
Effects of Elderly Care for an Aging Population on the Labor Market

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Motivation

- ▶ Aging Population: demand for elderly care increases
 - ▶ Suggested by literature: negatively affect caretakers.
 - ▶ What about others?
- ▶ Wang (2017) finds that females are heterogeneous in their responses to parental health shocks
- ▶ How this will shape the labor markets?
 - ▶ Will female labor force participation declines due to care-taking responsibilities?

The Model

Differences from other models: no altruistic or other incentives

Two-period OLG:

- ▶ The young generation: work, leisure, care and save
- ▶ The old generation: consume saving, require care (with positive probability)
- ▶ Care requirements are in binding constraints of the young

The Household Problem

The young's problem:

$$\max \ln(c_t) + \nu \ln(l_f) + \beta E(u_{t+1})$$

$$\text{s.t. } h_f + n_f + l_f = 3$$

$$[h_f^\theta + \alpha h_s^\theta]^{1/\theta} \geq H(\eta), \quad 0 < \theta < 1$$

$$w_m n_m + w_f n_f = c_t + p_x h_s + M(\eta) + M_n + s_t$$

Care Time Constraint

$$[h_f^\theta + \alpha h_s^\theta]^{1/\theta} \geq H(\eta), \quad 0 < \theta < 1$$

- ▶ Depend on parents' health condition, η
- ▶ h_f is care time supplied by the household female
- ▶ h_s is market care purchased
- ▶ α is an efficiency parameter
- ▶ Elasticity of Substitution, $1/(1 - \theta)$

Budget Constraint

$$w_m n_m + w_f n_f = c_t + p_x h_s + M(\eta) + M_n + s_t$$

- ▶ p_x is price per efficiency unit of care
- ▶ $M(\eta)$ is the medical expense requirement
- ▶ M_n is a fixed monetary cost if the female chooses to work

Abilities

Two production sectors: Goods (c) and Care (x)

Two types of abilities:

- ▶ Efficiency units of labor in goods production, e_c
- ▶ Efficiency units of labor in care production, e_x

Assumption: males work full-time in the goods sector and do not provide care.

Note: These abilities only apply to the formal production sectors.

The Model Population

Households are characterized by three independent draws:

- ▶ Female efficiency unit of labor in goods, $e_{f,c}$
- ▶ Female efficiency unit of labor in care, $e_{f,x}$
- ▶ Intra-household ability ratio, r_{fm}

Male efficiency unit of labor in goods is calculated as:

$$e_{m,c} = r_{fm}e_{f,c}$$

The Production Sectors

Production technologies:

Consumption goods sector: $Y_c = A_c N_c$

Care sector: $Y_x = N_x$

- ▶ Labor is the only input
- ▶ A_c - the total factor productivity in the goods market
- ▶ N_c and N_x are measured in efficiency units of labor

Calibration

Data Sources:

- ▶ Health and Retirement Survey (1992-2012)
 - ▶ Shock probability: 10%
- ▶ American Community Surveys (2007)
 - ▶ Ability distributions
 - ▶ Female labor force participation rate
 - ▶ Care sector size
 - ▶ Care worker wage
 - ▶ Magnitude of female labor supply responses

Summary

β : discount rate	0.96
Shock probability	10%
Mean log(female goods ability)	1
Std dev log(female goods ability)	0.29
Mean log(male/female ability ratio)	0.29
Std dev log(male/female ability ratio)	0.85
Mean log(female care ability)	0
Std dev log(female care ability)	0.2
A_c : goods sector TFP	1
θ : Elasticity parameter	0.75
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ν : female leisure utility weight	2.2
α : market care effectiveness	18
$M(\eta)$: Medical expense requirement	0.05
H_η : Care time requirement	1.5
\bar{M} : fixed cost to work	0.15

Matching the Moments

Moments	Model	Data
Female labor force part. rate	64.17%	64.42%
Care/Goods worker wage ratio	0.563	0.56
Care sector size	3.34%	3.32%
High-wage shock response	4.07%	7.68% (3.83%, 11.53%)
Low-wage shock response	1.19%	6.24% (-2.22%, 14.73%)

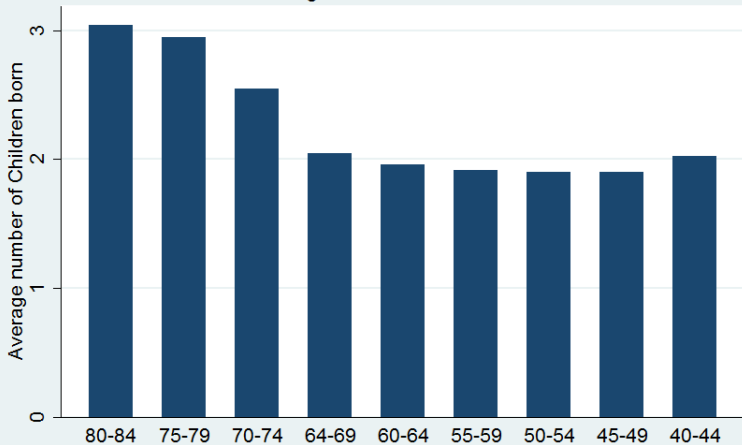
In an Aging Population

What are the implications for an aging population?

From census predictions, by 2060, elderly population/working-age population will increase by 115%:

- ▶ Number of households with aged parents: shock probability
- ▶ Care intensity when parents need care: $H(\eta)$ and $M(\eta)$

Number of Children Born by Age Group Age of Mothers in 2014



Source: U.S. Census Bureau, Current Population Survey, June 1970-2014

A Quantitative Experiment

Parameters	Current	Experiment	Changes (in %)
Shock Probability	0.1	0.143	+43%
$H(\eta)$: Care time	1.5	2.25	+50%
$M(\eta)$: Medical expense	0.05	0.075	+50%
Moments			
Female labor force part. rate	64.17%	65.28 %	+1.73%
Care/Goods wage ratio	0.56	0.49	-12.5%
Care sector size	3.32%	5.19%	+56.3%
High-wage shock response	4.07%	5.06%	
Low-wage shock response	1.14%	2.21%	

Conclusion

- ▶ High-wage and low-wage females have heterogeneous responses when parents age and require care
- ▶ Female labor supply increases in an aging population
- ▶ Specific policy is necessary to target different households

Thank You!