The Effect of the Affordable Care Act on the Labor Supply and Savings of Older Americans

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Disclaimer: The opinions and conclusions are solely those of the authors, and do not necessarily reflect the views of the Federal Reserve Bank of Richmond or the Federal Reserve System.

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- Most U.S. households received health insurance through their employers
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- Previous evidence
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  - Rust and Phelan (1997), French and Jones (2011), many others
- Many of those without employer insurance are uninsured, potentially they must work to pay for health care

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  - Severed job-insurance link
  - Work disincentives through income-based subsidies

DiD-Evidence: ACA had substantial effects on insurance choice, but modest effects on employment

Insurance

- Rates of uninsured dropped substantially (Duggan, Goda, and Jackson, 2019; Levy, Buchmueller, and Nikpay, 2017)
- Differential responses across Medicaid expansion / non-expansion states suggest substitution between subsidized private insurance and Medicaid
- Our data: Drop of 5 percentage points.

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Lots of heterogeneity across wealth distribution and initial health insurance state (**retiree**, **tied**, **non-group**)

Effect of ACA on Labor Supply by Health Insurance Type and Asset Tertile, HRS Data

Health Insurance	Non-Group			Tied		
Asset Tertile	Low	Middle	High	Low	Middle	High
Estimates	.03	-.01	-.02	-.02	-.003	.01

$$\text{Empl}_{it} = x_{it}b + \sum_{k \in K} \gamma_{k,\textbf{Non-Group}} 1\{year \geq 2014\} \times \textbf{Non-Group}_i \times 1\{\text{asset tertile}_{it-1} = k\}$$
$$+ \sum_{k \in K} \gamma_{k,\textbf{Tied}} 1\{year \geq 2014\} \times \textbf{Tied}_i \times 1\{\text{asset tertile}_{it-1} = k\} + u_{it}$$

- **Non-Group**, **Tied** : indicators for initial insurance type
- Estimates are relative to **Retiree** insurance.
- $K = \{\textbf{Low}, \textbf{Middle}, \textbf{High}\}$
- x_t includes age polynomial, year dummies, lagged asset tertile dummies, health insurance type dummies.

Our explanation for the small, heterogeneous retirement effects

- Before the ACA, many low-income people had access to implicit forms of insurance (Mahoney 2015, Finkelstein et al. 2017)
- We will model these implicit forms of insurance as a consumption floor (Hubbard et al. 1995, French and Jones 2011)

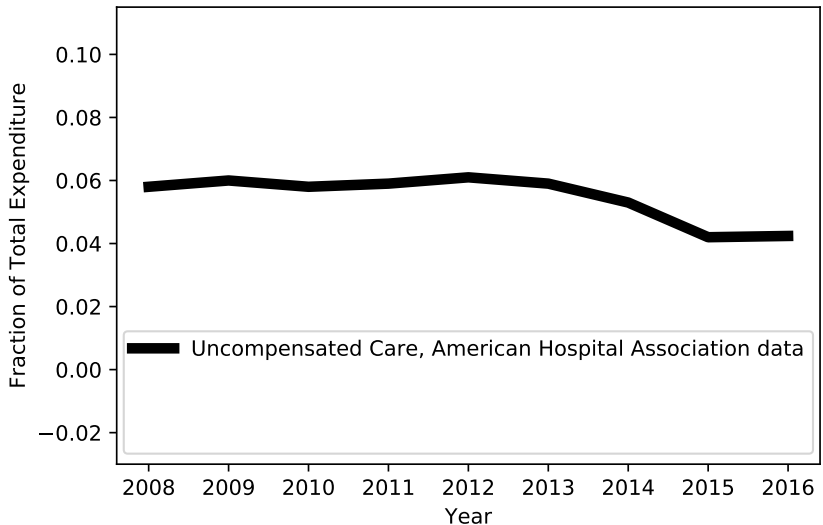
Medical spending, by insurance type and payor, pre-2014, MEPS Data (HRS for Assets)

	Uninsured	**Privately Insured**
Total expenses	7,930	9,570
Out of pocket	1,590	2,660
Private insurance	990	5,720
Medicare + Medicaid	1,540	629
Other*	1,940	580
Uncompensated care**	1,880	0
Share with assets $< 50,000$	.53	.35

* Other payors = the sum of payments by Tricare, VA care, workers compensation, other Federal or state/local plans, charity, and unclassified sources (including automobile, homeowner's, and liability insurance)

** Uncompensated care is constructed using data on charges and payments.

Decline in Uncompensated Care



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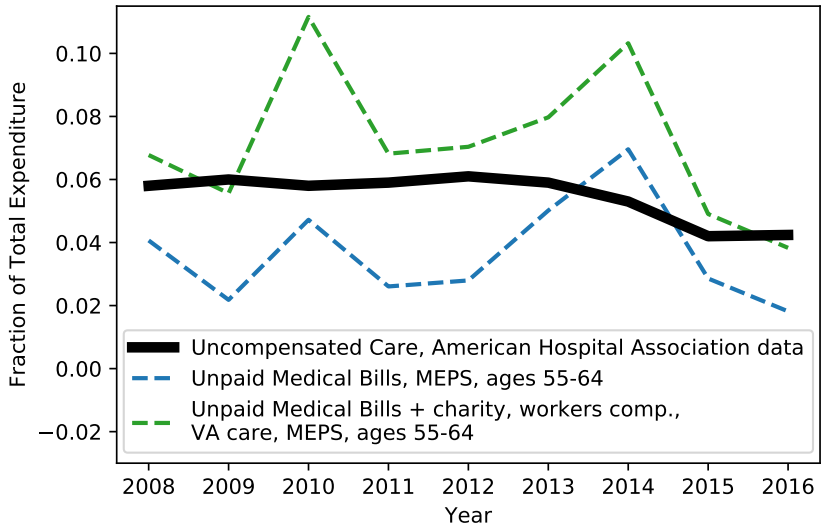
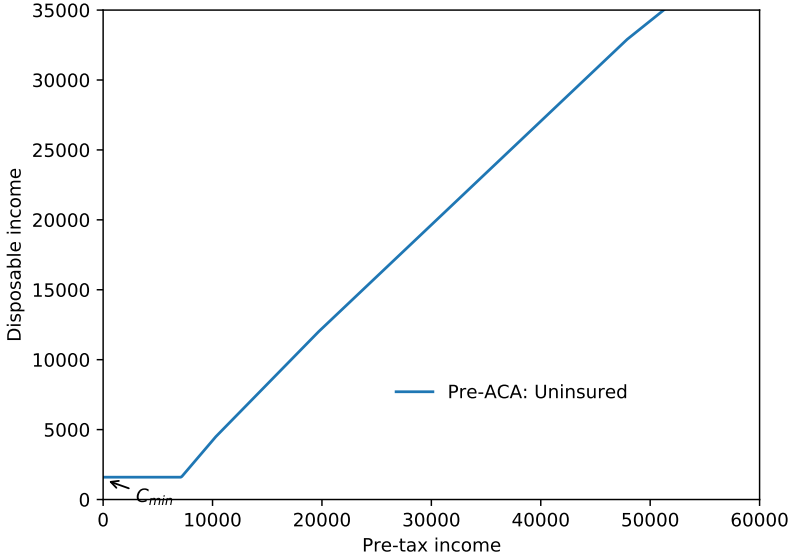


Our Contribution

- We estimate a retirement model that accounts for:
  - medical expense uncertainty
  - the saving decision
  - multiple insurance possibilities (uninsured, private non-group, employer-provided, Medicaid, Medicare, combinations)
  - default on medical bills (i.e., uncompensated care)
  - savings + default is key novelty relative to other papers (Aizawa and Fang 2019, Aizawa and Fu 2020)

Budget Set of Uninsured Person, No Assets, and $5,000 of Medical Expenses



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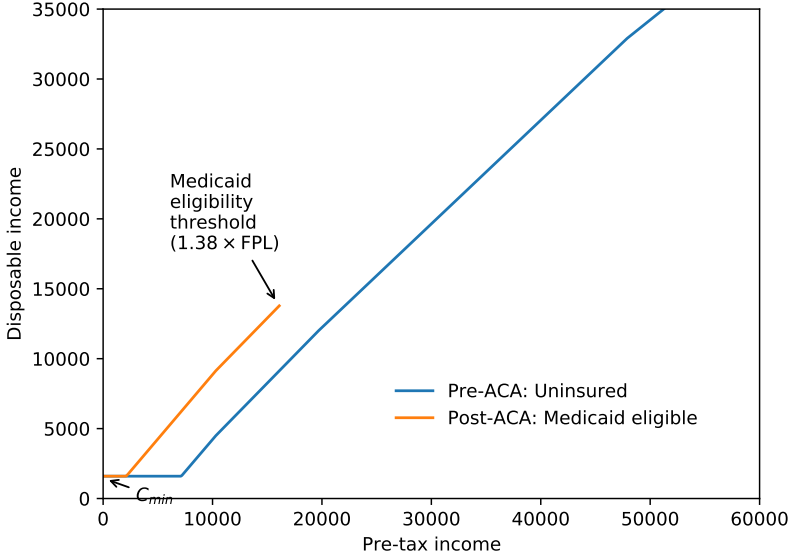

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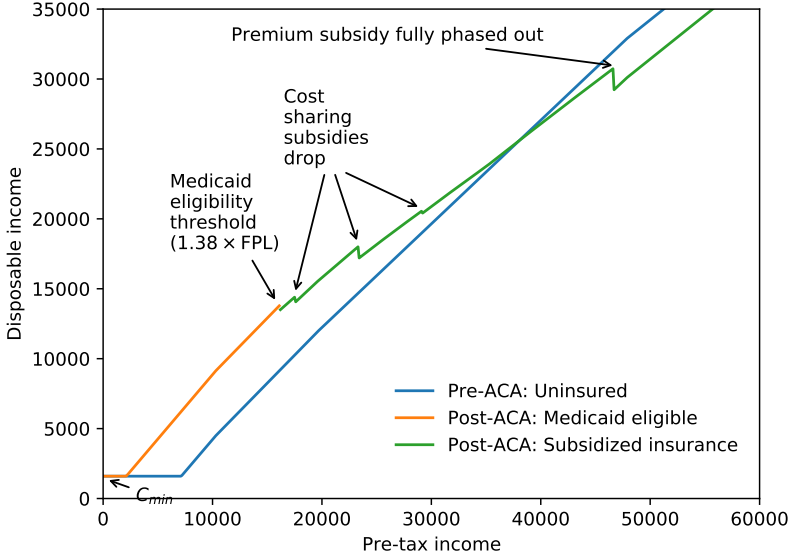

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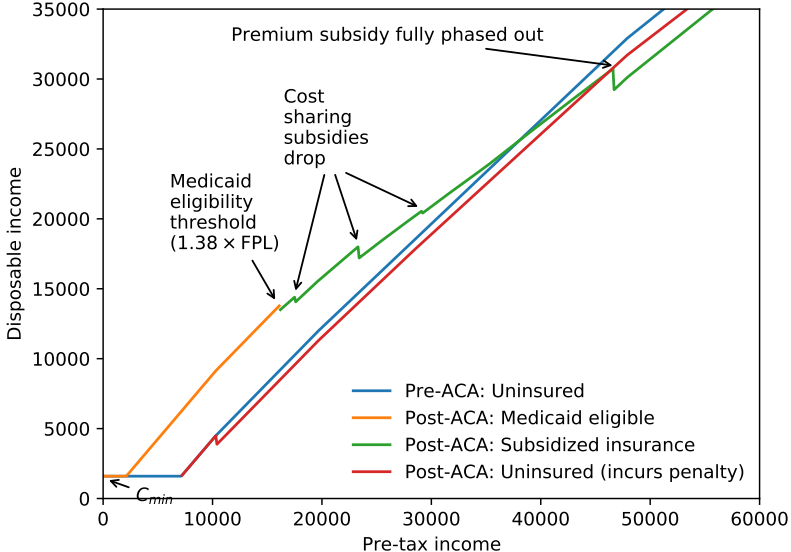

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- Findings
  - Small aggregate disemployment effects, but very heterogeneous
  - Default on medical bills key for finding small effects

Roadmap

Life-Cycle Model: Overview and Estimation

Data, Medical Spending and Health Insurance

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Government partially insures this risk with:

1. Progressive taxation
2. Public health insurance
3. Social Security / disability benefits
4. "Consumption floor"

Asset Accumulation Equation

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- expenditures_t includes: consumption; insurance premia; out-of-pocket medical expenses (realized after decisions)
- Government/hospital $\text{transfers}_t = \max\{0, C_{min} - resources_t\}$
  - C_{min}: consumption floor (Hubbard et al. 1995)
  - Captures insurance provided via non-payment of medical expenses – "default", or "uncompensated care"

Solution and Estimation

- Method of Simulated Moments, two steps
  - Step 1: estimate parameters of total medical spending, health, mortality, coinsurance rates, etc.
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  - State variables: assets, Social Security Claiming Status, health, AIME, age, insurance type, last period's employment, wage, medical spending shock, marital status, spousal income
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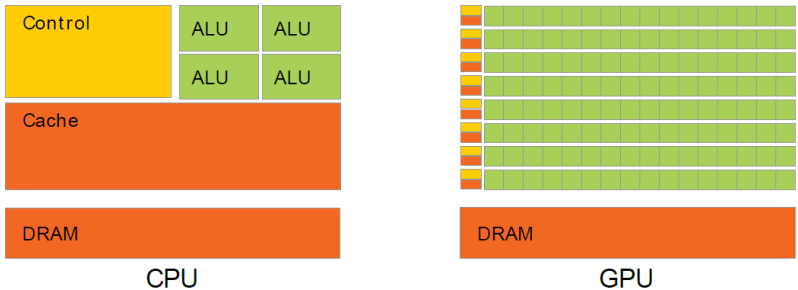
  - We solve the model on GPUs (using Python and Numba)
  - Implementation is an order of magnitude faster than on a 100-node cluster

Computing on GPUs

- Many very small computing units (think of each deciding on the colors of a portion of the screen) $\rightarrow$ Massive parallelization
- Each unit is rather "dumb": Can do floating point operations, but weak at control flow (if/then, loops)
- Very efficient, very scalable for arithmetic calculations



Reproduced from: NVIDIA (2016)

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- Use HRS and MEPS data
  - 1940s cohort, until 2012 to estimate the model
  - 1945-1963 cohort, after 2014 for model predicted effects

Household Total and Out-of-pocket Medical Spending

	Younger than 65		**65 and Older**	
	Total	OOP	Total	OOP
Mean	8,910	1,190	14,690	2,200
Median	3,540	580	7,630	1,300
90^{th} percentile	22,210	2,800	35,540	5,080
95^{th} percentile	36,620	4,180	52,420	7,110

MEPS data. OOP includes co-pays and deductibles, excludes premia.

Household Total Medical Spending

- The mean and variance of total medical spending (Z) are functions of health (H), marital status (SP), and age.
- Households face transitory and persistent medical expense shocks:

$$\begin{aligned} \ln Z_t &= \mu_z(H_t, SP_t, t) + \Psi_t, \\ \Psi_t &= \sigma_z(H_t, SP_t, t) \times \psi_t. \\ \psi_t &\sim \mathcal{N}(0, 1). \end{aligned}$$

ψ_t is the sum of a persistent (AR1, $\rho = 0.925$) and a transitory component

Health Insurance States

3 types of (employer-provided) health insurance

- **Retiree** = insurance you can hold onto after you leave your job
- **Tied** = insurance that ends shortly after you leave your job
- **None** = no employer provided insurance

Health Insurance States and Possibilities, Pre-ACA

State	**Choice Set** | **not disabled, age** < 65
Retiree	Retiree
Tied	Tied
Non-Group	Uninsured, Private Non-Group

Health Insurance States and Possibilities, Pre-ACA

State	**Possibilities | DI recipient or age > 65, high income and assets**
Retiree	Retiree, Retiree + Medicare
Tied	Tied, Tied + Medicare
Non-Group	Medicare

Health Insurance States and Possibilities, Pre-ACA

State	**Possibilities | DI recipient or age > 65, low income and assets**
Retiree	
	Medicare + Medicaid
Tied	
	Medicare + Medicaid
Non-Group	
	Medicare + Medicaid

Transitions

Four parameters describe a health insurance policy

- Deductible
- Co-pay rate
- Stop-loss (out-of-pocket maximum)
- Premium

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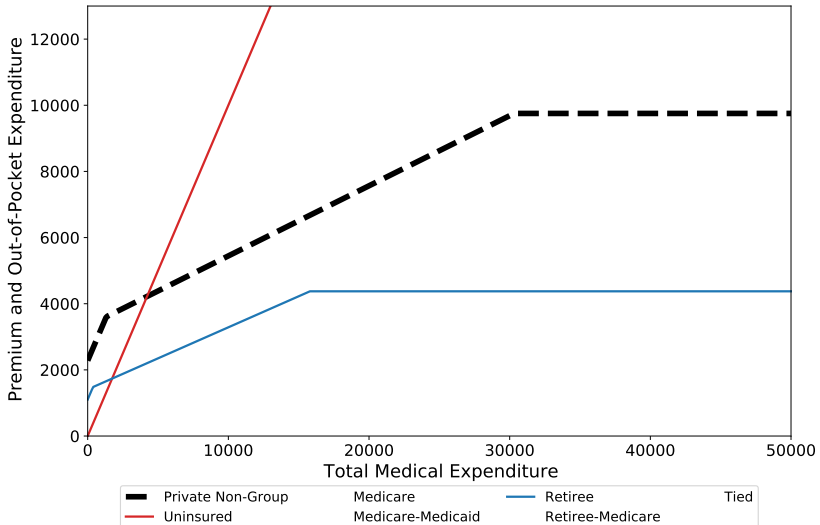
  - Private Non-Group: function of

    permanent shock to expenses, health, marital status, age
  - Employer-provided: function of

    employment, marital status

Budget Sets by Health Insurance Type, Age < 65
Average Predicted Medical Spending



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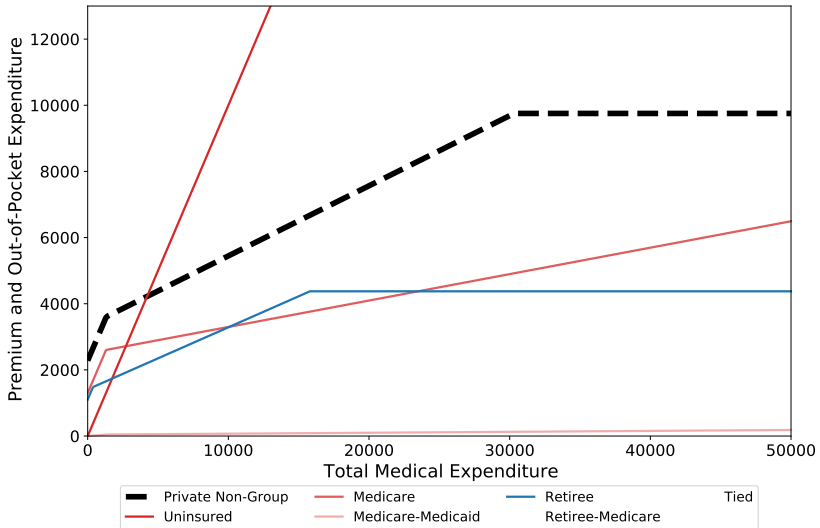

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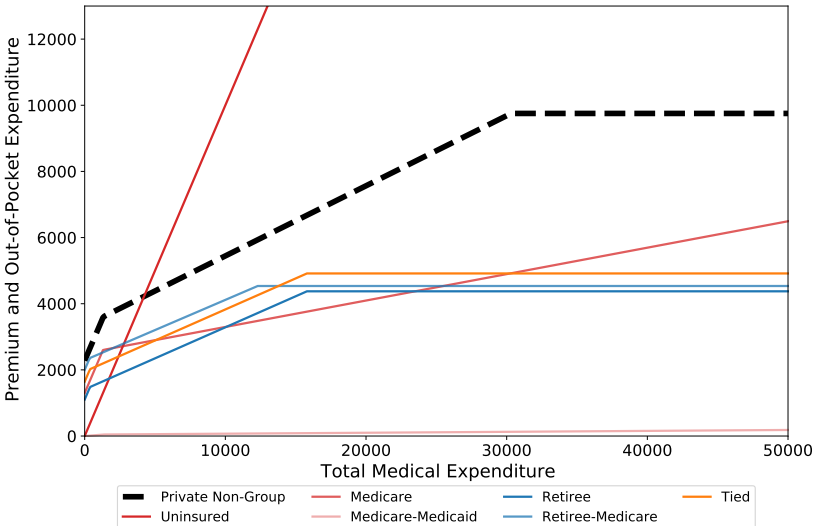

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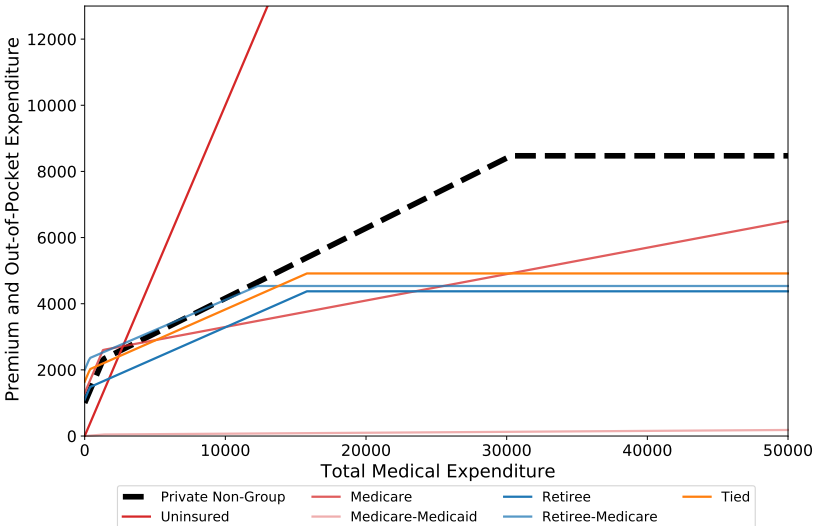
Low Predicted Medical Spending



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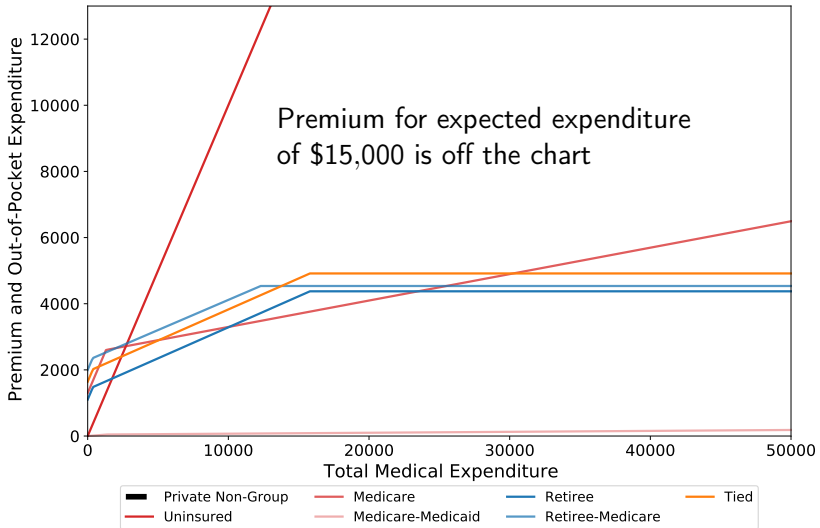

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Preference Parameter Estimates

$$U(C_t, L_t) = \frac{1}{1-\nu}\left(C_t^{\gamma} L_t^{1-\gamma}\right)^{1-\nu}$$

$L_t = L - N_t - \phi_{Pt} P_t - \phi_{RE} RE_t - \phi_H H_t$

C_t = equivalized consumption, N_t = work hours,

$P_t = 1$ if working, $RE_t = 1$ if working this period, not last period.

Parameter	**Symbol**	**Type 0**	**Type 1**	**Type 2**
Time discount factor	β	0.839	0.912	1.06
		(0.020)	(0.008)	(0.01)
Consumption weight	γ	0.678	0.881	0.0718
		(0.012)	(0.006)	(0.0855)
Coefficient of relative risk aversion	ν	3.84	0.999	3.83
		(0.35)	(0.079)	(1.82)
Population share		0.35	0.47	0.18
Bequest shifter	κ		334000.0	
			(31862.1)	
Bequest weight (MPC out of final-period wealth)			0.0286	
			(0.0015)	

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Parameter	**Symbol**	**All types**
Time endowment	L	3930.0 (31.7)
Fixed cost of work (intercept)	$\phi_{P_{\mathbf{50}}}$	338.0 (19.6)
Fixed cost of work (age trend)	$\phi_{P_{\mathbf{trend}}}$	84.1 (2.4)
Fixed cost of reentering the labor market	RE_t	120.0 (147.6)
Leisure cost of bad health	ϕ_H	409.0 (30.7)

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Parameter	**Symbol**	**All types**
Consumption floor	$C_{\min}$	1600.0 (127.2)
Private premium, additional markup on insurer fraction	b	1.16 (0.01)

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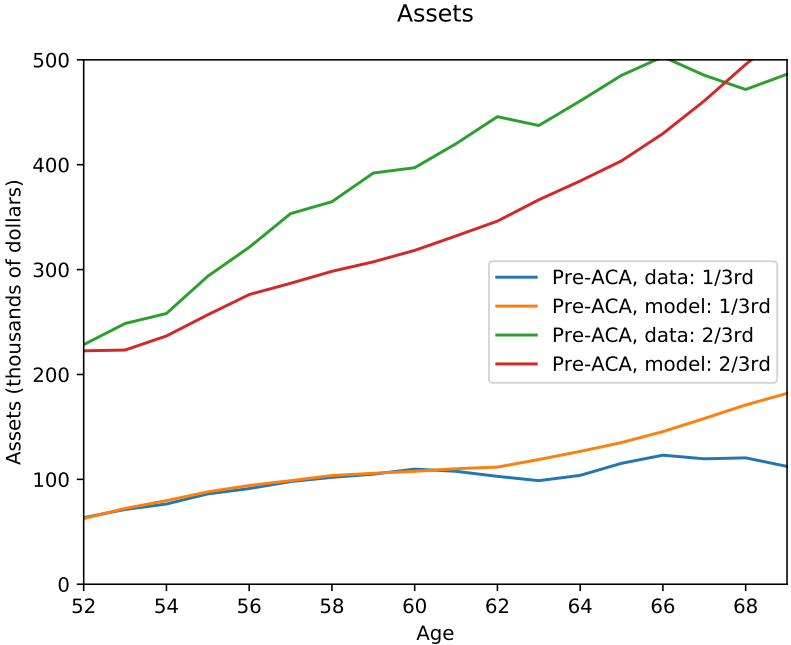
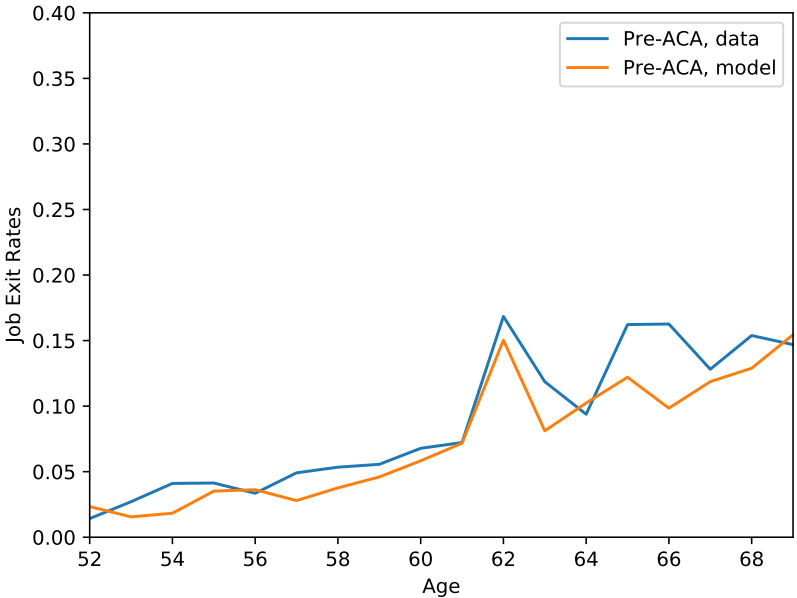
Parameter	**value**
Average Frisch labor supply elasticity, intensive margin, age 55	0.46
Average coeffficient of relative risk aversion, consumption	2.08


Assets
Assets (thousands of dollars)
Age
0
100
200
300
400
500
52
54
56
58
60
62
64
66
68
Pre-ACA, data: 1/3rd
Pre-ACA, model: 1/3rd
Pre-ACA, data: 2/3rd
Pre-ACA, model: 2/3rd


Job Exit Rate
Pre-ACA, data
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Job Exit Rates
0.00
0.05
0.10
0.15
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0.30
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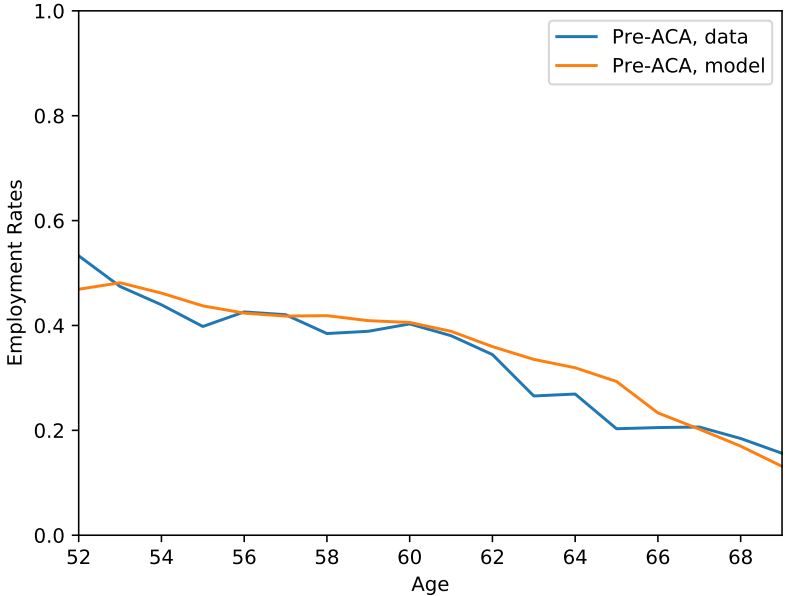
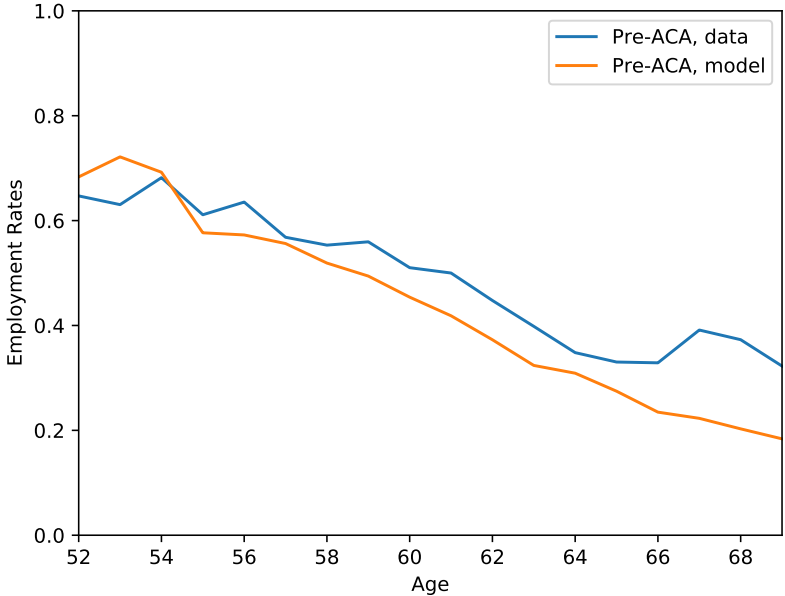
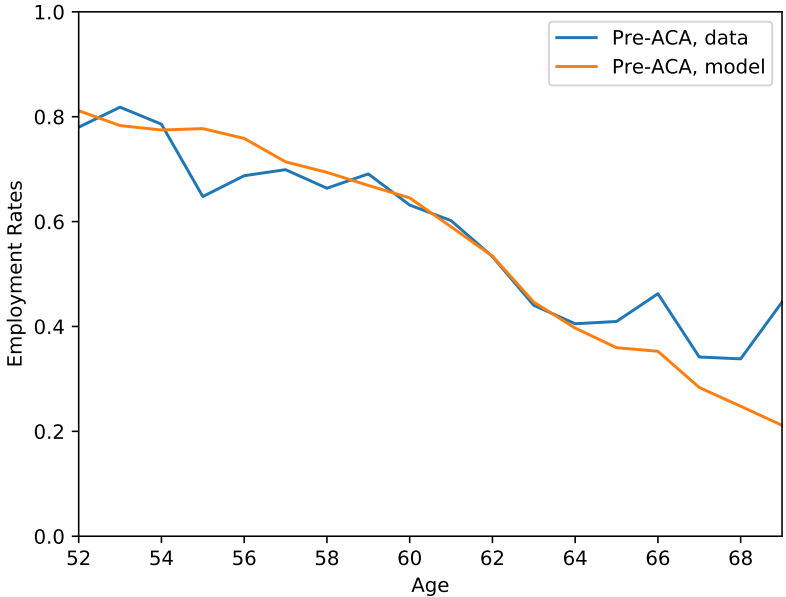
54
56
58
60
62
64
66
68
Age

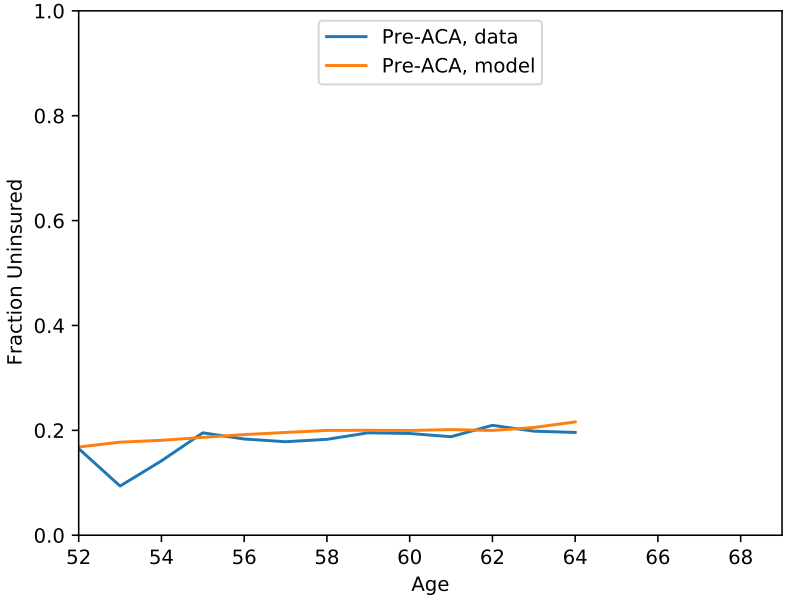
Employment Rates, Bottom Assets Tercile, No Group Health Insurance

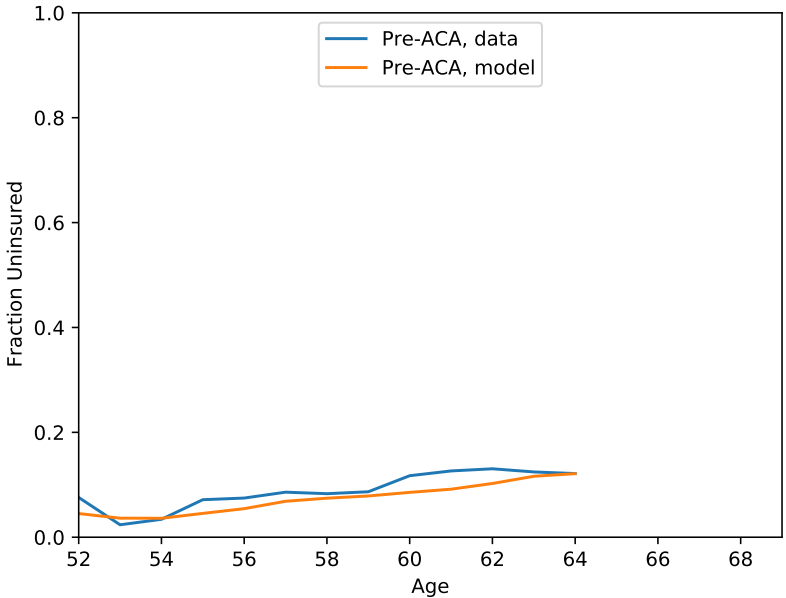


Employment Rates, Middle Assets Tercile, No Group Health Insurance




Employment Rates, Top Assets Tercile, No Group Health Insurance
Pre-ACA, data
Pre-ACA, model
Employment Rates
Age
1.0
0.8
0.6
0.4
0.2
0.0
52
54
56
58
60
62
64
66
68


Fraction Uninsured, Bottom Assets Tercile
Pre-ACA, data
Pre-ACA, model
Fraction Uninsured
Age
0.0
0.2
0.4
0.6
0.8
1.0
52
54
56
58
60
62
64
66
68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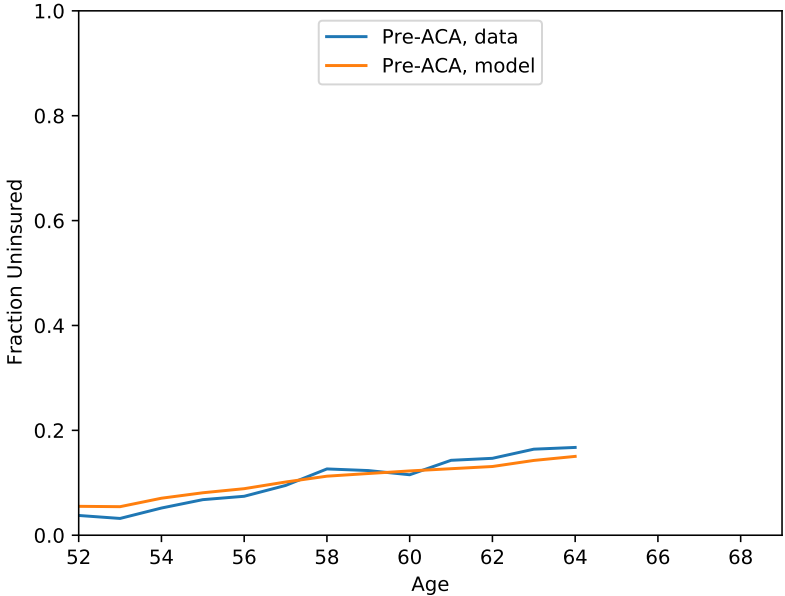
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Roadmap

Life-Cycle Model: Overview and Estimation

Data, Medical Spending and Health Insurance

Estimated parameters and model fit

Modeling the ACA and predicting its effects

Reforms We Model: Privately-Purchased Insurance

- Individual mandate

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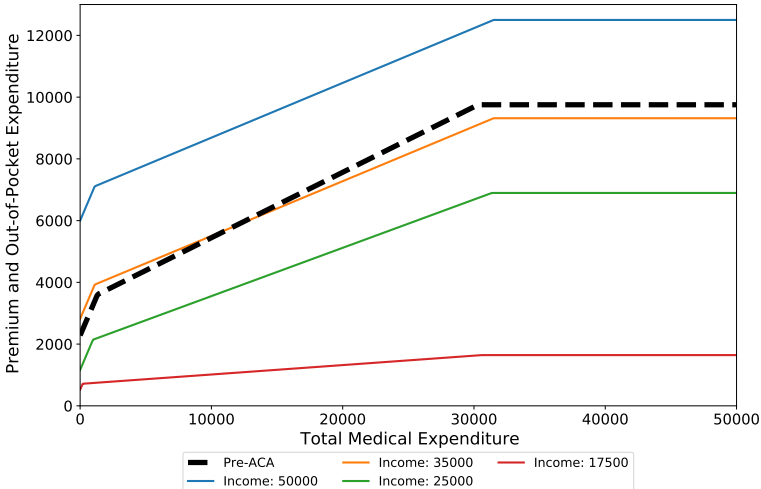
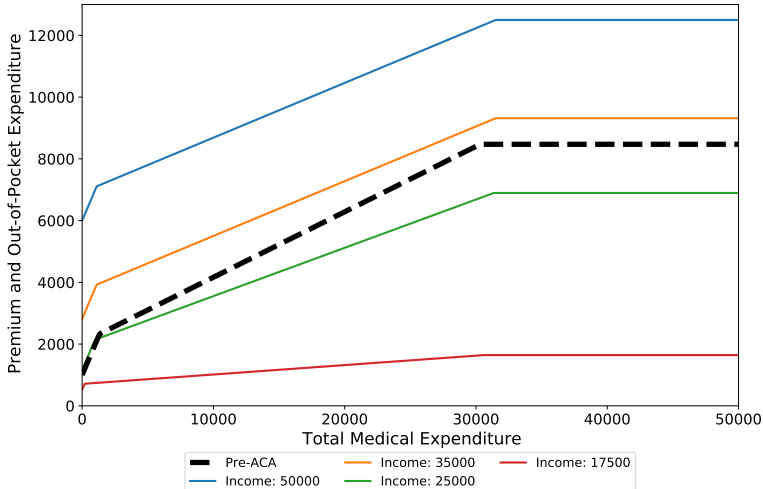
Effect of the ACA on Non-group Premia, Co-pays & Deductibles



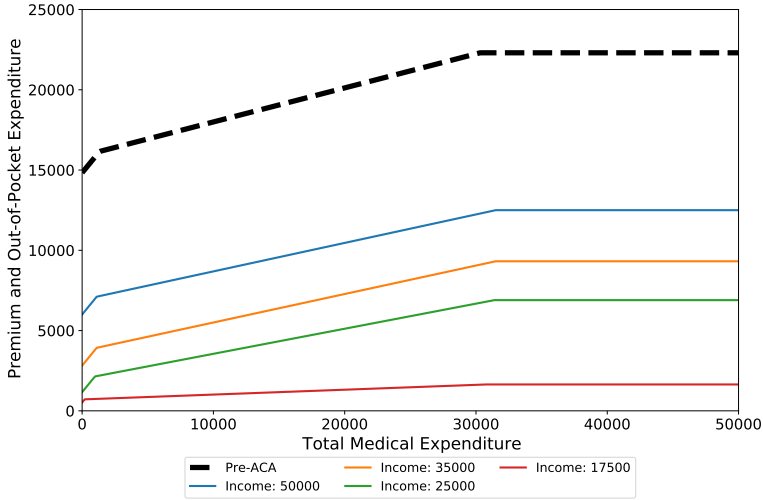
Results for a 60-year-old single with good health and an average value of ψ.

Effect of the ACA on Non-group Premia, Co-pays & Deductibles



Results for a 60-year-old single with good health and a low value of ψ.

Effect of the ACA on Non-group Premia, Co-pays & Deductibles



Results for a 60-year-old single with good health and a high value of ψ.

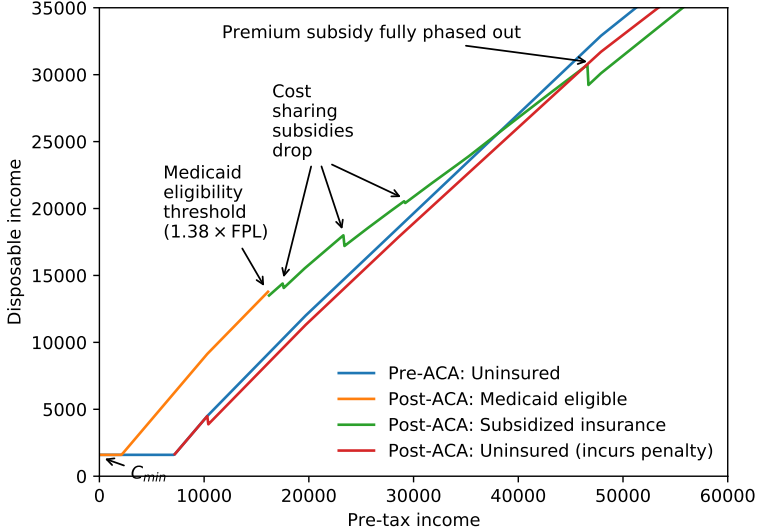
Reforms We Model: Medicaid

- Pre-ACA
  - Households without dependents qualify for Medicaid only via disability
  - Income and (financial) wealth tests
- Post-ACA
  - Any household with income $\leq$ 138% of FPL qualifies
  - No wealth test

Reforms we model: Financing

- 3.8% tax on unearned income in excess of $200k
- Additional 0.9% payroll tax on earnings in excess of $200k
- Revenue from mandate penalties

Budget Set of Previously Uninsured Person, No Assets, and $5,000 of Medical Expenses



Effects of Obamacare

- We present statistics for
  - Insurance coverage
  - Employment
  - Uncompensated Care

- Predict behavior of 1945-1963 cohorts using our model
  - Reforms come unanticipated in 2014 ("MIT shock")
  - Compare effects of ACA (data: before-after and DiD; model: with or without reform 2014-2016)
  - ACA reform is an average across scenarios with and without Medicaid expansion (non-group market reforms and tax changes same in both)

Main Outcomes, 55-64, Model and Data

	Uninsured	**Uncomp. Care**
Pre-ACA, Model	21.8	8.4
Post-ACA - Pre ACA, Model	−9.6	−3.4
Post-ACA - Pre ACA, HRS	−1.7	
Post-ACA - Pre ACA, MEPS	−5.1	−3.2

Main Outcomes, 55-64, Model and Data

	Uninsured	**Uncomp. Care**	**Empl.**
Pre-ACA, Model	21.8	8.4	65.9
Post-ACA - Pre ACA, Model	−9.6	−3.4	−1.1
Post-ACA - Pre ACA, HRS	−1.7		0.1
Post-ACA - Pre ACA, MEPS	−5.1	−3.2	0.1

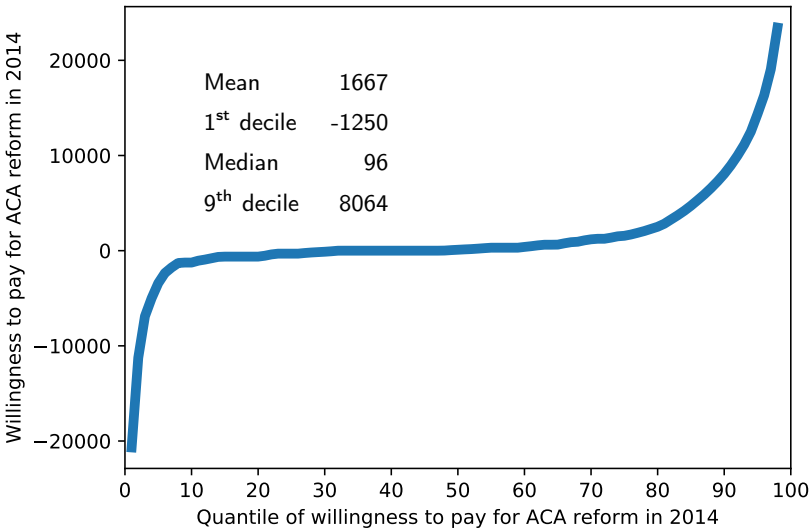
Effect of ACA on Labor Supply, HRS Data vs. Model, by Health Insurance Type and Asset Tertile

Health Insurance	Non-Group			Tied		
Asset Tertile	Low	Middle	High	Low	Middle	High
Estimates	.03	-.01	-.02	-.02	-.003	.01
Model Prediction	-.003	-.01	-.03	-.07	-.03	.01

$$\begin{aligned}\text{Empl}_{it} = \quad & x_{it}b + \sum_{k\in K}\gamma_{k,\textbf{Non-Group}}1\{year \geq 2014\} \times \textbf{Non-Group}_i \times 1\{\text{asset tertile}_{it-1} = k\} \\ & + \sum_{k\in K}\gamma_{k,\textbf{Tied}}1\{year \geq 2014\} \times \textbf{Tied}_i \times 1\{\text{asset tertile}_{it-1} = k\} + u_{it}\end{aligned}$$

- $\textbf{Non-Group}_i, \textbf{Tied}_i$: indicators for initial insurance type
- Estimates are relative to **Retiree** insurance.
- $K = \{\textbf{Low}, \textbf{Middle}, \textbf{High}\}$
- x_{it} includes age polynomial, year dummies, lagged asset tertile dummies, health insurance type dummies.

Willingness to pay for ACA in 2014, ages 55-64



Conclusions

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- Modest effects of ACA on employment
  - Very heterogeneous effects across the wealth / prior insurance distribution
- Default on medical bills as an alternative "insurance" mechanism key to understand effects
- Willingness to pay is positive on average; $\approx$ indifference at median

Elasticity of Labor Supply

- Solve for (approximate) Frisch leisure elasticity analytically:

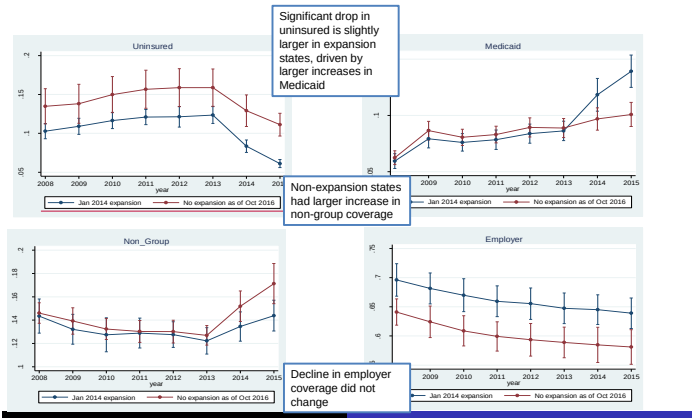
$$\epsilon_l = \frac{\gamma(1-\nu)-1}{\nu}.$$

- The Frisch labor supply elasticity is

$$\epsilon_h = -\frac{leisure_t}{h_t}\epsilon_l = \left(\frac{L-h_t}{h_t}\right)\frac{1-\gamma(1-\nu)}{\nu}.$$

The Medicaid Expansion and Retirement

Sources of coverage, Expansion vs. non-expansion states
Individuals ages 55-64, American Community Survey



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Health Insurance Transitions

Health Insurance States and Possibilities

I_{t-1}	Age (t)	P_{t-1}	H_t = disabled	Categorically Needy (Y_t, A_t)	I_t	Payment Sources
retiree	< 65	0 or 1	no	NA	retiree	R
.	.	0	yes	no	retiree	R + MC
.	.	1	yes	no	retiree	R
.	.	0	yes	yes	non-group	MA (+ MC)
.	.	1	yes	yes	non-group	MA
.	≥ 65	0 or 1	NA	no	retiree	R + MC
.	.	0 or 1	NA	yes	non-group	MC + MA
tied	< 65	0	no	NA	non-group	{U, PNG}
.	.	1	no	NA	tied	T
.	.	0	yes	no	non-group	MC
.	.	1	yes	no	tied	T
.	.	0	yes	yes	non-group	MA (+ MC)
.	.	1	yes	yes	non-group	MA
.	≥ 65	0	NA	no	non-group	MC
.	.	1	NA	no	tied	T + MC
.	.	0 or 1	NA	yes	non-group	MC + MA
non-group	< 65	0 or 1	no	NA	non-group	{U, PNG}
.	.	0	yes	no	non-group	MC
.	.	1	yes	no	non-group	{U, PNG}
.	.	0	yes	yes	non-group	MA (+ MC)
.	.	1	yes	yes	non-group	MA
.	≥ 65	0 or 1	NA	no	non-group	MC
.	.	0 or 1	NA	yes	non-group	MC + MA