

RIETI–JER Workshop

Economics of Aging in Japan and other Societies

Presentation



USUI Emiko

Associate Professor, Institute of Economic Research, Hitotsubashi University

December 13, 2014

Research Institute of Economy, Trade and Industry (RIETI)
<http://www.rieti.go.jp/en/index.html>

Work Capacity of the Elderly in Japan

RIETI-JER Workshop

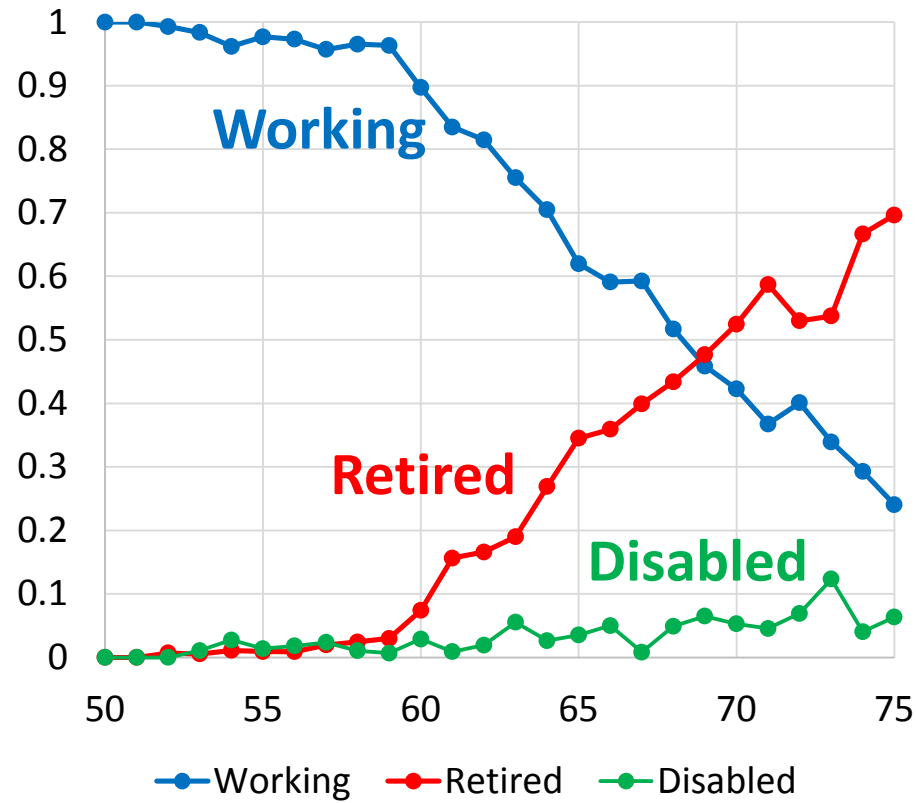
Emiko Usui

Satoshi Shimizutani

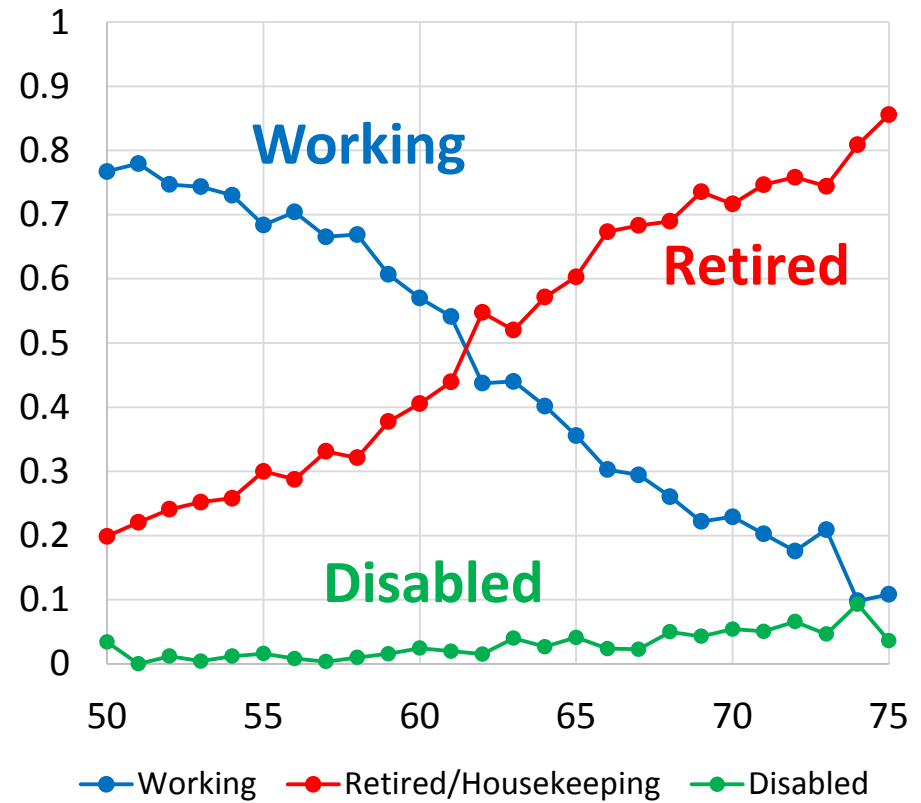
Takashi Oshio

Declining employment over age 60 in Japan

Men



Women



(Source) JSTAR in the baseline surveys in each municipality.

Objective 1

- Estimate work capacity of the elderly in Japan
 - Cutler, Meara, and Richards-Shubik (2012) method
 - Assumption: the relationship between work status and health conditions of persons aged 50-59 (not eligible for pension) would be the same as that for those over age 60
 - Estimate the effect of health on employment among people age 50-59.
 - Forecast work capacity of 60-74 years old.
- Findings: Substantial work capacity over age 60, especially for men who had salaried job at age 54
 - If pension benefits and employment opportunities etc are the same for those both above and below 60, more people over 60 will continue to work full-time
- Why men over age 60 move to part-time or retirement?

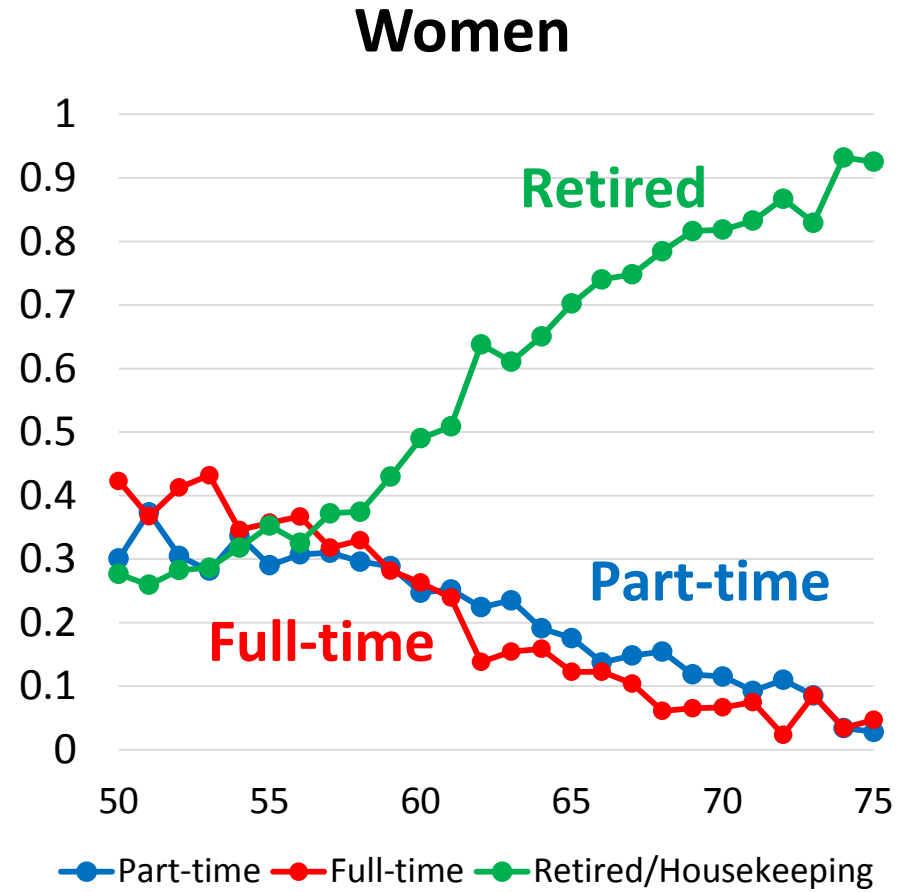
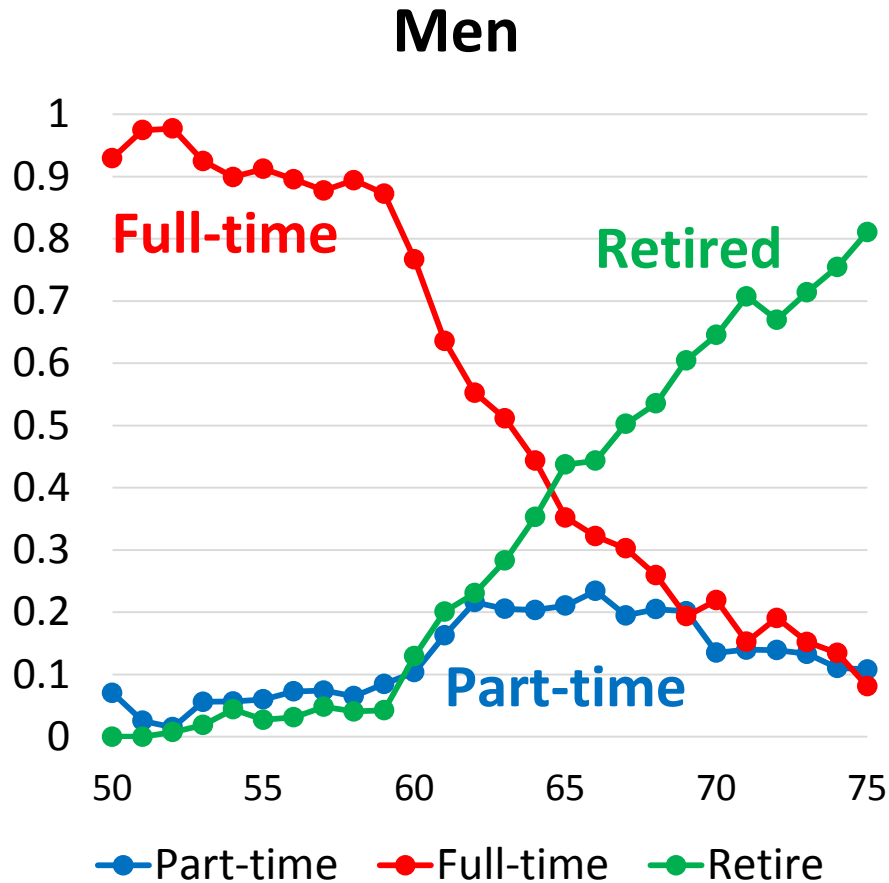
Objective 2

- **Salaried workers at age 54**
 - **Eligible for employees' pension insurance (EPI), Mandatory retirement**
 - Those with higher pension benefits (expected) move to part-time or retirement
 - After starting to receive pension, gradually move to part-time or retirement – they feel underemployed, involuntary hours reduction
- **Self-employed at age 54**
 - **Eligible for national pension insurance (NPI)**
 - No relationship between pension benefits and work status
 - Those with poor health (e.g., arthritis) move to part-time job
 - Those who worked at blue/service jobs at age 54 move to part-time or retirement
 - After starting to receive pension, they feel overemployed
- Japanese elderly are not being able to choose labor hours optimally across time

JSTAR (Japanese Study on Aging and Retirement)

- Sample size in the baseline (5 cities in 2007, 2 cities in 2009 and 3 cities in 2011) is 7,723
 - Comparable with HRS/ELSA/SHARE
- Detailed health information
 - Self-assessed health, Physical functional limitation, ADL and IADL limitation, CES-D, Heart disease, Lung disease, Stroke, Psychiatric disorder, Cancer, Hypertension, Arthritis, Diabetes, Underweight, Overweight, Obesity, Smoking, etc.
- Employment information
 - Current job, Job held at age 54
- Pension benefits
 - Actual amount; Expected amount if not yet receiving pension

Employment status (full-time, part-time, retired) by age



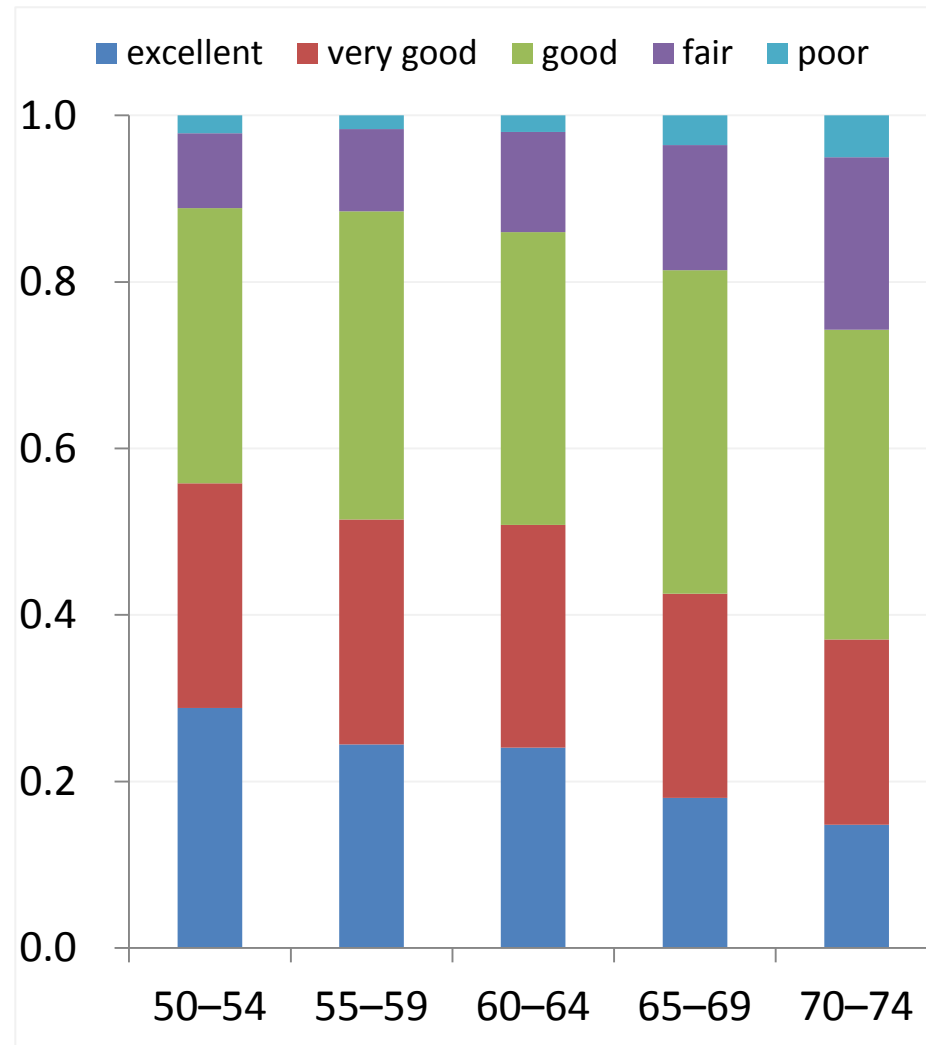
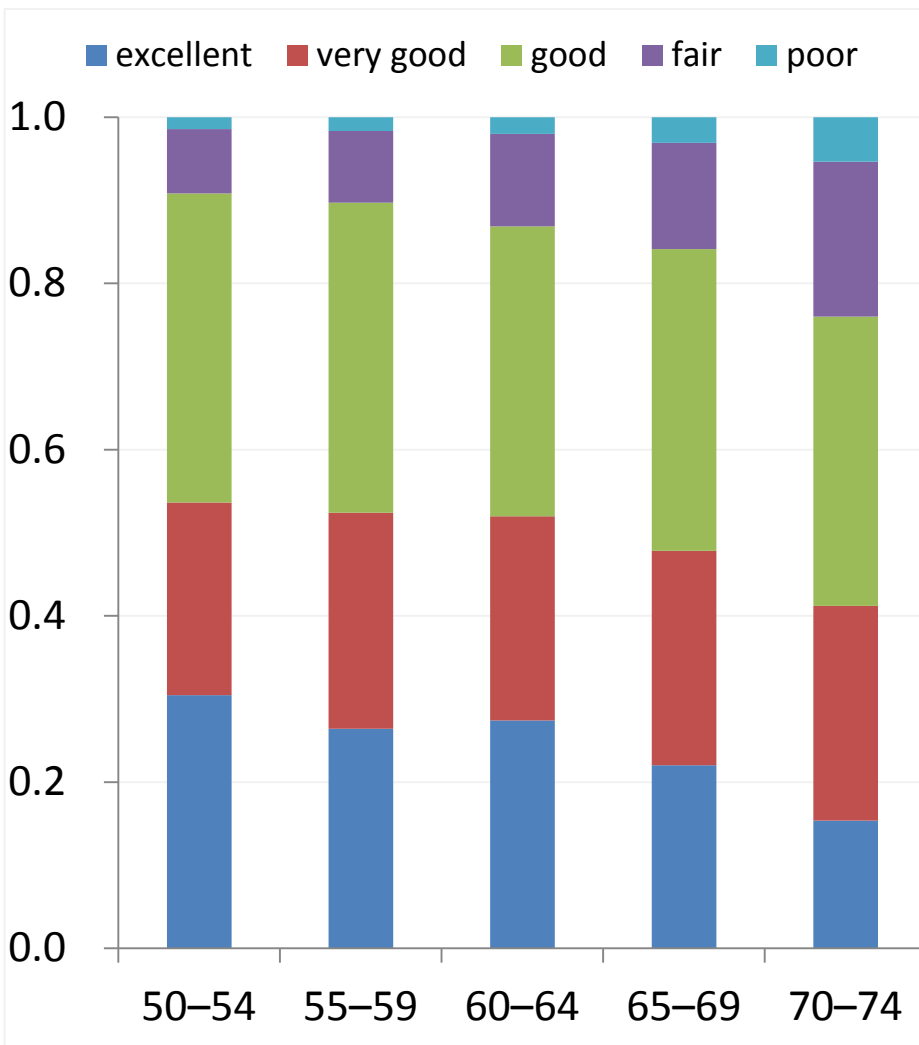
(Source) JSTAR in the baseline surveys in each municipality.

Self-assessed health status by age

(**excellent**, **very good**, **good**, **fair**, **poor**)

Men

Women



(Source) JSTAR in the baseline surveys in each municipality.

Health and work

- Decline in full-time employment after age 60
 - Rise in retired people after age 60
 - Initial modest increase followed by decline later in part-time employment during age 60s
- The number of people whose health deteriorate increases slowly in age 60s.

Cutler, Meara, and Richards-Shubik Method

- Assumption: The relationship between work status and health conditions of persons aged 50-59 would be the same as that for those over age 60
- Estimate the effect of health on work status (retired, part, full) among people aged 50-59 by multinomial logit
 - Forecast work capacity (ability to work based on one's health) for people aged 60-74.
 - Issues: health evolves exogenously from labor force status; propensity to find job conditional on seeking work may differ before and after 60; propensity to seek or maintain work conditional on health may differ before and after 60

Age 50-59, multinomial logit

Variable	Men 50–59			Women 50–59				
	Retired		Part-time	Retired		Part-time		
Health: very good	7.839	**	1.294	1.384	*	1.091		
Health: good	10.38	**	0.889	1.453	**	1.312	*	
Health: fair or poor	15.62	***	2.321	**	2.733	***	1.521	
Physical limitation: 1	7.026	***	1.208		1.490		0.908	
Physical limitation: 2+	17.12	***	1.892		3.209	***	0.837	
Any ADL limitations	3.604	***	1.404		4.379	**	2.236	
Any IADL limitations	0.036	**	0.086		0.595		0.421	
CES-D	1.042		1.083		0.985		1.069	*
Heart disease	3.257	**	2.286	**	2.030	*	1.477	
Lung disease	3.608		0.882		4.788		4.554	
Stroke	2.869		4.462	***	3.140		2.368	
Psychiatric disorder	21.71	***	1.049		6.593	***	2.688	*
Cancer	2.430		0.895		1.267		0.933	
Hypertension	0.937		0.575	**	1.490	*	1.880	***
Arthritis	0.493		0.381		2.331	***	1.143	
Diabetes	2.240		1.048		0.890		0.652	
Underweight	1.507		1.038		0.883		1.553	*
Overweight	0.681		0.778		0.812		0.914	
Obese	2.279		3.148	**	1.941		1.527	
Blue collar	0.329		0.535	**	0.246	***	1.129	
Low-skilled services	0.560		0.291	*	0.370	**	1.634	*
# Obs	1,793			1,697				

Age 60-74, multinomial logit

Variable	Men 60-74			Women 60-74			
	Retired		Part-time	Retired		Part-time	
Health: very good	1.416	***	1.147	1.521	***	1.130	
Health: good	1.519	***	1.238	1.463	***	1.024	
Health: fair or poor	2.356	***	1.407	2.228	***	0.957	
Physical limitation: 1	1.484	**	0.770	1.083		1.052	
Physical limitation: 2+	2.743	***	1.017	2.548	***	1.569	*
Any ADL limitations	1.885	***	0.904	1.839	*	0.772	
Any IADL limitations	0.789		1.212	0.609		0.576	
CES-D	1.026		0.987	1.085	**	1.109	***
Heart disease	1.505	**	1.326	1.500	*	0.886	
Lung disease	2.130	*	2.270	0.752		0.000	***
Stroke	2.261	***	1.101	0.857		0.604	
Psychiatric disorder	1.036		0.277	0.960		0.128	**
Cancer	1.221		1.238	2.926	**	2.461	*
Hypertension	1.246	**	1.487	1.042		0.898	
Arthritis	1.307		1.590	0.722		0.732	
Diabetes	1.296	*	1.083	0.985		0.742	
Underweight	0.960		1.309	1.422		1.810	*
Overweight	0.826	*	0.900	0.988		0.963	
Obese	0.742		0.686	1.606		0.857	
Blue collar	1.694	***	1.426	1.157		1.365	
Low-skilled services	1.673	*	1.182	1.312		1.706	*
# Obs	3731			3897			

Simulations of work capacity

Age	# Obs	Actual %Retired	Actual %PT	Actual %FT	Base age group 50–59		
					Predicted %Retired	Predicted %PT	Predicted %FT
Men							
60–64	1,287	19.5%	17.9%	62.5%	4.3%	6.5%	89.1%
65–69	1,268	47.7%	22.7%	29.6%	5.8%	7.5%	86.7%
70–74	1,256	67.0%	15.4%	17.6%	8.9%	8.5%	82.7%
Women							
60–64	1,324	50.5%	28.3%	21.1%	32.1%	31.2%	36.7%
65–69	1,299	69.4%	19.3%	11.2%	36.9%	30.1%	33.0%
70–74	1,362	83.7%	10.2%	6.1%	40.0%	28.8%	31.1%

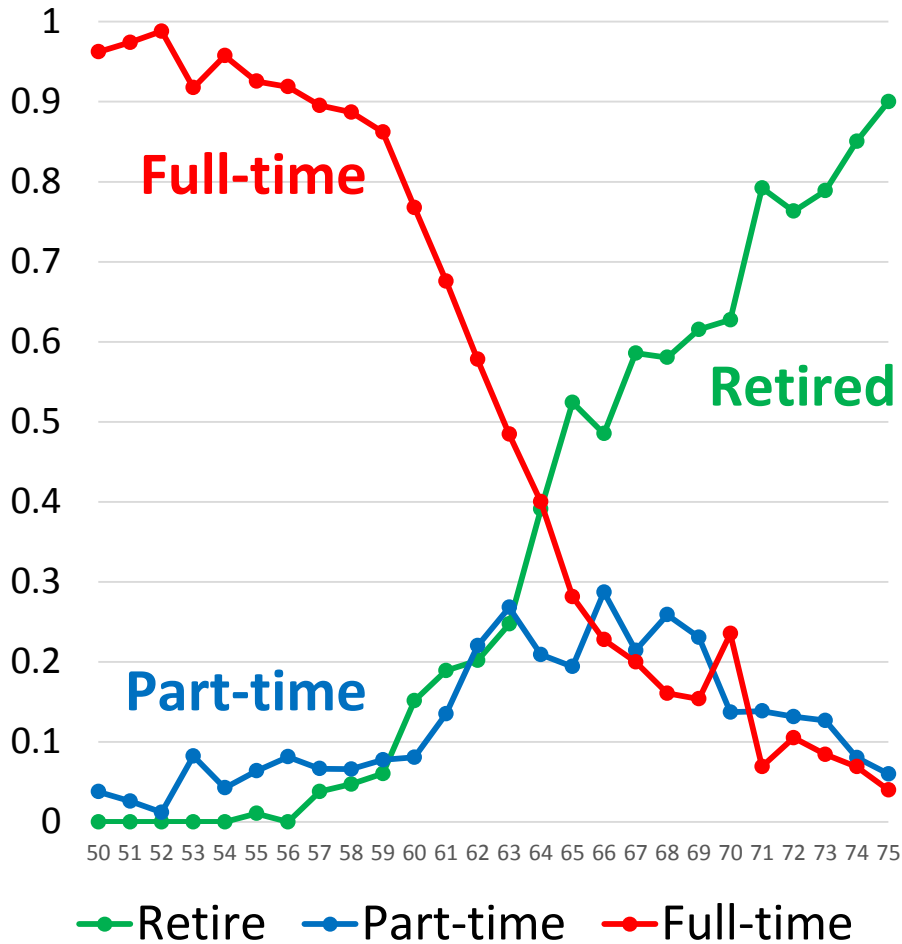
full-time work capacity declines with age

Next...

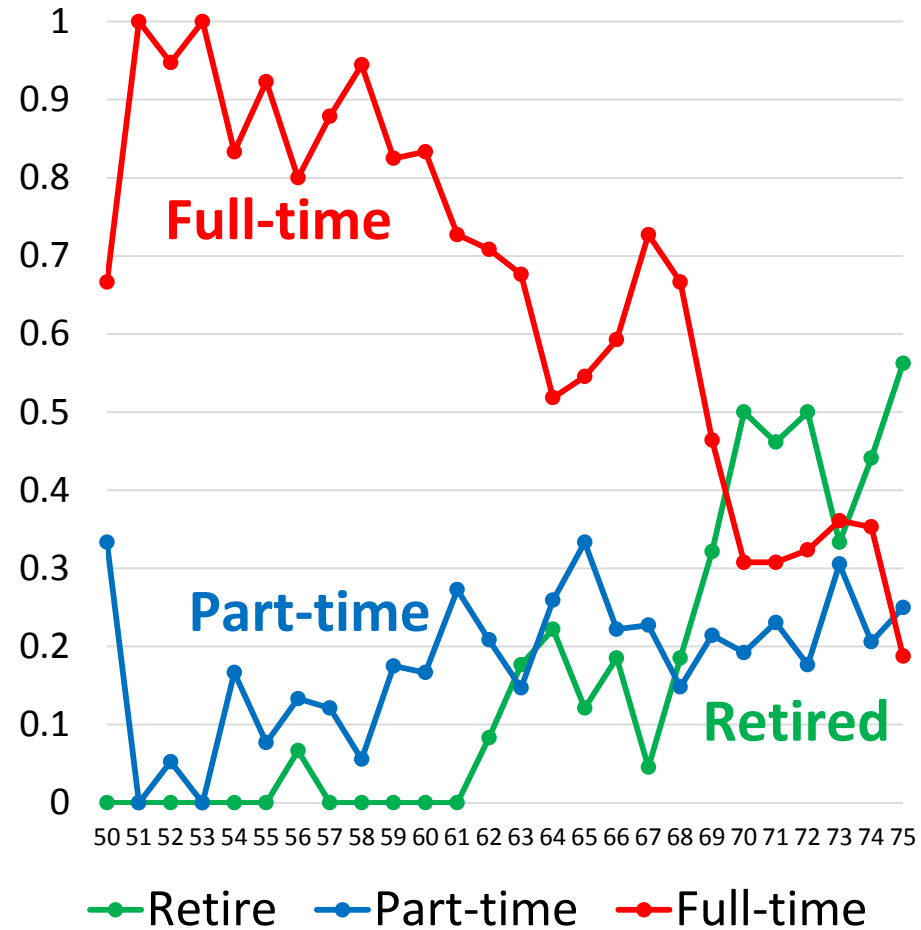
- For men over age 60, there are differences in the amount of pension benefits and employment opportunities between the following two groups:
 - People who held salaried at age 54
 - Eligible for employee's pension insurance (EPI)
 - Often higher pension benefits
 - Often face mandatory retirement
 - People who were self-employed at age 54
 - Eligible for national pension insurance (NPI)
 - Often lower pension benefits
 - No mandatory retirement

Full-time, part-time, retired by employed status at age 54: Men

Salaried at age 54



Self-employed at age 54



(Source) JSTAR in the baseline surveys in each municipality.

Simulation of full-time work capacity

- Men
 - Full-time → Part-time or Retirement
- Forecast full-time work capacity for men over age 60
 - Combine part-time and retirement into one category

Simulation of full-time work capacity: Men

Age Group	# Obs	Actual %Retired + %Part-time	Actual %Full-time	Base age group 50–59
				Predicted %Full-time
Salaried at age 54				
60–64	975	40.5%	59.5%	91.2%
65–69	972	77.7%	22.3%	88.8%
70–74	917	88.5%	11.5%	85.1%
Self-employed at age 54				
60–64	291	24.7%	75.3%	87.0%
65–69	272	42.6%	57.4%	84.0%
70–74	323	64.4%	35.6%	81.3%

Health explains only a little movement to part-time or retirement

Substantial work capacity after age 60

- Why men over age 60 don't work full-time?
 - Become eligible for pension benefits?
 - Assume that people have accurate expectation about their future pension benefits plan (because of Pension Coverage Regular Notice)
 - For those who are already receiving pension, use the amount currently receiving
 - For those who are not receiving pension, use the amount of pension expected to receive
 - Decline in employment opportunities? (not addressed in this paper, and to be taken up later)

Median Pension benefits

Men

Pension benefits			
	Retire	Part-time	Full-time
Salaried at age 54			
60-64	180	155	102
65-69	236	210	180
70-74	212	204	165
Self-employed at age 54			
60-64	79.6	61.5	70
65-69	88.5	85	90
70-74	90	120	90

Salaried at age 54:

Pension benefit: Retire > Part-time > Full-time

Self-employed at age 54:

Pension benefit: Small variation by work status

Men, age 60-74, multinomial logit

	Salaried worker at age 54				Self-employed at age 54			
	Retire		Part-time		Retire		Part-time	
65<=age<70	3.090	***	2.172	***	4.250	***	0.824	
70<=age<75	8.038	***	2.349	***	16.25	***	1.697	
Health: very good	1.434	*	1.252		1.088		1.295	
Health: good	1.255		1.012		1.554		2.488	***
Health: fair or poor	1.947	**	0.888		2.442	*	3.929	***
Physical limitation 1	1.084		0.641		1.711		0.636	
Physical limitation 2+	2.718	***	0.618		2.890	**	1.591	
Any ADL limitations	1.456		0.756		5.618	***	0.632	
Any IADL limitations	0.432		0.813		2.230		1.245	
Lung disease	4.122	**	3.580	**	1.208		2.260	
Stroke	2.041	*	0.469		7.237	**	6.010	**
Psychiatric disorder	0.506		0.000	***	2.024		0.000	***
Hypertension	1.268		1.902	***	1.455		1.417	
Arthritis	0.769		0.778		1.425		3.179	**
Married	0.540	**	1.146		0.510		1.556	
Blue collar at age 54	1.319		1.186		4.808	***	1.797	*
Service at age 54	2.004	**	1.698		4.998	**	1.298	
Pension benefits	1.008	***	1.006	***	1.001		1.002	
Prob. of survival till 85	0.855		1.010		0.503	***	1.062	
N	1019				658			

Men, age 60-74, multinomial logit

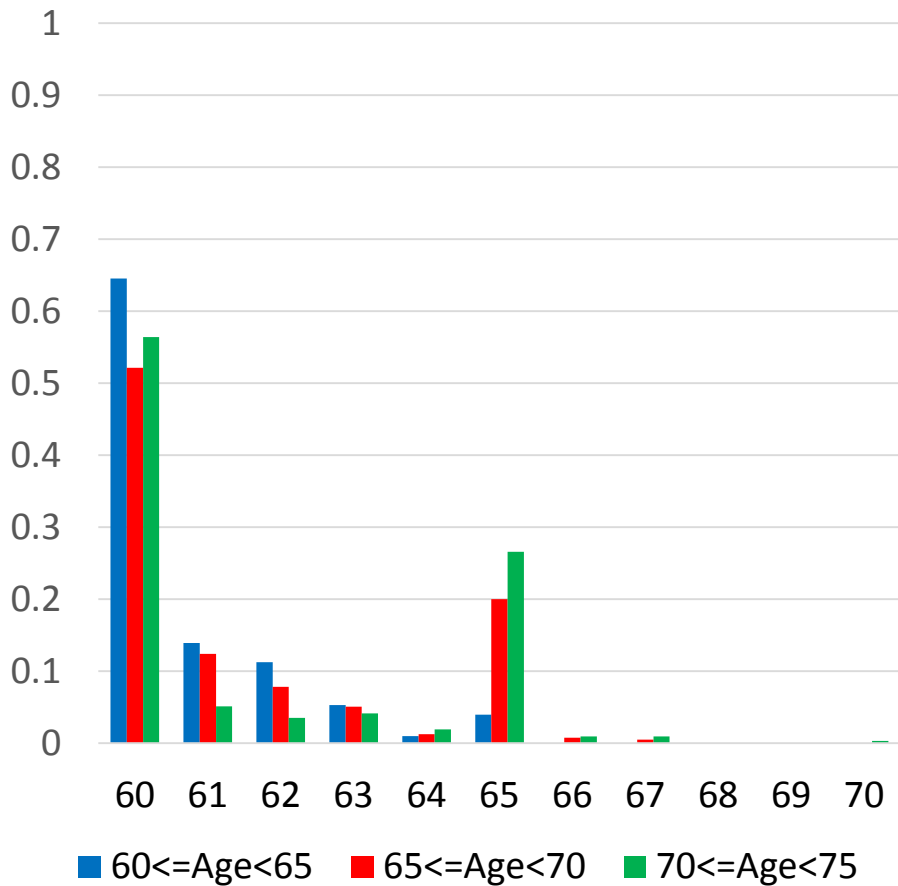
	Salaried worker at age 54				Self-employed at age 54			
	Retire		Part-time		Retire		Part-time	
65<=age<70	3.090	***	2.172	***	4.250	***	0.824	
70<=age<75	8.038	***	2.349	***	16.25	***	1.697	
Health: very good	1.434	*	1.252		1.088		1.295	
Health: good	1.255		1.012		1.554		2.488	***
Health: fair or poor	1.947	**	0.888		2.442	*	3.929	***
Physical limitation 1	1.084		0.641		1.711		0.636	
Physical limitation 2+	2.718	***	0.618		2.890	**	1.591	
Any ADL limitations	1.456		0.756		5.618	***	0.632	
Any IADL limitations	0.432		0.813		2.230		1.245	
Lung disease	4.122	**	3.580	**	1.208		2.260	
Stroke	2.041	*	0.469		7.237	**	6.010	**
Psychiatric disorder	0.506		0.000	***	2.024		0.000	***
Hypertension	1.268		1.902	***	1.455		1.417	
Arthritis	0.769		0.778		1.425		3.179	**
Married	0.540	**	1.146		0.510		1.556	
Blue collar at age 54	1.319		1.186		4.808	***	1.797	*
Service at age 54	2.004	**	1.698		4.998	**	1.298	
Pension benefits	1.008	***	1.006	***	1.001		1.002	
Prob. of survival till 85	0.855		1.010		0.503	***	1.062	
N	1019				658			

Before and after beginning to receive pension

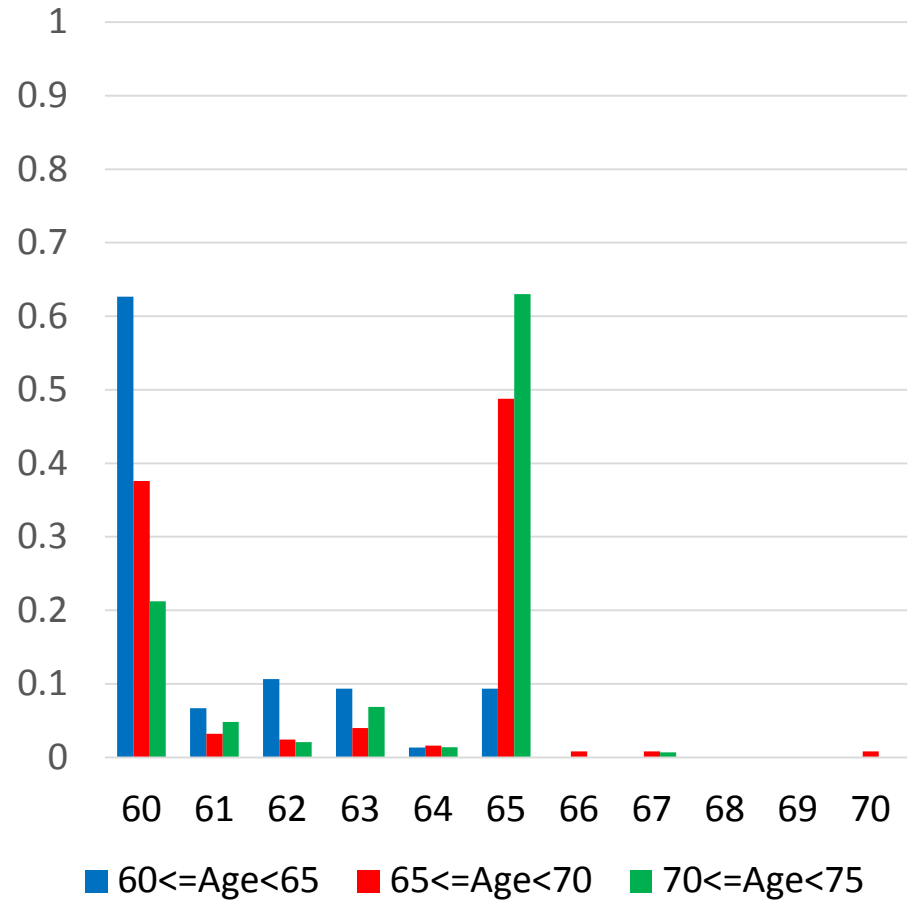
- Once one begins to receive pension, one cannot revoke it
- Get a picture of the relationship between timing of beginning to receive pension benefits and employment status

Age to begin receiving pension, Men

Salaried at age 54



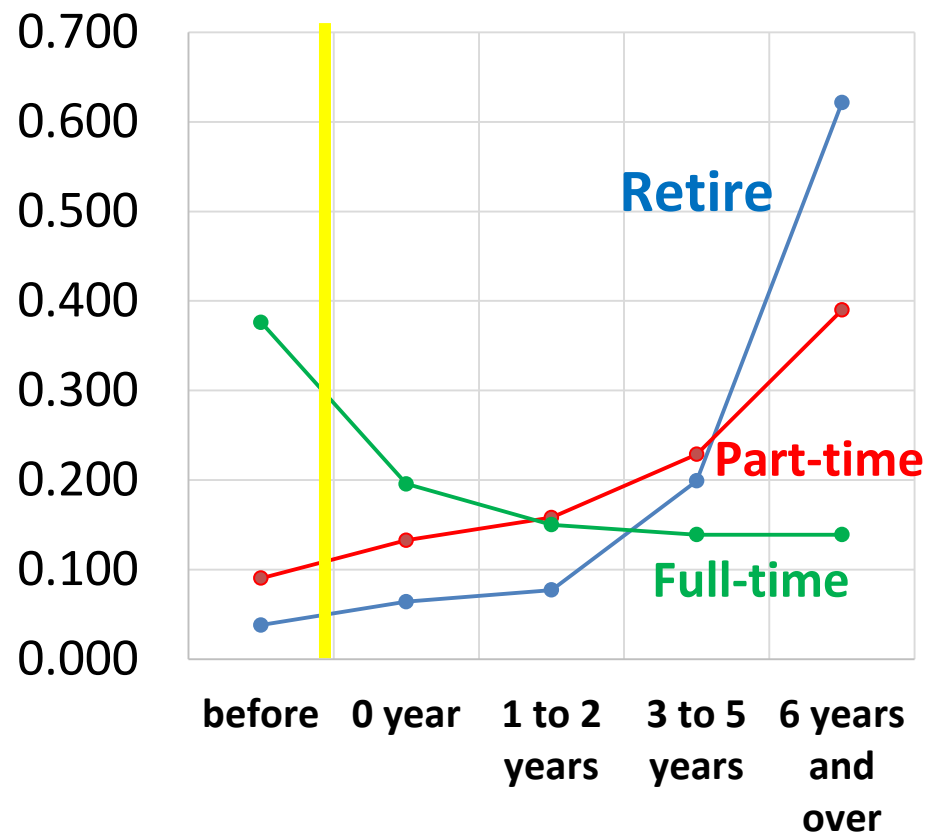
Self-employed at age 54



Regardless of employment status at age 54, people tend to begin receiving pension at the age of 60 or 65

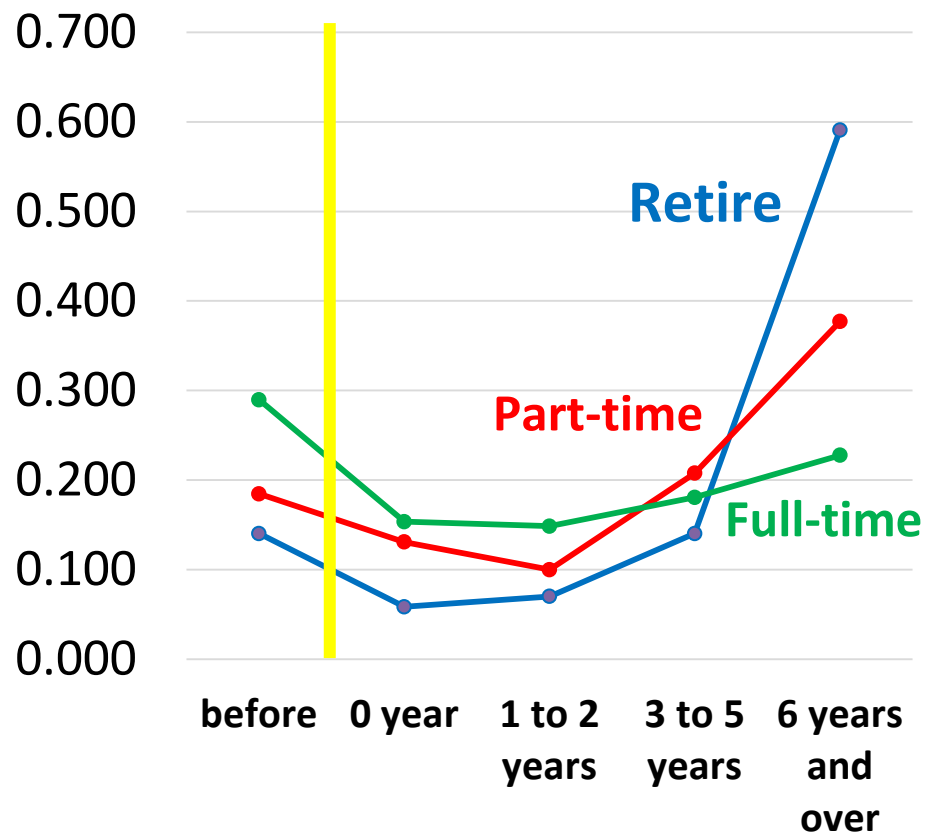
Work status by years since beginning to receive pension, Men

Salaried at age 54



● Retire ● Part-time ● Full-time

Self-employed at age 54



● Retire ● Part-time ● Full-time

Before and after beginning to receive pension

- Once one begins to receive pension, one cannot revoke it
- Get a picture of the relationship between timing of beginning to receive pension benefits and employment status
- Estimate multinomial logit model by including dummies for years since beginning to receive pension benefits
 - $work\ status = \beta_1 pension_{after} + \beta_2 X + \varepsilon$
 - Dummies for 0 years, 1-2 years, 3-5 years, and 6 years over
 - Issue of causality remains

Multinomial logit, Men 60-74

Years after beginning to receive pension, relative to years before receiving pension

	Salaried at Age 54		Self-employed at Age 54	
	Retire	Part-time	Retire	Part-time
0 year	4.799***	1.161***	1.076	1.899
1 to 2 years	5.644***	1.416***	0.763	0.646
3 to 5 years	8.526***	2.195***	1.365	1.438
6 years and over	13.66***	4.283***	2.586	1.726
# Obs	1881		689	

Salaried worker at age 54

- After beginning to receive pension, gradually move to part-time or retirement

Self-employed at age 54

- Before and after beginning to receive pension, little change in employment

Hours/week, weeks/year after beginning to receive pension

- After beginning to receive pension, how do people change their working hours
- Estimate labor supply (hours per week or weeks per year) by including dummies for years since beginning to receive pension benefits
 - $work\ hours = \beta_1 pension_{after} + \beta_2 X + \varepsilon$
 - Dummies for 0 year, 1-2 years, 3-5 years, and 6 years and over

Work hours after beginning to receive pension

Dependent variable: Hours per week

	Salaried at Age 54	Self-employed at Age 54
0 year	-5.557***	-0.067
1 to 2 years	-7.838***	4.699
3 to 5 years	-9.809***	-1.150
6 years and over	-10.94***	-3.031
# Obs	1026	522

Dependent variable: Weeks per year

	Salaried at Age 54	Self-employed at Age 54
0 year	-2.348***	-1.495
1 to 2 years	-1.380*	0.309
3 to 5 years	-1.983**	-1.121
6 years and over	-0.986	-1.980
# Obs	1069	551

Salaried at age 54: Hours reduces after beginning to receive pension

Self-employed at age 54: Effects on hours unrelated with receipt of pension

Overemployed after beginning to receive pension?

- After beginning to receive pension, do people who work feel overemployed?
- Estimate probit model of overemployment by including dummies for years since beginning to receive pension benefits
 - $overemployed = \beta_1 pension_{after} + \beta_2 X + \varepsilon$
 - Dummies for 0 year, 1-2 years, 3-5 years, and 6 years and over
- Case 1: Retired people are excluded from the sample
- Case 2: Let overemployed = 0 if retired
 - One cannot feel overemployed if retired

Overemployed after beginning to receive pension?

	Overemployed	
	Salaried at Age 54	Self-employed at Age 54
0 year	-0.023	0.073**
1 to 2 years	-0.027	0.079*
3 to 5 years	-0.061	0.052
6 years and over	-0.107**	0.013
# Obs	579	290

	Overemployed, =0 if Retired	
	Salaried at Age 54	Self-employed at Age 54
0 year	-0.006	0.052**
1 to 2 years	-0.007	0.063**
3 to 5 years	-0.024**	0.021
6 years and over	-0.038***	0.013
# Obs	1434	457

Marginal effects at the mean

Salaried at age 54: Effects on overemployment are negative and insignificant

Self-employed at age 54: Overemployed after beginning to receive pension

Underemployed after beginning to receive pension?

- After beginning to receive pension, are people feeling underemployed?
- Estimate probit of underemployment by including dummies for years since beginning to receive pension benefits
 - $underemployed = \beta_1 pension_{after} + \beta_2 X + \varepsilon$
 - Dummies for 0 year, 1-2 years, 3-5 years, and 6 years and over

Underemployed after beginning to receive pension?

	Underemployed	
	Salaried at Age 54	Self-employed at Age 54
0 year	0.057**	-0.685*
1 to 2 years	0.016	-0.128
3 to 5 years	0.035	-0.420
6 years and over	0.024	-0.166
# Obs	579	290

Salaried at age 54: Underemployed after beginning to receive pension

Self-employed at age 54: Effects on underemployment are negative with receipt of pension

Conclusion

- Salaried worker at age 54
 - After beginning to receive pension, gradually move to part-time or retirement
 - Feel underemployed; unable to choose to work more hours
- Self-employed at age 54
 - Timing to start receiving pension is not related to employment status
 - Feel overemployed; unable to reduce work hours
- Issues:
 - For those who were self-employed at age 54, only health shock affects decision to move to part-time or retirement after age 60?
 - For those who had salaried jobs at age 54, decline in employment opportunities after age 60?