Health Insurance Market Design

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Igal Hendel (Northwestern University)

Introduction

- Lots of interest has focused on creation and regulation of health insurance markets (exchanges)
    - Affordable Care Act (ACA) in United States (2010)
    - Netherlands (2006), Switzerland (1996), Private market in Germany
    - Private employer exchanges US
- This type of regulated insurance market, termed managed competition, characterized by:
    - Annual policies (in most cases)
    - "Free entry" of insurers
    - Pre-specified financial coverage levels plans can offer (60%, 70%, 80%, 90% in U.S.)
    - Minimum coverage (health conditions included)
    - Restrictions on pricing pre-existing conditions, demographics

- Ongoing work in US congress replacing the ACA
  - proposals by different Republicans in Congress
    - Better Way: Paul Ryan, Patient Care Act: Orrin Hatch, Empowering Patients First Act: Thomas Price, Health Care Choice Act: Ted Cruz, Healthcare Accessibility, Empowerment, and Liberty Act: William Cassidy and Peter Sessions
- All proposals include repealing participation mandate
  - mandate intended to prevent market unravelling
  - already scrutinized by Supreme Court
  - but perceived as infringing freedom
- Some proposals remove ban on pricing of pre-existing conditions

Why study exchanges?

Some terminology

- Universal Health Care: all citizens covered
  - Origins in 19th century, took off in Europe after WWII
  - Enforced by mandate and/or free access
  - Tied to: health care perceived as a right (and affordable)
- Single-payer Health Care: government pays costs
  - Delivery of care may or may not be by government
  - Tax funded vs employees and employers' contributions
- Exchange design useful when care is not fully delivered by the government
  - even then there is a role

Why study exchanges?

The U.S. History

- Individual hospitals started offering services on a pre-paid basis, as precursors to Blue Cross organizations in the 30s
- Roosevelt Admin while designing Social Security also considered national health program
  - plan dropped, among others opposition by American Medical Association (AMA)
- Post WWII, under wage controls, health insurance used as perk to attract workers
- 1945 Truman proposes public health insurance, opposed by AMA and AHA, as socialism
- 1965 LB Johnson signs Medicare and Medicaid laws
- 70s Nixon proposes mandate and incentives for employers
- 90s Clinton proposal: mandates and subsidies, stopped by 1994 Republican take-over of Congress
- 21st century: Obamacare vs Repeal and replace...

Why is the U.S. Different?

- Despite many attempts, as Bernie Sanders put it during presidential campaign:
  - "We still have 35 million Americans without insurance."
  - "We are the only major country on Earth that doesn't guarantee health care to all people as a right."

Why is the U.S. Different?

- Why the lack of support for universal care in the U.S.?
  - History dependence: good share of population well served by employer provided health insurance
    - Tax benefits of employer provider coverage: increase the cost the alternative
  - Universal coverage requires either:
    - mandate to purchase: infringes freedom (anti-constitutional): freedom collides with long term insurance (more later)
    - free coverage generates backlash: suspicion of large government ("keep the government out of my Medicare"), access requires costly redistribution

- Market design (rules) needed to contend with two potential problems:
- or two risks: i. medical costs given type, ii. type (conditions)
- Risk 1: Adverse section (AS)
  - if charged average premiums, healthy individuals may opt out, leading to premium increase...
  - standard Akerlof lemons inefficiency (market may even collapse)
- Risk 2: Reclassification risk (RR)
  - if health conditions priced
  - individuals face risk of changing health type
    - leading to potentially high premiums at bad times

- Tension between: AS and RR
- AS can be contended with by pricing of health condition
  - individualized prices (rather than average) can eliminate adverse selection
  - less adverse selection, implies more trade, higher welfare
- But pricing health conditions leads to more premium uncertainty
  - exacerbating RR, lowers welfare
- Relates to notion of insurance
  - two risks

- Market rules dictate extent of these concerns
- The Affordable Care Act (ACA) went to one extreme
  - banning pricing of health conditions, eliminating RR
- The potential costs of the ban is AS, in terms of:
  - low participation (mitigated by mandate) or
  - (if mandate effective) underinsurance (low coverage)
- Since pricing rules affect AS vs RR trade-off
- Policy question: how costly are AS and RR?
  - where in that trade-off is welfare highest?
  - answer depends on: preferences toward risk and transitions across health types (costs) over time

- Most regulations stipulate one-year contracts
- Longer contracts, as in private German and Chilean HI markets, might improve welfare
- Long-term contracts might:
    - eliminating AS through health based pricing
    - while insuring RR through commitment to future policy terms
- Policy question: are long term contracts welfare improving?
    - answer depends on: preferences toward risk and transitions across health types (costs) over time

Introduction

Main Economic Issues: Repeal and Replace

- All Republican proposals eliminate the mandate
  - there is no penalty for not participating
- Instead they propose:
  - penalties while returning to the market
    - House of Representatives bill: 30% penalty for non-continuous coverage
    - Senate bill penalizes with 6 months exclusion when back
- Both alternatives, to enhance participation, create dynamics:
  - although contracts are yearly
  - current consumer behavior affects future payoffs
  - thus, finding demand and equilibrium, entails a DP problem
- Policy question: which type of penalties performs better?
  - answer depends on: preferences toward risk and transitions across health types (costs) over time

- One can simulate equilibria and compute welfare, in all 3 set -ups:
    - one period contracts with different pricing rules
    - one period contracts with rules generating demand dynamics
    - long term contracts
- Data needed:
    - distribution of health types (“health state”)
        - distribution of costs given types
    - health state transitions (from year to year)
    - preferences toward risk (parameter)

Data

In the work I will discuss...

- Individual-level panel: provided by large employer (10k emp/25k covered lives) from 2004-2009
  - Plan choices, plan characteristics and consumer demographics
  - Medical claims data (ICD-9 codes) for every person covered in PPO (65%)
    - medical claims reflect health realizations
- Leveraged with: Adjusted Clinical Group (ACG) program:
  - software developed by Johns Hopkins Medical School
  - provides risk score conditional on previous medical claims (ICD-9 codes) and demographics
  - used by insurers for underwriting
  - $\Longrightarrow$we have access to the same information insurers do

Data

- We treat the large employer as the *population* in the exchange
- Having an ACG score for each person, we basically *observe* distribution of risk types
  - the distribution of types is data, rather than estimated
- Use ACG changes over time to estimate health *transitions*
- Estimate distribution of realized medical costs given ACG
  - reflects uncertainty faced by each type
- *Risk preferences*
  - Choice Model in Handel, Hendel, Whinston (2015)
  - Comparable choices in the literature: Collier et al. (2017)

From the Data to Market Simulations

Ingredients

- For each person in population we know:
  - risk type (ACG)
  - estimated risk preference (CARA parameter)
  - estimated distribution of costs given ACG (uncertainty faced)
- With: type, uncertainty and risk preferences
  - compute expected utility from an insurance **policy** with Actuarial Value (**AV**) x: $EU_x(ACG)$
- Knowing expected utility, we get willingness to pay for any level of coverage as:
  - e.g., WTP for a 60% policy is: $\theta_{60} = EU_{60}(ACG) - EU_0(ACG)$
- Compute WTP for every person in the population (given their ACG and age)
  - which represents demand for such policy

From the Data to the Simulations

- Final product is a population, with θ for every person and policy of interest
  - treats insurance policy as a financial asset
- Distribution of θ determines:
  - demand
  - costs (given premiums)
- With WTP of every person in population we can simulate
  - static contracts
  - long term contracts
  - dynamic consumer behavior

Population Health Costs

Sample Total Health Expenditure Statistics				
Ages	Mean	S. D.	S. D. of ACG	S. D. around ACG
All	6,099	13,859	6,798	9,228
25-30	3,112	9,069	4,918	5,017
30-35	3,766	10,186	5,473	5,806
35-40	4,219	10,753	5,304	6,751
40-45	5,076	12,008	5,942	7,789
45-50	6,370	14,095	6,874	9,670
50-55	7,394	15,315	7,116	11,092
55-60	9,175	17,165	7,414	13,393
60-65	10,236	18,057	7,619	14,366

Population Health States

AGE:	Health States:						
	1	**2**	**3**	**4**	**5**	**6**	**7**
25-30	0.49	0.19	0.14	0.07	0.04	0.03	0.04
30-35	0.41	0.18	0.13	0.08	0.06	0.06	0.07
35-40	0.27	0.30	0.13	0.06	0.09	0.07	0.09
40-45	0.19	0.28	0.16	0.09	0.12	0.08	0.10
45-50	0.01	0.15	0.32	0.15	0.13	0.12	0.12
50-55	0.00	0.10	0.25	0.19	0.15	0.16	0.15
55-60	0.00	0.01	0.01	0.25	0.24	0.28	0.22
60-65	0.00	0.00	0.00	0.18	0.24	0.26	0.31

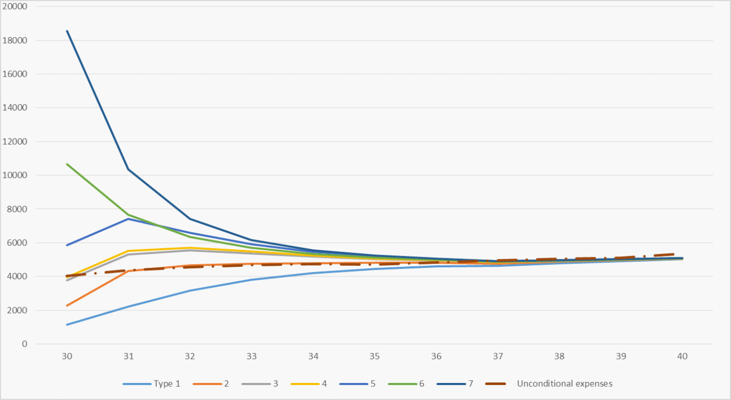
Health State Transitions: 30-35 year olds

		λ_{t+1}						
		1	**2**	**3**	**4**	**5**	**6**	**7**
	$\lambda_t = \mathbf{1}$	0.72	0.13	0.05	0.05	0.02	0.01	0.03
	$\lambda_t = \mathbf{2}$	0.35	0.25	0.12	0.11	0.04	0.03	0.11
λ_t	$\lambda_t = \mathbf{3}$	0.15	0.23	0.19	0.15	0.10	0.08	0.10
	$\lambda_t = \mathbf{4}$	0.20	0.08	0.12	0.24	0.18	0.12	0.08
	$\lambda_t = \mathbf{5}$	0.10	0.10	0.05	0.20	0.20	0.20	0.15
	$\lambda_t = \mathbf{6}$	0.16	0.11	0.14	0.11	0.08	0.22	0.19
	$\lambda_t = \mathbf{7}$	0.11	0.11	0.07	0.04	0.11	0.20	0.37

Health State Transitions: 50-55 year olds

		λ_{t+1}						
		1	**2**	**3**	**4**	**5**	**6**	**7**
	$\lambda_t = \mathbf{1}$	0.67	0.15	0.10	0.02	0.02	0.01	0.03
	$\lambda_t = \mathbf{2}$	0.25	0.37	0.20	0.09	0.04	0.02	0.04
λ_t	$\lambda_t = \mathbf{3}$	0.09	0.21	0.21	0.20	0.12	0.10	0.08
	$\lambda_t = \mathbf{4}$	0.10	0.19	0.26	0.12	0.10	0.19	0.05
	$\lambda_t = \mathbf{5}$	0.09	0.19	0.14	0.15	0.10	0.19	0.15
	$\lambda_t = \mathbf{6}$	0.00	0.09	0.13	0.09	0.19	0.23	0.28
	$\lambda_t = \mathbf{7}$	0.03	0.10	0.10	0.10	0.21	0.16	0.29

Health State Persistence starting at age 30



- We need a solution concept to predict outcomes under different market rules
- For example, in the context of static contracts we used Riley equilibrium
  - think of breaking-even premiums
- In the context of long term contracts, we find competitive equilibria
  - optimal contracts subject to break even and lapsation constraints

PART I

One-period Contracts: Pricing Rules

Part I: One-Period Contracts

Handel, Hendel and Whinston (2015)

- We find that markets fully unravel if only age is priced
  - like in the ACA
- We estimated: cost of AS (namely, of underinsurance) under Obamacare (ACA) is about $600 per person/year
- If health conditions are priced
  - trade increases, some individuals get high level of coverage (90% Actuarial Value)
  - so AS is reduced (but in a very limited way)
- Downside: premiums become uncertain (over time), creating RR
  - although AS is reduced, welfare declines as more conditional priced
  - we find the risk associated with uncertain premium is a lot more costly
- Take away: ACA did well banning pricing of health conditions
  - less costly to suffer AS than RR

Part I: One-Period Contracts

Handel, Hendel and Whinston (2015)

	Q1	Q2	Q3	Q4
Ages	Share 90	Share 90	Share 90	Share 90
All	**35.2**	**0**	**0**	**0**
25-29	63	25	0	0
30-34	63	42	0	0
35-39	52	50	0	0
40-44	38	0	0	0
45-49	63	18	0	0
50-54	27	0	0	0
55-59	33	0	0	0
60-65	0	0	0	0

PART II

One-period contracts: Republican's Reform

Part II: Republican Reform

Static Contracts with Consumer Dynamics

- Ghili, Hendel and Whinston (2017) go back to static contracts
  - firms offer one-period contracts
  - with no pricing of health conditions
  - but penalties for lack of continuous coverage
- Simulate:
  - House of Representatives proposal: 30% premium increase for returning buyers
  - Senate proposal: 6 months without coverage, $EU_0(ACG)$
- Unlike the mandate, both options generate consumer dynamics

- Given a vector of premiums $\mathbf{p} = \{p_a\}$ for ages $a = 25, ..., 64$.
- The value for an age a consumer with current type λ (ACG) is:

$$\begin{aligned} V_a(\lambda, \gamma, 0|\mathbf{p}) \quad = \quad & \max\{\ E_0(u_\gamma(c)|\lambda) - \phi_0 + \beta E(V_{a+1}(\lambda', \gamma, 0|\mathbf{p})|\lambda)\ , \\ & E_H(u_\gamma(c)|\lambda) - p_a - \phi_R + \beta E(V_{a+1}(\lambda', \gamma, 1|\mathbf{p})|\lambda)\ \} \end{aligned}$$

and

$$\begin{aligned} V_a(\lambda, \gamma, 1|\mathbf{p}) \quad = \quad & \max\{\ E_0(u_\gamma(c)|\lambda) - \phi_0 + \beta E(V_{a+1}(\lambda', \gamma, 0|\mathbf{p})|\lambda)\ , \\ & E_H(u_\gamma(c)|\lambda) - p_a + \beta E(V_{a+1}(\lambda', \gamma, 1|\mathbf{p})|\lambda)\ \} \end{aligned}$$

-
  - where $E(V_{a+1}(\lambda', \gamma, 1|\mathbf{p})|\lambda)$ is the expectation wrt future type λ' given current type λ.
  - $\chi = 0$ means out of market, $1 =$ in.
  - ϕ is the penalty for returning to the market

- For a given $\mathbf{p}$ we find $V_a(\lambda, \chi|\mathbf{p})$
- $V_a(\lambda, \chi|\mathbf{p})$ and $\mathbf{p}$ determine participation and insurer's cost for every a
- Update $\mathbf{p}$ such that insurers break for every a
- Update $V_a(\lambda, \chi|\mathbf{p})$ for new $\mathbf{p}$
- Iterate
    - not a contraction, need not converge, it did so far
- Equilibrium involves: consumers optimizing and firms breaking even

Part II:

Equilibrium Participation: Preliminary Numbers

	Static, penalty =		House	Senate
Age	\$0	\$400	30%	Year out
25 – 29	0.17	0.18	0.19	1.00
30 – 34	0.20	0.20	0.21	1.00
35 – 39	0.28	0.28	0.30	1.00
40 – 44	0.32	0.33	0.34	1.00
45 – 49	0.37	0.37	0.39	1.00
50 – 54	0.44	0.44	0.47	0.99
55 – 59	0.48	0.48	0.51	0.97
60 – 64	0.57	0.57	0.59	0.75

PART III

Long-Term Contracts

Part III: Long Term contracts

Handel, Hendel and Whinston (2017)

- Firms can offer long term contracts
  - like in German and Chilean private health insurance market, or US life insurance
- Consumers can lapse any time, without termination fees

- **Question:** Can long-term contracts with health status-based pricing improve upon static contracts?

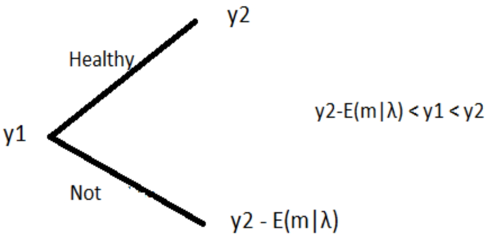
Part III: Long Term contracts: One Sided Commitment

Why one sided commitment?

- Legal reasons only one-sided feasible
- Why is it an interesting case?
  - first impression is that, when insurers can commit they will promise coverage to fully insure risk of developing a condition
  - solving reclassification risk concern
  - why wouldn't they fully insure risk averse buyers if they can commit to do so?
- Turns out: consumer inability to commit compromises insurance
  - we can see it in the simplest set-up in next figure

Simplest Example

One Sided Commitment: 2 periods, 2 (second period) states



Welfare Impact of Long Term Contracts

We compare welfare under:

1. **Benchmark #1:** the first-best (full insurance) = long-term contract with full commitment
2. **Benchmark #2:** annual "spot" contracts with risk rating
3. **Long-term contracts with one-sided commitment and risk rating** (Key assumption: consumer can lapse and can't borrow)
4. **Benchmark #3:** full medical expense insurance at each age with no intertemporal consumption smoothing
5. Annual contracts with community rating and age-based pricing (ACA-like market)

Three Benchmarks

- **First best:**

$$C^* = \left(\frac{1-\delta}{1-\delta^T}\right)\sum_{t=1}^{T}\delta^{t-1}(y_t - \mathbb{E}[m_t])$$

- **Spot Contracting:**

$$u(CE_{SPOT}) = \left(\frac{1-\delta}{1-\delta^T}\right)\mathbb{E}\left[\sum_{t=1}^{T}\delta^{t-1}u(y_t - \mathbb{E}[m_t|\lambda_t])\right]$$

- **Full Insurance without Intertemporal Smoothing:**

$$u(C^*_{NBNS}) = \left(\frac{1-\delta}{1-\delta^T}\right)\sum_{t=1}^{T}\delta^{t-1}u(y_t - \mathbb{E}[m_t]))$$

- T periods, $U = \mathbb{E}\left[\sum_t \delta^t u(c_t)\right]$
  - $T = 40$, from age 25 to 65 (Medicare)
- Individual income in period t: y_t
- Health state λ_t (ACG), summarizes expected health costs, $\mathbb{E}[m_t|\lambda_t]$
- Health expenses m_t and λ_{t+1} determined by density $f_t(m_t, \lambda_{t+1}|\lambda_t)$
  - the transitions just showed you
- Symmetric learning:
  - m_t and λ_t observed by consumers and firms
- We assume industry is competitive, firms risk neutral, discount factor δ, capital market frictions

Optimal Dynamic Contracts with One-sided Commitment

Theorem

The equilibrium contract in a competitive market with one-sided commitment for a consumer with income path $y = (y_1, ..., y_T)$ and who cannot borrow is characterized by the consumption guarantees offered in the first period of a contract starting in period t with health state λ_t, $c_t^y(\lambda_t)$. The consumer who agrees to a contract in period 1 is fully insured against within-period medical expense risk, and enjoys in each period t following health state history $(\lambda_1, ..., \lambda_t)$ the certain consumption $\max_{\tau \leq t} c_\tau^y(\lambda_\tau)$. The levels $\{c_t^y(\lambda_t)\}$ lead insurers to break even in expectation and consumers have no incentive to save under this contract.

Equilibrium Contracts

Predictions

- Optimal contract offers a minimum guaranteed consumption level
- Guarantee is bumped up to match outside offers after good news
- New guaranteed consumption level is the first-period consumption of an optimal contract that would start at that date and state λ_t
- Optimal contracts equate $u'(c)$ only across states with no outside offers (bad states)
- Consumption guarantee parallels downward rigid wages in Harris and Holmstrom (1982)

Health State Transitions: 30-35 year olds

		λ_{t+1}						
		1	**2**	**3**	**4**	**5**	**6**	**7**
	$\lambda_t = \mathbf{1}$	0.72	0.13	0.05	0.05	0.02	0.01	0.03
	$\lambda_t = \mathbf{2}$	0.35	0.25	0.12	0.11	0.04	0.03	0.11
λ_t	$\lambda_t = \mathbf{3}$	0.15	0.23	0.19	0.15	0.10	0.08	0.10
	$\lambda_t = \mathbf{4}$	0.20	0.08	0.12	0.24	0.18	0.12	0.08
	$\lambda_t = \mathbf{5}$	0.10	0.10	0.05	0.20	0.20	0.20	0.15
	$\lambda_t = \mathbf{6}$	0.16	0.11	0.14	0.11	0.08	0.22	0.19
	$\lambda_t = \mathbf{7}$	0.11	0.11	0.07	0.04	0.11	0.20	0.37

Elements from Data

- The key ingredients are: health status and transitions over time, risk preferences
- Age dependent annual transitions across a 7 health-state partition (using 5-year bins)
- We use estimated risk preferences from HHW (2015) choice model: CARA with population mean $\gamma_j = 4.39 * 10^{-4}$
- $\delta = 0.975$

- With those parameters, find optimal contracts, and welfare

Results: Optimal Contract for Flat Net Income

Front-loading and Reclassification Risk

- "Flat net income" means $y_t - \mathbb{E}[m_t]$ is constant
- Optimal premium in period t depends on history, from age 25 to t
- Many histories! (40 million in first 10 years)
- First period premiums and actuarial costs:

First-Year Equilibrium Contract Terms: Flat Net Income

	λ_1						
	1	2	3	4	5	6	7
Premium	2,750	4,155	6,008	6,130	8,885	11,890	18,554
Costs	1,131	2,291	3,780	3,975	5,850	10,655	18,554
Front-Load	1,619	1,864	2,228	2,155	3,035	1,235	0
$c_1^y(\lambda_1)$	52,550	51,145	49,292	49,170	46,415	43,410	36,746

Results: Optimal Contract for Flat Net Income

Front-loading and Reclassification Risk

Second-Year Equilibrium Premiums: Flat Net Income

				λ_2				P_1
λ_1	1	2	3	4	5	6	7	
1	2,943	3,300	3,300	3,300	3,300	3,300	3,300	2,750
2	2,943	4,302	4,705	4,705	4,705	4,705	4,705	4,155
3	2,943	4,302	6,090	6,206	6,558	6,558	6,558	6,008
4	2,943	4,302	6,090	6,206	6,680	6,680	6,680	6,130
5	2,943	4,302	6,090	6,206	8,955	9,434	9,434	8,885
6	2,943	4,302	6,090	6,206	8,955	11,919	12,440	11,890
7	2,943	4,302	6,090	6,206	8,955	11,919	18,554	18,554

Results: Optimal Contract for Flat Net Income

Front-loading and Reclassification Risk

Second-Year Equilibrium Consumptions: Flat Net Income

	λ_2							C_1
λ_1	1	2	3	4	5	6	7	
1	52,905	52,550	52,550	52,550	52,550	52,550	52,550	52,550
2	52,905	51,545	51,145	51,145	51,145	51,145	51,145	51,145
3	52,905	51,545	49,758	49,642	49,292	49,292	49,292	49,292
4	52,905	51,545	49,758	49,642	49,170	49,170	49,170	49,170
5	52,905	51,545	49,758	49,642	46,893	46,415	46,415	46,415
6	52,905	51,545	49,758	49,642	46,893	43,929	43,410	43,410
7	52,905	51,545	49,758	49,642	46,893	43,929	37,294	36,746

Results: Welfare

- For each contracting scenario X and income profile we find a constant certainty equivalent CE_X
  - C^* = first best (two-sided commitment)
  - CE_{SPOT} = spot (annual) contracts
  - CE_D = dynamic contracts (one-sided commitment)
  - C^*_{NBNS} = full insurance within each period/no smothing over time
  - CE_{ACA} = ACA (60% coverage policies with deductible and OOP max)
- Comparisons for:
  - (i) flat net income
  - (ii) non-managers
  - (iii) managers
  - (iv) downscaled managers

Results: Optimal Contracts

Welfare

	Certainty Equivalent ($1,000s)					Gains from Lor	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Income	C^*	CE_{SPOT}	CE_D	C^*_{NBNS}	CE_{ACA}	$\frac{C^* - CE_{SPOT}}{C^*}$	$\frac{CE_D - C}{C^* - CE}$
Flat net	53.67	46.27	52.77	53.53	51.30	13.8%	87.7
Non-mngr	53.67	40.73	44.10	47.39	46.25	24.1%	26.0
Manager	84.00	50.32	51.77	56.08	55.09	40.1%	4.3
Downs Mngr	53.67	31.74	34.10	37.93	36.84	40.9%	10.8

- CE_D as expected is in between spot and two-sided contracts
  - Less of the gap is closed with steeper income profiles $\left(\frac{CE_D - CE_S}{CE_{TS} - CE_S}\right)$
- TSNS always at least as good as D
- ACA better for steep profiles, worse for flat ones

Risk Aversion:

CARA coeff 0.00008

	Certainty Equivalent			
Income	C^*_{NB}	CE_S	CE_D	CE_{ACA}
Flat-net	53.67	52.47	53.62	52.85
Manager	47.20	46.41	46.94	46.80

Switching Costs

Welfare Impact: CARA coeff 0.0004

Switching Cost		Flat-net	Manager
D		52.76	34.10
$1,000$		52.95	34.95
$5,000$		53.39	36.92
$10,000$		53.58	38.82
C^*		53.67	37.93

Conclusion

- Dynamic contracts with one-sided commitment can substantially reduce reclassification risk
  - Eliminate between 18%-75% of welfare loss due to reclassification risk (with precautionary savings), depending on slope of income path
- In base model/parameters, ACA is better for rising income levels
- Dynamic contracts better than ACA with some combination of lower risk aversion, switching costs, and government insurance of pre-age 25 health risk

Concluding Remarks

- Plenty can be simulated
- Treating health insurance policies as financial instruments
  - non-financial components can be accommodated
- Using data firms are increasingly willing to share (e.g., Alcoa, Microsoft)
- Ideally, governments would be willing to collect and share
- ACG software extremely useful
  - replacing parametric assumptions in prior literature with data
  - same data/information used by market participants