Competition, Asymmetric Information, and the Annuity Puzzle: Evidence from a Government-run Exchange in Chile

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January 5, 2018

Chile: Exception to Annuity Puzzle

- Previous literature has documented a lack of annuitization - "annuity puzzle" - in many countries
- In contrast, more than 60% of eligible retirees in Chile voluntarily annuitize
  - At a 3-5% markup over actuarially fair
- What lessons can we learn about this well-functioning market?
- Today: reforming the system to make it more similar to the US setting would likely cause the market to unravel

Related Literature

- Documenting US annuity puzzle and implications for consumer preference
  - Friedman and Warshawsky (1990), Mitchell et al. (1999), Davidoff et al. (2005), Lockwood (2012)
- Identifying and analyzing private information in markets with asymmetric information
  - Chiappori and Salanie (2000), Einav et al. (2010), Finkelstein and Poterba (2014)
- Methodology - nonparametric estimation of unobservable consumer preference
  - Fox et al. (2011), Nevo et al. (2016)

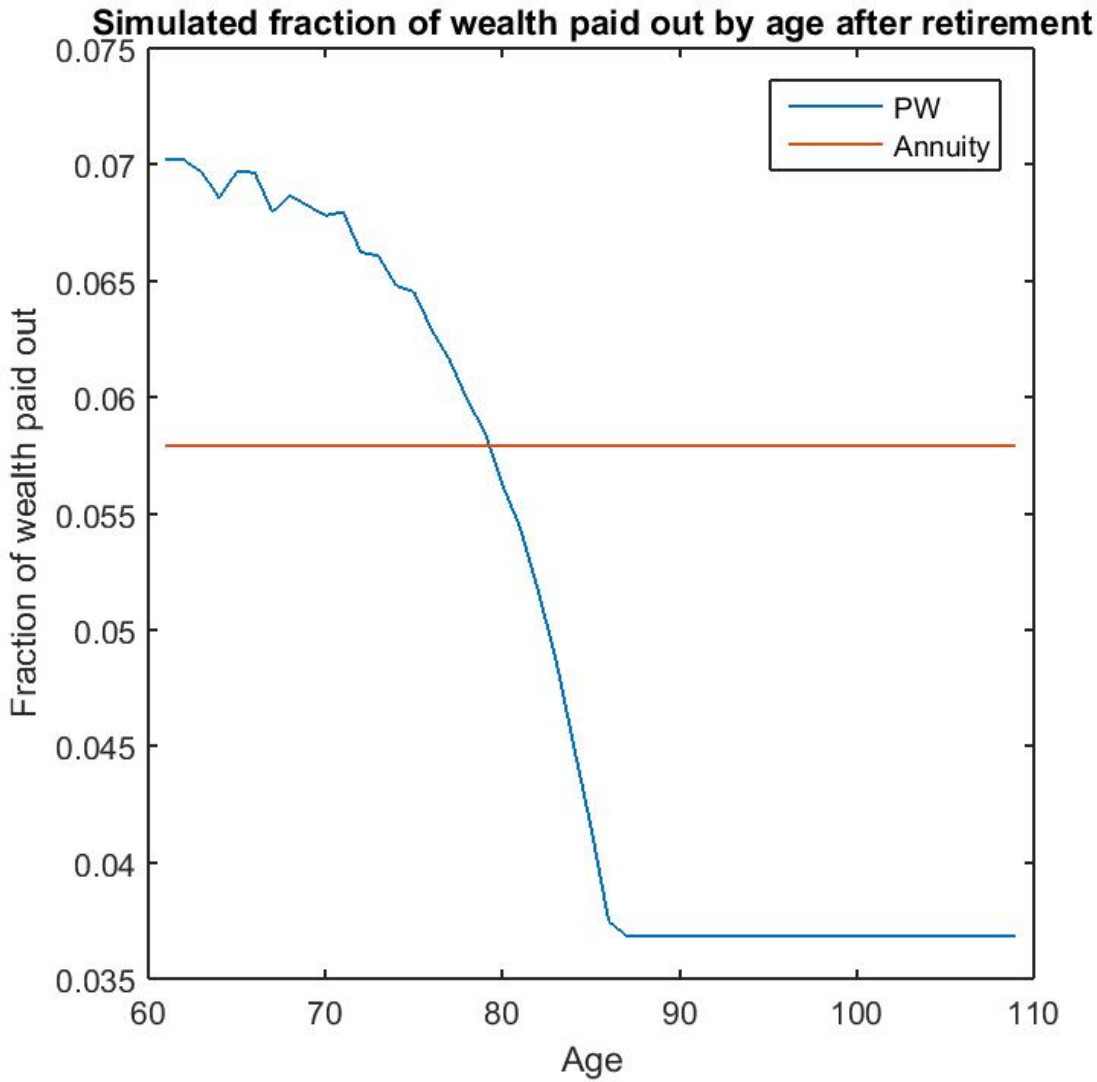
Today

1. Setting: The Chilean Retirement Exchange
2. Descriptive Evidence
3. Model
4. Calibration Exercise
5. Demand Estimation
6. Counterfactuals

The Chilean Retirement Exchange

- Chileans save throughout their lives in private retirement accounts
- Access these funds through an exchange called SCOMP
- SCOMP takes retirees' info and sends it to life insurance companies, who send annuity offers back
- SCOMP compiles info and sends it to the retiree
- Retiree can choose an annuity offer, or to take "Programmed Withdrawal"
  - Government-set withdrawal schedule, savings continue to be invested
  - Upon death, balance received by heirs
- Minimum pension guarantee (MPG): annuity offers can't fall below it, PW payouts are topped-up

Simulated PW Path vs. Annuity, 60 yr old female



Sample SCOMP Printout, One Annuity Contract Type

MODALIDAD RENTA VITALICIA INMEDIATA

RENTA VITALICIA INMEDIATA SIMPLE

Annuitize full wealth, 0 guarantee, 0 deferral

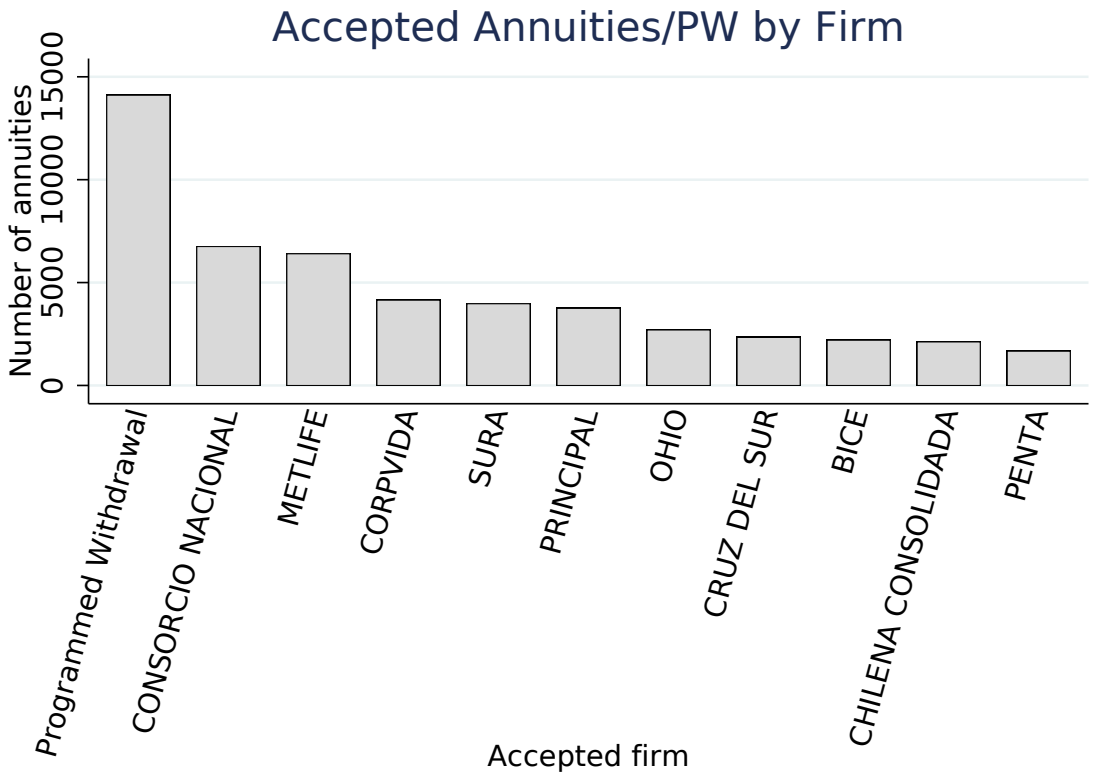
N° Oferta	Compañia de Seguros de Vida Brand Name	Pensión final Mensual sin Retiro de Excedente UF	Pensión final Mensual en UF Considerando un retiro de excedente de 0,00 UF	Pensión con retiro de Excedente Máximo		Clasificación de riesgo de la Compañía de Seguros (2)
				Pensión final Mensual UF	Excedente UF	
43872093	CRUZ DEL SUR	26,61	<- Monthly payment		Risk rating ->	AA-
43872099	RENTA NACIONAL	26,58				BBB-
43872083	METLIFE	26,52				AA
43872100	CORPSEGUROS	26,34				AA-
43872094	PRINCIPAL	26,28				AA
43872097	CORPVIDA	26,26				AA-
43872084	EUROAMERICA VIDA	26,25				AA-
43872090	PENTA VIDA	26,25				AA-
43872091	OHIO NATIONAL	26,24				AA
43872098	SURA	26,21				AA
43872095	CN LIFE	25,90				AA
43872092	BICE VIDA	25,86				AA+
43872085	CHILENA CONSOLIDADA	25,59				AA
43872086	CONSORCIO VIDA	25,36				AA+

Data Sources

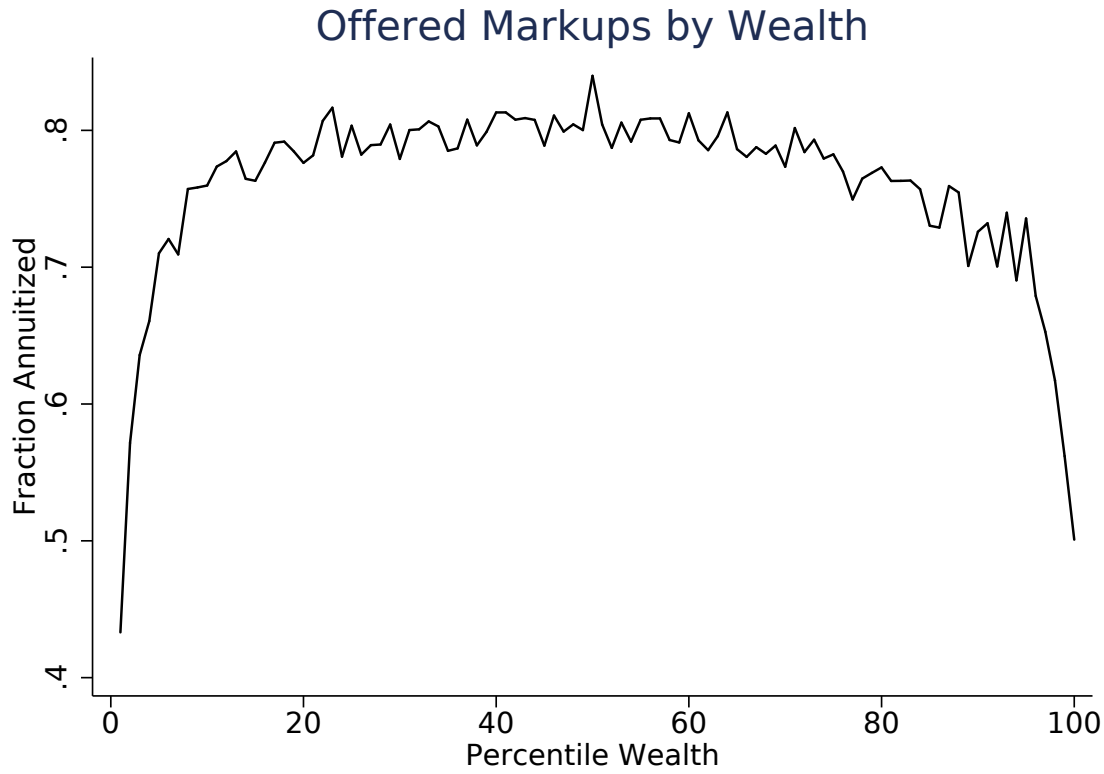
- Individual-level administrative dataset from SCOMP, 2004-2013
  - All info life insurance companies see about the retiree
  - Every offer made & choices
- 230,000 retirees and over 30 million annuity offers
- Match to death records, see death by 2015
- Focus on single life annuitants:
  - Married retirees get joint survival annuities
  - So do retirees with children under 18 (or under 25 but in college)

▸ Summary Stats

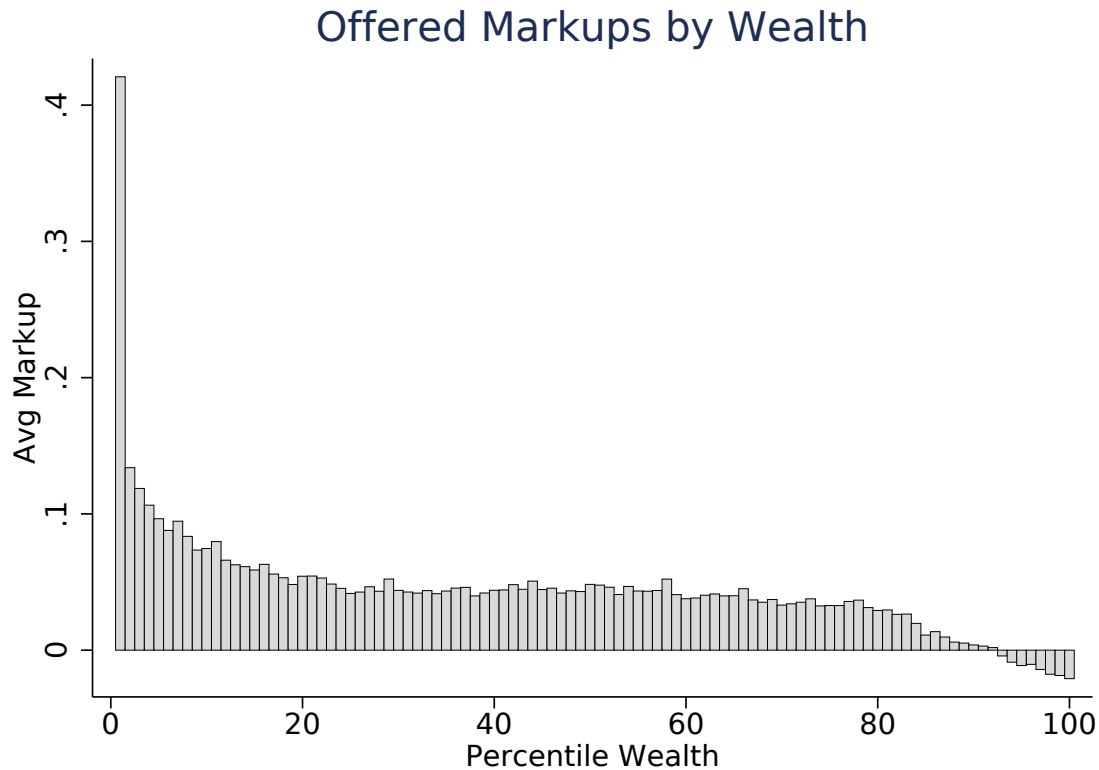
Unconcentrated Market



Probability of Taking PW, by Savings



(Almost) always low markups



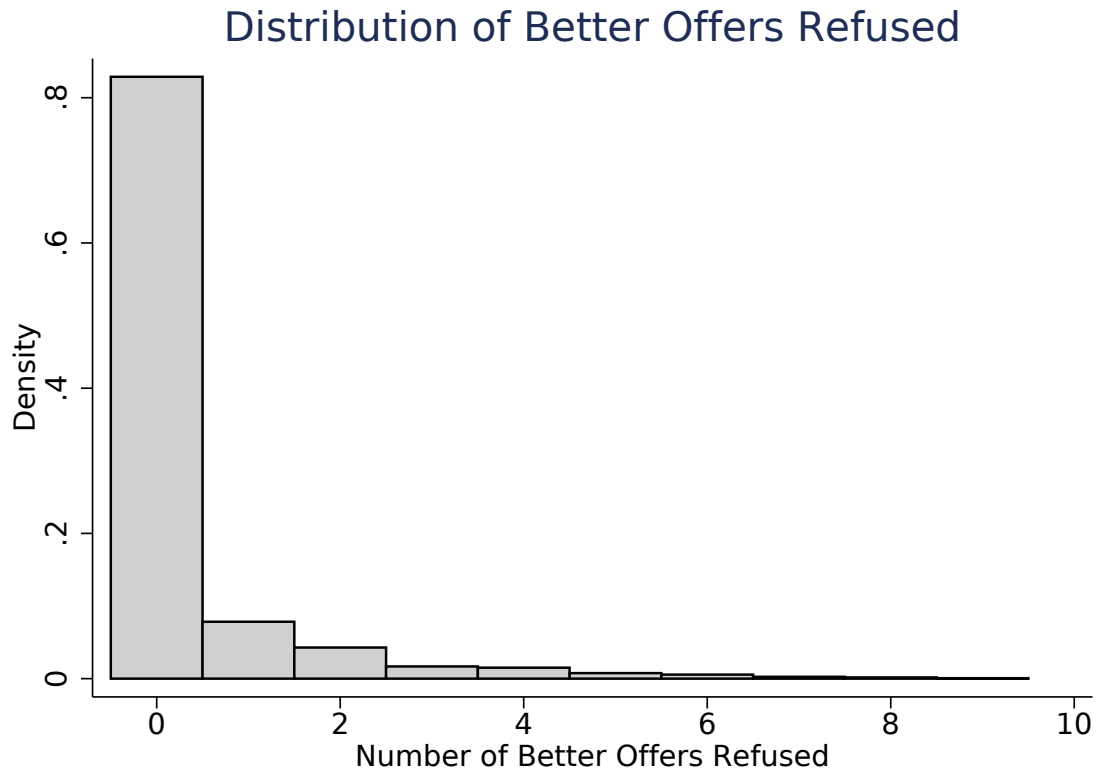
MWR: PW is not a bad deal

	Annuity	PW
No Bequest	0.789	0.925
Bequest = 2.5%	0.896	0.955

Adverse selection into annuities

	(1) Death	(2) Death	(3) Death
Choose annuity	-0.00801**	-0.00495**	-0.00471**
	(0.00133)	(0.00133)	(0.00150)
Individual characteristics		✓	✓
Request characteristics			✓
Observations	53356	53356	53356
Base group mean		0.015	
		(0.121)	

20% of population takes dominated offers



Model

- Goal: comparisons across contracts with different flow payments over time, exposures to risk, and inheritance properties
- Set up a finite-horizon consumption-savings model with the following features:
  - Uncertain longevity
  - CRRA utility
  - Bequest motive
- Given a level of risk aversion γ, outside wealth ω, bequest motive β, and mortality shifter μ, can calculate the expected PDV of utility for an annuity offer or for PW.
  - Solve numerically using EGM (Carroll (2011))

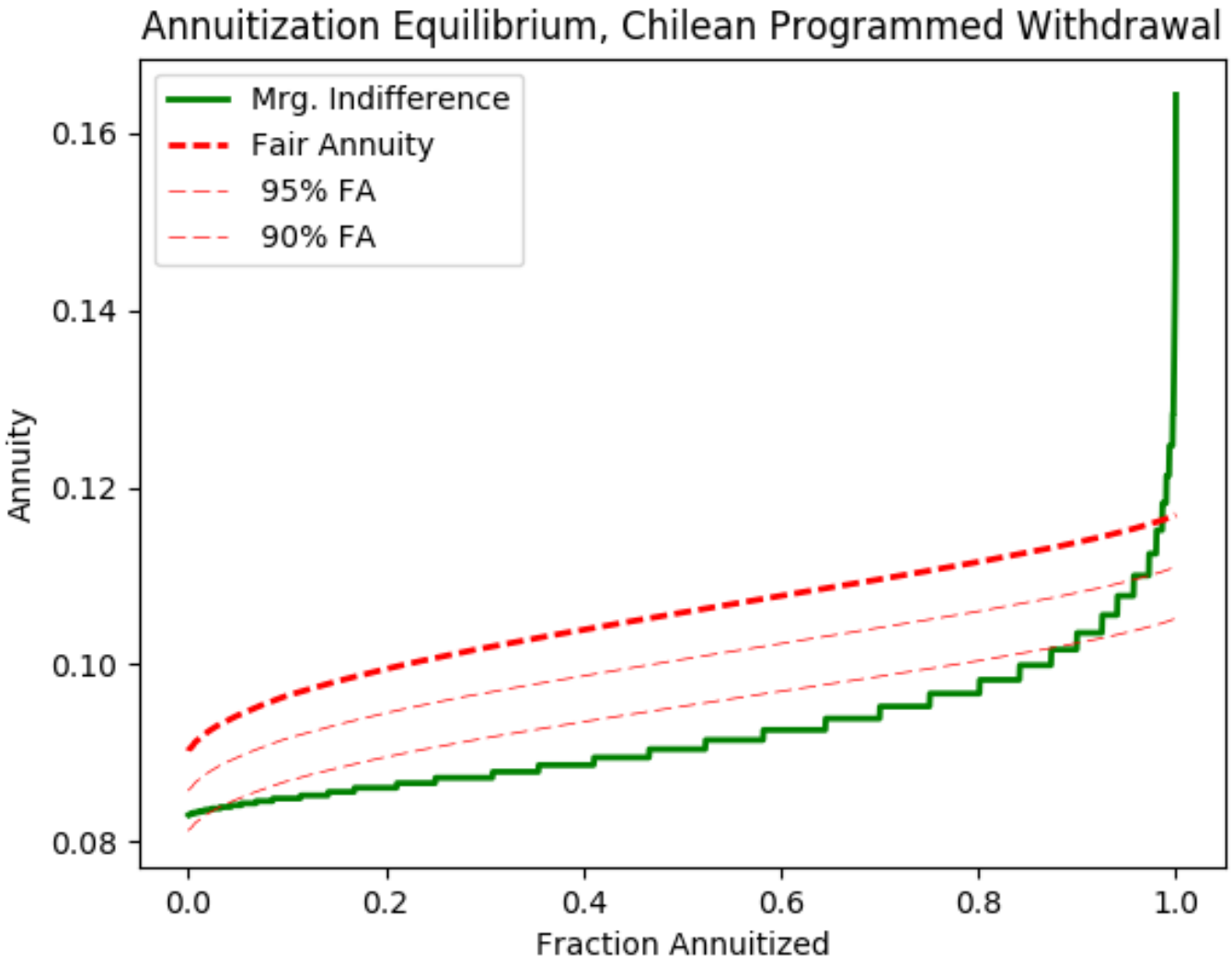
▸ Equations

Calibration

- We take a 60 year old female, retiring in 2007 with \$90,000 USD in the system and \$360,000 USD outside
- Set risk aversion parameter ($\gamma = 3$) & bequest motive ($\beta = 10$).
- Death probabilties follow the Chilean pension authorities' tables
  - Include private information through shifts around these tables: a 60 year old with a mortality shifter of x has the mortality probabilities of a $60 + x$ year old
- Abstract away from multiple annuity contracts and firm preferences: consider an immediate, non-guaranteed annuity against PW

▸ Utility Plot

Calibration - Chilean Equilibrium

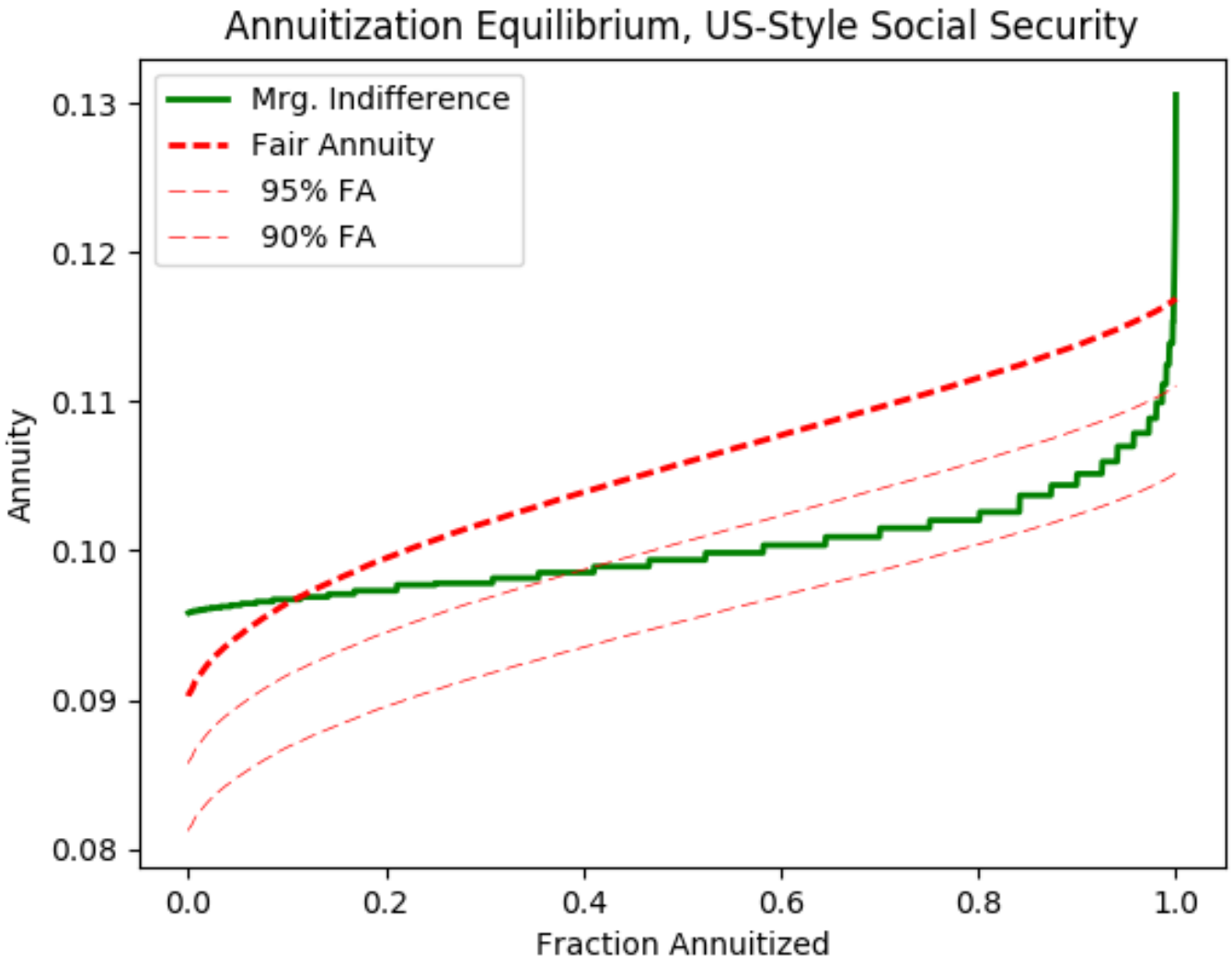


US-like reform

- Consider reforming the system to make it more like Social Security
- Following Mitchell et al (1999), have half of pension wealth in a mandatory, actuarially fair annuity
- Other half is unconstrained wealth, can be annuitized in the private market

▸ Utility Plot

Calibration - US-like Equilibrium



Demand Model

- Let:

$$U_{ioj}^{A} = V^{A}(X_{ioj}, \pi_i) + \xi_j + \xi_o + \xi_{oj} + \epsilon_{ioj}$$
$$U_{i}^{PW} = V_{i}^{PW}(X_{ioj}, \pi_i) + \xi_0 + \epsilon_{i0}$$

- Goal: recover the distribution of types and the ξ's
- Challenge: ξ's potentially known by firms when making offers
- Paper: strategy for tackling this (endogeneity) issue via an exclusion restriction
- Here: assume $\xi = 0$, no non-financial utility

FKRB (2011) Framework

- Take a grid over the space of unobserved types, find values conditional on each type r ($V^A(X_{ioj}, \pi_r$ and $V_i^{PW}(X_{ioj}, \pi_r)$)
- Calculate choice probabilities given types s_{iojr}
- Find distribution of types ϕ that minimizes distance between predicted shares and observed shares

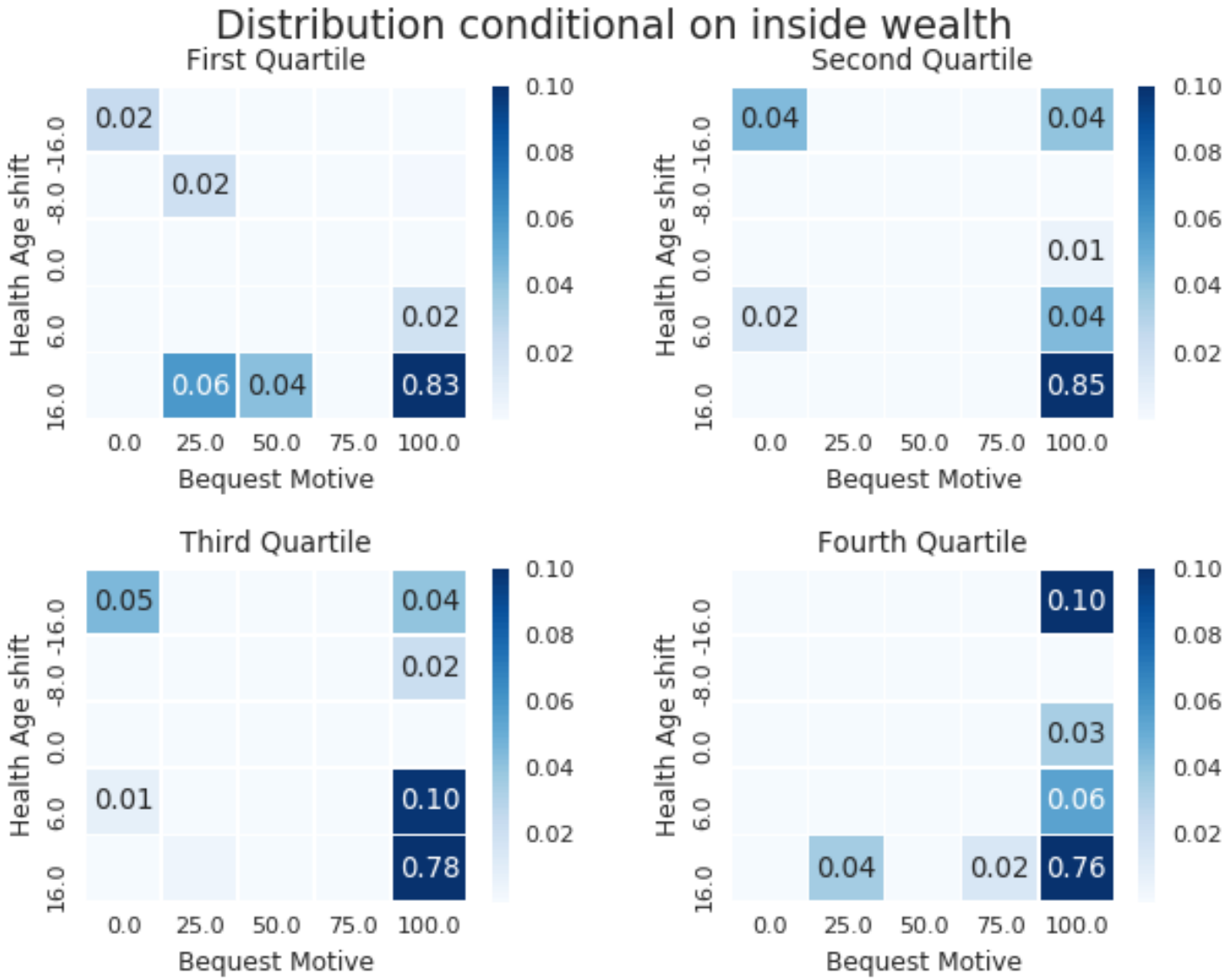
$$\min_{\phi} \sum_{i,o,j} (y_{ioj} - \sum_{r} s_{iojr}\phi_r)^2$$

$$s.t.$$

$$\phi_r \geq 0 \, \forall r$$

$$\sum_{r} \phi_r = 1$$

Preliminary Results



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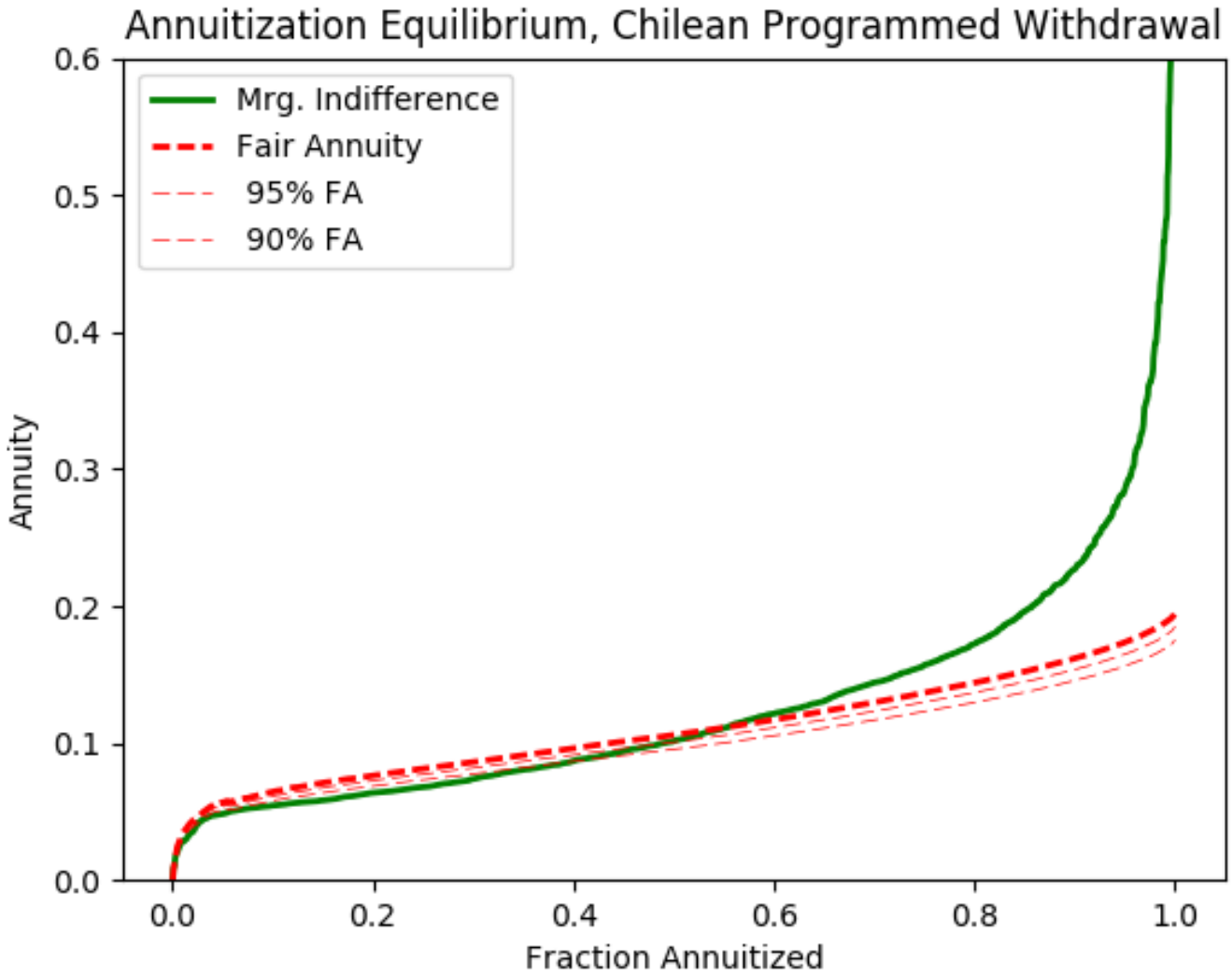
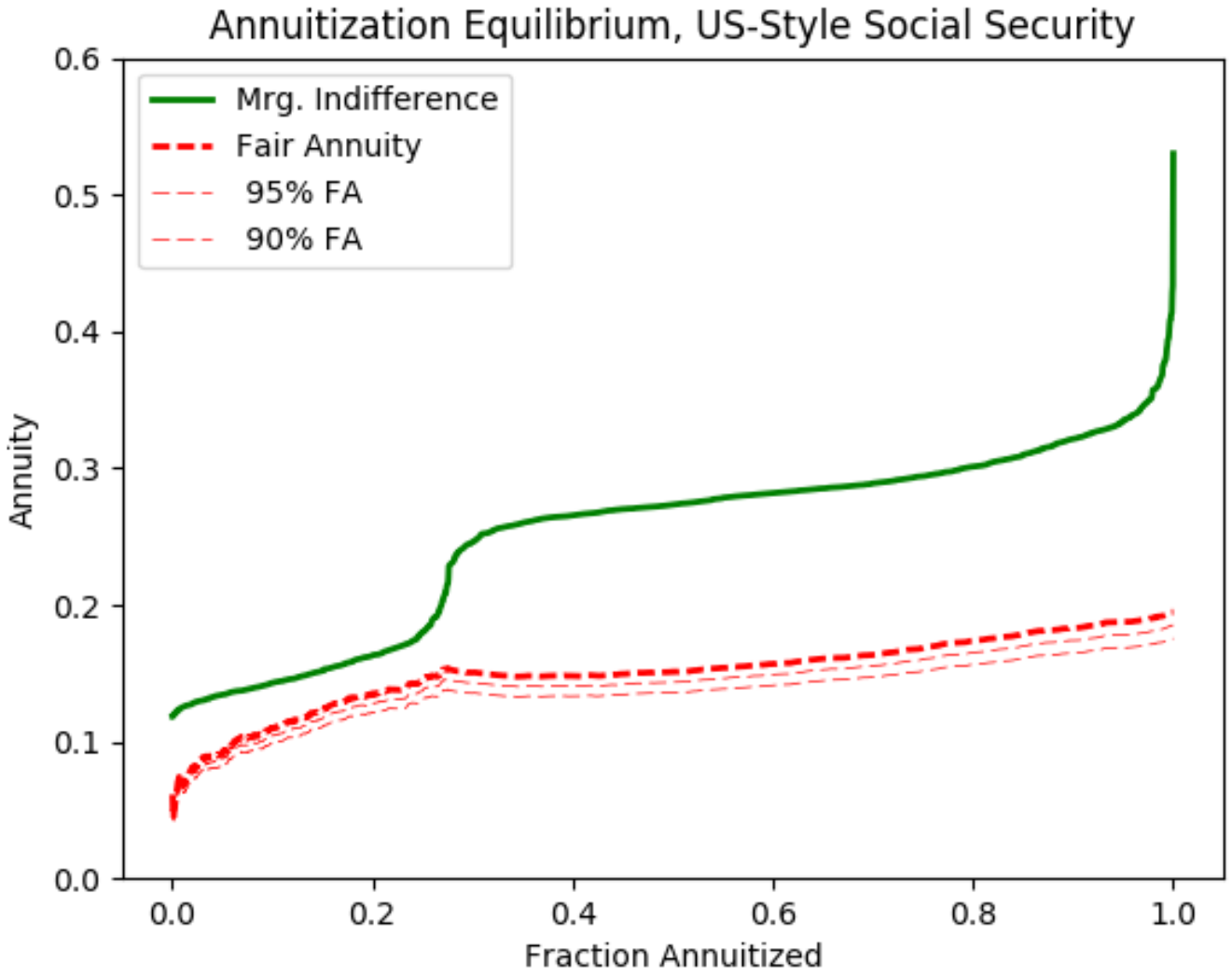


Preliminary Results

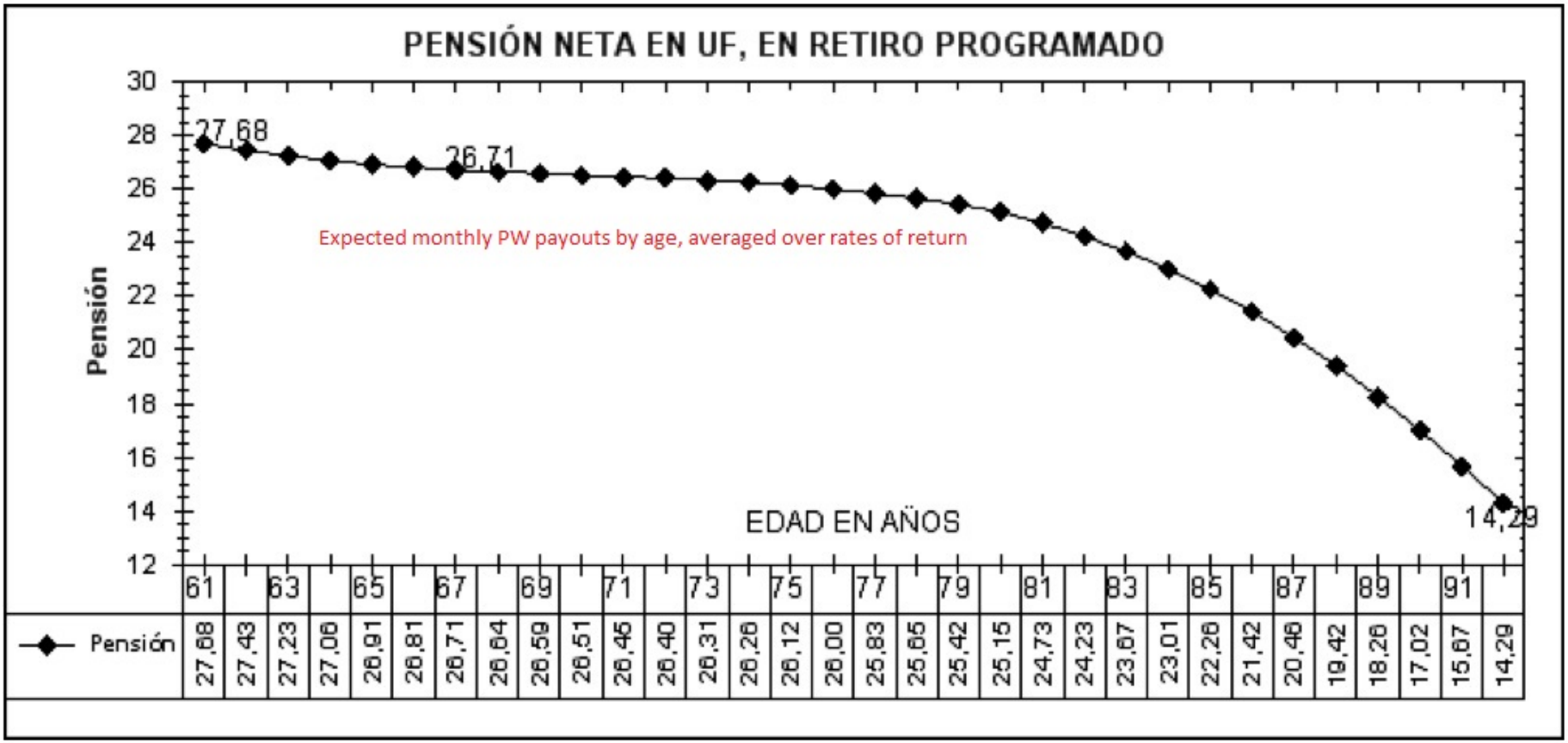


Next Steps and Conclusion

- Next steps:
  - Demand estimation needs to be refined, & non-financial value needs to be added (dominated offers)
  - Counterfactuals can be expanded to consider all annuity contracts
- Conclusion
  - Preliminary demand results highlight significant degree of private information about mortality & high bequest motives
  - Moving the Chilean system to US-style Social Security setup would cause market to fully unravel

Additional Slides

PW Info from SCOMP



Monto Pensión mensual promedio: 24,18 UF

Monto Comisión mensual promedio: 0,30 UF

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Summary Statistics

	N	Mean	10th Pctile	Median	90th Pctile
Panel A: Retiree Characteristics					
Total wealth (UFs)	39252	2188.09	979.12	1830.08	3784.43
Female (dummy)	53356	0.747	0	1	1
Age	53356	61.98	59	61	66
Panel B: Contract Characteristics					
Choose annuity (dummy)	53356	0.736	0	1	1
Monthly payment (UFs)	39252	11.24	5.06	9.26	19.57
Deferral years	39252	0.53	0	0	2
Guarantee months	39252	123.61	0	120	216

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Model

$$\max E_0 \left[\sum_{\tau=0}^{T} \delta^{\tau} u(c_\tau, d_\tau) \right]$$

$$s.t.$$

$$a_t = m_t - c_t \, \forall t$$

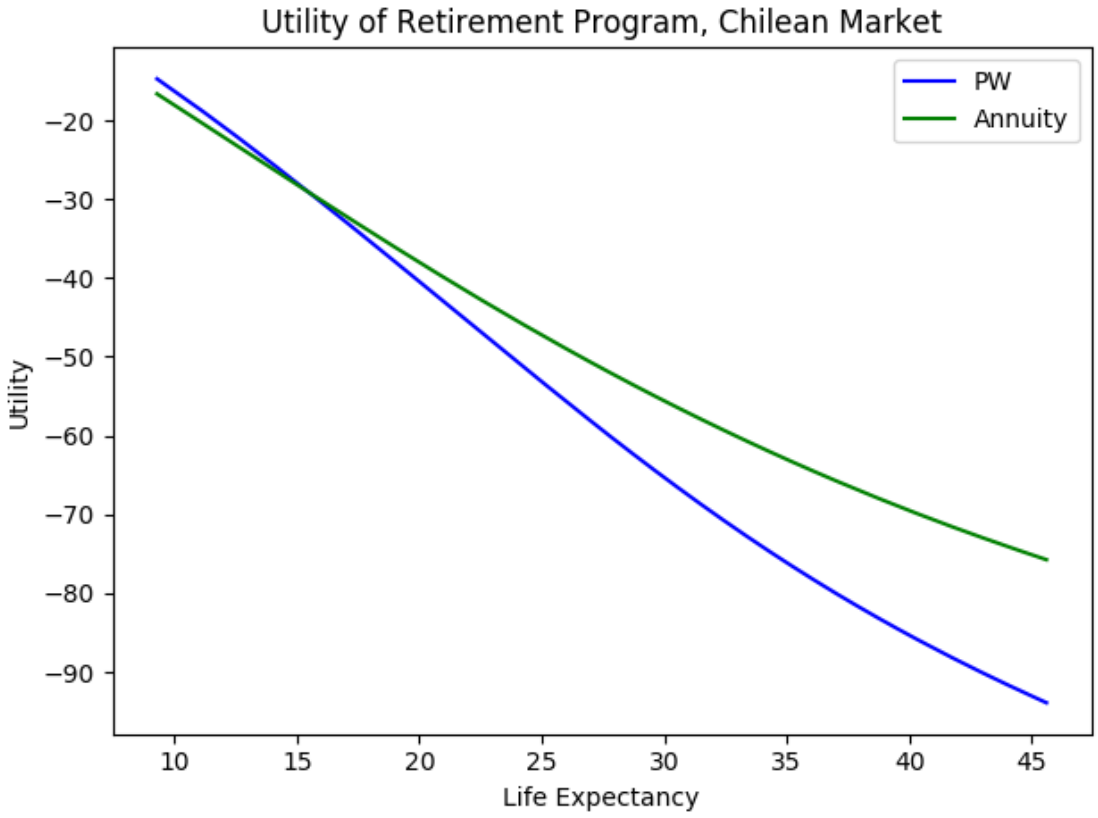
$$b_{t+1} = a_t \cdot R \, \forall t$$

$$m_{t+1} = b_{t+1} + z_{t+1}(d_{t+1}, q_{t+1}, D, G) \, \forall t$$

$$a_t \geq 0 \, \forall t$$

◂ Return

Utility comparison, Chilean system



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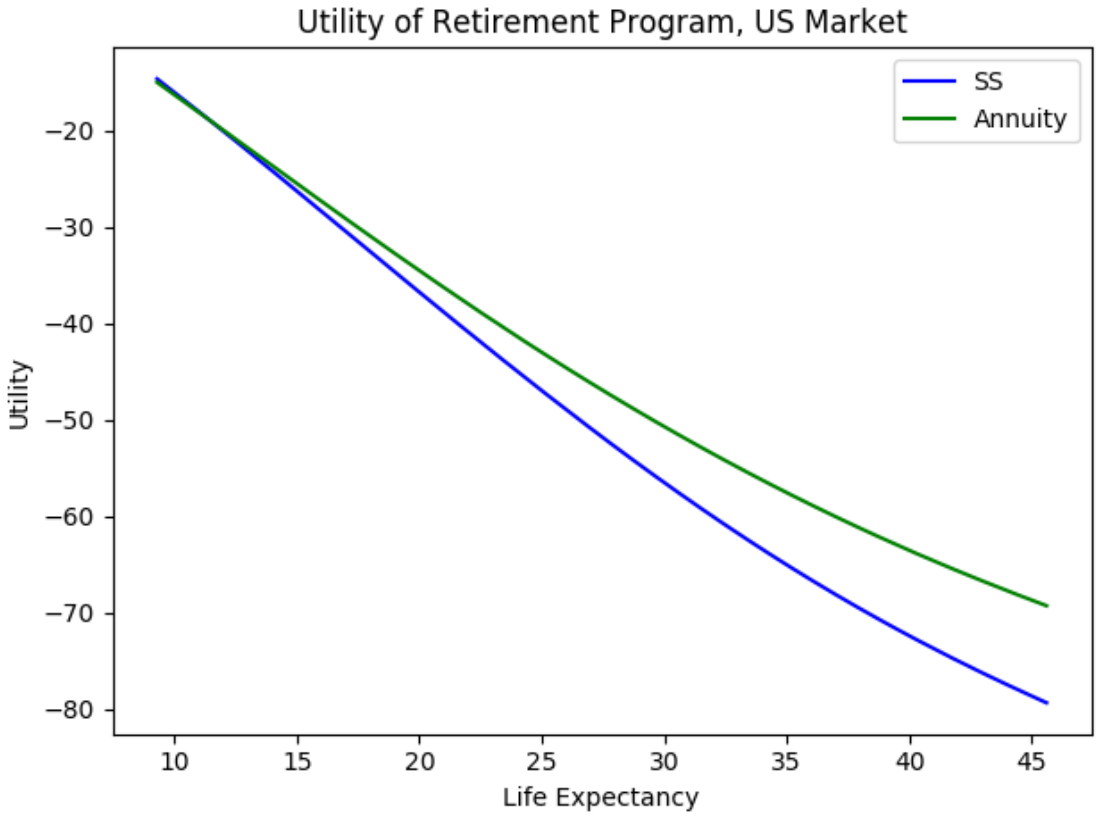
Calibration



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