

# Long-term Care Choice in Equilibrium

## Implications for Public Policies

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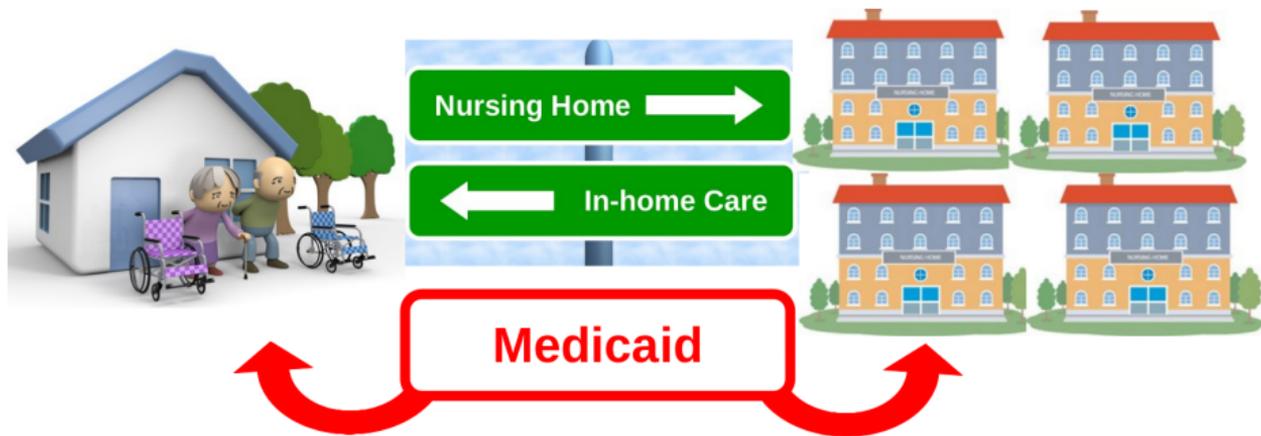
### *Genworth Cost of Care Survey 2020 (U.S.)*

- **70%** of 65+ will need LTC over their life time.
- **50%** of 65+ will use paid care.
- Long-term care is expensive.
  - Nursing home: semi-private room **\$250/day**
  - In-home care: \$20-40/hour + high fixed costs.
- Many rely on public Long-term Services and Supports (LTSS) programs.

- Largest public LTSS program in the U.S.: Medicaid
  - means-tested
  - covers long-term stays in nursing homes and in-home care
- More likely to be on Medicaid if
  - more disabled
  - have no spouse
  - in nursing home

- Nursing home care is mostly delivered by the private sector.
- \$130 billion industry
  - 57% of its long-term care revenue comes from Medicaid beds; reimbursement rate is below the private price.
  - small portion from private insurance payments
  - the rest is paid out of pocket
- Competition: limited number of players on a local market

## Equilibrium approach to long-term care choice



- Medicaid plays a big role on both sides of the nursing home market.
- To analyze policy, need to model decision-makers on both sides.

### Household life-cycle optimization

- Long-term care risk (Braun et al., De Nardi et al., Achou)
- Care choice: family vs nursing home (Mommaerts, Barczyk and Kredler)
- Public policy: Medicaid, subsidy to family care

Assume **exogenous cost and quality of nursing home care.**

### **Nursing home optimization**

- Price, quality of care, beds decisions (Gertler, 1992)
- Local competition and structural estimation (Hackmann, 2017)
- Public policy: Medicaid reimbursement rates, size restrictions (Ching, Hayashi and Wang, 2015, Hackmann, 2017)

Assume **reduced-form demand for nursing home care**.

Decision-makers on both sides of the market:

## 1 Household life-cycle optimization with old-age risks

- savings-consumption decision
- long-term care choice:
  - in-home care (intensive margin)
  - nursing home

⇒ **Micro-founded demand for nursing home care**

## 2 Nursing home profit optimization

- observe the household demand for care
- decide price, intensity of care, and the number of beds

⇒ **Endogenous cost and intensity of nursing home care**

- 1 Household life-cycle optimization with old-age risks
  - ▶ Micro-founded demand for nursing home care
- 2 Nursing home profit optimization
  - ▶ Endogenous cost and intensity of nursing home care
- 3 Discipline with micro and macro evidence on long-term care on
  - ▶ **patterns of long-term care** by health, wealth, and family status (HRS)
    - extensive margin: selection onto nursing home/in-home care
    - intensive margin: hours of care
    - Medicaid receipt.
  - ▶ **nursing home market**
- 4 Quantify effects of long-term care policies

- 1 Household life-cycle optimization with old-age risks
  - ▶ Micro-founded demand for nursing home care
- 2 Nursing home profit optimization
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- 3 Discipline with micro and macro evidence on long-term care on
  - ▶ patterns of long-term care by health, wealth, and family status
  - ▶ nursing home market
- 4 Quantify equilibrium effects of LTC policies:
  - **Medicaid generosity**
  - **Subsidies to in-home care**on
  - ▶ allocation, cost and intensity of care
  - ▶ welfare

# Model of long-term care choice in equilibrium

### Market players

- **Retired households**:  $T$  overlapping generations
    - heterogeneous
    - face old-age risks
    - demand care
  - **Nursing homes**:  $N$  local firms
    - produce care
    - face identical cost structure
  - **Government**
    - specifies subsidy rules for both sides of the market
- 
- No private insurance, no consumer discrimination by nursing homes
  - Stationary **symmetric Nash equilibrium** on the nursing home market

- Heterogeneous in age, wealth, income, health, and family status.
- Face uncertainty about
  - **health**, includes *low and high long-term care needs*
  - **family status**: spouse survival and child availability
- Value consumption of goods, *care in bad health states*, and bequests.
- Make saving, consumption and care decisions.
- Solve life-cycle dynamic optimization problems.

When health is bad, individuals choose between

- **in-home** care:
  - decide intensity
  - marginal cost is lower if there is a healthy spouse or child nearby
  - fixed cost if no family
- **nursing home** care:
  - take intensity and price as given (set by nursing homes)

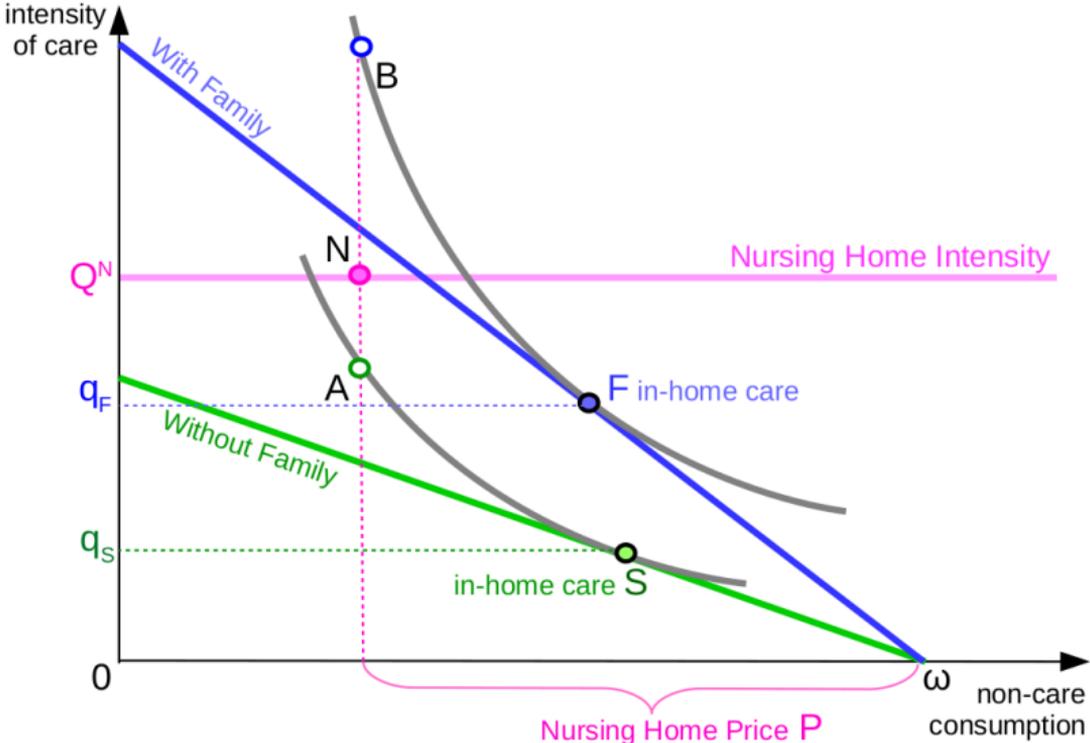
## Medicaid for long-term care

Medicaid finances nursing home and in-home care of the poor.

- transfers determined with **income and asset tests**
  - Coverage: lower for in-home care under low need (ADLL)
- ⇒ Caring for individuals with **ADLL costs more in a nursing home**

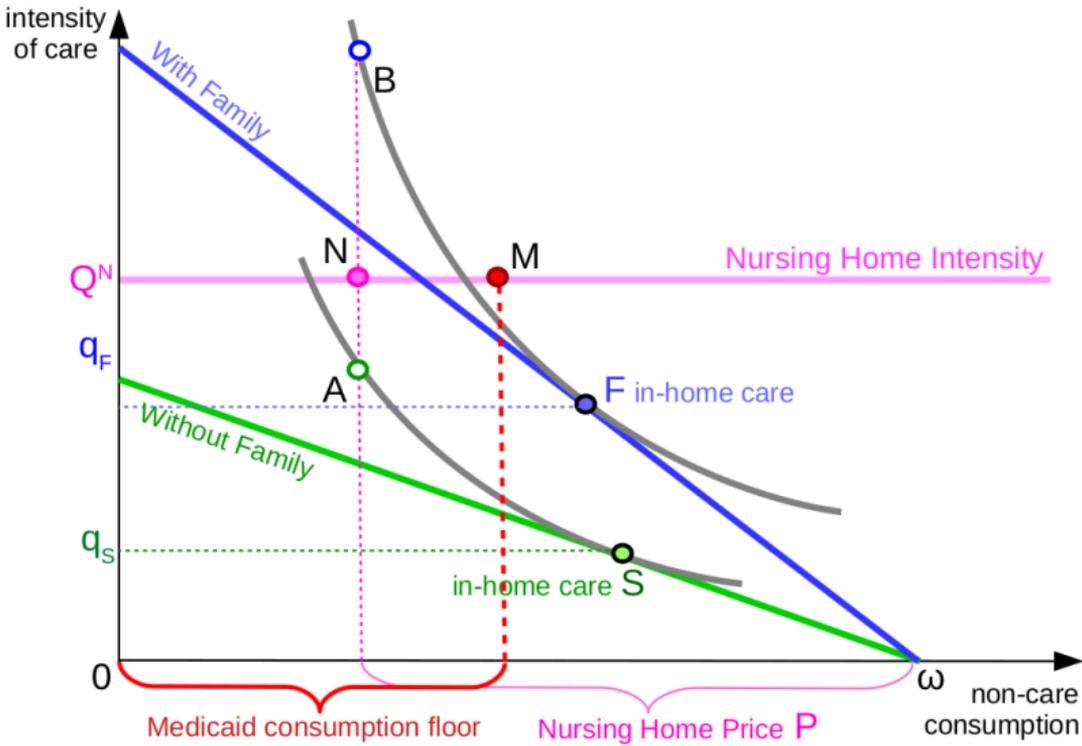
# Choice of care: Private

## Simple model illustration



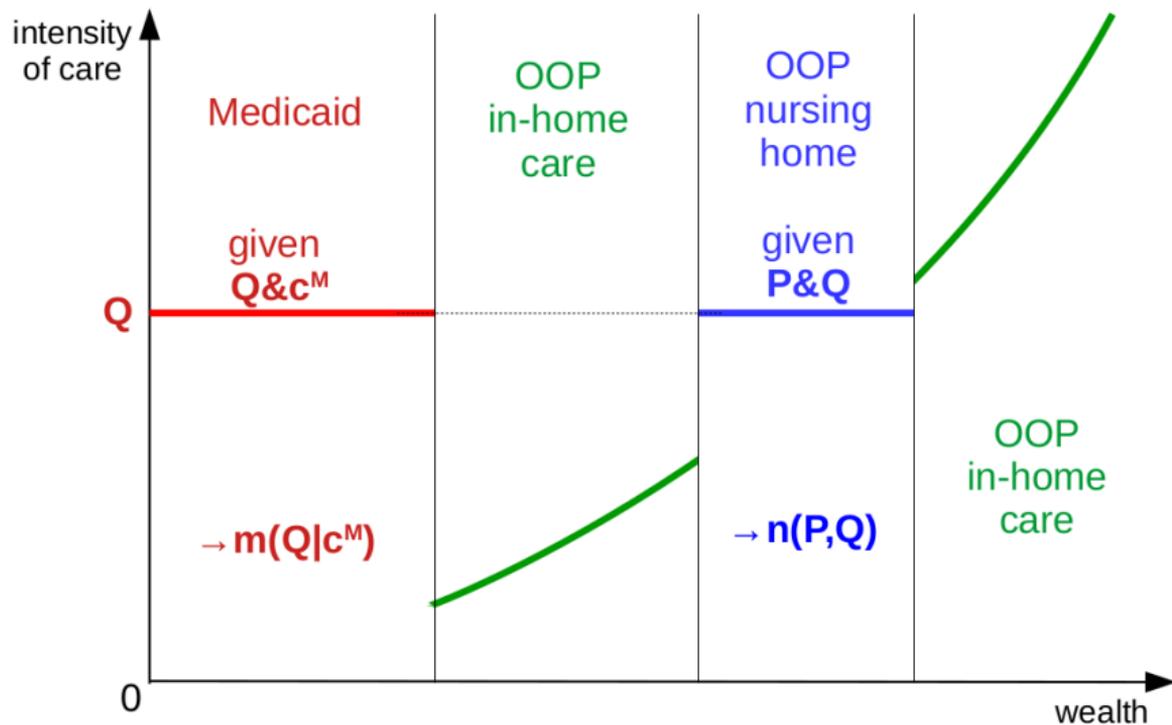
# Choice of care with Medicaid

## Simple model illustration



# Aggregate Demands for Care

## Simple model illustration



# Nursing homes

## Full model: supply side

- Nursing home  $j$  takes as given the residual demand for care and the choices of other nursing homes
- delivers uniform intensity across Medicaid and private residents
- receives **reimbursement  $M$**  per Medicaid bed

Problem of nursing home  $j$  is to choose price, intensity and number of beds to maximize profits:

$$\max_{P_j, Q_j} \underbrace{n_j(P_j, Q_j | \mathbf{P}_{-j}, \mathbf{Q}_{-j}) P_j}_{\text{private revenue}} + \underbrace{m_j(Q_j | \mathbf{Q}_{-j}) M}_{\text{Medicaid reimb.}} - \underbrace{c(N_j, Q_j)}_{\text{costs}} - \chi,$$

where  $\underbrace{N_j}_{\text{\#beds}} = \underbrace{n_j(P_j, Q_j | \mathbf{P}_{-j}, \mathbf{Q}_{-j})}_{\text{private demand}} + \underbrace{m_j(Q_j | \mathbf{Q}_{-j})}_{\text{Medicaid demand}}$  and  $c(N_j, Q_j) = \bar{c} N_j^\beta Q_j^\alpha$

# Data and Parametrization

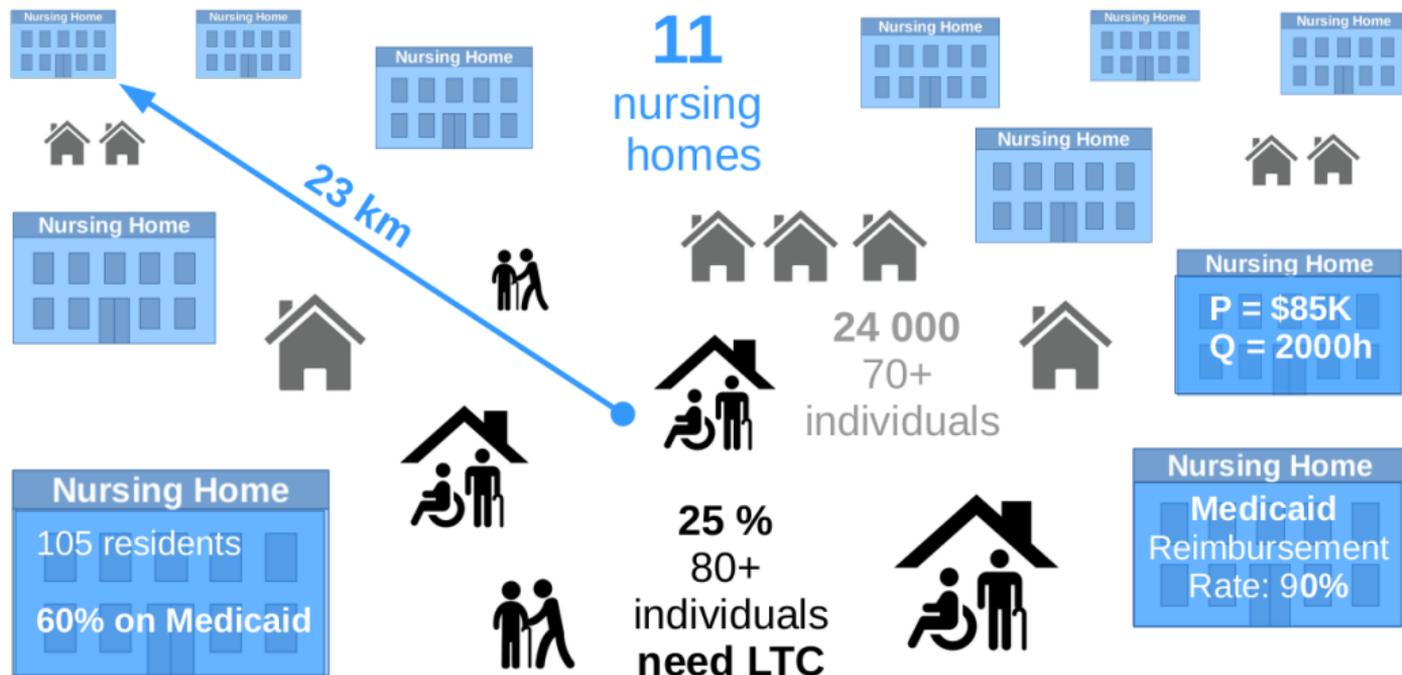
- Health and Retirement Studies (HRS), 2004-2014.

### Intensive and extensive margins of care usage by

- wealth and income quartiles
- health status
  - 'ADLL' if need help with one or two Activities of Daily Living (ADLs).
  - 'ADLH' if need help with more than two ADLs.
- family status
  - having a spouse in good/fair health or a child nearby ('has family').
- Medicaid reciprocity

# Local Nursing Home Market

## Typical structure



Source: Pennsylvania State Department of Health, Hackmann (2018)

# Policy Experiments

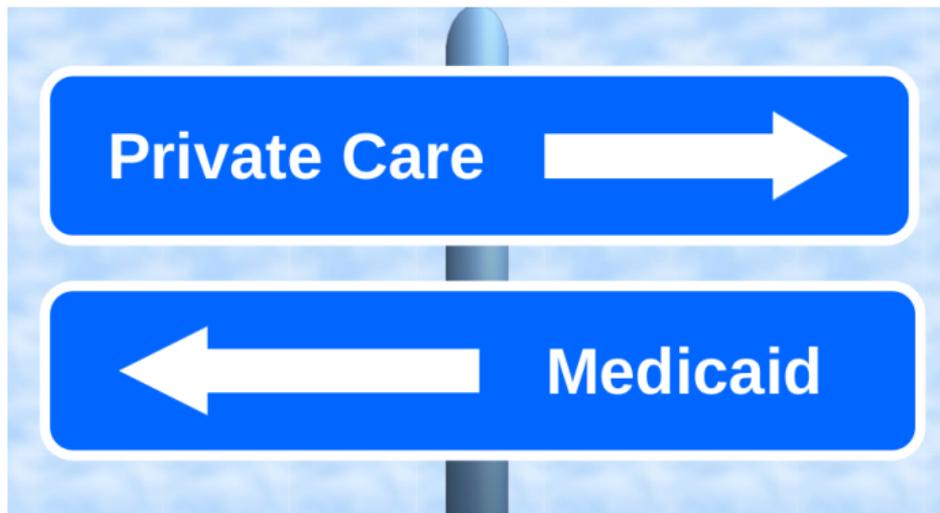
- 1 More generous **Medicaid**
- 2 **Subsidy to in-home care** for individuals without family support
  - Study steady state effects with & without [nursing home response](#).
  - Focus on allocation of care and welfare (apart from tax distortions).
  - Consumer surplus is measured as a lump-sum wealth compensation at age 70.

## More generous Medicaid

Medicaid consumption floors  $\uparrow$  \$3K

### Direct effect: Demand side

- More individuals qualify for Medicaid (most are in private in-home care)
- Move to Medicaid-financed care, both in-home and nursing home care



## More generous Medicaid

Medicaid consumption floors ↑ \$3K

### ► Direct effect: Demand side

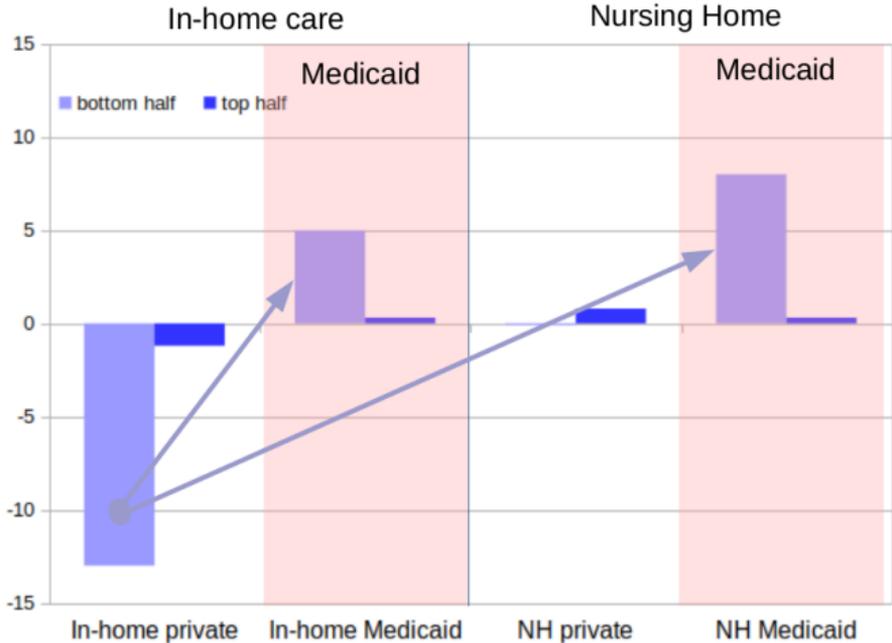
- More individuals qualify for Medicaid (most are in private in-home care)
- Move to Medicaid-financed care, both in-home and nursing home care

### ► Indirect effect: Nursing home response

- higher demand from Medicaid residents ⇒ ↑ intensity and price of care
- higher NH intensity attracts more Medicaid residents
- higher NH price drives away private NH residents → private in-home care

# More generous Medicaid: No nursing home response

## Reallocation of care

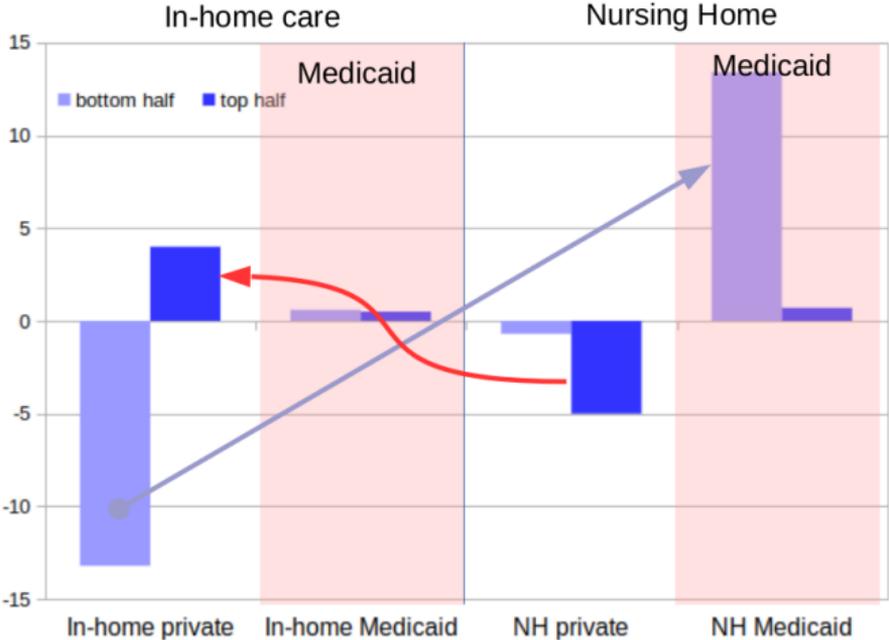


top half wealth:

bottom half wealth: private in-home → Medicaid in-home & nursing home

# More generous Medicaid: With nursing home response

## Reallocation of care

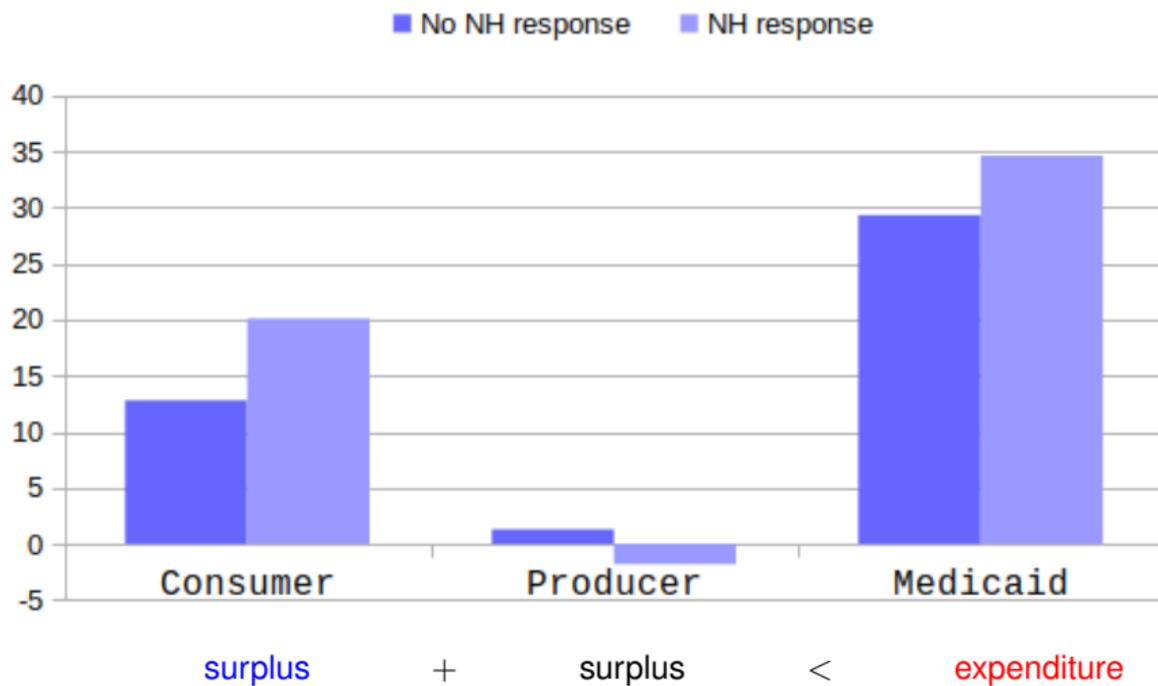


top half wealth: private nursing home → private in-home care

bottom half wealth: private in-home → Medicaid nursing home

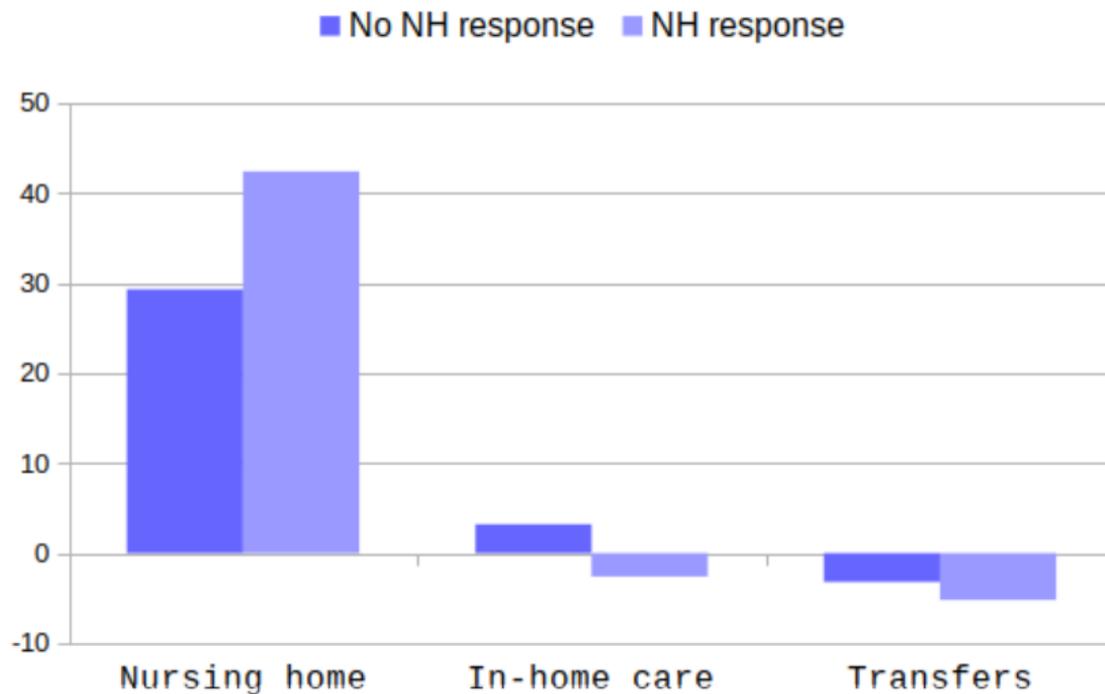
# More generous Medicaid: Welfare

## Surpluses and Medicaid Expenditure, \$M



# More generous Medicaid: Medicaid

Long-term care expenditures, \$M



Bad policy!

Supply-side reaction is important:

- Medicaid claims by nursing homes increase greatly
- Privately payers relocate from more expensive nursing homes to in-home care.

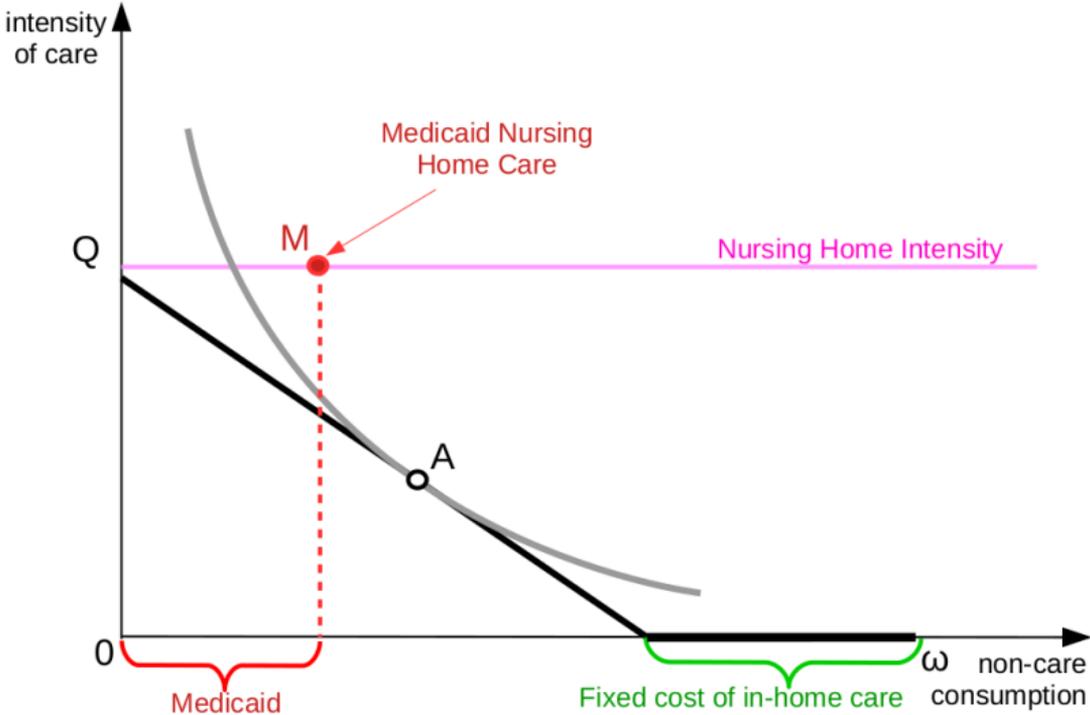
## Policy experiment: In-home Care Subsidy

- The fixed cost of in-home care is high: \$20K/year (Achou, 2021)
- Conjecture: the fixed cost is a big barrier to the in-home care.

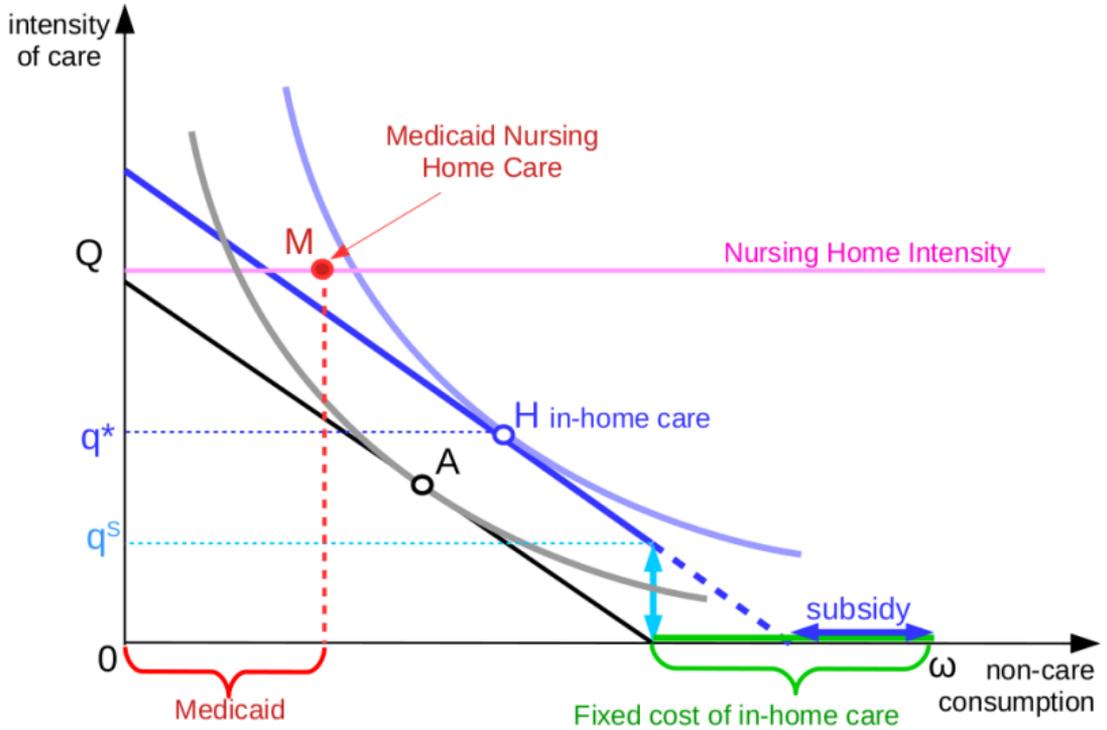


- **Subsidy**: direct cash transfer or a fixed number of hours of basic/custodial care.
- **Uniform eligibility** for individuals **without** family support.

# In-home care: Fixed cost is a barrier to entry

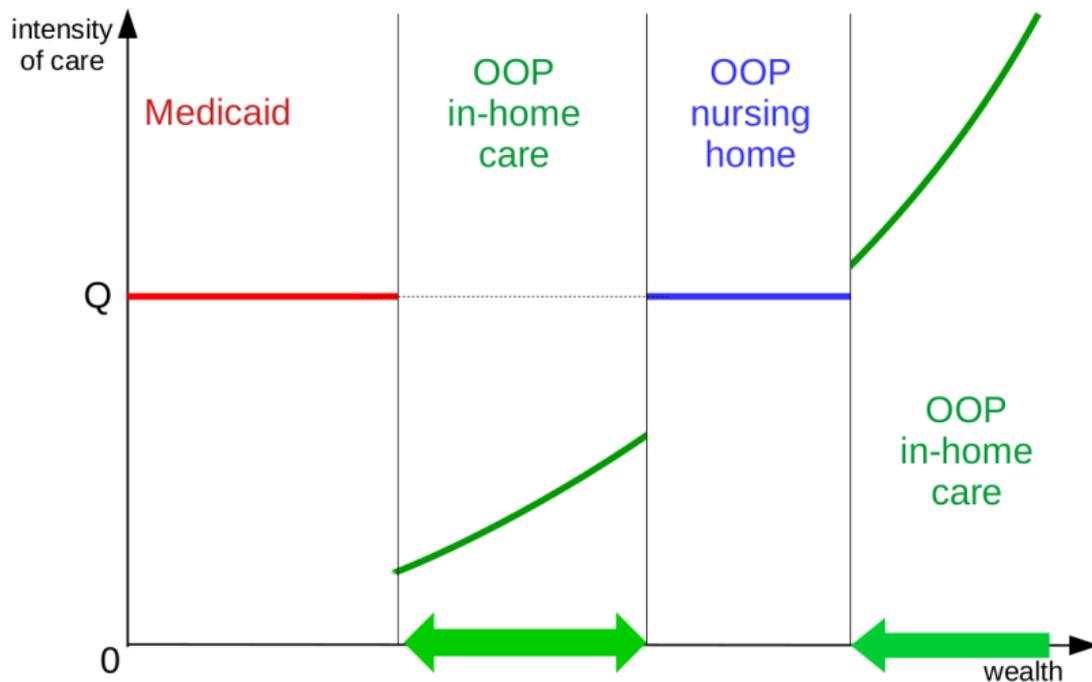


# In-home care subsidy: Moving out of Medicaid nursing home



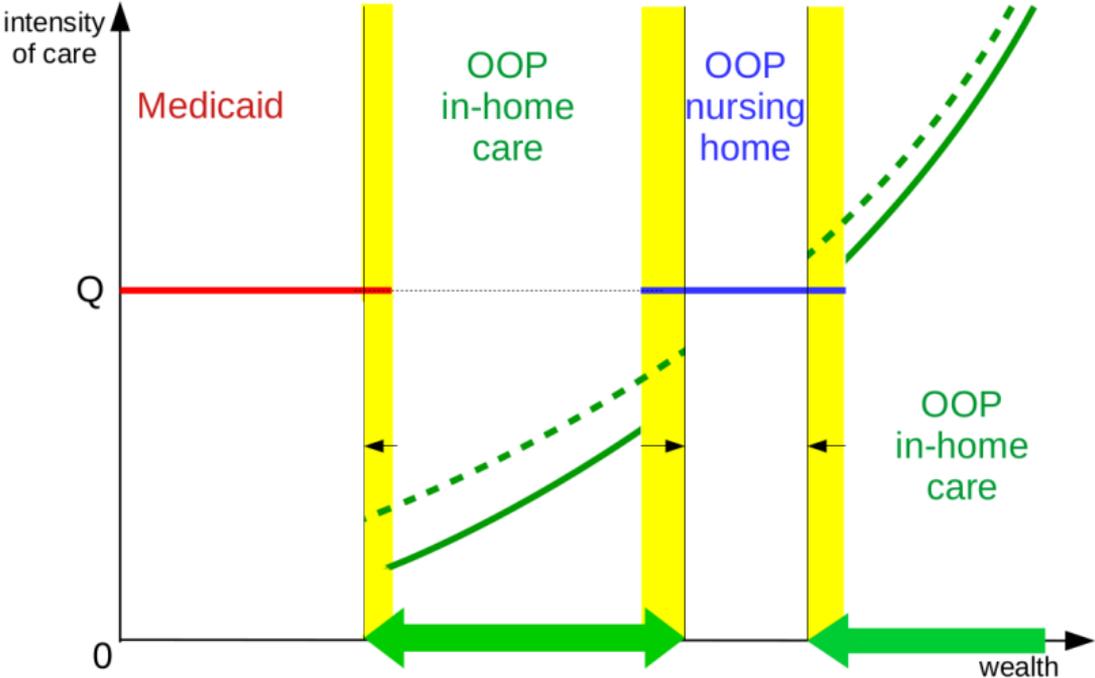
# In-home subsidy

## Initial allocation of care



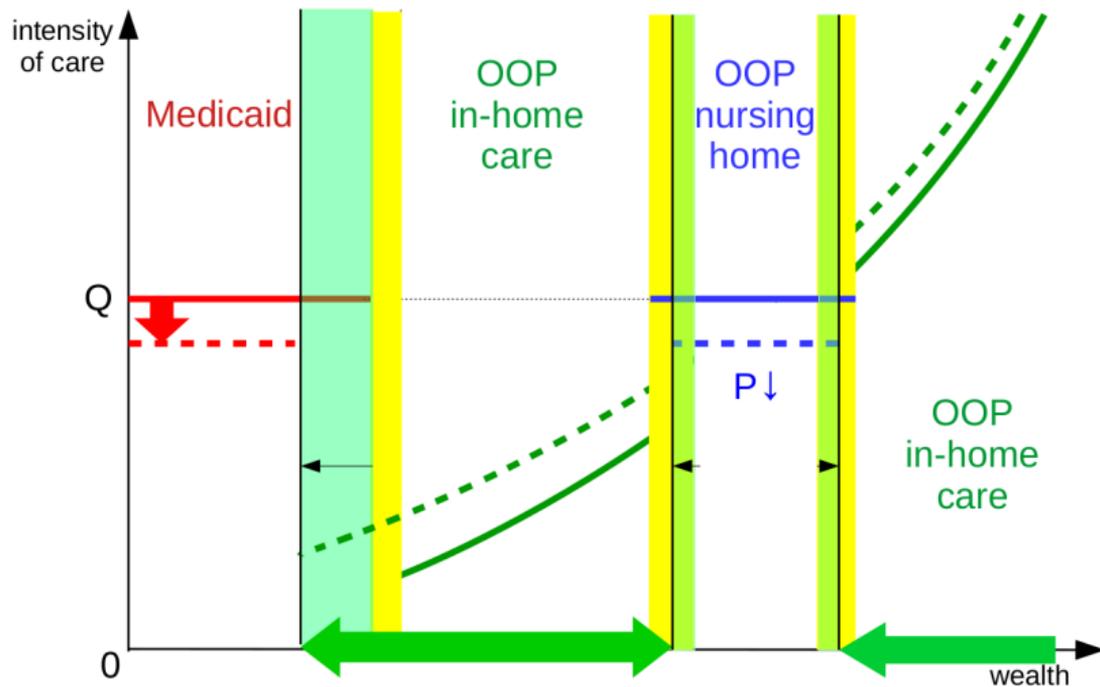
# In-home subsidy: Demand-side response

Nursing homes face higher competition from the in-home care.



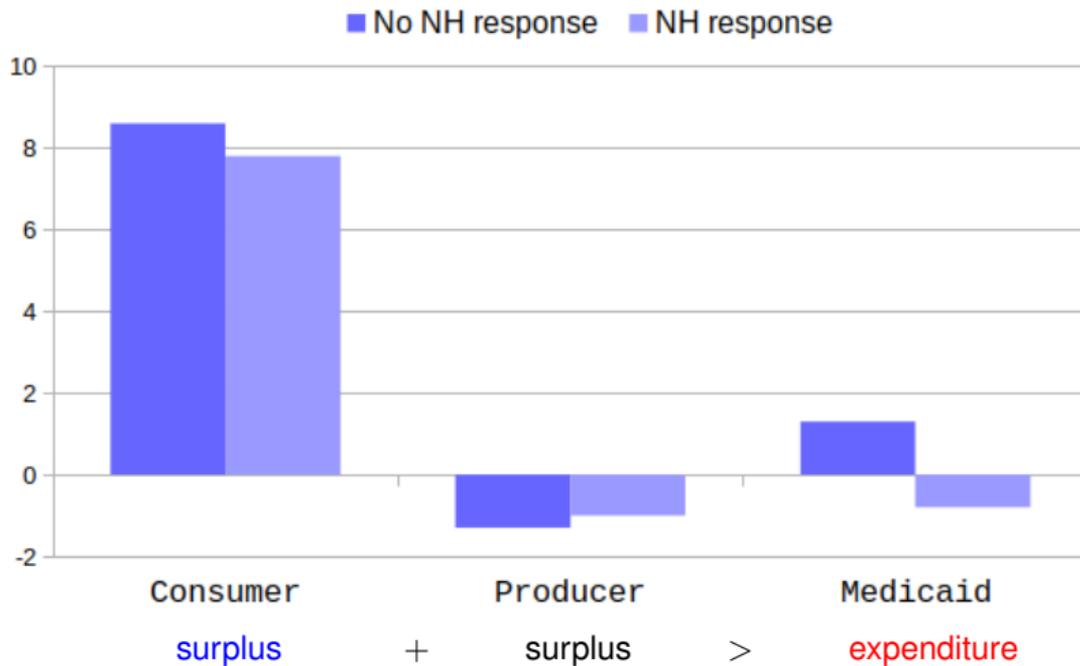
## In-home subsidy: Supply-side response

Nursing homes drop price  $P$ :  $\$85K \rightarrow \$80K$ ; and intensity  $Q$ :  $2000h \rightarrow 1836h$



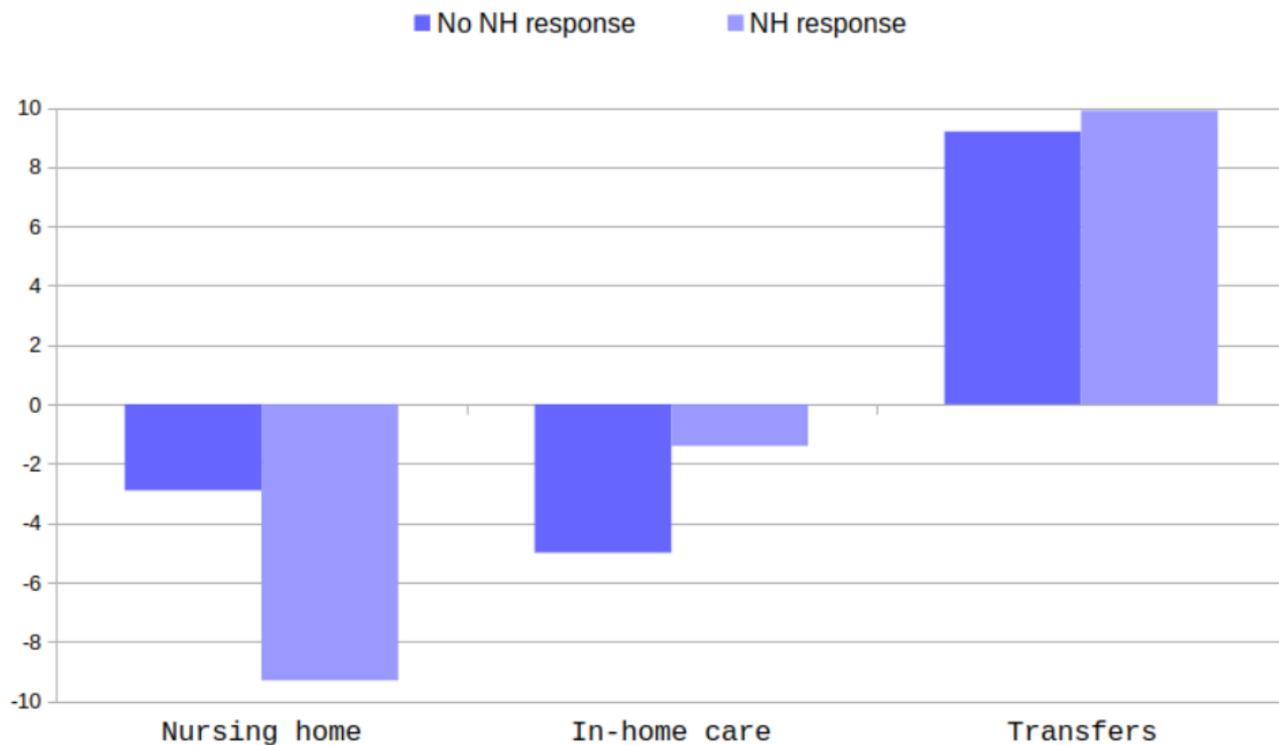
# In-home Care Subsidy: Welfare

## Surpluses & Medicaid expenditures, \$M



# In-home Care Subsidy: Medicaid

Long-term care expenditures, \$M





Good policy!

- Uniform eligibility  $\Rightarrow$  fewer distortions & easy to implement.
- The subsidy pays for itself: no extra taxes necessary.
- Care allocated more efficiently when consumers face the marginal price of care.
- Both intensive & extensive margins in the care decision are at work.
- Supply-side reaction is important.
- High fixed cost of in-home care is a significant barrier to using this care.

# Conclusion

- Build **an equilibrium model of long-term care choice** with decision makers on both sides of the market.
- The model generates the **long-term care patterns** observed in the HRS. In particular, it matches
  - the distribution of hours of care (intensive margin)
  - patterns of nursing home usage (extensive margin)
  - Medicaid rates for in-home and nursing home care
  - by ADL and family status
- **In-home care subsidies** achieve more efficient distribution of care at no additional cost to the government.
- Key to this result is allowing individuals to face **marginal price of care**.
- Important to take into account the **supply-side response** even when analyzing the LTC policies targeting the demand side.