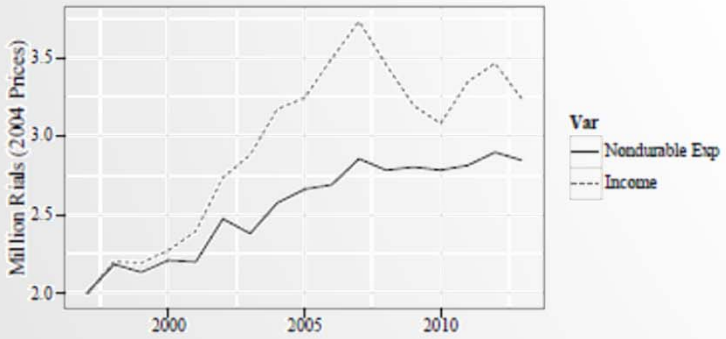


(c) Cohort 1951–60

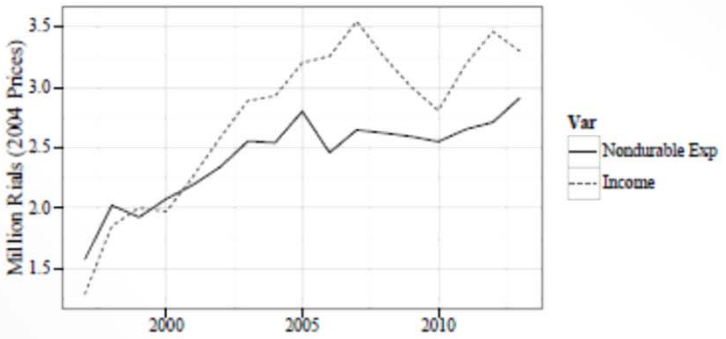


(d) Cohort 1961–70

NONDURABLE EXPENDITURES AND INCOME



(e) Cohort 1971–80



(f) Cohort 1981–90

ESTIMATIONS: BASE RESULTS

	All	Gov. Emp.	Prv. Emp.	Non Emp.
r_t	0.03	0.11*	0.12*	0.13*
	(0.06)	(0.07)	(0.07)	(0.06)
$\Delta y_{i,t}$	0.28*	0.33	0.38**	0.70***
	(0.15)	(0.28)	(0.15)	(0.16)
R^2	0.59	0.43	0.54	0.65
Adjusted R^2	0.52	0.37	0.47	0.57
Number of Observations	147	80	109	141
F Stat.	48.24	21.31	43.82	112.32
p-value (F Stat.)	0.00	0.00	0.00	0.00

ESTIMATIONS: CONTROLLING FOR TASTE SHIFTERS AND NON-ADDITIVITY IN UTILITY: ALL HOUSEHOLDS

	Base	Taste 1	Taste 2	Taste 3	Non-additivity
r_t	0.03	0.01	0.04	0.01	0.10**
	(0.06)	(0.05)	(0.06)	(0.05)	(0.05)
$\Delta y_{i,t}$	0.28*	0.18	0.30**	0.17	0.40***
	(0.15)	(0.14)	(0.15)	(0.14)	(0.10)
$\Delta lit_{i,t}$		1.08***		1.09***	
		(0.22)	-0.03	(0.22)	
$\Delta sex_{i,t}$			(0.16)	0.10	
				(0.14)	
ΔU_t					-0.01*
					(0.00)
R^2	0.59	0.58	0.59	0.58	0.58
Adjusted R^2	0.52	0.51	0.52	0.50	0.51
Num. obs.	147	147	147	147	147
F Stat.	48.24	56.74	34.78	42.36	51.42
p-value (F Stat.)	0.00	0.00	0.00	0.00	0.00

ESTIMATIONS: CONTROLLING FOR TASTE SHIFTERS AND NON-ADDITIVITY IN UTILITY: GOVERNMENT EMPLOYEES

	Base	Taste 1	Taste 2	Taste 3	Non-additivity
r_t	0.11*	0.12*	0.11*	0.12*	0.10
	(0.07)	(0.07)	(0.07)	(0.07)	(0.08)
$\Delta y_{i,t}$	0.33	0.26	0.36	0.28	0.16
	(0.28)	(0.27)	(0.28)	(0.28)	(0.28)
$\Delta lit_{i,t}$		0.52		0.48	
		(0.38)		(0.40)	
$\Delta sex_{i,t}$			-0.11	-0.05	
			(0.16)	(0.17)	
ΔU_t					0.00
					(0.01)
R^2	0.43	0.41	0.44	0.42	0.38
Adjusted R^2	0.37	0.34	0.37	0.35	0.32
Num. obs.	80	80	80	80	80
F Stat.	21.31	12.91	15.15	10.27	7.03
p-value (F Stat.)	0.00	0.00	0.00	0.00	0.00

ESTIMATIONS: CONTROLLING FOR TASTE SHIFTERS AND NON-ADDITIVITY IN UTILITY: PRIVATE SECTOR EMPLOYEES

	Base	Taste 1	Taste 2	Taste 3	Non-additivity
r_t	0.12*	0.11*	0.12*	0.11*	0.19**
	(0.07)	(0.07)	(0.07)	(0.07)	(0.08)
$\Delta y_{i,t}$	0.38**	0.28*	0.40***	0.31**	0.24
	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)
$\Delta lit_{i,t}$		0.59***		0.57***	
		(0.20)		(0.19)	
$\Delta sex_{i,t}$			-0.19	-0.04	
			(0.30)	(0.29)	
ΔU_t					-0.01
					(0.01)
R^2	0.54	0.52	0.54	0.54	0.47
Adjusted R^2	0.47	0.45	0.46	0.46	0.40
Num. obs.	109	109	109	109	109
F Stat.	43.82	29.36	30.89	23.29	20.35
p-value (F Stat.)	0.00	0.00	0.00	0.00	0.00

ESTIMATIONS: CONTROLLING FOR TASTE SHIFTERS AND NON-ADDITIVITY IN UTILITY: NON-EMPLOYEES

	Base	Taste 1	Taste 2	Taste 3	Non-additivity
r_t	0.13**	0.03	0.12**	0.03	0.12**
	(0.06)	(0.07)	(0.06)	(0.07)	(0.05)
$\Delta y_{i,t}$	0.70***	0.42**	0.67***	0.40**	0.64***
	(0.16)	(0.19)	(0.15)	(0.18)	(0.11)
$\Delta lit_{i,t}$		0.75**		0.80***	
		(0.30)		(0.29)	
$\Delta sex_{i,t}$			0.26*	0.24**	
			(0.13)	(0.12)	
ΔU_t					0.00
					(0.00)
R^2	0.65	0.71	0.66	0.72	0.65
Adjusted R^2	0.57	0.62	0.58	0.62	0.57
Num. obs.	141	141	141	141	141
F Stat.	112.32	98.32	75.18	75.18	76.61
p-value (F Stat.)	0.00	0.00	0.00	0.00	0.00

ESTIMATIONS: DIFFERENT MEASURES OF INTEREST RATE: ALL HOUSEHOLDS

	Fix N	Deposit	Loan	Short	1 Y	2 Y	3 Y	4 Y	5 Y	D Return
r_t	0.04	0.03	0.02	0.01	0.03	0.01	0.01	0.01	0.01	-0.17^{***}
	(0.07)	(0.06)	(0.05)	(0.08)	(0.07)	(0.06)	(0.07)	(0.07)	(0.07)	(0.06)
Δy_{it}	0.25^{*}	0.28^{*}	0.20^{*}	0.33^{**}	0.27^{*}	0.19	0.20	0.21	0.25	0.38^{***}
	(0.14)	(0.15)	(0.12)	(0.16)	(0.15)	(0.14)	(0.15)	(0.15)	(0.16)	(0.10)
R^2	0.59	0.59	0.58	0.58	0.59	0.58	0.58	0.58	0.58	0.60
Adj. R^2	0.52	0.52	0.51	0.51	0.52	0.51	0.51	0.51	0.52	0.53
Num. obs.	147	147	147	147	147	147	147	147	147	147
F Stat.	42.62	48.24	33.53	59.38	45.64	31.54	32.38	34.63	41.65	75.89
p-value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

ESTIMATIONS: DIFFERENT MEASURES OF INTEREST RATE: GOVERNMENT EMPLOYEES

	Fix N	Deposit	Loan	Short	1 Y	2 Y	3 Y	4 Y	5 Y	D Return
r_t	0.14*	0.11*	0.09	0.10	0.10	0.10	0.10	0.10	0.10	−0.16*
	(0.09)	(0.07)	(0.07)	(0.10)	(0.09)	(0.08)	(0.08)	(0.08)	(0.08)	(0.10)
Δy_{it}	0.32	0.33	0.26	0.29	0.28	0.24	0.25	0.27	0.29	0.26
	(0.24)	(0.28)	(0.17)	(0.32)	(0.31)	(0.24)	(0.24)	(0.25)	(0.29)	(0.28)
R^2	0.43	0.43	0.40	0.42	0.42	0.41	0.41	0.42	0.42	0.42
Adj. R^2	0.36	0.37	0.34	0.36	0.36	0.35	0.35	0.35	0.36	0.35
Num. obs.	80	80	80	80	80	80	80	80	80	80
F Stat.	20.89	21.31	17.50	18.38	18.13	15.59	16.36	17.54	18.33	17.68
p-value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

ESTIMATIONS: DIFFERENT MEASURES OF INTEREST RATE: PRIVATE SECTOR EMPLOYEES

	Fix N	Deposit	Loan	Short	1 Y	2 Y	3 Y	4 Y	5 Y	D Return
r_t	0.14*	0.12*	0.09*	0.11	0.10	0.13*	0.13*	0.13*	0.12*	−0.26***
	(0.09)	(0.07)	(0.06)	(0.09)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.09)
Δy_{it}	0.36**	0.38**	0.35***	0.33**	0.33**	0.36***	0.36***	0.37***	0.35**	0.37***
	(0.15)	(0.15)	(0.13)	(0.15)	(0.16)	(0.13)	(0.13)	(0.13)	(0.14)	(0.14)
R^2	0.54	0.54	0.52	0.53	0.53	0.53	0.53	0.53	0.53	0.55
Adj. R^2	0.47	0.47	0.46	0.46	0.47	0.46	0.46	0.46	0.47	0.48
Num. obs.	109	109	109	109	109	109	109	109	109	109
F Stat.	40.53	43.82	39.19	36.39	36.28	40.95	41.29	41.85	40.18	47.01
p-value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

ESTIMATIONS: DIFFERENT MEASURES OF INTEREST RATE: NON-EMPLOYEES

	Fix N	Deposit	Loan	Short	1 Y	2 Y	3 Y	4 Y	5 Y	D Return
r_t	0.11*	0.13**	0.02	0.18*	0.15**	0.07	0.08	0.10	0.13*	−0.15**
	(0.07)	(0.06)	(0.05)	(0.10)	(0.07)	(0.07)	(0.07)	(0.07)	(0.08)	(0.07)
Δy_{it}	0.61***	0.70***	0.42***	0.76***	0.71***	0.57***	0.60***	0.64***	0.71***	0.50***
	(0.15)	(0.16)	(0.14)	(0.15)	(0.15)	(0.15)	(0.15)	(0.16)	(0.16)	(0.11)
R^2	0.65	0.65	0.64	0.64	0.65	0.64	0.64	0.64	0.65	0.65
Adj. R^2	0.57	0.57	0.56	0.57	0.57	0.57	0.57	0.57	0.57	0.57
Num. obs.	141	141	141	141	141	141	141	141	141	141
F Stat.	113.36	112.32	83.37	103.11	111.92	109.10	110.80	112.08	109.65	103.63
p-value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

ESTIMATES OF ELASTICITY OF INTERTEMPORAL SUBSTITUTION

- Several estimates, all significant ones in a reasonable range
- Range: [0.09,0.24]
- Median: 0.12
- Average: 0.1345,
  - after removing highest and lowest estimates: 0.1324
- Different from usual 0.5 used in DSGE models
- Consistent with those of developing countries in Havranek et. al. (2014)

CONCLUSIONS

- Excess sensitivity observed on synthetic panels of Iranian households.
- No excess sensitivity in the panel of households with head working in government sector
- Excess sensitivity higher in non-employees (self-employed, non-work income, ...)

WHERE DOES OUR WORK DIFFER FROM LITERATURE

- Excess sensitivity due to borrowing constraints
- Zeldes (1989)
  - Saving more than 3 month vs no savings
  - Food expenditures only
- Stephens (2008)
  - Excess sensitivity higher in younger households: suggests borrowing constraints but not rigorous
- Johnson & Li (2012)
  - Debt-Payment-to-Income ratio
  - Endogeneity problem

THANKS FOR YOUR ATTENTION!

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