Disclaimer:

The project described received funding from the TIAA Institute. The findings and conclusions expressed are those of the authors and do not necessarily represent official views of the TIAA Institute or TIAA.
MOTIVATION

- Retirement programs are facing a dilemma
  - Reduce benefit to stay viable
  - Increase benefit to help people
  - E.g., 48% of US household with 55 years old head have zero retirement savings

- Q. Can we use market-based system to provide better retirement products? E.g., annuities?

- Lot of research on determinants of demand
  - Relatively little information about costs
    - i. How do demand and strategic supply interact to determine “prices” and welfare?
    - ii. How do they change with informational friction?
    - iii. How can we choose market system to promote efficiency?
• Sheds light on these questions in the context of Chilean annuity market

• Demand from risk averse retiree depend on
  • savings
  • information processing costs
  • bequest-preference
  • mortality (longevity) risks
  • heterogenous preferences

• Supply
  • private annuitization costs
  • varies across firm and retirees
  • private information
  • first-price auctions + bargaining
  • winner gives highest utility
• Started privatized system in 1981
• eBay for annuities started in 2004
• Rich data, simpler annuity contracts.
• High annuitization rate (>60%).
• Still plagued by low pensions
• Debates about ways to improve pensions.

• In the Context of US
• Secure Act of 2019 promotes Annuities
• How to structure the market?
• No existing data – *annuity puzzle*
• Chile provides an ideal setting

WHY CHILE?
DATA

• Chile from Jan 2007 to Dec 2017

• Those without any qualifying children

• Retire within the normal range

• 238,548 qualify to buy annuity

• We focus on the rest who chose an annuity.

• Average Savings
  • male $121,955
  • female $97,308

• Median Savings
  • male $69,372
  • female $81,185
## OFFERED PENSIONS

<table>
<thead>
<tr>
<th>Annuity Type</th>
<th>Gender</th>
<th>Mean</th>
<th>Median</th>
<th>Savings Q1</th>
<th>Savings Q2</th>
<th>Savings Q3</th>
<th>Savings Q4</th>
<th>Savings Q5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immediate</td>
<td>Female</td>
<td>479</td>
<td>414</td>
<td>202</td>
<td>288</td>
<td>385</td>
<td>510</td>
<td>857</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>631</td>
<td>435</td>
<td>200</td>
<td>269</td>
<td>372</td>
<td>585</td>
<td>1329</td>
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<tr>
<td>Deferred</td>
<td>Full Sample</td>
<td>570</td>
<td>423</td>
<td>201</td>
<td>278</td>
<td>378</td>
<td>556</td>
<td>1152</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>412</td>
<td>374</td>
<td>190</td>
<td>258</td>
<td>349</td>
<td>463</td>
<td>714</td>
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<tr>
<td></td>
<td>Male</td>
<td>473</td>
<td>356</td>
<td>187</td>
<td>241</td>
<td>331</td>
<td>529</td>
<td>1019</td>
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<tr>
<td></td>
<td>Full Sample</td>
<td>446</td>
<td>365</td>
<td>189</td>
<td>248</td>
<td>339</td>
<td>500</td>
<td>882</td>
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</table>
## Predicted Median Age at Death

<table>
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<tr>
<th>Savings</th>
<th>Male</th>
<th>Female</th>
<th>Overall</th>
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</thead>
<tbody>
<tr>
<td>Q1</td>
<td>85.15</td>
<td>93.80</td>
<td>86.89</td>
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<tr>
<td></td>
<td>(5.79)</td>
<td>(6.03)</td>
<td>(5.82)</td>
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<tr>
<td>Q2</td>
<td>85.86</td>
<td>94.24</td>
<td>87.64</td>
</tr>
<tr>
<td></td>
<td>(5.81)</td>
<td>(6.06)</td>
<td>(5.84)</td>
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<tr>
<td>Q3</td>
<td>86.45</td>
<td>94.83</td>
<td>88.23</td>
</tr>
<tr>
<td></td>
<td>(5.83)</td>
<td>(6.09)</td>
<td>(5.88)</td>
</tr>
<tr>
<td>Q4</td>
<td>87.62</td>
<td>95.48</td>
<td>89.40</td>
</tr>
<tr>
<td></td>
<td>(5.88)</td>
<td>(6.12)</td>
<td>(5.95)</td>
</tr>
<tr>
<td>Q5</td>
<td>90.87</td>
<td>97.25</td>
<td>93.52</td>
</tr>
<tr>
<td></td>
<td>(6.01)</td>
<td>(6.21)</td>
<td>(6.11)</td>
</tr>
<tr>
<td>Total</td>
<td>86.75</td>
<td>94.91</td>
<td>89.57</td>
</tr>
<tr>
<td></td>
<td>(5.82)</td>
<td>(6.09)</td>
<td>(5.94)</td>
</tr>
</tbody>
</table>
TIMING OF THE GAME

1. Retiree requests offers on several annuities

2. Active life insurance companies decide to participate or not

3. Those who take part make multidimensional sealed-bids.

4. Retiree can choose from these offers, outside option or bargain.

5. If bargaining, bargaining happens over one type annuity.

6. Winner: who can offer highest indirect utility not just pension.
Indirect Utility:

\[ U_{ij} = \rho(P_{ij}) + \theta_i \times b_i(P_{ij}) + \beta_i \times Z_j - U_0(S_i) \]

- Pension \( \rho(P_{ij}) \) expected present discounted util
- Bequest \( b_i(P_{ij}) \) expected present discounted util
- Risk rating \( Z_j \)
- Savings \( S_i \)
- Bequest preference \( \theta \sim F_{\theta|s}(\cdot | \cdot) \)

Annuitzation Cost

- if firm j promises to pay i $P_{ij}$ until death
- It varies across firms, and across retirees.
\[ C_{ij} = C(P_{ij}) = P_{ij} \times UNC_j \]
- Unitary Necessary Capital (UNC)
- To make cost comparable we work with
\[ r_{ij} \equiv \frac{UNC_j}{UNC_i} \sim W_r|s(\cdot | \cdot) \]
BEQUEST PREFERENCE
Preference for Risk Ratings

![Graphs showing preference for risk ratings by AFP, Sales Agent, and Advisor across different time periods (Pre, At, Post).]
COST

(i) Over the Full Support

(ii) Focusing on $r < 1$. 

1. Low savers care more about risk-rating.
2. ↑ Savings ↓ information processing costs.
3. 50% show no preference for bequest.
4. But among the rest, significant heterogeneity.
5. E.g., top 20% savers care average 2.82 times more about bequest.
6. Firms’ costs lower for top 40%.
7. Market is quite competitive.
8. Asymmetric Information hurts top 40%.
10. Most significant gain for the top 40%
11. Yet, DMU ⇒ welfare do not change.
THANK YOU!