Disability in Retirement, Home Production, and Informal Insurance between Spouses

Bertrand Achou

CIRRIS and Université Laval

December 5, 2016

Future Well-Being of the Elderly (Montreal)

Quotation

"Couples face two sets of health and medical expense risks but they can pool both their risks and assets. They may also be able to partially *self-insure by using the time of the healthier partner to provide care for the other one.*"

De Nardi, French and Jones. Savings after Retirement: A Survey. 2015

Overview

- what is done
  - introduce this self-insurance channel of couples within a life-cycle model of elderly households
  - through the presence of home production
  - and "endogenous" mobility in nursing homes (NEW)
- why?
  - self-insurance within the couple may delay nursing home entry
  - reduce the needs for savings
  - policies to delay nursing home entry?
  - evaluate attractiveness of insurance products (LTCI, annuities...)

What the model replicates

- elderly saving behaviour
- responses of home production to deterioration of own health and health of the spouse
- the fact that probability to be in a nursing home is lower when in couple at bad health states (in progress)

Literature

- life-cycle literature in retirement concentrates mainly on single households:
  - De Nardi, French, Jones (JPE 2010, forthcoming AER), Ameriks et al. (JoFi 2011), Lockwood (2016)

- not taking into account informal care except:
  - Dobrescu (JHR, 2015), Barczyk and Kredler (forthcoming RES), Mommaerts (2016)

Table of contents

Table of contents

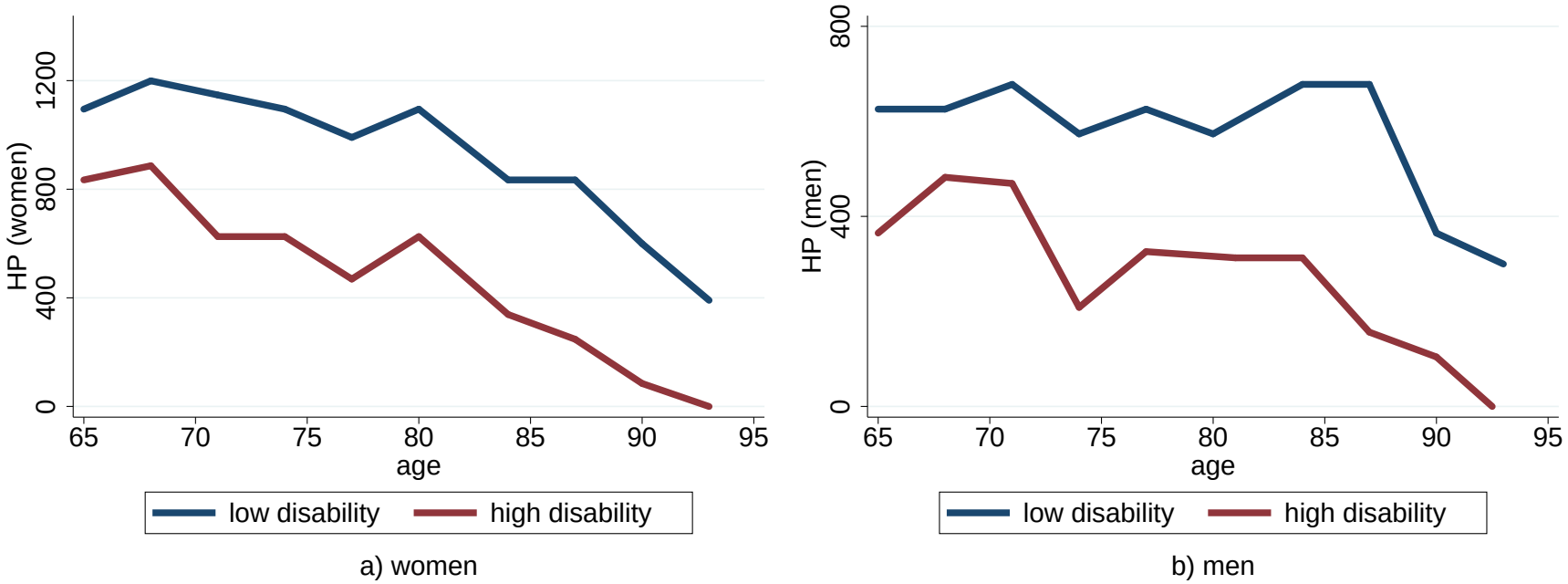

Figure 1: Median hours home production (HP) as a function of disability and age (source: HRS/CAMS)

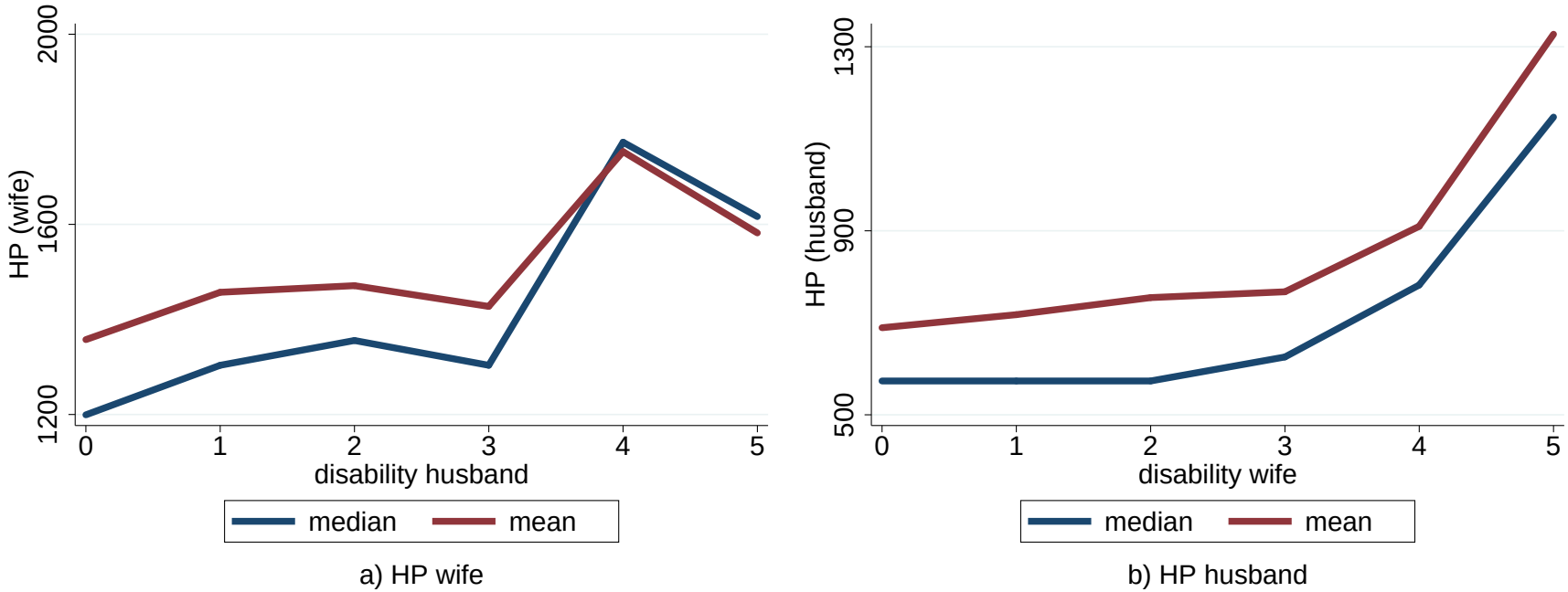

Figure 2: Hours home production (HP) as a function of disability of spouse for those with disability <= 1 and spouse not in nursing home (source: HRS/CAMS)

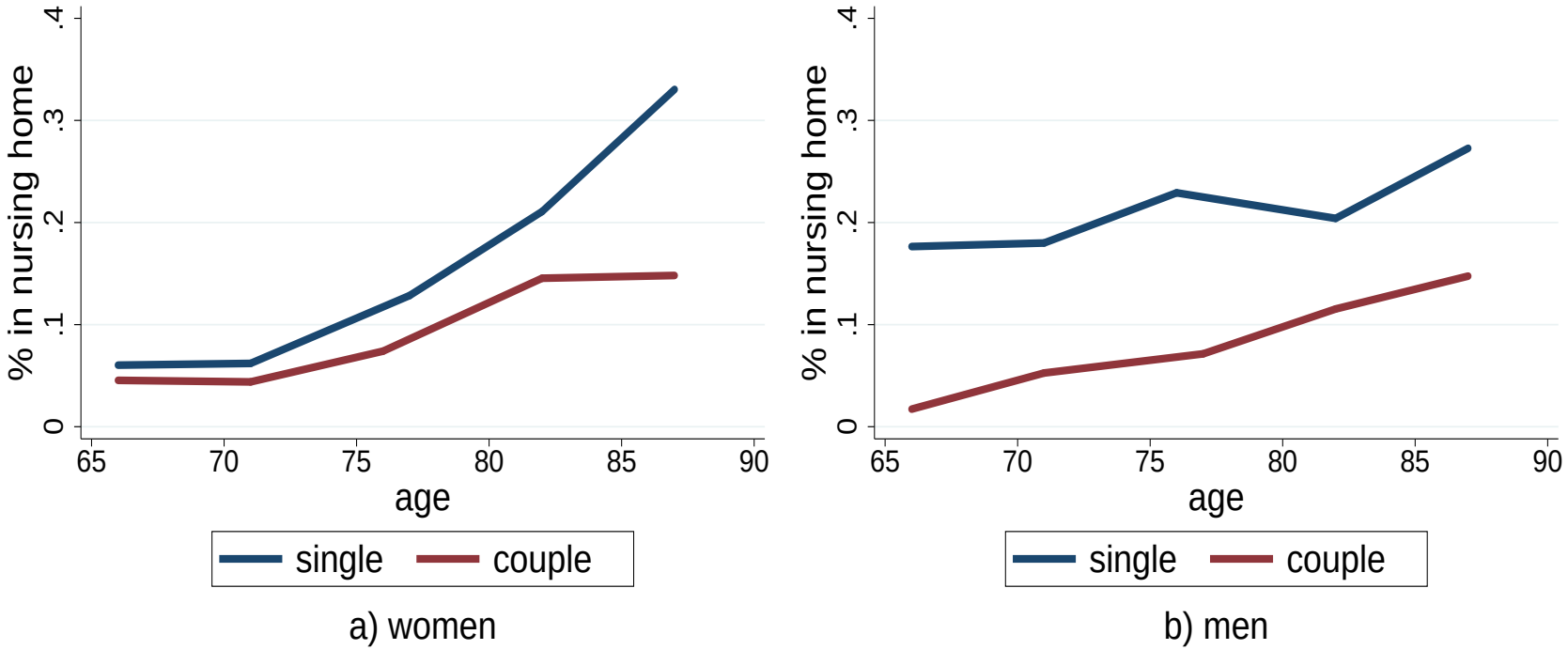

Figure 3: Percentage in nursing home (disability >= 4) (source: HRS/CAMS)

Table of contents

Main Features

- (retired) households can be singles or couples
- utility:
  - consumption depends positively on hours spent on home production and spending (substitutes)
  - costly in terms of effort to perform home production, and this *cost is increasing in worse health*
- each year must decide:
  - how much to spend
  - how much hours of home production each member performs
  - if one (or both) member(s) go to a nursing home
- risks:
  - mortality risk
  - health risk
  - medical expense risk
  - government insurance program (Medicaid)

Couples at home

For a given level of effective expenditures q_t.

$$\max \ \phi\left(\frac{c_{f,t}^{1-\gamma}}{1-\gamma} - A_f\frac{h_{f,t}^{1+\eta}}{1+\eta}\right) + (1-\phi)\left(\frac{c_{m,t}^{1-\gamma}}{1-\gamma} - A_m\frac{h_{m,t}^{1+\eta}}{1+\eta}\right)$$

s.t.

$$\text{HP hours of the household: } h_t = h_{f,t} + h_{m,t}$$

$$\text{Consumption: } c_t = \left(h_t^{\rho} + \psi q_t^{\rho}\right)^{1/\rho} \text{ and } c_t = c_{f,t} + c_{m,t}$$

Couples at home

For a given level of effective expenditures q_t.

$$\max \ \phi\left(\frac{c_{f,t}^{1-\gamma}}{1-\gamma} - A_f \frac{h_{f,t}^{1+\eta}}{1+\eta}\right) + (1-\phi)\left(\frac{c_{m,t}^{1-\gamma}}{1-\gamma} - A_m \frac{h_{m,t}^{1+\eta}}{1+\eta}\right)$$

s.t.

$$\text{HP hours of the household: } h_t = h_{f,t} + h_{m,t}$$

$$\text{Consumption: } c_t = \left(h_t^{\rho} + \psi q_t^{\rho}\right)^{1/\rho} \text{ and } c_t = c_{f,t} + c_{m,t}$$

Couples at home

For a given level of effective expenditures q_t.

$$\max \ \phi \left(\frac{c_{f,t}^{1-\gamma}}{1-\gamma} - A_f \frac{h_{f,t}^{1+\eta}}{1+\eta} \right) + (1-\phi) \left(\frac{c_{m,t}^{1-\gamma}}{1-\gamma} - A_m \frac{h_{m,t}^{1+\eta}}{1+\eta} \right)$$

s.t.

$$\text{HP hours of the household: } h_t = h_{f,t} + h_{m,t}$$

$$\text{Consumption: } c_t = \left(h_t^{\rho} + \psi q_t^{\rho} \right)^{1/\rho} \text{ and } c_t = c_{f,t} + c_{m,t}$$

Intuitions

- being in a couple may reduce the needs for precautionnary saving through 2 channels:
  - reduces the needs for additional spending when at home to maintain well-being, through the home production performed by the healthy spouse
  - delays nursing home entry as makes it easier to maintain a given level of utility

Table of contents

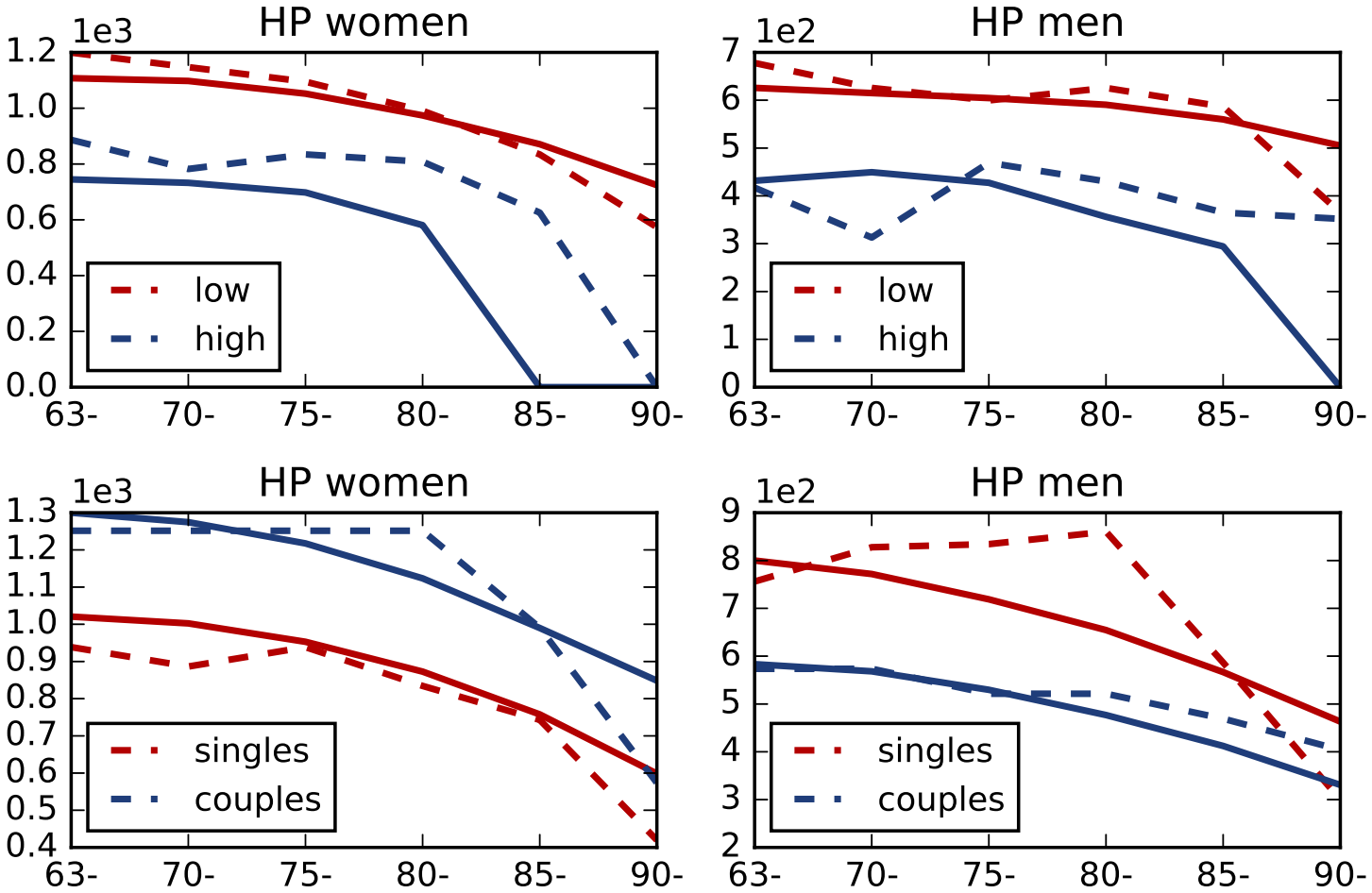

Figure 4: Match home production hours: plain (model), dotted (data)

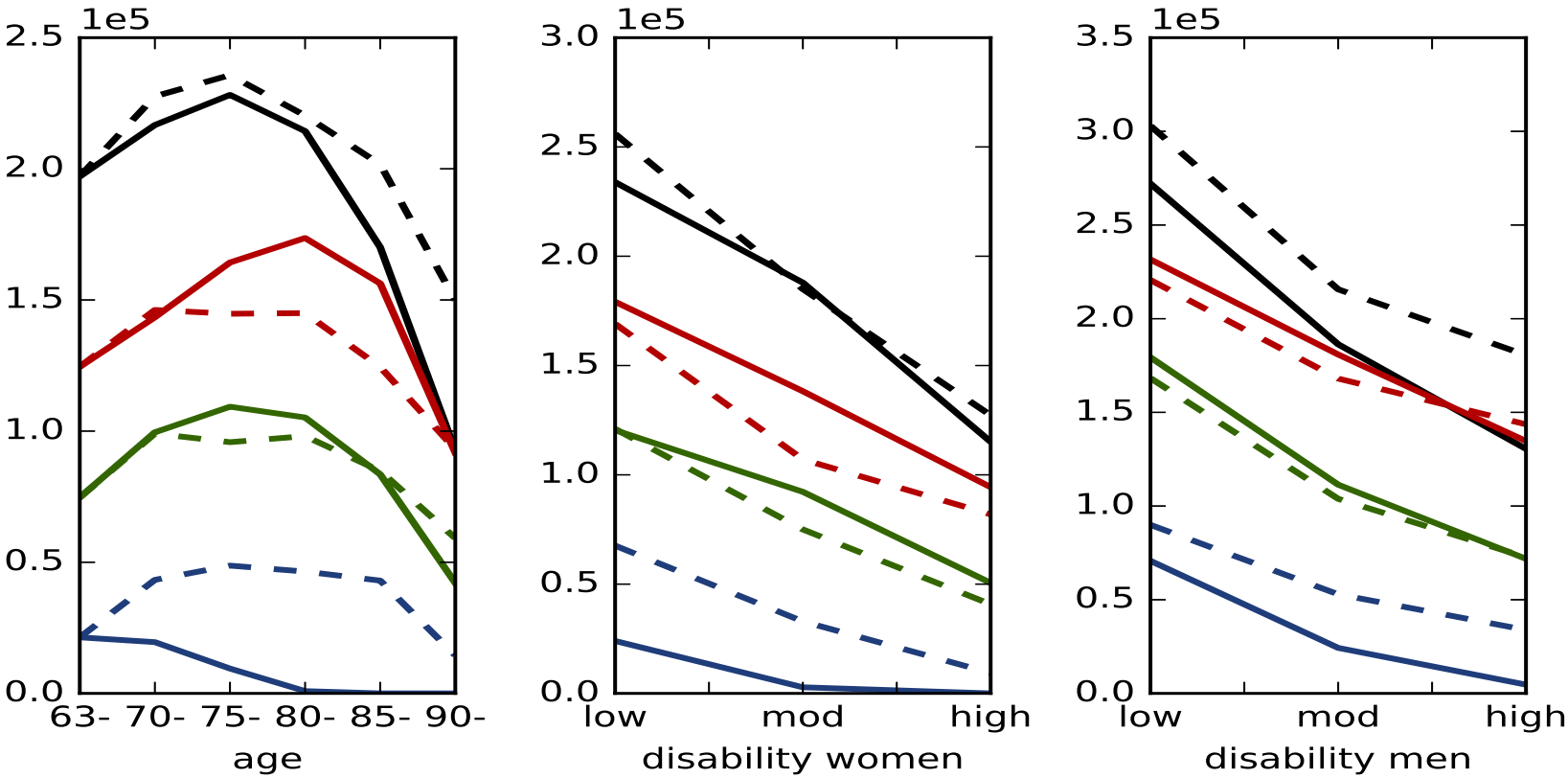

Figure 5: Match wealth: plain (model), dotted (data)

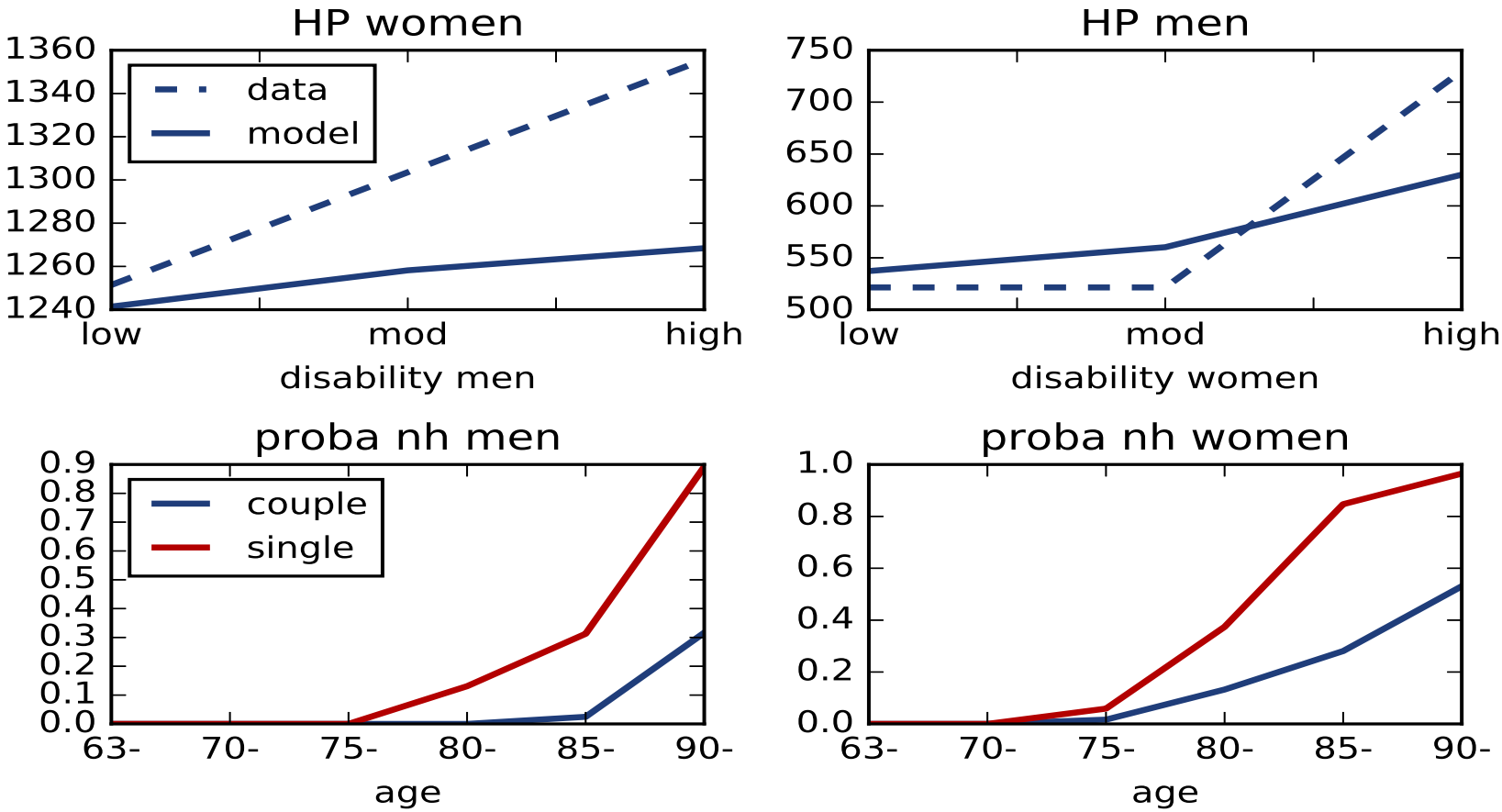

Figure 6: Match home production vs disability spouse; nursing home probability single vs couple

Conclusion

- introduce additional self-insurance within households through time of spouse into a life-cycle model of retired households
- generates wealth and home production patterns broadly consistent with the data
- can reproduce the fact that probability to be in a nursing home lower if in couple when disability is high
- next steps:
  - match nursing home entry rates
  - study demand for LTCI and/or annuities
  - children?

Thank you!

Recursive Problem Singles

The problem solved by a single women is:

$$v_t^{sf}\left(w_t, S_t\right) = \max_{x_t} u^{sf}\left(x_t, S_t, t\right) + p_t^f\left(S_t\right)\beta E_t\left[v_{t+1}^{sf}\left(w_{t+1}, S_{t+1}\right) \mid S_t\right] + \left(1 - p_t^f\left(S_t\right)\right)\beta v_f\left(w_{t+1}\right)$$

The value function for the couple household from this situation is:

$$v_t^{hhsf}\left(w_t, S_t\right) = \phi u^{sf}\left(x_t^\star, S_t, t\right) + p_t^f\left(S_t\right)\beta E_t\left[v_{t+1}^{hhsf}\left(w_{t+1}^\star, S_{t+1}\right) \mid S_t\right] + \left(1 - p_t^f\left(S_t\right)\right)\beta\left(\phi v_f\left(w_{t+1}^\star\right) + \left(1-\phi\right)v_m\left(w_{t+1}^\star\right)\right)$$

Recursive Problem Couples

Given the previous problem, the problem solved by a couple household is:

$$\begin{aligned} v_t^{hh}(w_t, S_t) = \max_{x_t} u^{hh}(x_t, S_t, t) + p_t^f(S_t)\, p_t^m(S_t)\, \beta E_t\left[v_{t+1}^{hh}(w_{t+1}, S_{t+1}) \mid S_t\right] \\ + p_t^f(S_t)\left(1 - p_t^m(S_t)\right)\beta E_t\left[v_{t+1}^{hhsf}(w_{t+1}, S_{t+1}) \mid S_t\right] \\ + \left(1 - p_t^f(S_t)\right) p_t^m(S_t)\, \beta E_t\left[v_{t+1}^{hhsm}(w_{t+1}, S_{t+1}) \mid S_t\right] \\ + \left(1 - p_t^f(S_t)\right)\left(1 - p_t^m(S_t)\right)\beta\left(\phi v_F(w_{t+1}) + (1-\phi)\, v_M(w_{t+1})\right) \end{aligned}$$

Full Set of Moments

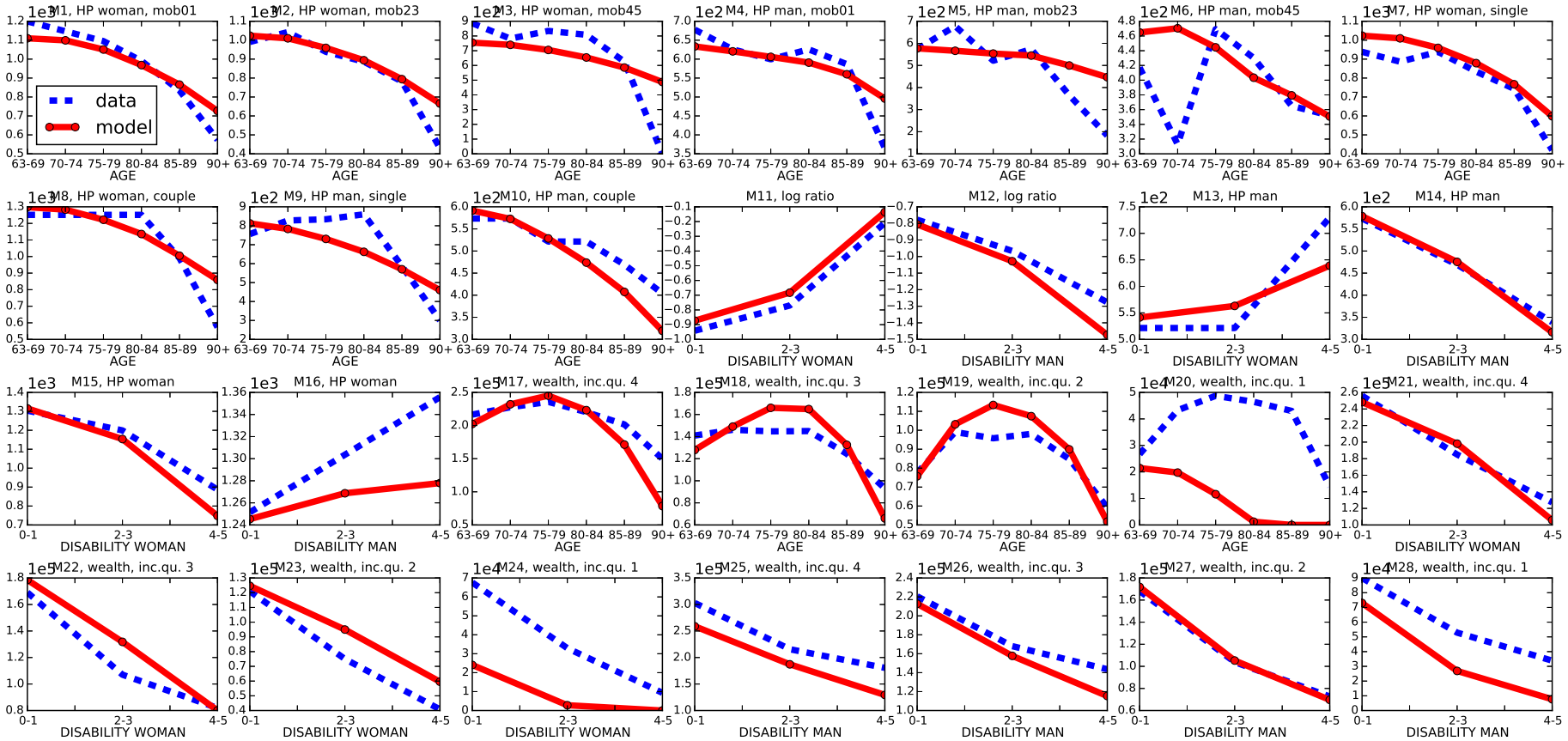

Figure 7: Model vs Data