IPDC 20th
Session 3.3 July 10, 2014

Health Consequences of Transitioning to Retirement and Social Participation: Evidence from JSTAR panel data

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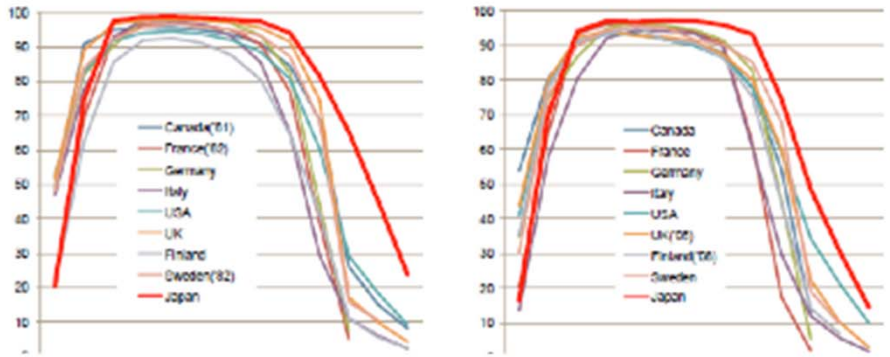
Retirement and health

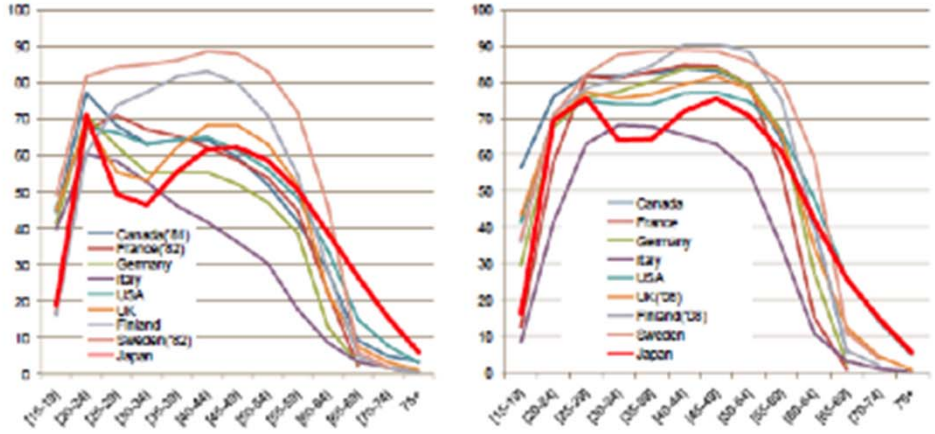
- One of major transitions in one's life
- Japan with an exceptionally high labor participation among 65+
  - Economic and health policy impact of retirement
    - Pension design
    - Health care cost and social insurance design
    - Job conflict with younger generation (?)
  - Healthy ageing context

High labor participation in Japan

日本と欧米：男性、1980年と2007年比較



日本と欧米：女性、1980年と2007年比較



データ出典:ILO, *LABORSTA Internet*

Occupational cohort studies in epidemiology circle

- Whitehall II study (UK) Mein et al. 2003, Jokela et al. 2010
  - UK civil servants
  - Repeat measurement of SF36 treated with random-intercept mixed model
  - Retirement results in improved physical function and mental health. Higher class is more likely to enjoy improvement .
- GAZEL study (French) Sojosten, et al. 2012 and others
  - Employees in a national gas and electricity company
  - Repeat measurement with GEE estimation
  - Improved physical activities, mental status, esp. among those with chronic conditions.
- Limitation
  - Selected occupational class
  - Very homogenous process of retirement
  - No control (growth curve analysis)

Challenges

- Heterogeneous population, diversifying path from labor participation to full retirement
- Reciprocal relationship b/w health and labor participation (chicken and egg)
- Selection bias and mis-specification bias

Theory of retirement and health

- Human capital (Grossman) model
  - Investment and cost
    - Wage as a marker of time cost
    - No marker for time cost after retirement
  - Return of investment (depreciation rate)
    - Larger depreciation rate due to physiological decline
    - Suggesting lower return of investment?

  -> Ambiguous suggestion for retirement impact on health

Theory of retirement and health

- Role theory (e.g. Wang, et al. Am. Psychol - ogist, 2011)
  - Retirement as a role transition from work-related one to informal (family, or community)
    - Impact of retirement depending on former job characteristics, easiness of role transition, available resource, significance of new roles, and preference for work-life balance

Social participation and health

- Participation in social networks other than work place networks
  - Community activities
  - Learning, hobby, and other leisure activities in the community/or with family
- Previous studies suggested health benefit through social network participation and social ties in community settings
  - Berkman (1979), House (1982), and more in the U.S.
  - Sugisawa, et al. (1997) and Ishizaki, et al. (1998) in Japan

Dave Rashad,and Spasojevic 2006

- HRS panel data
  - Fixed effect model to control for unobserved factor
  - limited to those who had no health conditions at baseline to account for reverse causality
- Self-reported ill health, Mobility, IADL, comorbidity diagnosis, CESD (depression)
- Retirement worsens various health measures, esp in involuntary retirement.
- The impact is alleviated by social support and participation.

Bound and Waidmann 2007

- Cross-sectional treatment of ELSA wave 2
- A kind of regression discontinuity analysis with statutory retirement age as an exogenous shock
- Physical limitation, IADL, chronic conditions (self-reported), physical performance scale, and mortality
- Retirement showed no negative effects, but some positive effects within 6 years after retirement among men (not among women).

Coe and Zammaro 2008

- SHARE data, 1st wave cross-sectional, age of 50-69
- Statutory retirement age by country as IV, with use of regression discontinuity model
- Outcomes
  - Standardized subjective reported health (health index) by country to adjust for report bias
    - see, SHARE report, also Fujii, Oshio, and Shimizutani RIETI DP 2012
  - depression, and cognitive function (word recall and verbal fluency)
- Retirement at 65 preserves health, but retirement at younger age does not.

Behncke 2010

- ELSA panel data (wave 1, 2, and 3)
- Propensity matching (radius matching and kernel estimator, with balancing scores) to predict retirement in the next wave
- New emergence of chronic conditions
- Retirement increases the likelihood of chronic conditions and risk factors among males. Not among females and younger retirees aged 65-.

Why inconsistent?

- Definition of “retirement”
- Health measure used
- Misspecification and endogeneity problem

Why inconsistent? (cont'd)

- Definition of "retirement"
  - "Retired" as best description of current status
  - Not in "paid work"
  - Working hours less than a threshold defined
  - "Home-maker" in female respondents

  Depending on the based theory for hypothesis

  Availability of economic/health resource?

  Role in the work place?
- In this study, we defined as "not in paid work" as a marker of role in the work place

Why inconsistent? (cont'd)

- Health measure used
  - Self-reported health
  - Functions (Physical, mental, and cognitive)
  - Objectively measured (e.g. grip, blood chemical)
  - Self-reported chronic conditions diagnosed
- Newly emerging chronic conditions (heart disease, stroke, cancer) after two-year interval cannot be attributed to retirement event (latent period bias)
- Diagnosed conditions does not suggest "incidence" (referral bias, e.g. time to visit available after retirement -> more likely to be diagnosed after retirement)
- Physical strength is rather a determinant of retirement than result.
- In this study, we chose "cognitive function" as responsive enough to role change.

Why inconsistent? (cont'd)

- Misspecification and endogeneity problem
  - Voluntary/involuntary retirement, statutory retirement age, availability of pension, etc.
  - Family, social support & network, life-time saving, unmeasured health shocks
  - Health as a determinant of retirement decision

- IV or not IV?

IV or not IV

- IV estimator = "Local average treatment effect "(LATE)
  - the effect revealed for the subpopulation affected by the observed change in the instrument ("complier" Angrist, Imbens, Rubin, 1996)
  - Equal to "Average treatment effect" (ATE) under constant effect assumption
  - IV previously used = statutory retirement age
    - What about self-employed?
    - Those in larger company vs. small workplace, or secured vs. non-secured jobs
    - Full time worker vs. part time worker
    - Gender (different age for pension eligibility)

Alternative;
propensity score matched difference-in-difference

- ATET (average treatment effect for the treated) estimator under “conditional independence assumption”
- More generic view of what happened after retirement

Caution !

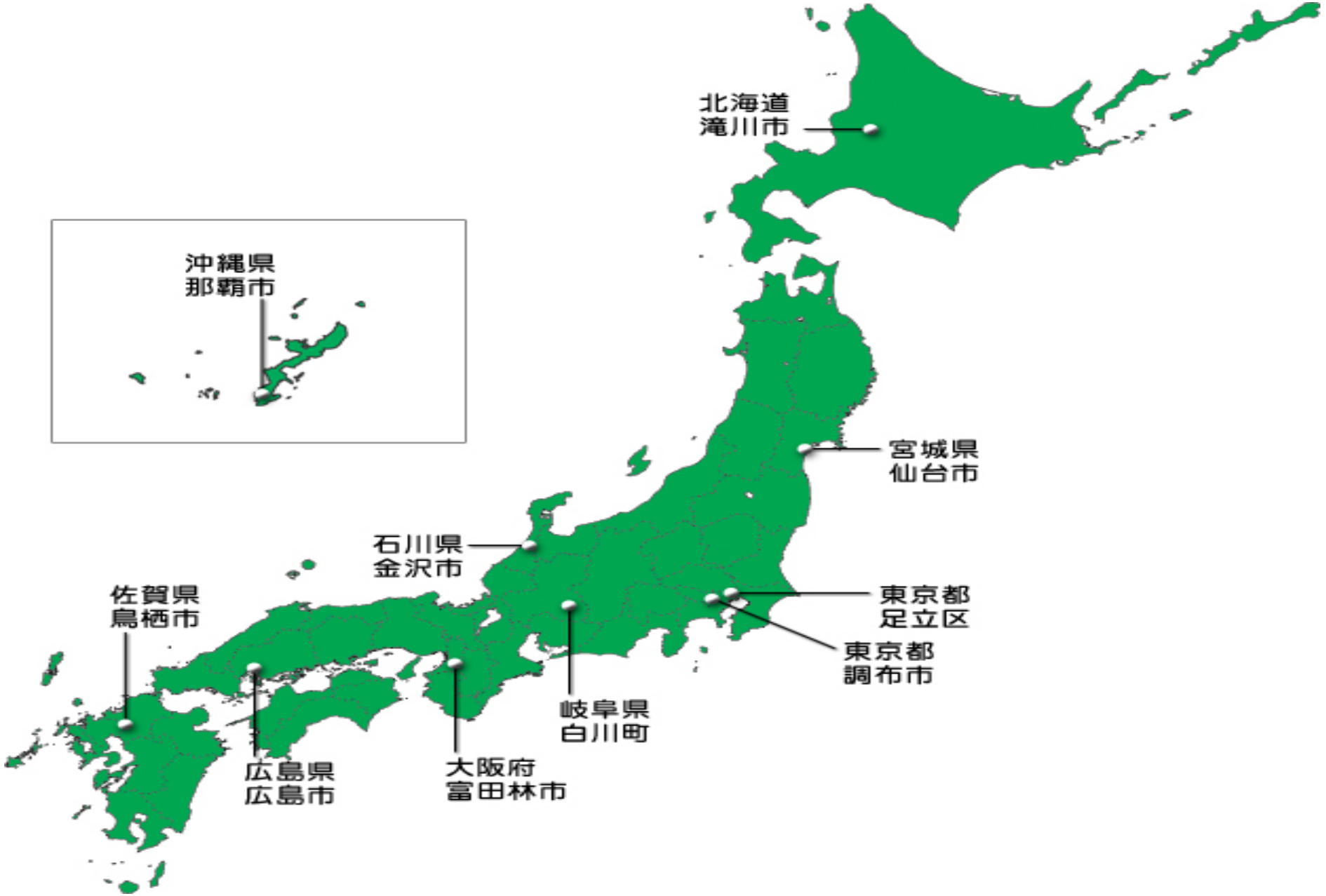
- “conditional independence assumption” often not met
- treatment of outlier propensity -> common support

Posed question

- Robustness across specification methods
- Difference in subpopulation
  - Gender difference
  - Work conditions (fulltime vs. non-fulltime; secured vs. not; stressful vs. not)

Japanese Study on Ageing and Retirement (JSTAR)

- A family member of HRS/ELSA/SHARE and Asian sisters.
- 1st wave in 2007 (5 municipals, N=4,200) followed for 2nd wave in 2009 (FU 75%)
- Additional 2 municipals since 2009
- Further additional 3 cities since 2011
- Funded by Hitotsubashi Univ. and Research Institute of Economics, Trade, and Industry (PI; Profs. Ichimura and Takayama with Dr. Shimizutani)
- Open data! (http://www.rieti.go.jp/jp/projects/jstar)


北海道
滝川市
沖縄県
那覇市
宮城県
仙台市
石川県
金沢市
佐賀県
鳥栖市
東京都
足立区
東京都
調布市
岐阜県
白川町
広島県
広島市
大阪府
富田林市

Sample for this study

- JSTAR (Japanese sister for HRS, ELSA, and SHARE)
  - wave 1 and wave 2 data
  - limited to age<65 (statutory retirement age) and at paid work in wave 1
- Work transition (full-time, part-time, self-employed, other employment, unemployed, retired, homemaker, and other)
- Reasons (statutory, external shock, etc.)
- Socio-economic
  - Income, asset (deposit, bond/stock), marital status, education
  - Expected public pension availability
- Health measures
  - Mobility, Instrumental Activities in Daily Life (IADL), grip
  - Self-reported ill health, comorbidities, and depression (CESD)
  - Cognitive function (word recall)
- Social participation
  - Community voluntary activities, own leisure/hobby/learning activities

Estimation strategy

- Propensity score for being at paid work at wave 2, predicted by regression on characteristics at wave 1

  -> avoid reverse causation

- Outcome
  - Cognitive function measured in word recall
  - Difference b/w Wave2 CF – Wave1 CF
- Outcome compared between matched pair of those at paid work and those not
- Matching (kernel matching with “attk” command by Becker and Ichino) and neighborhood matching and propensity matching using “teffect” command in STATA ver 13.0

Further details

- Multiple imputation with chained equation
  - Then, limited to those with outcomes variable available in the original sample (did not used imputed outcomes)

Descriptive statistics (males)

	observation	mean	SD
age	732	57.559	3.738
married	732	0.881	0.324
highschool graduate	731	0.420	0.494
college graduate	731	0.358	0.480
fulltime work at wave 1	732	0.561	0.497
secured job at wave 1	732	0.716	0.451
job with compulsory retirement	732	0.511	0.500
job with excess stress*	732	0.246	0.431
expecting public pension	713	0.820	0.384
treatment (leaving paid job at wave2)	732	0.078	0.268
smoker at wave1	731	0.435	0.496
poor self-rated health at wave1	730	0.441	0.497
IADL limitation at wave 1	732	0.398	0.490
ADL limitation at wave1	730	0.023	0.151
grip strength at wave 1 (Kg)	725	38.663	6.404
word recall counts at wave1	720	5.206	1.545
depression at wave1	732	0.145	0.352
heart disease at wave1	728	0.073	0.260
hypertention at wave1	728	0.265	0.442
diabetes at wave1	728	0.102	0.302
arthritis at wave1	728	0.018	0.133
cataracts at wave1	728	0.038	0.192
ln(income) at wave1	727	5.630	1.817
ln(deposit) at wave1	723	5.109	2.596
stock/bond posession at wave1	725	0.207	0.405
social network (commitment) at wave1	731	0.209	0.407
social netwok (preference-based) at wave1	731	0.246	0.431

Descriptive statistics (females)

	observation	mean	SD
age	472	57.494	3.892
married	471	0.781	0.414
highschool graduate	469	0.516	0.500
college graduate	469	0.309	0.463
fulltime work at wave 1	472	0.239	0.427
secured job at wave 1	472	0.729	0.445
job with compulsory retirement	472	0.354	0.479
job with excess stress*	472	0.267	0.443
expecting public pension	467	0.869	0.337
treatment (leaving paid job at wave2)	472	0.133	0.340
smoker at wave1	472	0.153	0.360
poor self-rated health at wave1	472	0.392	0.489
IADL limitation at wave 1	472	0.269	0.444
grip strength at wave 1 (Kg)	471	24.338	4.409
word recall counts at wave1	468	5.711	1.503
depression at wave1	472	0.157	0.364
heart disease at wave1	471	0.040	0.197
hypertention at wave1	471	0.208	0.406
cancer at wave1	471	0.028	0.164
arthritis at wave1	471	0.053	0.224
cataracts at wave1	471	0.064	0.244
ln(income) at wave1	472	5.394	1.733
ln(deposit) at wave1	467	5.353	2.477
stock/bond posession at wave1	469	0.228	0.420
social network (commitment) at wave1	472	0.174	0.379
social netwok (preference-based) at wave1	472	0.239	0.427

Propensity for leaving paid work at W2 (males)

	coefficient	std err	z	p
age	0.232	0.055	4.20	0.000
married	−0.786	0.433	−1.81	0.070
highschool graduate	0.112	0.399	0.28	0.778
college graduate	−0.066	0.471	−0.14	0.889
fulltime work at wave 1	0.443	0.371	1.20	0.232
secured job at wave 1	−0.737	0.317	−2.33	0.020
job with compulsory retirement	−0.043	0.391	−0.11	0.913
expecting public pension	0.184	0.352	0.52	0.601
job with excess stress*	−0.308	0.369	−0.84	0.404
smoker at wave1	−0.049	0.311	−0.16	0.875
IADL limitation at wave 1	0.062	0.323	0.19	0.848
grip strength at wave 1 (Kg)	−0.007	0.026	−0.26	0.791
word recall counts at wave1	−0.064	0.100	−0.64	0.522
depression at wave1	0.405	0.391	1.04	0.300
heart disease at wave1	−0.523	0.651	−0.80	0.422
hypertention at wave1	−0.118	0.341	−0.35	0.729
diabetes at wave1	0.338	0.448	0.75	0.451
arthritis at wave1	0.882	0.903	0.98	0.329
cataracts at wave1	1.208	0.599	2.02	0.044
ln(income) at wave1	0.210	0.133	1.58	0.115
ln(deposit) at wave1	−0.063	0.068	−0.92	0.359
stock/bond posession at wave1	−0.239	0.414	−0.58	0.564
social network (commitment) at wave1	−0.076	0.423	−0.18	0.857
social netwok (preference-based) at wave1	0.195	0.371	0.53	0.599
d_city3	0.277	0.451	0.61	0.540
d_city4	0.177	0.535	0.33	0.740
d_city5	−0.021	0.536	−0.04	0.968
d_city6	−0.539	0.581	−0.93	0.354
_cons	−15.708	3.831	−4.10	0.000

Number of obs = 712
LR chi2(28) = 52.44
Prob > chi2 = 0.0034
Log likelihood = −167.44037
Pseudo R2 = 0.1354

Propensity for leaving paid work at W2 (females)

	coefficient	std err	z	p
age	0.167	0.047	3.58	0.000
married	−0.007	0.364	−0.02	0.984
highschool graduate	−0.358	0.406	−0.88	0.378
college graduate	0.113	0.459	0.25	0.805
fulltime work at wave 1	−0.052	0.415	−0.13	0.900
secured job at wave 1	−0.293	0.340	−0.86	0.390
job with compulsory retirement	0.417	0.357	1.17	0.243
expecting public pension	−0.058	0.441	−0.13	0.895
job with excess stress*	0.523	0.322	1.62	0.104
smoker at wave1	0.373	0.405	0.92	0.358
self reported poor health at wave1	0.130	0.321	0.40	0.687
IADL limitation at wave 1	0.117	0.347	0.34	0.735
grip strength at wave 1 (Kg)	0.026	0.038	0.70	0.485
word recall counts at wave1	0.036	0.104	0.35	0.728
depression at wave1	−0.084	0.439	−0.19	0.848
heart disease at wave1	0.422	0.722	0.59	0.559
hypertention at wave1	0.701	0.332	2.11	0.035
cancer at wave1	−0.891	1.131	−0.79	0.431
arthritis at wave1	−0.730	0.839	−0.87	0.384
cataracts at wave1	−1.848	1.088	−1.70	0.089
ln(income) at wave1	−0.236	0.096	−2.46	0.014
ln(deposit) at wave1	0.127	0.085	1.48	0.138
stock/bond posession at wave1	−0.309	0.428	−0.72	0.470
social network (commitment) at wave1	0.139	0.423	0.33	0.742
social netwok (preference-based) at wave1	−0.165	0.384	−0.43	0.668
d_city3	−0.251	0.456	−0.55	0.582
d_city4	−0.167	0.550	−0.30	0.762
d_city5	−0.169	0.513	−0.33	0.741
d_city6	−0.698	0.541	−1.29	0.197
_cons	−11.666	3.319	−3.51	0.000

Number of obs = 463
LR chi2(29) = 42.55
Prob > chi2 = 0.0500
Log likelihood = −159.1536
Pseudo R2 = 0.1179

ATET estimation (males)

Table 6-1 Estimated average treatment effect in the treated (ATET, leaving paid work at wave 2), male

	N	ATET	std error	t-stat	p-value
ATET by kernel matching	544	-0.238	0.234	-1.02	0.238
				z-stat	
ATET by neighborhood matching	497	-0.627	0.382	-1.64	0.101
ATET by PS matching	497	-0.432	0.152	-2.84	0.004

Psmatching adhoc stratified analysis

	N	ATET	std error	t-stat	p-value
full time	251	-0.421	0.246	-1.71	0.087
non-fulltime	218	0.167	0.600	0.28	0.781
stressed	97	-1.250	0.921	-1.36	0.175
less stressed	361	0.240	0.432	0.56	0.578
secured	355	-0.762	0.661	-1.15	0.249
less secured	137	0.063	0.451	0.14	0.890

- CF declined after leaving paid work
- The decline more magnificent among those at fulltime job, job with stress, and job with expected security

ATET estimation (females)

Table 6-2 Estimated average treatment effect in the treated (ATET, leaving paid work at wave 2), female

	N	ATET	std error	t-stat	p-value
ATET by kernel matching					
	478	-0.023	0.303	-0.08	0.397
ATET by neighborhood matching				z-stat	
	365	-0.301	0.371	-0.81	0.287
ATET by PS matching					
	365	0.000	0.181	0.00	0.399

- No obvious impact among female

Summary

- Transition from full-time basis participation has a negative impact on cognitive function among males, but part-time basis to retirement did not, suggesting a drastic change in role may be culprit to functional decline.
- Women seems less vulnerable to work transition and related stress, possibly due to multi-facet role in workplace, household, and community already.

Discussion

- Retirement and health
  - Diverse, simply “it depends”
  - Policy to smooth role transition may be effective to prevent functional decline for males.
- Limitation
  - Female transition needs alternative measure?
    - Reason for retirement (e.g. care for fragile family among female led to depression)
  - Comparative analysis with other countries (e.g. SHARE)

Comments welcome

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