IZA/RIETI Workshop
Informal care and employment status of Japanese middle aged women :
a study using JSTAR

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Motivation

- **Objective** : analyze whether informal care provided by middle-aged Japanese women to their elderly parents affects their labour force participation.
- Motivation
  - Rapidly aging population
    - affects the sustainability of the public pensions system
    - increases the demand for caregiving for the elderly
  - Double burden on middle-aged women
    - encouraged to participate more on labour market (increase of retirement age)
    - main informal carers

Contexte

- Context
  - Mandatory Long-Term Care Insurance since April 2000
    - Lessen the burden of care on family caregivers
    - Encourage participation on the labor market
  - Multigenerational households
    - Commonplace compared to other industrialized countries : 17.7% (JP) vs 1.7% (GE)
    - Continuously declining since several decades
- Does informal caregiving affects japanese middle-aged women ?
  - around 10 years after the launch of the LTCI
  - distinguish coresident caregivers and extraresident caregivers

Literature : different channels

- Impact of informal care on labor market participation

  (Carmichel and Charles, 1993 ; Heitmueller, 2007 ; Fontaine, 2010)

  - negative effect : substitution effect ; discrimination effect
  - positive effect : income effect ; respite effect

- The net effect is theorically unknown

Literature

- Endogeneity between care and employment (reverse causality)
  - Instrumental variable method
    - two steps estimation (Ettner, 1995 ; Heitmueller, 2007 ; Bolin et al.,2008)
    - simultaneously by maximum likelihood (Lo Sasso et Johnson, 2000 ; Crespo, 2006)
  - matching and difference-in-difference method (Cassado-Marin et al, 2008)
  - Exemples of instruments :
    - parent's health
    - living distance from parents' house
    - Siblings' structure

Literature

- Some results
  - Mixed results when intensity is not taken into account
  - High intensity care affects negatively the probability of labour participation
  - The need of distinguishing coresident and non-coresident (Heitmuller,2007)
    - No evidence of endogeneity for coresidents
    - Endogeneity found for non-coresidents
- Studies based on Japanese data
  - Shimizutani et al. (2008) on data from 1999, 2001 and 2002
  - Yamada and Shimizutani (2014) on data from 2010

Econometric specification

- Probit Model

$$W_i = \begin{cases} 1 & \text{if } W_i^* > 0 \\ 0 & \text{if } W_i^* \leq 0 \end{cases}$$

$$Pr(W_i^* > 0 | IC_i, X_i) = \Phi(\beta_0 + X_i\beta_x + IC_i\beta_{ic})$$

- endogenous variable

$$IC_i = \alpha_0 + Z_i\alpha_1 + X_i\alpha_2 + \varepsilon_i$$

  - W_i : 1 if working, 0 otherwise
  - IC_i : informal caregiving
  - X_i : a vector of other caregiver's characterisctics
  - Zi : instrument

Econometric specification

- Dependant variable W :
  - **Work or not**
  - Work time
- Variable of interest IC :
  - Care or not : household, physical care, administrative
  - Frequency of care : daily, weekly, less
  - Care time
  - **Daily or weekly care (excluding administrative care)**

Data

- 1st to 3rd wave of Japanese Survey of Aging and Retirement (JSTAR)
  - 5 cities : Adachi, Kanazawa, Shirakawa, Sendai, Takikawa
  - 2 cities : Tosu, Naha
  - 3 cities : Chofu, Tondabayashi, Hiroshima
- Total of 12 992 observations and 7 116 individuals

TABLE: Number of observations

	year			
town	2007	2009	2011	Total
5 cities	3 742	2,718	2,185	8 645
2 cities	0	1,409	973	2 382
3 cities	0	0	1,965	1 965
Total	3 742	4 127	5 123	12 992

Data

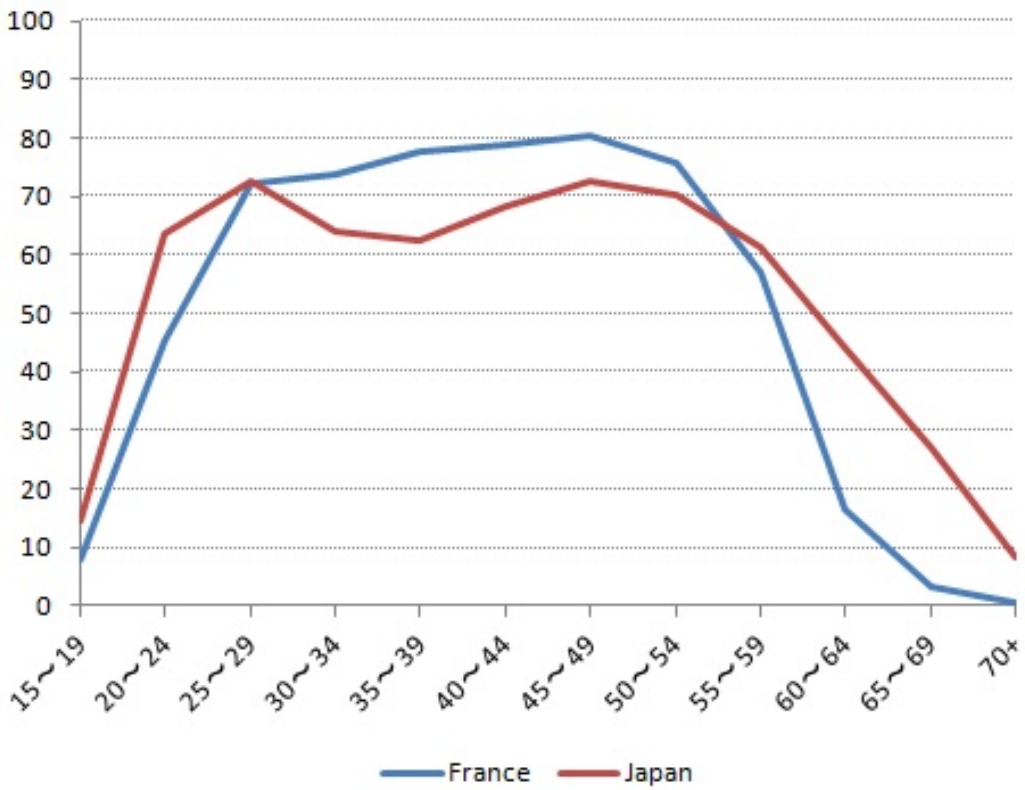
- Sample : respondants as adult-daugthers (potential caregivers)
  - Women aged 70 years old or less
  - With at least one parent or parent-in-law alive, but not living in institution
  - without any spouse declaring having a bad health

TABLE: Sample description

Variable	Mean	(Std. Dev.)	Min.	Max.	N
Age	57.77	(4.98)	47	70	1 442
Marital status	0.81	(0.39)	0	1	1 441
CoResident	0.28	(0.45)	0	1	1 442
Number of parents	1.72	(0.83)	1	4	1 442
Working	0.61	(0.49)	0	1	1 421
Weekly or daily care	0.20	(0.40)	0	1	1 442
Daily care	0.13	(0.34)	0	1	1 442

Women's participation to labor market in 2010

- Almost 27% of women aged 65-69 years old were working in 2010



Source : stat.gov.jp and insee.fr

Data

- Variables of control
  - Age, Level of education
  - Number of children (2 children or more)
  - Marital situation and working status of spouse
  - Self declared health (bad health)
  - Receiving pension or not
  - Pension type (received pension or expected pension)
    - National Pension Scheme (*Kokumin Nenkin*) only or other
  - Wave dummy

Data summary

- All women

Variable	Mean	(Std. Dev.)	Min.	Max.	N
Junio High School	0.14	(0.35)	0	1	1 438
High School	0.44	(0.50)	0	1	1 438
Junior College	0.30	(0.46)	0	1	1 438
University	0.12	(0.32)	0	1	1 438
2 children or more	0.73	(0.44)	0	1	1 442
Bad health	0.02	(0.14)	0	1	1 442
No spouse	0.18	(0.39)	0	1	1 441
Spouse (not working)	0.15	(0.36)	0	1	1 430
Spouse (working)	0.65	(0.48)	0	1	1 442
Receive pension	0.38	(0.49)	0	1	1 442
NPS only	0.16	(0.37)	0	1	1 442

Data summary

- Women not coliving with a parent

Variable	Mean	(Std. Dev.)	Min.	Max.	N
Working	**0.61**	(0.49)	0	1	1 021
Weekly or daily care	**0.14**	(0.35)	0	1	1 039
Daily care	**0.06**	(0.23)	0	1	1 039
Junior High School	0.14	(0.35)	0	1	1 036
High School	0.45	(0.50)	0	1	1 036
Junior College	0.29	(0.45)	0	1	1 036
University	0.11	(0.32)	0	1	1 036
2 children or more	0.77	(0.42)	0	1	1 039
Bad health	0.02	(0.15)	0	1	1 039
No spouse	0.16	(0.37)	0	1	1 038
Spouse (not working)	0.17	(0.37)	0	1	1 029
Spouse (working)	0.66	(0.47)	0	1	1 039
Receive pension	0.40	(0.49)	0	1	1 039
NPS only	0.16	(0.36)	0	1	1 039

Data summary

- Women coliving with at least one parent

Variable	Mean	(Std. Dev.)	Min.	Max.	N
Working	**0.62**	(0.49)	0	1	400
Weekly or daily care	**0.36**	(0.48)	0	1	403
Daily care	**0.33**	(0.47)	0	1	403
Junior High School	0.15	(0.35)	0	1	402
High School	0.41	(0.49)	0	1	402
Junior College	0.32	(0.46)	0	1	402
University	0.13	(0.33)	0	1	402
2 children or more	0.65	(0.48)	0	1	403
Bad health	0.02	(0.14)	0	1	403
No spouse	0.24	(0.43)	0	1	403
Spouse (not working)	0.12	(0.33)	0	1	401
Spouse (working)	0.63	(0.48)	0	1	403
Receive pension	0.34	(0.47)	0	1	403
NPS only	0.18	(0.39)	0	1	403

Instrumental variable

- Four potential instruments
  - Level of LTCI certification of the parent
  - Lenght of care required by the parent
  - Death of the parent in N+2 (only on invididual observed twice)
  - Age of the eldest parent
- conditions for a good instruments
  - orthogonal to the error
  - correlated with the potentially endogenous variable (F-Stat ¿ 10)

Results

- 4 tables of results
  - Estimation under exogenous assumption
  - First stage results
  - IV results - women coliving with a parent
  - IV results - women not coliving with any parent

	(1) Female (n=1407) Household Care		(2) Not Coliving (n=986) Household Care		(3) Coliving (n=381) Household Care		(4) Coliving (n=381) Physical Care only	
	dy/dx	*Std. Err.*	dy/dx	*Std. Err.*	dy/dx	*Std. Err.*	dy/dx	*Std. Err.*
Bring Care								
No Care	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.
Less Care	-0.038	(0.051)	-0.006	(0.056)	-0.209	(0.202)	0.063	(0.187)
Weekly Care	**-0.198*** **	(0.056)	**-0.215*** **	(0.062)	0.108	(0.157)	0.085	(0.151)
Daily Care	**-0.127*** **	(0.044)	**-0.155***	(0.080)	**-0.151*** **	(0.058)	**-0.102***	(0.062)
Living								
Not CoResident	ref.	ref.						
CoResident	0.005	(0.033)						
Age								
under 60	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.
60-64	**-0.169*** **	(0.040)	**-0.172*** **	(0.048)	**-0.167** **	(0.079)	**-0.157** **	(0.078)
65-70	**-0.285*** **	(0.059)	**-0.317*** **	(0.070)	**-0.230** **	(0.115)	**-0.229** **	(0.114)
Level of education								
Elementary/Middle School	-0.045	(0.041)	-0.004	(0.049)	**-0.149***	(0.085)	**-0.156***	(0.085)
High School/Junior College	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.
University or More	**0.088** **	(0.042)	**0.090***	(0.051)	0.104	(0.075)	0.111	(0.074)
Bad Health	**-0.361*** **	(0.086)	**-0.373*** **	(0.100)	**-0.461** **	(0.180)	**-0.465*** **	(0.173)
2 children or more	**0.082** **	(0.033)	0.053	(0.040)	**0.195*** **	(0.071)	**0.177** **	(0.070)
Marital Status								
no spouse	**0.152*** **	(0.035)	**0.170*** **	(0.042)	**0.172*** **	(0.065)	**0.155** **	(0.066)
no working spouse	**-0.130*** **	(0.043)	**-0.115** **	(0.049)	-0.142	(0.096)	-0.155	(0.096)
working spouse	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.
Receiving pension or not								
No pension	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.
Receiving pension	**-0.067***	(0.041)	-0.063	(0.049)	-0.118	(0.079)	-0.112	(0.078)
Information Missing	-0.044	(0.116)	-0.009	(0.121)	-0.089	(0.399)	-0.085	(0.391)
Pension type								
Other Pension	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.
National pension (Kokumin)	**0.078** **	(0.037)	**0.078***	(0.045)	0.102	(0.069)	**0.121***	(0.067)
Information Missing	-0.043	(0.050)	**-0.113***	(0.062)	0.067	(0.089)	0.078	(0.088)
Wave dummies	Yes		Yes		Yes		Yes	
Constant	**0.696*** **	(0.036)	**0.684*** **	(0.042)	**0.695*** **	(0.064)	**0.679*** **	(0.064)
Pseudo R-squared	0.108		0.107		0.164		0.155	

	(1) Female		(2) Not Coliving		(3) Coliving	
	(n=1409)		(n=1012)		(n=397)	
	Frequent Care		Frequent Care		Daily Care	
VARIABLES	coeff	*Std. Err.*	coeff	*Std. Err.*	coeff	*Std. Err.*
Age of eldest parent	**0.010*** **	(0.002)	**0.009*** **	(0.002)	**0.018*** **	(0.005)
Age						
under 60	*ref.*	*ref.*	*ref.*	*ref.*	*ref.*	*ref.*
60-64	-0.025	(0.032)	-0.062*	(0.034)	0.019	(0.072)
65-70	0.005	(0.048)	-0.042	(0.052)	0.049	(0.104)
Level of education						
Elementary/Middle School	-0.038	(0.031)	-0.044	(0.033)	-0.047	(0.069)
High School/Junior College	*ref.*	*ref.*	*ref.*	*ref.*	*ref.*	*ref.*
University or More	**-0.063***	(0.033)	-0.023	(0.035)	**-0.149** **	(0.072)
2 children or more	-0.006	(0.025)	-0.004	(0.026)	0.049	(0.061)
Bad health	-0.016	(0.071)	-0.042	(0.073)	-0.058	(0.169)
Marital Status						
no spouse	-0.027	(0.029)	**-0.056***	(0.031)	**0.118***	(0.066)
no working spouse	-0.005	(0.032)	-0.020	(0.033)	0.051	(0.081)
working spouse	*ref.*	*ref.*	*ref.*	*ref.*	*ref.*	*ref.*
Receiving pension or not						
No pension	*ref.*	*ref.*	*ref.*	*ref.*	*ref.*	*ref.*
Receiving pension	-0.008	(0.031)	0.024	(0.033)	-0.052	(0.072)
Information Missing	-0.029	(0.091)	-0.031	(0.087)	0.125	(0.331)
Pension type						
Other Pension	*ref.*	*ref.*	*ref.*	*ref.*	*ref.*	*ref.*
National pension (Kokumin)	**-0.075*** **	(0.029)	**-0.061***	(0.031)	**-0.140** **	(0.063)
Information Missing	**-0.069***	(0.037)	-0.060	(0.040)	-0.056	(0.081)
Living						
CoResident	**0.224*** **	(0.024)				
NoCoResident	*ref.*	*ref.*				
Wave dummies	yes		yes		yes	
Constant	**-0.708*** **	(0.176)	**-0.554*** **	(0.185)	**-1.279*** **	(0.415)
R-squared	0.095		0.033		0.083	
F-test	26.73		19.40		16,97	

Pooled sample CoResident	(1) OLS (n=381)		(2) 2SLS Max Age (n=378)		(3) PROBIT (n=381)		(4) IVPROBIT Max Age (n=378)	
	coeff	*Std. Err.*	coeff	*Std. Err.*	dy/dx	*Std. Err.*	dy/dx	*Std. Err.*
Daily Care	**-0.134*** **	(0.049)	-0.160	(0.228)	**-0.148*** **	(0.057)	-0.521	(0.721)
Age								
under 60	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.
60-64	**-0.143** **	(0.067)	**-0.162** **	(0.069)	**-0.156** **	(0.078)	**-0.460** **	(0.216)
65-70	**-0.196** **	(0.096)	**-0.207** **	(0.100)	**-0.218***	(0.115)	**-0.583***	(0.318)
Level of education								
Elementary/Middle School	**-0.136***	(0.070)	**-0.134***	(0.069)	**-0.155***	(0.084)	**-0.395***	(0.214)
High School/Junior College	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.
University or More	0.086	(0.070)	0.084	(0.077)	0.101	(0.075)	0.272	(0.256)
2 children or more	**0.159*** **	(0.059)	**0.160*** **	(0.059)	**0.186*** **	(0.070)	**0.498*** **	(0.188)
Bad Health	**-0.382** **	(0.172)	**-0.390** **	(0.169)	**-0.445** **	(0.177)	**-1.243** **	(0.616)
Marital Status								
no spouse	**0.155** **	(0.064)	**0.152** **	(0.066)	**0.163** **	(0.065)	**0.458** **	(0.208)
no working spouse	**-0.138***	(0.079)	**-0.134***	(0.079)	-0.151	(0.096)	-0.376	(0.251)
working spouse	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.
Receiving pension								
No pension	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.
Receiving pension	-0.108	(0.068)	-0.095	(0.067)	-0.120	(0.078)	-0.279	(0.209)
Information Missing	-0.089	(0.317)	-0.089	(0.312)	-0.092	(0.398)	-0.232	(1.015)
Pension type								
Other Pension	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.
National pension	0.085	(0.062)	0.097	(0.068)	0.107	(0.068)	0.337	(0.228)
Information Missing	0.055	(0.080)	0.065	(0.078)	0.071	(0.089)	0.227	(0.257)
Wave dummies	Yes		Yes		Yes		Yes	
Constant	**0.695*** **	(0.063)	**0.699*** **	(0.087)				
Wu-Hausmann			0.016	(p=0.89)				

Pooled sample Not CoResident	(1) OLS (n=986)		(2) 2SLS Max Age (n=973)		(3) PROBIT (n=986)		(4) IVPROBIT Max Age (n=973)	
	coeff	*Std. Err.*	coeff	*Std. Err.*	dy/dx	*Std. Err.*	dy/dx	*Std. Err.*
Frequent Care	**-0.173*** **	(0.045)	0.190	(0.325)	**-0.192*** **	(0.050)	0.484	(0.860)
Age								
under 60	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.
60-64	**-0.157*** **	(0.044)	**-0.154*** **	(0.046)	**-0.171*** **	(0.048)	**-0.410*** **	(0.139)
65-70	**-0.291*** **	(0.066)	**-0.314*** **	(0.070)	**-0.315*** **	(0.070)	**-0.835*** **	(0.197)
Level of education								
Elementary/Middle School	-0.001	(0.045)	0.012	(0.048)	-0.003	(0.049)	0.025	(0.130)
High School/Junior College	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.
University or More	0.078	(0.048)	**0.086***	(0.049)	**0.091***	(0.051)	**0.252***	(0.141)
Bad health	**-0.348*** **	(0.102)	**-0.322*** **	(0.107)	**-0.374*** **	(0.100)	**-0.877*** **	(0.339)
2 children or more	0.046	(0.035)	0.042	(0.037)	0.053	(0.040)	0.119	(0.102)
Marital Status								
no spouse	**0.153*** **	(0.042)	**0.177*** **	(0.048)	**0.171*** **	(0.042)	**0.516*** **	(0.127)
no working spouse	**-0.110** **	(0.044)	**-0.112** **	(0.046)	**-0.115** **	(0.049)	**-0.285** **	(0.129)
working spouse	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.
Receiving pension or not								
No pension	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.
Receiving pension	-0.060	(0.044)	-0.053	(0.047)	-0.063	(0.049)	-0.137	(0.127)
Information Missing	-0.010	(0.110)	-0.002	(0.119)	-0.007	(0.121)	0.008	(0.325)
Pension type								
Other Pension	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.
National pension (Kokumin)	0.068	(0.042)	**0.103** **	(0.048)	**0.078***	(0.045)	**0.293** **	(0.127)
Information Missing	**-0.097***	(0.054)	-0.061	(0.058)	**-0.112***	(0.062)	-0.178	(0.165)
Wave dummies	Yes		Yes		Yes		Yes	
Constant	**0.683*** **	(0.042)	**0.628*** **	(0.062)				
Wu-Hausmann			1.369	(p=0.24)				

Conclusion

- Objective
  - Analyze the impact of informal care provided by middle-aged Japanese women on their labour force participation
  - Highlight potential difference between coliving and not coliving caregivers
- Results
  - Caregiving affect coresident and not coresident caregiver in very different way
  - Coresident caregiving appears to be clearly exogenous
  - Exogeneity of non coresident caregiving could not be fully rejected

Thank you for your attention.

Conceptual Framework

- Utility maximizing decision (Johnson and Lo Sasso, 2000)

$$U = \mu(C, L, IC) + \beta \cdot \phi(IC, FC, H)$$

$$C \leq wW + R$$

$$W + IC + L \leq 1$$

μ : utility of the caregiver according to the time allocation
ϕ : parent's utility according to received care and health status
β : decisions are made by altruistic adult children
C : Consumption
L : Leasure
IC : Informal Care
FC : Formal Care
H : Parent's health

- Expected results :

$$\frac{dW^o}{dIC} < 0$$