Market Inefficiency, Insurance Mandate and Welfare: U.S. Health Care Reform 2010

Juergen Jung
Towson University, Maryland

Chung Tran
Australian National University

ASHEcon
June 2014

Disclaimer

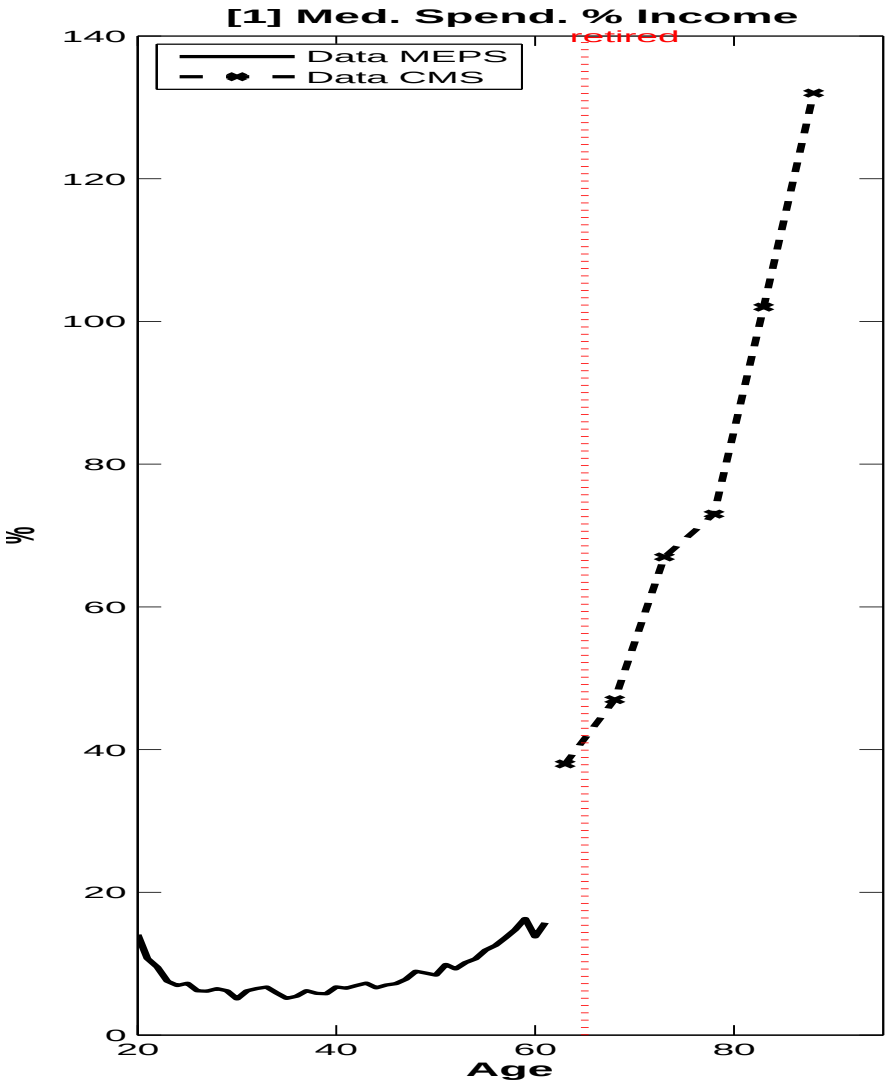
This project was supported by the Agency for Healthcare Research and Quality (AHRQ, Grant No.: R03HS019796), the Australian Research Council (ARC, Grant No.: CE110001029), and funds from the Centers for Medicare & Medicaid Services, Office of the Actuary (CMS/OACT).

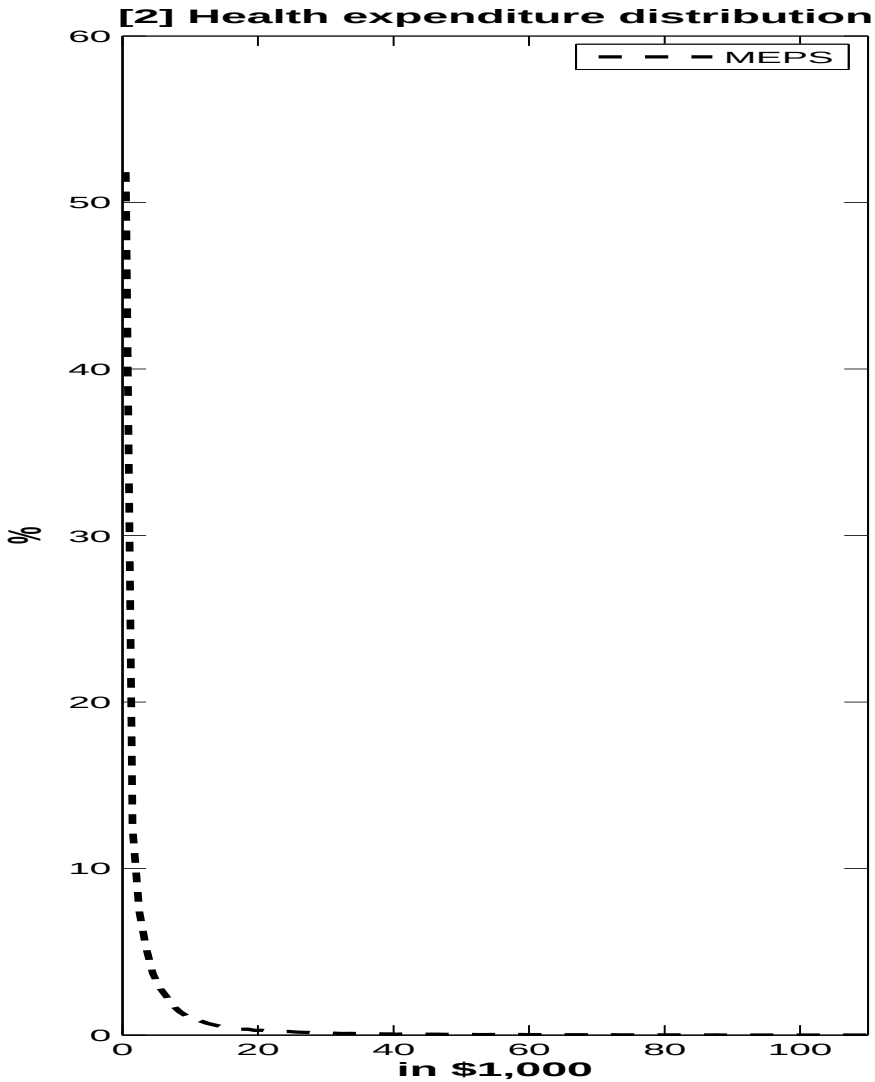
The content is solely the responsibility of the authors and does not represent the official views of the Agency for Healthcare Research and Quality.

The U.S. health insurance system

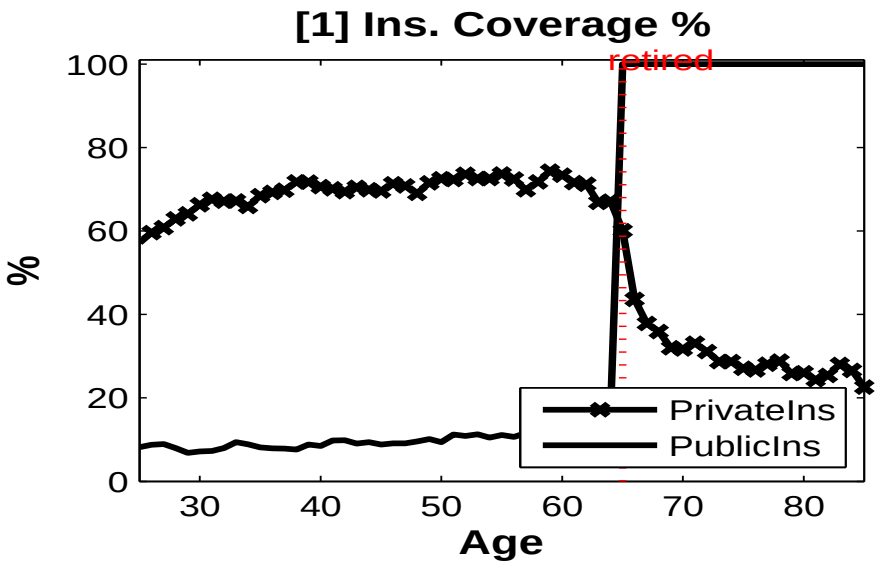
- Mixed system:
  - Private health insurance for working population
  - Public health insurance for poor (Medicaid) and old (Medicare)
- Main issues in the current system:
  - Low coverage: 47 million uninsured in 2010 ($\approx 15\%$)
  - High cost: 16% of GDP on Health in 2010 and close to 20% by 2015
  - Health outcomes: questionable?

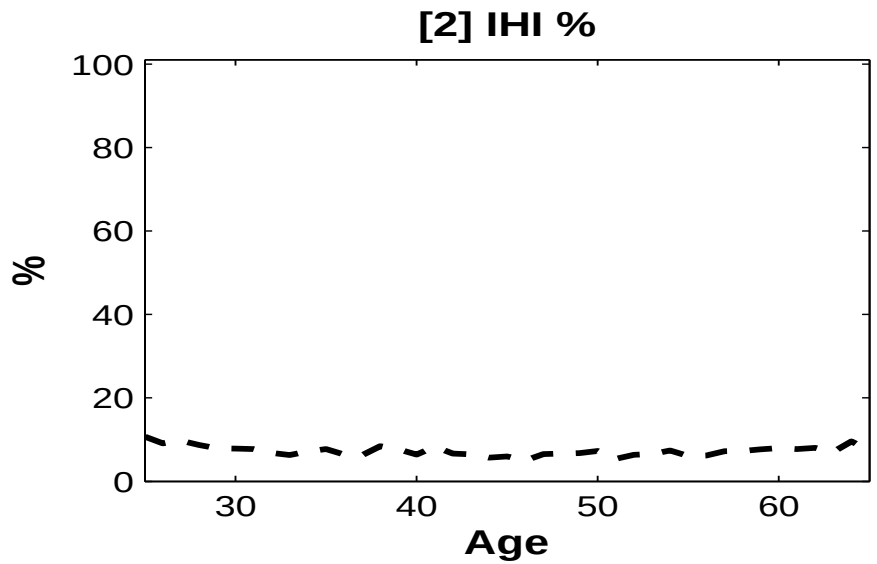
Health expenditures: MEPS 2000-2009

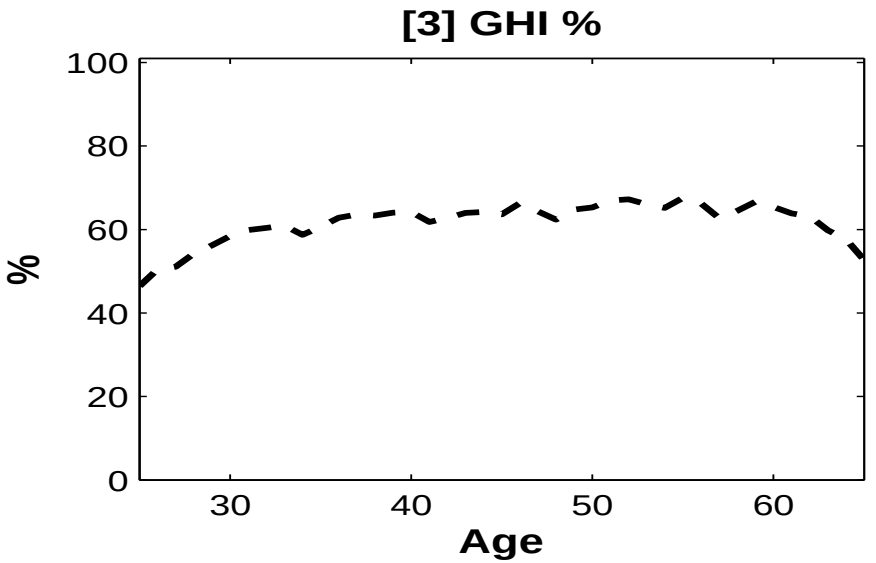


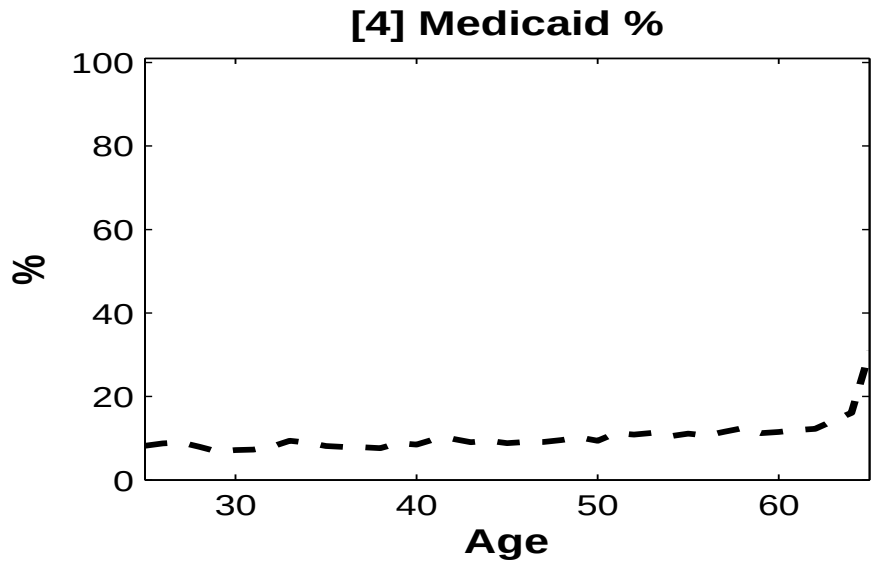


Insurance take-up rates: MEPS 2000-2009









Affordable Care Act (2010)

- Private insurance:
  1. Health insurance mandate enforced by **penalties** and **subsidies**
  2. Health insurance exchanges
  3. Restrictions on insurance companies
- Public insurance
  1. Expansion of **Medicaid**
  2. Cuts in Medicare
  3. New **taxes**
- Focus on reducing the number of uninsured

This paper

1. Develop a stochastic dynamic general equilibrium **OLG model** with
   - endogenous health spending + insurance choice
   - core structure of US health insurance system

   that accounts for
   - life-cycle patterns of health spending + insurance take-up
   - distributions of income and health expenditures
2. to quantify the long-run effects of the ACA (2010) on
   - insurance coverage and health expenditures
   - macroeconomic aggregates and welfare

Results preview

- **Coverage**
  - 76.23% to 90.41% of workers due to ↓ Adverse selection
  - IHI ↑, Medicaid ↑, but GHI ↓
  - Insurance take-up driven by **penalty** and not subsidies
- **Medical Spending**
  - Moral hazard ↑ → medical services M ↑ and health capital ↑
  - but switch from high to low price types → total spending $p_m M$ ↓
- **Aggregates and welfare**
  - Redistribution from high-income-healthy types
  - Capital stock ↓ and labor supply ↓ → GDP ↓ 1.2%
  - Welfare ↓ except low income groups
- **Fiscal costs**
  1. Payroll tax of 0.5% on income $> \$200,000$
  2. Consumption tax ↑ by 1.0%
  3. Lump-sum tax of 0.36% of household income
  4. Government spending ↓ by 0.5% of GDP

Related literature

1. Health microeconomics/econometrics
   - Grossman (1972a,1972b), Grossman (2000)

2. Quantitative macroeconomics/public finance
   - Ayagari (1994), Imrohoroglu et al (1995), Hugget (1996)

3. Macro-health economics:
   - Exogeneous health expenditure shocks: Attanasio, Kitao and Violante (2008), Jeske and Kitao (2009), Pashchenko and Porapakkarm (2010), Janicki (2011)

   - Endogenous health expenditures and insurance: Suen (2006), Feng (2009), Fonseca et al.(2009,2013), Galama and Kapteyn (2011), and Jung and Tran (2008, 2010, 2013)

MODEL

The Model: "Workhorse" macro model

Dynamic stochastic overlapping generations model with heterogeneous agents:

- Structure: households, government and production sectors for C
- Markets: consumption, labor and capital
- Households live for multiple-periods as workers and retirees
- Exogenous mortality shocks
- Idiosyncratic labor productivity shocks
- Incomplete financial markets

The Model: New features

- Health as a durable good: consumption and investment
- Idiosyncratic health shocks
- Endogenous health spending
- Elements of the US health insurance system
  - Individual health insurance (IHI)
  - Group health insurance (GHI)
  - Medicaid and Medicare
  - Random employer matching
- Endogenous health insurance choice

The Model: Preferences and technology

- Preferences:

$$u\left(c_j, l_j, h_j, m_j\right)$$

- Health capital:

$$h_j = i\left(m_j, h_{j-1}, \delta^h, \epsilon_j^h\right)$$

- Human capital ("labor"):

$$e_j = e\left(\vartheta, h_j, \epsilon_j^l\right)$$

- Shocks:

$$\Pr\left(\epsilon_{j+1}^h | \epsilon_j^h\right) \in \Pi_j^h \text{ and } \Pr\left(\epsilon_{j+1}^l | \epsilon_j^l\right) \in \Pi_j^l$$

The Model: Health insurance

- A private health insurance market for workers
  - Individual and group plans for $\text{prem}^{\text{IHI}}(j,h)$ and prem^{GHI}
  - Group insurance offer ϵ^{GHI} depends on current insurance state and income
  - $\Pr\left(\epsilon_{j+1}^{\text{GHI}}|\epsilon_{j}^{\text{GHI}},\vartheta\right) \in \Pi_{j,\vartheta}^{\text{GHI}}$
  - Health insurance choice:

$$in_j = \begin{cases} 0 & \text{if no insurance} \\ 1 & \text{if Individual health insurance (IHI)} \\ 2 & \text{if Group health insurance (GHI)} \\ 3 & \text{if Medicaid} \end{cases} \quad \text{if } j \leq J_w$$

- Income/asset test for Medicaid
- Medicare for retirees for $\text{prem}^{R} \rightarrow$ no more insurance choice

The Model: Out-of-Pocket health spending

- Worker's out-of-pocket health expenditures depend on insurance state

$$o\left(m_j\right) = \begin{cases} p_m^{in_j} \times m_j, & \text{if } in_j = 0 \\ \rho^{in_j}\left(p_m^{in_j} \times m_j\right), & \text{if } in_j > 0 \end{cases}$$

- Retiree's out-of-pocket health expenditures depend on Medicare generosity

The Model: Technology and firms

- Final goods C production sector for price $p_C = 1$:

$$\max_{\{K,\ L\}} \{F(K, L) - qK - wL\}$$

- Medical services M production sector for price p_m:

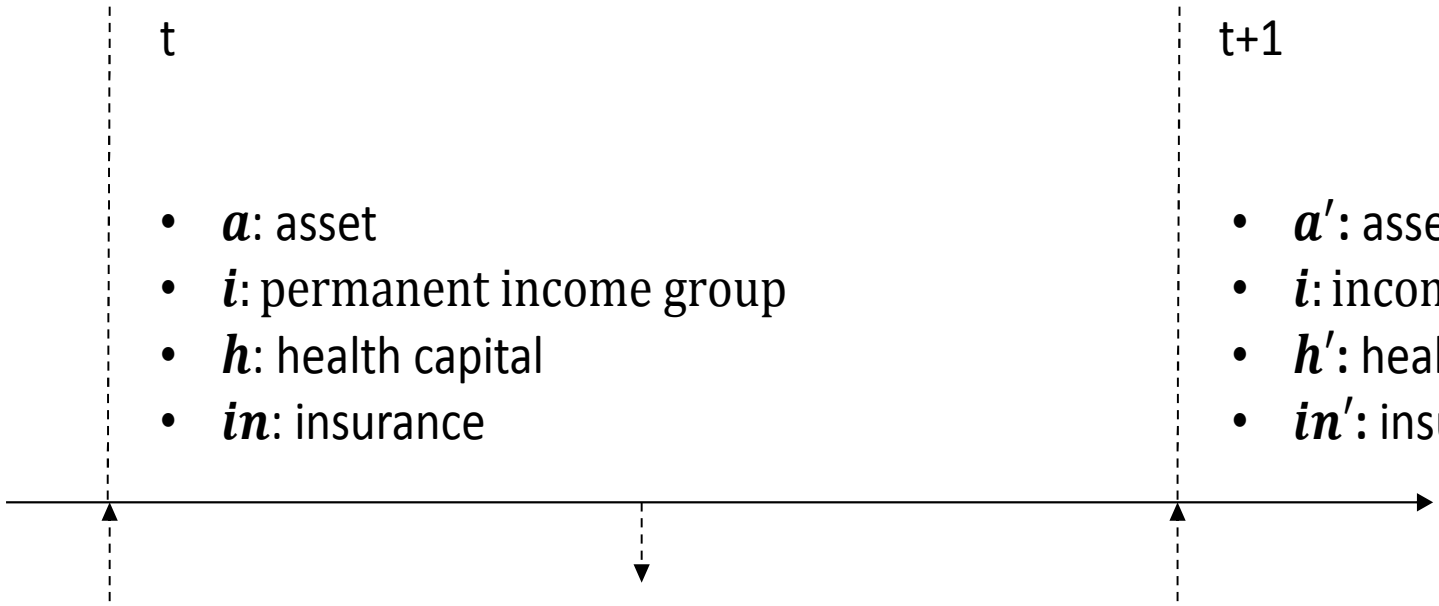
$$\max_{\{K_m,\ L_m\}} \{p_m F_m(K_m, L_m) - qK_m - wL_m\}$$

- p_m is a base price for medical services
- Price paid by households depends on insurance state:

$$p_j^{in_j} = \left(1 + \nu^{in_j}\right) p_m$$

- ν^{in_j} is an insurance state dependent markup factor
- Profits are redistributed to all surviving agents

The Model: Household problem



Shocks:
- ϵ_t^h: health
- ϵ_t^l: productivity
- ϵ_t^{GHI}: group HI

Choices:
- c: consumption
- l: leisure
- m: medical services
- a': savings
- in': insurance

Shocks:
- ϵ_{t+1}^h : health
- ϵ_{t+1}^l: productivity
- ϵ_{t+1}^{GHI}: group HI

State vector:
$x_t = \{j, a, i, h, in, \epsilon^h, \epsilon^l, \epsilon^{GHI}\}$ → Choice $=\{c, l, m, a', in'\}$ → $x_{t+1} = \{j+1, a', i, h', in', \epsilon'^h, \epsilon'^l, \epsilon'^{GHI}_t\}$

Worker's dynamic optimization problem

$$V(x_j) = \max_{\{c_j, l_j, m_j, a_{j+1}, in_{j+1}\}} \left\{ u(c_j, h_j, l_j, m_j) + \beta \pi_j E\left[V(x_{j+1}) \mid \epsilon_j^l, \epsilon_j^h, \epsilon_j^{GHI} \right] \right\}$$

$$s.t.$$

$$\left(1+\tau^C\right) c_j + (1+g)\, a_{j+1} + o(m_j)$$

$$+1_{\{in_{j+1}=1\}} \text{prem}^{\text{IHI}}(j,h) + 1_{\{in_{j+1}=2\}} \text{prem}^{\text{GHI}}$$

$$= y_j^W - tax_j + t_j^{\text{SI}}$$

$$0 \leq a_{j+11}$$

$$0 \leq l_j \leq 1$$

$$h_j = i\left(m_j, h_{j-1}, \delta^h, \epsilon_j^h\right)$$

Worker's dynamic optimization problem

where

$$
\begin{aligned}
y_j^W &= e\left(\vartheta, h_j, \epsilon_j^I\right) \times l_j \times w + R\left(a_j + t^{\text{Beq}}\right) + \text{profits} \\
tax_j &= \tilde{\tau}\left(\tilde{y}_j^W\right) + tax_j^{SS} + tax_j^{\text{Med}} \\
\tilde{y}_j^W &= y_j^W - a_j - t^{\text{Beq}} - 1_{[in_{j+1}=2]}\text{prem}^{\text{GHI}} - 0.5\left(tax_j^{SS} + tax_j^{\text{Med}}\right) \\
tax_j^{SS} &= \tau^{\text{Soc}} \times \min\left(\bar{y}_{ss},\ e\left(\vartheta, h_j, \epsilon_j^L\right) \times l_j \times w - 1_{[in_{j+1}=2]}\text{prem}^{\text{GHI}}\right) \\
tax_j^{\text{Med}} &= \tau^{\text{Med}} \times \left(e\left(\vartheta, h_j, \epsilon_j^I\right) \times l_j \times w - 1_{[in_{j+1}=2]}\text{prem}^{\text{GHI}}\right) \\
t_j^{\text{SI}} &= \max\left[0,\ \underline{c} + o\left(m_j\right) + tax_j - y_j^W\right]
\end{aligned}
$$

Retiree's dynamic optimization problem

$$V(x_j) = \max_{\{c_j, m_j, a_{j+1}\}} \left\{ u(c_j, h_j, m_j) + \beta \pi_j E\left[V(x_{j+1}) \mid \epsilon_j^h \right] \right\}$$
$$s.t.$$

$$\left(1+\tau^C\right) c_j + (1+g)\, a_{j+1} + o^R(m_j) + \text{prem}^R = R\left(a_j + t_j^{\text{Beq}}\right) - tax_j + t_j^{\text{Soc}} + t_j^{\text{SI}}$$

where

$$\begin{aligned} a_{j+1} &\geq 0 \\ h_j &= i\left(m_j, h_{j-1}, \delta^h, \epsilon_j^h\right) \end{aligned}$$

$$\begin{aligned} tax_j &= \tilde{\tau}\left(\tilde{y}_j^R\right) \\ \tilde{y}_j^R &= t_j^{\text{Soc}} + r \times \left(a_j + t_j^{\text{Beq}}\right) + \text{profits} \\ t_j^{\text{SI}} &= \max\left[0, \underline{c} + o^R(m_j) + tax_j - R\left(a_j + t_j^{\text{Beq}}\right) - t_j^{\text{Soc}}\right] \end{aligned}$$

Insurance sector

$$\left(1+\omega_{j,h}^{\text{IHI}}\right)\sum_{j=2}^{J_1}\mu_j\int\left[1_{\left[in_j\left(x_j\right)=1\right]}\left(1-\rho^{\text{IHI}}\right)p_m^{\text{IHI}}m_{j,h}\left(x_{j,h}\right)\right]d\Lambda\left(x_{j,h}\right)$$

$$=\quad R\sum_{j=1}^{J_1-1}\mu_j\int\left(1_{\left[in_{j,h}\left(x_{j,h}\right)=1\right]}\text{prem}^{\text{IHI}}\left(j,h\right)\right)d\Lambda\left(x_{j,h}\right)$$

$$\left(1+\omega^{\text{GHI}}\right)\sum_{j=2}^{J_1}\mu_j\int\left[1_{\left[in_j\left(x_j\right)=2\right]}\left(1-\rho^{\text{GHI}}\right)p_m^{\text{GHI}}m_j\left(x_j\right)\right]d\Lambda\left(x_j\right)$$

$$=\quad R\sum_{j=1}^{J_1-1}\mu_j\int\left(1_{\left[in_j\left(x_j\right)=2\right]}\text{prem}^{\text{GHI}}\right)d\Lambda\left(x_j\right),$$

Government budget

$$
\begin{aligned}
& G + \sum_{j=1}^{J} \mu_j \int t_j^{\mathrm{SI}}(x_j)\, d\Lambda(x_j) + \sum_{j=2}^{J_1} \mu_j \int \left(1-\rho^{\mathrm{MAid}}\right) p_m^{\mathrm{MAid}} m_j(x_j)\, d\Lambda(x_j) \\
& + \sum_{j=J_1+1}^{J} \mu_j \int \left(1-\rho^{R}\right) p_m^{R} m_j(x_j)\, d\Lambda(x_j) \\
= \quad & \sum_{j=1}^{J} \mu_j \int \left[\tau^{C} c(x_j) + tax_j(x_j)\right] d\Lambda(x_j) + \sum_{j=J_1+1}^{J} \mu_j \int \mathrm{prem}^{R}(x_j)\, d\Lambda(x_j) \\
& + \sum_{j=1}^{J_1} \mu_j \int \tau^{\mathrm{Med}} \left(e_j(x_j) \times l_j(x_j) \times w - 1_{[in_{j+1}(x_j)=2]} \mathrm{prem}^{\mathrm{GHI}}(x_j)\right) d\Lambda(x_j)
\end{aligned}
$$

Pensions and bequests

- Pensions:

$$\sum_{j=J_1+1}^{J} \mu_j \int t_j^{\text{Soc}}(x_j)\, d\Lambda(x_j)$$

$$= \sum_{j=1}^{J_1} \mu_j \int \tau^{\text{Soc}} \times \left(e_j(x_j) \times l_j(x_j) \times w - 1_{[in_{j+1}(x_j)=2]} \text{prem}^{\text{GHI}} \right) d\Lambda(x_j)$$

- Bequests:

$$\sum_{j=1}^{J_1} \mu_j \int t_j^{\text{Beq}}(x_j)\, d\Lambda(x_j) = \sum_{j=1}^{J} \int \tilde{\mu}_j a_j(x_j)\, d\Lambda(x_j)$$

A competitive equilibrium

Given the transition probability matrices and the exogeneous government policies, a competitive equilibrium is a collection of sequences of distributions of household decisions, aggregate capital stocks of physical and human capital, and market prices such that

- Agents solve the consumer problem
- The F.O.Cs of firms hold
- The budget constraints of insurances companies hold
- All markets clear
- All government programs and the general budget clear
- The distribution is stationary

CALIBRATION

Parameterization and calibration

- Goal: to match U.S. data pre ACA
- Data sources:
  - MEPS: labor supply, health shocks, health expenditures, coinsurance rates
  - PSID: initial asset distribution
  - CENSUS: demographic profiles
  - Previous studies: income process, labor shocks, aggregates

Parameterization

- Preferences:

$$u(c, l, h, m) = \frac{\left(\left(c^{\eta} \times \left(\frac{1-l-1_{[l>0]}\bar{l}_j}{(1+m)^{\eta_m}}\right)^{1-\eta}\right)^{\kappa} \times h^{1-\kappa}\right)^{1-\sigma}}{1-\sigma}$$

- Human capital:

$$e = e_j\left(\vartheta, h_j, \epsilon^l\right) = \left(\overline{wage}_{j,\vartheta}\right)^{\chi} \times \left(\exp\left(\frac{h_j - \bar{h}_{j,\vartheta}}{\bar{h}_{j,\vartheta}}\right)\right)^{1-\chi} \times \epsilon^l$$

- $\overline{wage}_{j,\vartheta}$ from MEPS
- ϵ^l and Π^l from prior studies using Tauchen (1986) procedure

Parameterization

- Health capital accumulation:

$$h_j = i\left(m_j, h_{j-1}, \delta_j^h, \epsilon_j^h\right) = \overbrace{\phi_j m_j^{\xi}}^{\text{Investment}} + \overbrace{\left(1-\delta_j^h\right) h_{j-1}}^{\text{Trend}} + \overbrace{\epsilon_j^h}^{\text{Disturbance}}$$

- ϕ and ξ calibrated to match health spending
- δ^h from MEPS using zero medical spenders and $\bar{h}_j = \overbrace{\left(1-\delta_j^H\right)\bar{h}_{j-1}}^{\text{Trend}}$
- ϵ^h and Π^h from MEPS

Parameterization: Production function

- Final goods production:

$$F(K, L) = AK^{\alpha}L^{1-\alpha}$$

- Medical services production:

$$F_m(K_m, L_m) = A_m K_m^{\alpha_m} L_m^{1-\alpha_m}$$

- Parameters from other studies
- $A = 1$ and A_m calibrated to match aggregate health spending

Calibration: Price of medical services

- Reimbursement rates of Medicare/Medicaid are close to 70% of private health insurance (CMS)
- The national average is a markup of around 60% for the uninsured (Brown (2006))
- Large GHI can negotiate favorable prices (Phelps (2003))
- Price vector:

$$\left[p_m^{\text{noIns}}, p_m^{\text{IHI}}, p_m^{\text{GHI}}, p_m^{\text{Maid}}, p_m^{\text{Mcare}}\right] = (1 + [0.70, 0.25, 0.10, 0.0, -0.10]) \times p_m$$

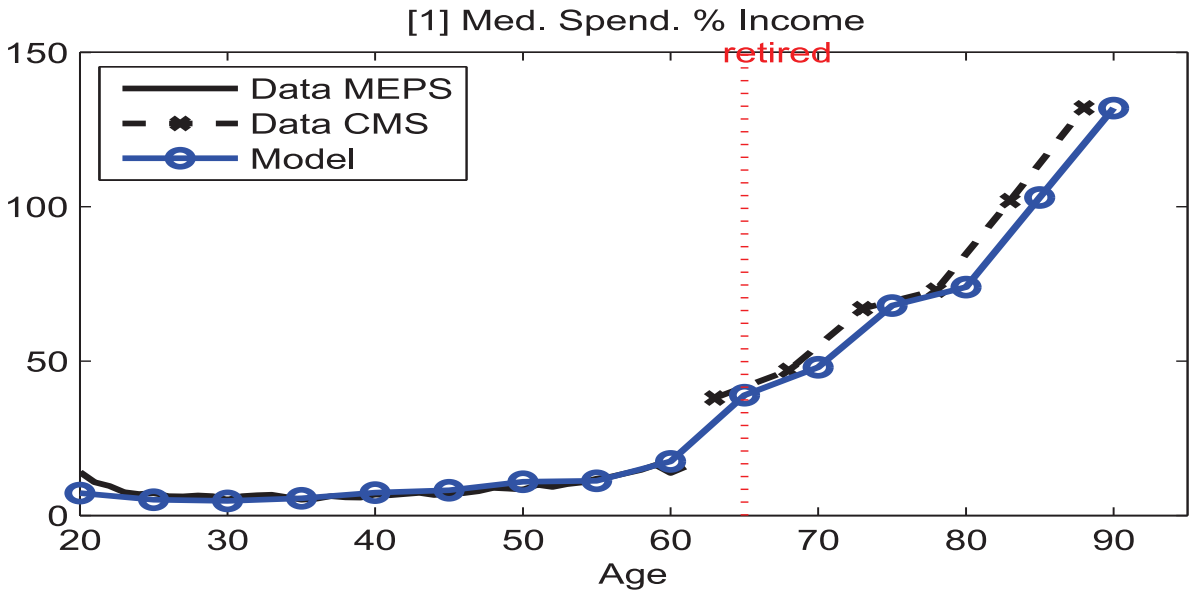
Calibration: External parameters

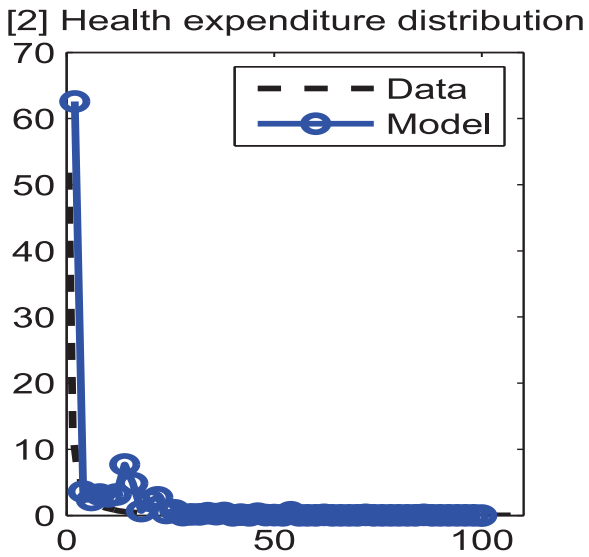
Parameters:		**Explanation/Source:**
- Periods working	$J_1 = 9$	
- Periods retired	$J_2 = 6$	
- Population growth rate	$n = 1.2\%$	CMS 2010
- Years modeled	$years = 75$	from age 20 to 95
- Total factor productivity	$A = 1$	Normalization
- Capital share in production	$\alpha = 0.33$	KydlandPescott1982
- Capital in medical services production	$\alpha_m = 0.26$	Donahoe (2000)
- Capital depreciation	$\delta = 10\%$	KydlandPescott1982
- Health depreciation	$\delta_{h,j} = [0.6\% - 2.13\%]$	MEPS 1999/2009
- Survival probabilities	π_j	CMS 2010
- Health Shocks	see appendix	MEPS 1999/2009
- Health transition prob.	see appendix	MEPS 1999/2009
- Productivity shocks	see appendix	MEPS 1999/2009
- Productivity transition prob.	see appendix	MEPS 1999/2009
- Group insurance transition prob.	see appendix	MEPS 1999/2009

Calibration: Calibrated parameters

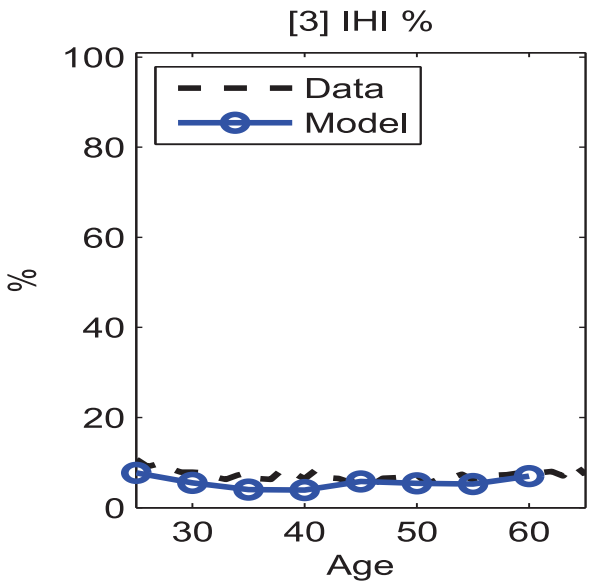
Parameters:		**Explanation/Source:**
- Relative risk aversion	$\sigma = 3.0$	to match $\frac{K}{Y}$ and R
- Preference on consumption vs. leisure:	$\eta = 0.43$	to match labor supply and $\frac{p \times M}{Y}$
- Disutility of health spending:	$\eta_m = 1.5$	to match health capital profile
- Preference on c and l vs. health	$\kappa = 0.89$	to match labor supply and $\frac{p \times M}{Y}$
- Discount factor	$\beta = 1.0$	to match $\frac{K}{Y}$ and R
- Health production productivity	$\phi_j \in [0.7 - 0.99]$	to match spending profile
- TFP in medical production	$A_m = 0.4$	to match $\frac{p \times M}{Y}$
- Production parameter of health	$\xi = 0.175$	to match $\frac{p \times M}{Y}$
- effective labor services production	$\chi = 0.26$	to match labor supply
- Health productivity	$\theta = 1$	used for sensitivity analysis
- Pension replacement rate	$\Psi = 40\%$	to match τ^{soc}
- Residual Government spending	$\Delta_C = 12.0\%$	to match size of tax revenue
- Minimum health state	$h_{\min} = 0.01$	to match health spending

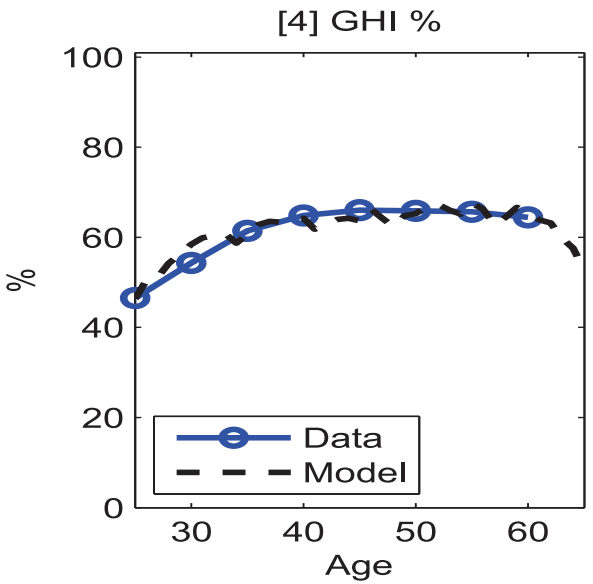
Health Expenditures: Model vs. Data

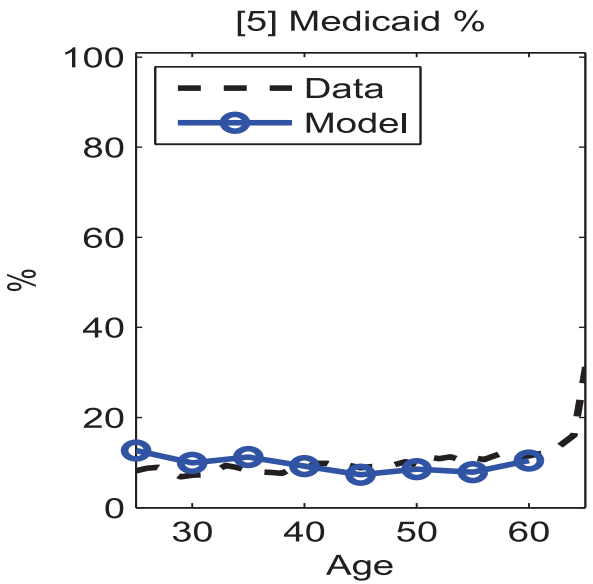


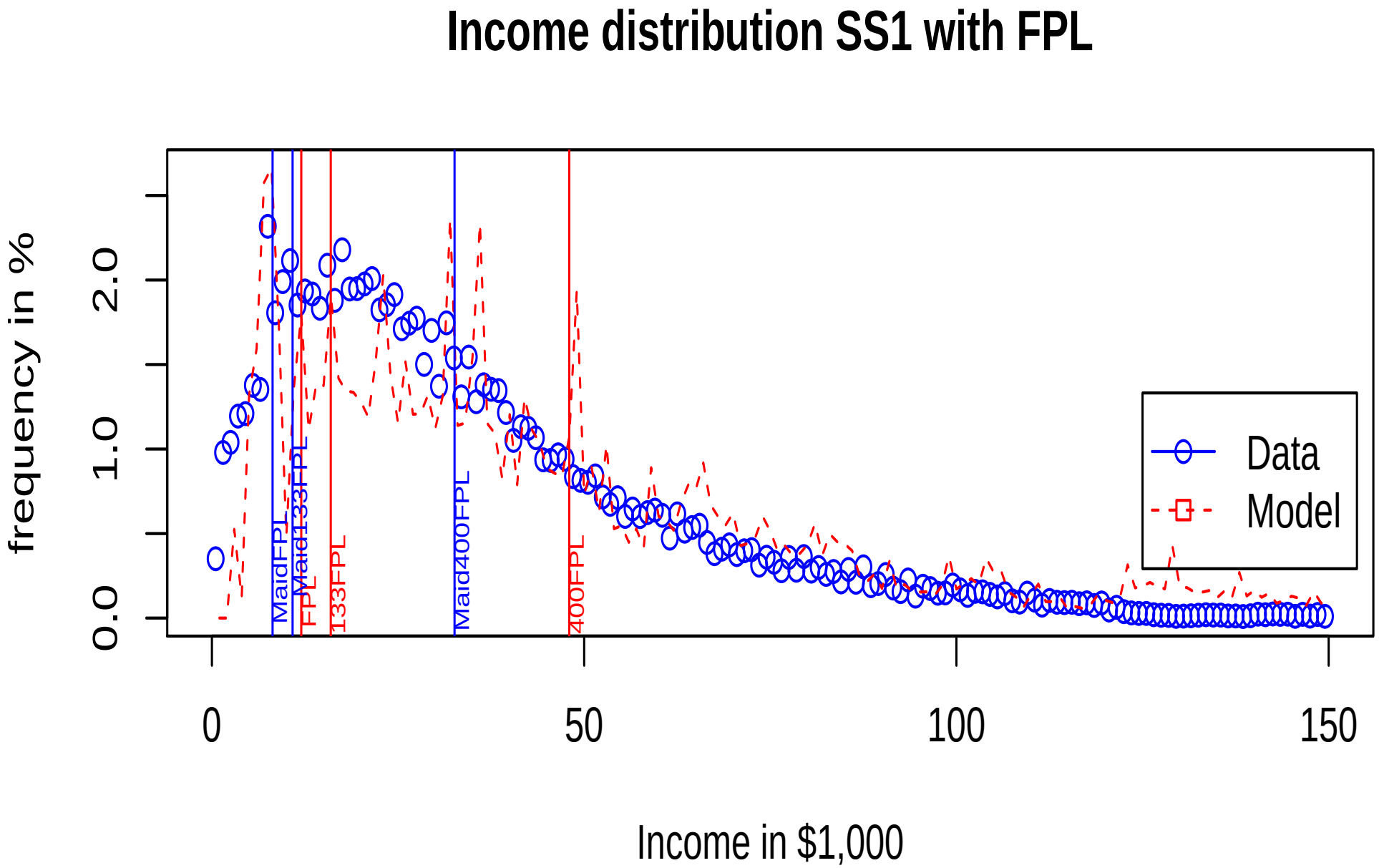


Insurance Take Up Rate: Model vs. Data








Income distribution SS1 with FPL
frequency in %
0.0
1.0
2.0
0
50
100
150
Income in $1,000
MaidFPL
Maid133FPL
FPL
133FPL
Maid400FPL
400FPL
Data
Model

Calibration: Matched moments

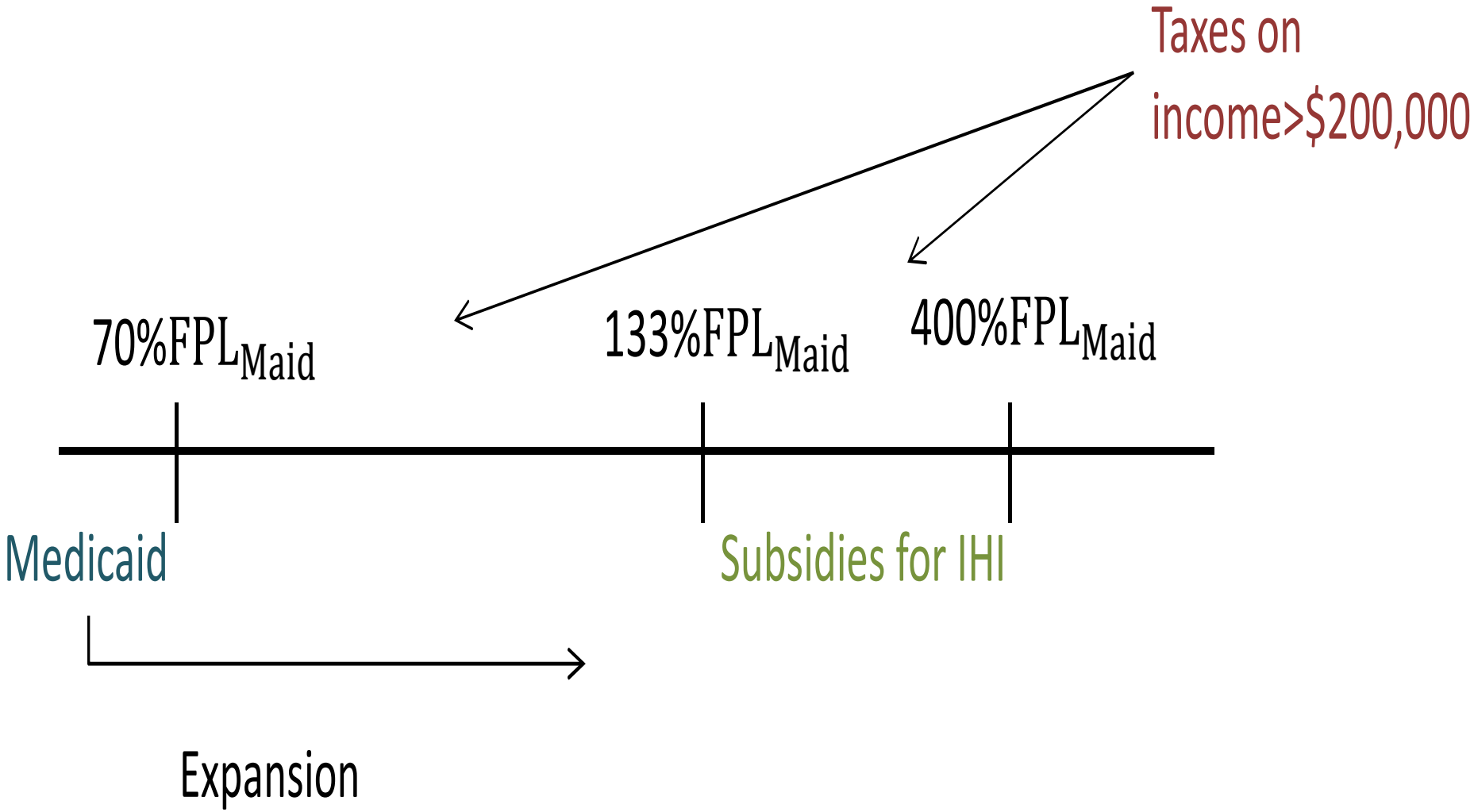
Moments	**Model**	**Data**	**Source**
- Medical expenses HH income	17.6%	17.07%	CMS communication
- Workers IHI	6.7%	7.6%	MEPS 1999/2009
- Workers IHI	62.2%	63.6%	MEPS 1999/2009
- Workers Medicaid	9.0%	9.2%	MEPS 1999/2009
- Capital output ratio: K/Y	2.9	$2.6-3$	NIPA
- Interest rate: R	4.2%	4%	NIPA
- Size of Social Security: $SocSec/Y$	5.9%	5%	*OMB* 2008
- Size of Medicare: $Medicare/Y$	3.1%	$2.5-3.1\%$	U.S. Department of Health 2007
- Payroll tax Social Security: τ^{Soc}	9.4%	$10-12\%$	IRS
- Consumption tax: τ^{C}	5.0%	5.7%	Mendoza et al. (1994)
- Payroll tax Medicare: τ^{Med}	2.9%	$1.5-2.9\%$	Social Security Update 2007
-Total tax revenue/Y	21.8%	28.3%	Stephenson (1998) and Barro and Sahasakul (1986)
- Medical spending profile		see figure	
- Medical spending distribution		see figure	
- Insurance take-up ratios		see figure	

ACA IMPLEMENTATION

Elements of the "Obama reform" in the model

1. **Penalty:** Uninsured pay penalty of 2.5% of income
2. **Subsidy and insurance exchanges:** Subsidy to buy IHI if $133\% FPL < income < 400\% FPL$
3. **Expansion of Medicaid:**
   - Income $<$ 133% FPL
   - No more asset tests
4. **No screening:** No price discrimination in IHI markets
5. **Financing:**
   1. Payroll tax on the rich (income $>$ 200k)
   2. Consumption tax, or
   3. Fixed tax (let exogenous gov't consumption adjust)

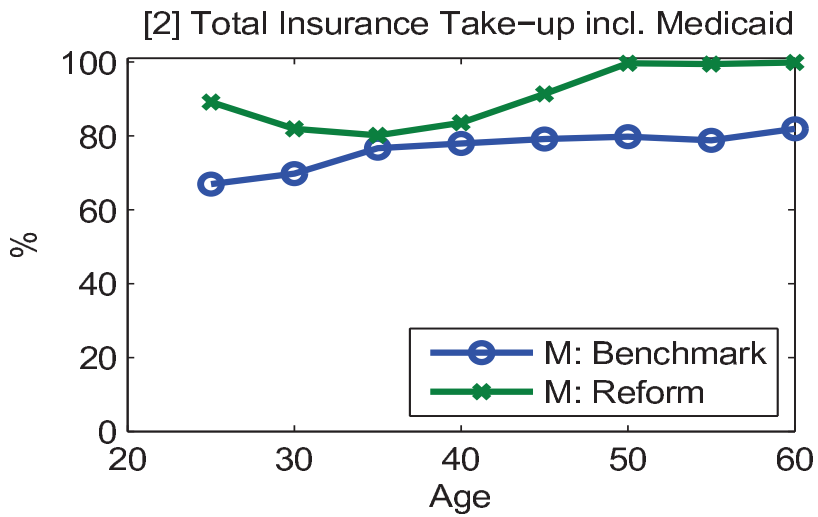
Elements of the "Obama reform" in the model

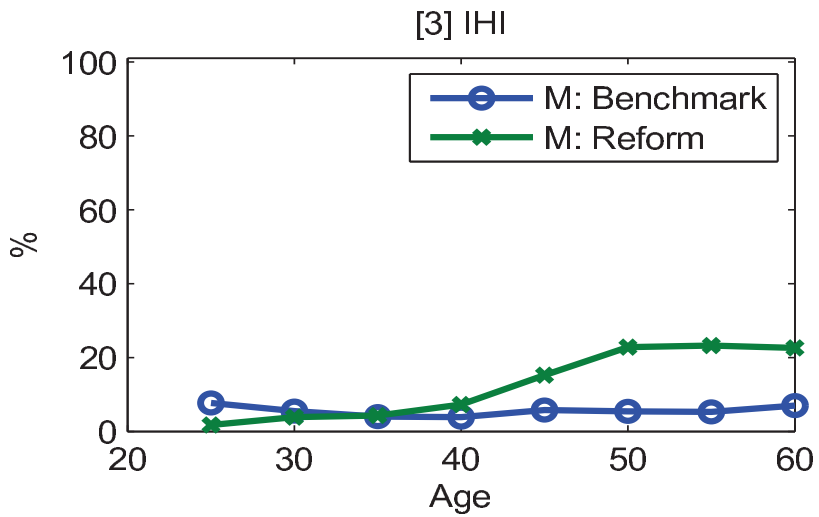


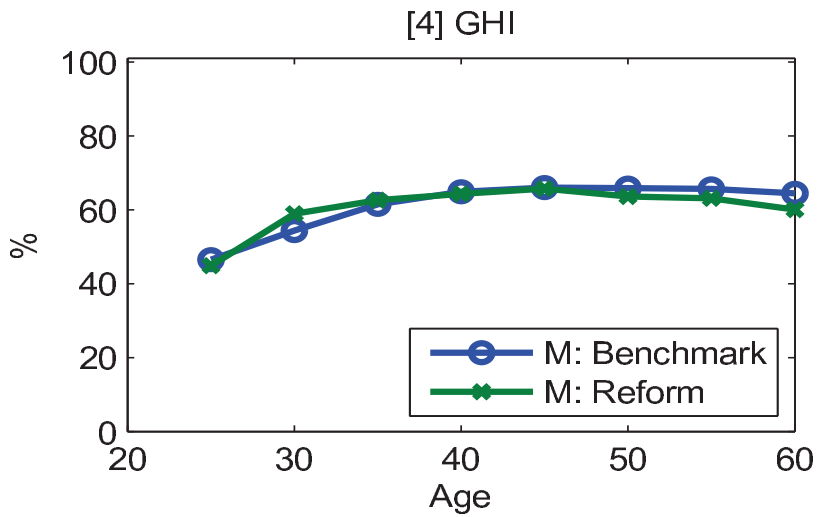
RESULTS

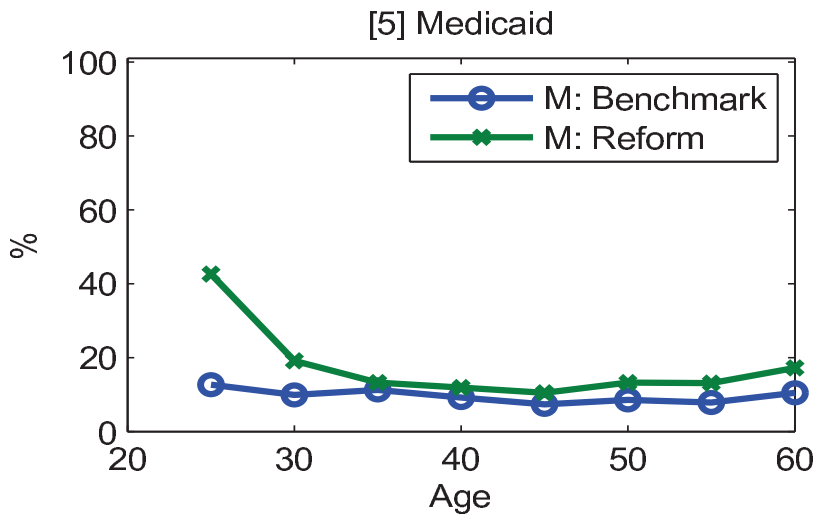
OVERALL EFFECTS OF ACA

Benchmark vs. Reform: Insurance take-up rates









Benchmark vs. Reform: Health insurance and expenditures

	Benchmark	**The ACA Reform**	
		(a) Partial eqm.	(b) General eqm.
Workers insured (%):	76.23	99.00	90.41
+ IHI (%)	5.55	23.85	12.38
+ GHI (%)	61.05	57.64	60.38
+ Medicaid (%)	9.62	17.51	17.64
IHI average premium	100	100	140.20
GHI premium	100	100	80.48
Medical services (M)	100	100.06	100.04
Med. spending ($p_m \times M$)	100	95.04	96.31
Med. spending/GDP(%)	17.66	–	17.61

Benchmark vs. Reform: Market aggregates

	Benchmark	**The ACA Reform**	
		(a) Partial eqm.	(b) General eqm.
⋮	⋮	⋮	⋮
Med. spending/GDP(%)	17.66	–	17.61
ACA payroll tax (%)	0	0.60	0.50
GDP	100	–	98.51
Capital (K_c)	100	99.12	98.61
Capital (K_m)	100	101.22	100.24
Weekly hours worked	100	94.79	96.26
Health (H)	100	100.10	100.01
Consumption (C)	100	98.33	97.85
Welfare change		⊕	⊖

The key channels of effects

1. **Negative savings effect:** self-insurance vs. market insurance
2. **Moral hazard effect:** lower effective price of health services
3. **Tax effect:** higher tax rates for high income earners
4. **General equilibrium effect:** wage and interest rates $\rightarrow$
5. Lower income for most
6. Lower consumption levels for most

Welfare effects

- Negative efficiency effects
  - Capital drops
  - Output drops
  - Household income drops (w decrease)
  - Consumption of C drops
- Positive insurance effects
  - More insured, improved risk sharing, less risk
  - More medical services for some AND overall health spending decreases
  - Increases in health capital H
  - If H is productive, it has a positive effect on output

Welfare effects by health and skill group

Health capital	Skill 1 (low)	Skill 2	Skill 3	Skill 4 (high)
h = 15 (healthy)	1.40	-1.03	-2.60	-2.30
h = 14	1.16	-1.33	-2.68	-2.35
h = 13	0.37	-1.44	-2.77	-2.40
h = 12	0.12	-1.56	-2.83	-2.45
h = 11	0.07	-1.54	-2.89	-2.48
h = 10	0.14	-1.26	-2.65	-2.36
h = 9	0.38	-0.55	-2.14	-2.29
h = 8	0.77	0.55	-1.72	-2.09
h = 7	1.06	1.46	-1.42	-1.70
h = 6	2.22	2.40	-0.92	-1.31
h = 5	3.96	3.69	-0.20	-0.98
h = 4	5.71	5.28	0.68	-0.58
h = 3	7.58	7.31	1.73	0.01
h = 2	10.37	9.11	2.38	0.38
h = 1 (sick)	14.14	12.89	4.86	1.06

Table: Compensating consumption in percent of lifetime income.

ISOLATING THE EFFECTS OF PENALTIES, SUBSIDIES, AND MEDICAID EXPANSION

Only penalties

	Bench	**Penalty in % of individual income**			
		(a) 2.5%	(b) 5%	(c) 10%	(d) 15%
Workers insured (%):	76.23	98.72	99.33	99.73	99.84
+ IHI (%)	5.55	23.78	24.43	25.19	25.69
+ GHI (%)	61.05	66.92	67.41	68.10	68.85
+ Medicaid (%)	9.62	8.03	7.49	6.44	5.31
IHI average premium	100	102.22	101.64	101.16	101.20
GHI premium	100	66.30	65.58	64.90	64.35
Med. spending	100	95.53	95.47	95.46	95.50
Med. spending/GDP(%)	17.66	17.24	17.21	17.17	17.14
GDP	100	100.55	100.74	101.04	101.33
Welfare change (%Δ)		⊖	⊖	⊖	⊖

Only subsidies

	Bench	IHI Subsidies relative to ACA (%)			
		(a) 100%	(b) 120%	(c) 135%	(d) 150%
Workers insured (%):	76.23	85.13	86.36	86.76	87.02
+ IHI (%)	5.55	14.40	15.79	16.41	16.67
+ GHI (%)	61.05	63.99	65.02	65.25	65.36
+ Medicaid (%)	9.62	6.74	5.56	5.10	4.98
IHI average premium	100	99.14	101.30	102.40	102.81
GHI premium	100	88.07	83.16	81.64	80.93
Med. spending	100	98.57	98.46	98.41	98.36
Med. spending/GDP (%)	17.66	17.64	17.69	17.72	17.73
ACA payroll tax (%)	0.0	0.32	0.53	0.67	0.73
GDP	100	99.78	99.59	99.44	99.37
Welfare change (%Δ)		⊕	⊕	⊕	⊕

Only Medicaid

	Bench	**Medicaid extension (% of FPL_{Maid})**			
		(a) 133	(b) 150	(c) 200	(d) 300
Workers insured (%):	76.23	79.81	81.36	84.75	87.16
+ IHI (%)	5.55	6.21	6.61	6.43	5.72
+ GHI (%)	61.05	58.51	56.89	54.05	49.90
+ Medicaid (%)	9.62	15.09	17.86	24.26	31.54
IHI average premium	100	98.38	96.71	92.33	88.07
GHI premium	100	98.87	98.08	97.64	98.38
Med. spending	100	99.17	98.74	97.71	96.71
Med. spending/GDP(%)	17.66	17.74	17.77	17.91	18.07
ACA payroll tax (%)	0.0	0.25	0.40	0.83	1.35
GDP	100	98.93	98.39	96.77	94.94
Welfare change (%Δ)		⊕	⊕	⊕	⊖

IHI screening off or Medicaid asset test off

	[1] Bench	[2] IHI screen off	[3] Asset test off
Workers insured (%):	76.23	65.22	77.36
+ IHI (%)	5.55	0	5.87
+ GHI (%)	61.05	56.12	59.80
+ Medicaid (%)	9.62	9.10	11.70
Med. spend.	100	101.93	99.69
Med. spend./GDP(%)	17.66	17.84	17.67
GDP	100	99.96	99.80
Welfare (%Δ)		$\ominus$	$\oplus$

Summary of separate effects

- **Penalty**
  - force young and healthy agents to buy insurance
  - expand coverage and improve risk sharing
  - but distort savings and work incentives and cause of welfare loss
- **Subsidy**
  - Induce low income agents to buy insurance
  - Prevent collapse of IHI caused by NO screening policy and Medicaid expansion
  - Redistribute income toward the poor
  - Mitigate welfare loss caused by penalty
  - Source of tax distortion
- **Medicaid expansion**
  - Extend coverage of low income agents
  - Improve risk pooling and income redistribution
  - Cause income loss due to fiscal distortions
  - Cost containment (lowest re-imbursement levels)

FINANCING THE REFORM

Financing the ACA

	[1] Benchmark	[2] ACA	[3] ACA financed by		
		τ^V	(a) G	(b) τ^C	(c) τ^{Lump}
Workers:	76.23	90.41	90.68	90.35	90.53
+ IHI (%)	5.55	12.38	12.74	12.39	13.01
+ GHI (%)	61.05	60.38	60.55	60.42	61.55
+ Medicaid (%)	9.62	17.64	17.39	17.54	15.97
Med. Spending	100	96.31	96.29	96.35	96.34
Output (GDP)	100	98.51	98.74	98.70	99.15
Welfare change (%Δ)	0	-0.23	0.41	-0.21	-0.36
Taxes financing the ACA:					
Payroll tax τ^V (%)	0	0.50	–	–	–
Gov't consumption C^G (%)	11.51	–	11.03	–	–
Consumption tax τ^C (%)	5.00	–	–	5.94	–
Lump-sum tax τ^{Lump} (%)	0	–	–	–	0.36

Conclusion

1. Construct a heterogeneous agents macro-model with health as a durable good
2. Account for life-cycle patterns of health expenditures and private insurance take up rates
3. Assess the macroeconomic effects of the Obama health care reform 2010

Future work on macro-health economics

- More sensitivity analysis
- Health capital and endogenous survival probabilities
- Optimal public health insurance with endogenous health capital
- Life-cycle consumption puzzle: the role of health
- Structural estimation of the health production function