Gender gap in pension savings: evidence from Peru's individual capitalization system

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Motivation

- Defined contribution (DC) schemes based on Individual Retirement Accounts (IRA) are widespread in Latin America
- These schemes have been fiercely criticized due to its distributional impact (favouring better-off individuals and pension fund managers) and high administrative costs
- But backed due to its positive spillovers on national savings, economic growth, and development of annuity markets
- IRAs are part of the compulsory pension system in Peru, Bolivia, Chile, Colombia, El Salvador, Mexico, and Dominican Republic. Also in Costa Rica, Panama, Uruguay (mixed systems)
- IRAs reproduce and expand labour income inequalities through capitalization and contribution density
- IRAs are similar to financial wealth

Motivation

- DB schemes tend to reduce pension gap through pension rules, minimum benefits and unisex life tables
- Also non-contributory pensions (*Pension 65* program) treat equally men and women
- However the IRA scheme of Peru does not include minimum pensions, and the affiliates are not eligible for non-contributory pensions
- Gender gaps could be significant in this setting
- However, two forces:
  - Income gaps are reducing across cohorts
  - Capitalization process (return rate and period length) magnifies income gaps
- Pension funds in Peru are sizeable (23% GDP in 2019)

Motivation

- In Peru, individuals can cash up to 95.5% of pension fund at retirement
- Pensions = Pension balance / annuity price
- Pension balance depends on income (*w*), return rate (*r*), contribution rate (*a*), and frequency of contributions ($d \in [0,1]$)
- $P_i = \frac{B_i}{A_i} \qquad i = m, f$
- $B_i = a \sum_{j=25}^{65} w_{ij} d_{ij} (1+r)^{z-j}$
- $gender\ gap = B_m - B_f = a \sum_{j=25}^{65} \underbrace{\left(w_{mj} d_{mj} - w_{fj} d_{fj}\right)}_{\text{Labour market}} \underbrace{(1+r)^{z-j}}_{\text{Capital market}}$

Gender gaps

- Labour income gender gap (2019):

  male = 1,835 Soles ; female = 1,341 Soles (73.1%)

  2014: 68.3%

  2009: 65.2%

- Participation in pension in any pension system (2019):

  male = 41.4% ; female = 28.6%

  2014: m=40.5%; f=27.7%

  2009: m=35.2%; f=20.4%

- Monthly pension in the public pension system SNP (2019):

  male = 559 Soles ; female = 660 Soles (84.7%)

- Pension balance in the private pension system SPP (2019):

  male = 29,352 Soles ; female = 21,403 Soles (72.9%)

Data

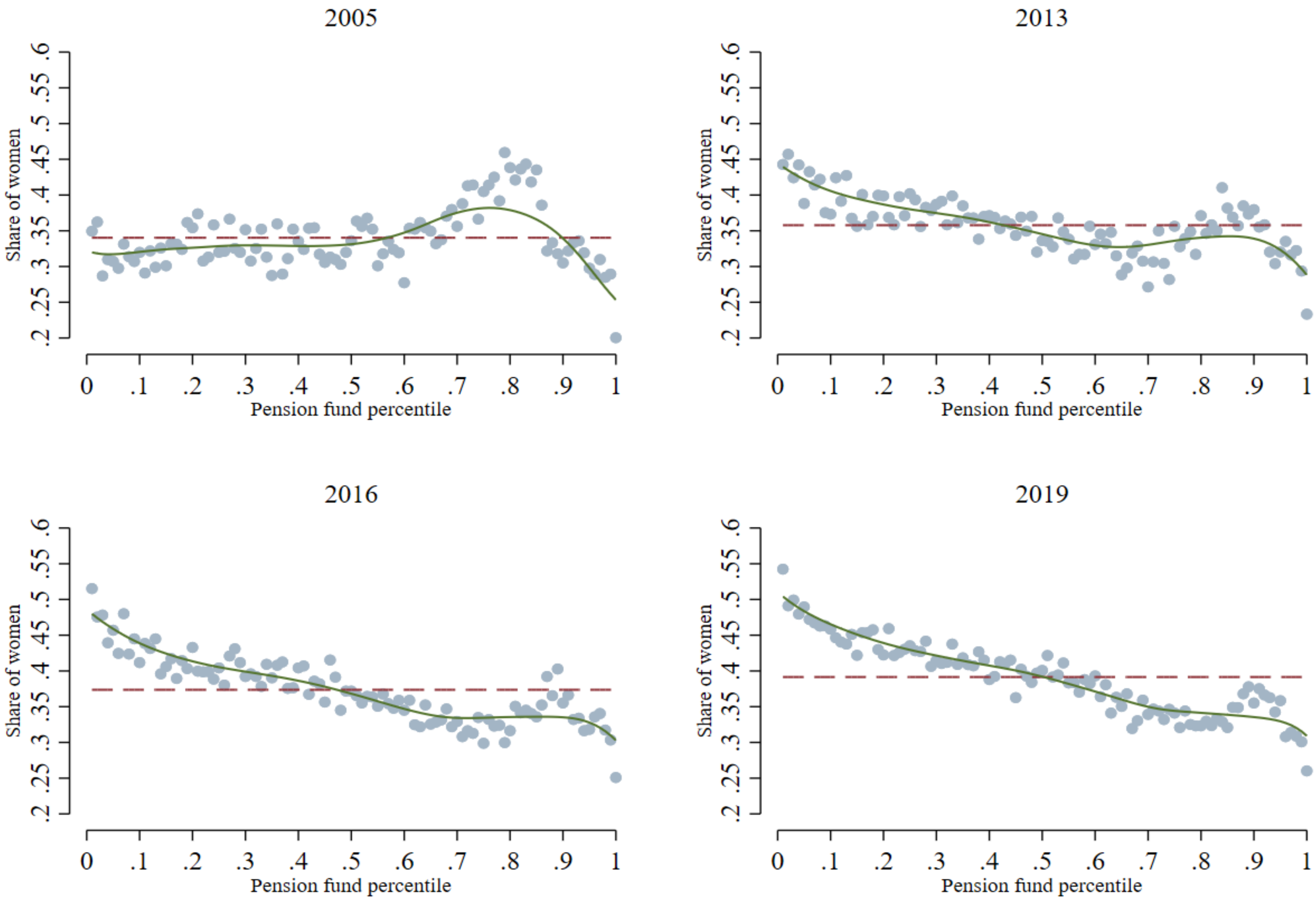
- Cross-sectional samples of the total non-retired population from the SPP administrative registers as of: 2005, 2006, 2013, 2015, 2016, and 2019
- Samples are random, stratified and representative of 5-year age groups, sex and year of enrolment in SPP
- Unique datasets with information about each individual's pension balance, management fees, income and some demographic variables
- Sample is 2% of the total non-retired population for each year
- Initial sample is 600,360, but 65,657 observations with zero pension balance are dropped. After other selections, n=533,231.

2005	49,448
2006	53,005
2013	94,315
2015	103,399
2016	108,091
2019	124,973
Total	**533,231**

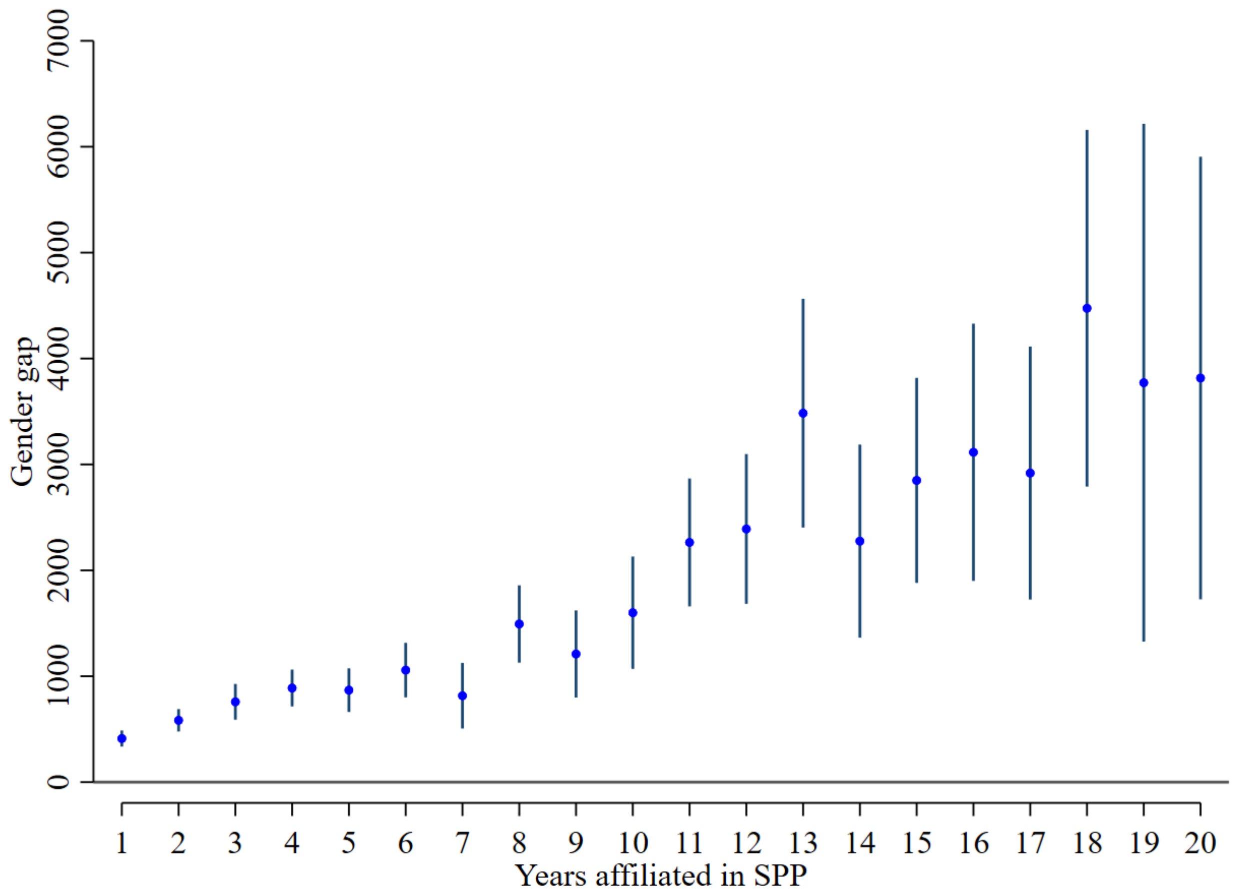
Statistics

	Total	Male	Female	Diff M-F	Gap in %
All	26,240	29,352	21,403	7949.11***	37.1
Cohorts					
1996-1998	1,441	1,549	1,302	247.405***	19.0
1989-1991	7,488	7,857	7,002	855.505***	12.2
1979-1981	23,469	25,425	20,397	5027.78***	24.6
1969-1971	48,821	51,992	43,175	8816.88***	20.4
1959-1961	69,947	74,893	59,507	15385.8**	25.9
Years affiliated					
1-3	2,142	2,450	1,784	665.615***	37.3
9-11	14,155	14,913	12,957	1955.86***	15.1
19-21	40,335	42,263	36,810	5453.19***	14.8
25-27	89,839	93,014	82,536	10477.9***	12.7
Regular contributor					
No	10,828	12,103	8,863	3239.92***	36.6
Yes	37,319	41,683	30,495	11187.7***	36.7
Pension balance distribution					
Bottom 25%	568	584	549	34.7973***	6.3
Bottom 50%	2,037	2,121	1,928	193.262***	10.0
Top 10%	158,384	166,158	142,578	23579.8***	16.5
Top 5%	237,852	245,469	219,939	25530.6***	11.6
Top 1%	533,889	550,237	487,412	62825.8***	12.9

Share of women across the unconditional distribution of pension balance



Unconditional gender gaps by number of years enroled in SPP (pooled sample)

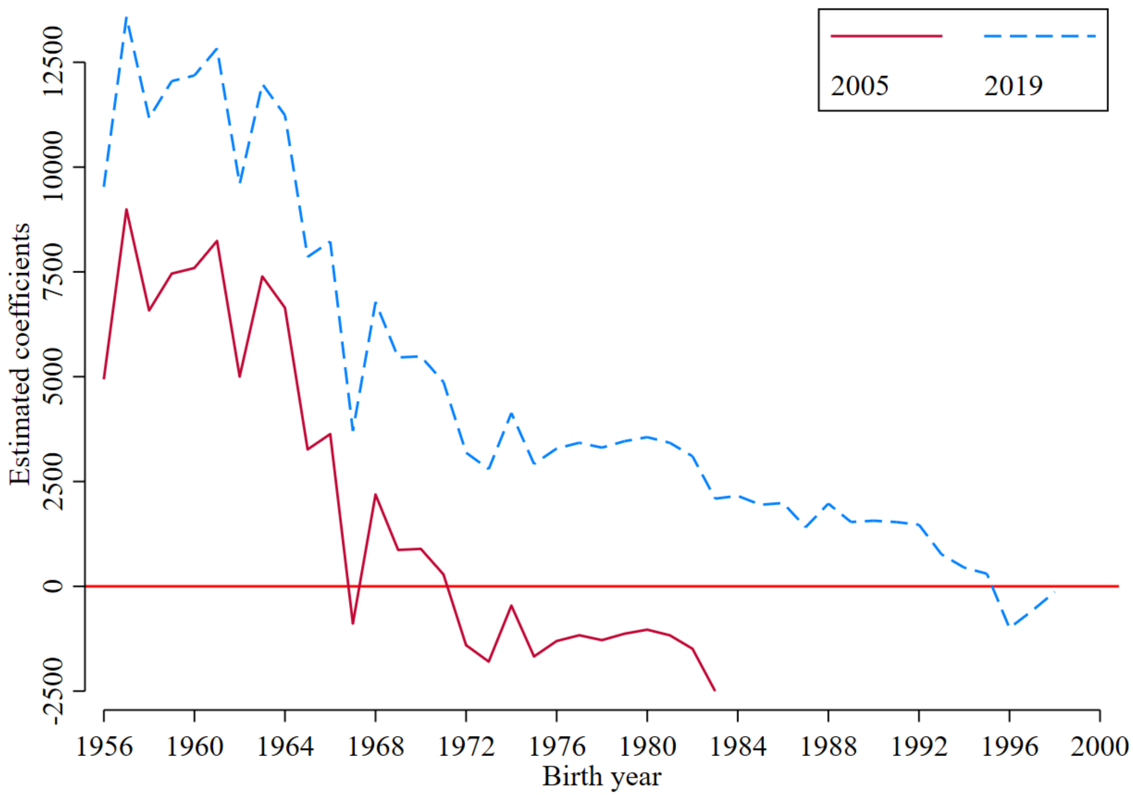


OLS estimates of pension balance (2005-2019)

	(1)	(2)	(3)	(4)	(5)
Male	5,513***	3,119***	2,753***	14,385**	14,382**
	(160.7)	(143.4)	(141.9)	(5989)	(5990)
Regular contributor		22,126***	22,105***	22,210***	22,203***
		(140)	(139.2)	(141.2)	(141.1)
Years enrolled in SPP		57.83	-160.9***	-147.7***	-146.5***
		(56.25)	(55.99)	(55.81)	(55.73)
Years enrolled^2		135.7***	129.9***	129.5***	129.3***
		(2.916)	(2.924)	(2.916)	(2.909)
Constant	5,624***	-6,701***	3185	-6,983*	-6,958*
	(146.4)	(338.7)	(4089)	(3758)	(3761)
Year	Yes	Yes	Yes	Yes	Yes
AFP		Yes	Yes	Yes	Yes
Cohort			Yes	Yes	Yes
Cohort*Male				Yes	Yes
Year*Male					Yes
Observations	533,231	533,231	533,231	533,231	533,231
R-squared	0.008	0.155	0.161	0.162	0.162

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Gender gap by cohorts in 2005 and 2019



It uses Model 5 of previous regressions

Unconditional quantile regressions

- The unconditional quantile regression is based on a recentered influence function (RIF), which provide a linear approximation of the unconditional quantiles of the dependent variable (Firpo et al. 2009)
- RIF regressions:
  - Evaluate the impact of covariates on a statistic of interest (e.g. a quantile), or what covariates are associated with large 'influence'
  - The RIF at *y* gives the influence on *υ(F)* of an infinitesimal increase in the density of the data at *y*
  - Regression coefficients reveal how much the average influence of observations vary with *X* (holding other covariates constant)
  - Let *υ*(*F*) be a statistic of interest calculated in distribution *F*, e.g. a quantile
  - The *influence function* of *υ* is a function of *y* and *F* and is defined as:

$$\mathrm{IF}(y;\nu,F)=\lim_{\epsilon\to 0}\frac{\nu((1-\epsilon)F+\epsilon\Delta_y)-\nu(F)}{\epsilon}$$

Unconditional quantile regressions

- Specification:

$$RIF(w_i; Q_\tau) = \alpha_{0,\tau} + \sum_{k=1}^{K} \alpha_{k,\tau} x_{i,\tau}^{k} + \varepsilon_{i,\tau}$$

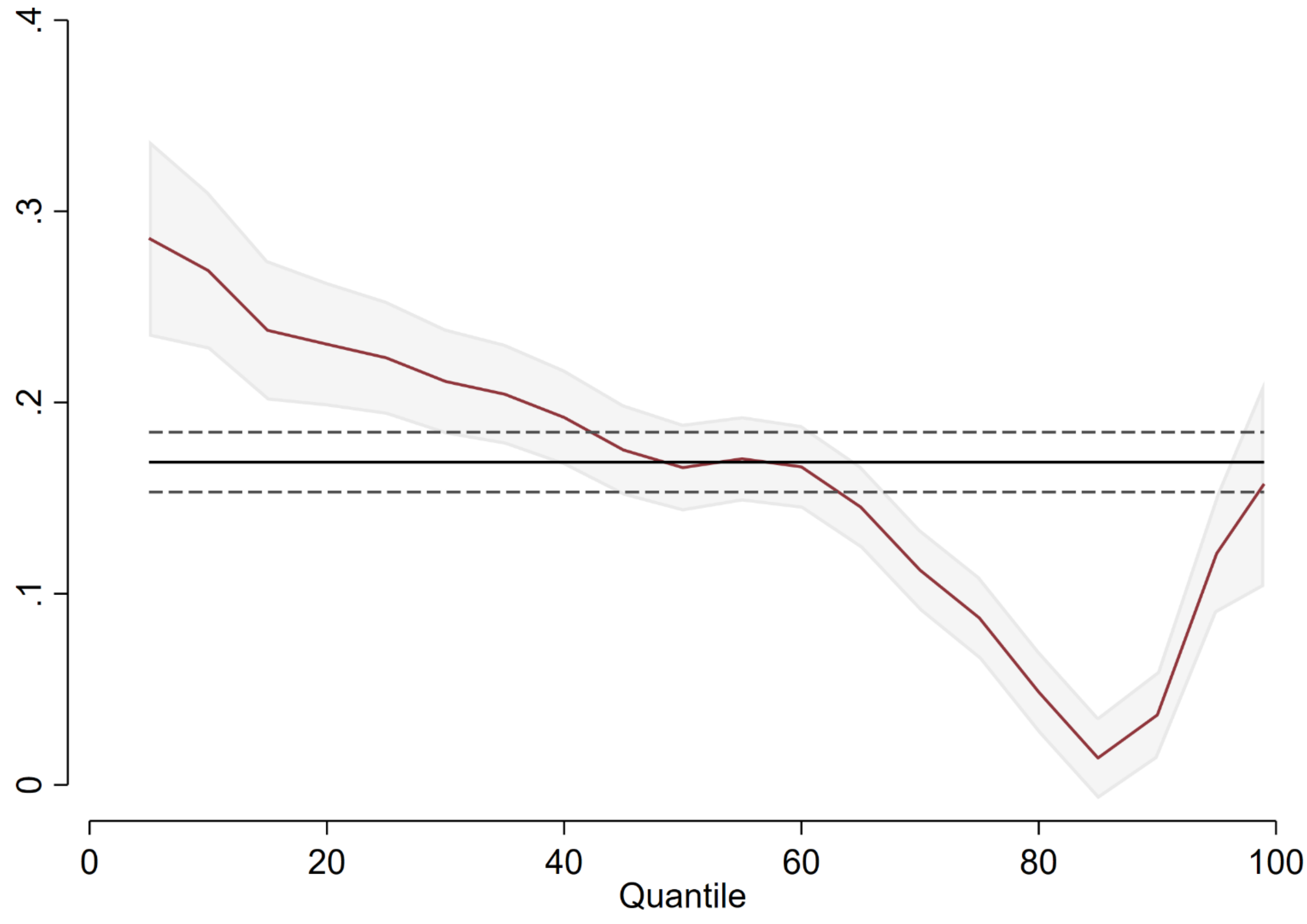
- Where $RIF(w_i; Q_\tau)$ represents the recentered influence function of the pension balance (w_i) of individual i at he τth quantile Q_τ; x^k denotes a explanatory variable; $\alpha_{0,\tau}$ and $\alpha_{k,\tau}$ are the effects of the explanatory variables on the τth quantile of pension balance; $\varepsilon_{i,\tau}$ is the error term

Results of unconditional quantile regressions (log of pension balance 2019)

Variables	OLS	q25	q50	q75	q90	q95	q99	q99.5
Male	**0.169*** **	**0.223*** **	**0.166*** **	**0.0873*** **	**0.0366*** **	**0.121*** **	**0.157*** **	**0.212*** **
	(0.00801)	**(0.0152)**	**(0.0117)**	**(0.0110)**	**(0.0116)**	**(0.0158)**	**(0.0274)**	**(0.0347)**
Regular contributor	1.830***	2.198***	2.111***	1.624***	0.993***	0.933***	0.734***	0.690***
	(0.00845)	(0.0152)	(0.0122)	(0.0117)	(0.0119)	(0.0161)	(0.0270)	(0.0343)
Years enrolled in SPP	0.328***	0.545***	0.421***	0.155***	0.00857***	-0.00139	-0.0547***	-0.0635***
	(0.00249)	(0.00488)	(0.00311)	(0.00303)	(0.00326)	(0.00452)	(0.00751)	(0.00991)
Years enrroled^2/100	-0.625***	-1.370***	-0.893***	0.0306**	0.420***	0.452***	0.626***	0.655***
	(0.00909)	(0.0166)	(0.0119)	(0.0122)	(0.0139)	(0.0197)	(0.0352)	(0.0474)
Constant	4.492***	1.352***	3.621***	6.941***	9.871***	10.90***	14.39***	15.50***
	(0.0717)	(0.112)	(0.0834)	(0.0892)	(0.132)	(0.225)	(0.626)	(0.924)
Observations	124,973	124,973	124,973	124,973	124,973	124,973	124,973	124,973
R-squared	0.540	0.317	0.438	0.377	0.224	0.132	0.047	0.029

Notes: Robust standard errors are in parentheses. *p<0.10, **p<0.05, ***p<0.01. All the regressions include dummy variables for AFP and birth year cohorts.

Estimates of unconditional effects on quantiles of the pension balance distribution for males



Active portfolio management

- Choosing a type of pension fund other than the default requires a special administrative procedure. It captures awareness about risk diversification and may therefore be a proxy for **financial literacy**
- When people turn 60 they are automatically allocated to pension fund 1 by **default**, unless they asked to be in pension fund 2. People can also move back to pension type 2 afterwards.
  - Fund type 1: investments with relatively low returns and volatility, automatic assignation at age 60, the individual has to act to move to fund type 0 or 2
  - Fund type 2: investments with moderate growth and volatility. This is the default type when the individual enrolls for first time
- We focus on individuals aged 60-64:
  - *Active portfolio management* is one if an individual 60+ has a pension fund other than the default pension fund, and takes value zero otherwise

Unconditional quantile regressions (pooled sample 60+)

Variables	OLS	q25	q50	q75	q90	q95	q99	q99.5
Male	**0.0762****	**0.158****	**-0.0727***	0.0594	**0.110****	**0.177*****	**0.126****	**0.123***
	(0.0311)	(0.0630)	(0.0437)	(0.0394)	(0.0475)	(0.0447)	(0.0634)	(0.0671)
Risk awareness	**0.363*****	**0.371***	0.0212	**0.727*****	**1.057*****	**1.071*****	0.299	-0.221***
	(0.119)	(0.196)	(0.167)	(0.169)	(0.253)	(0.290)	(0.355)	(0.0687)
Risk awareness*male	**0.266***	-0.0753	**0.449****	0.115	0.461	0.429	**1.579*****	**2.321*****
	(0.136)	(0.225)	(0.189)	(0.194)	(0.299)	(0.347)	(0.530)	(0.523)
Regular contributor	2.345***	3.177***	3.155***	1.746***	1.220***	0.770***	0.468***	0.361***
	(0.0288)	(0.0598)	(0.0437)	(0.0341)	(0.0385)	(0.0369)	(0.0526)	(0.0605)
Years enrolled in SPP	0.206***	0.457***	0.204***	-0.0109	-0.0297**	-0.0537***	-0.0550**	-0.0533**
	(0.0120)	(0.0250)	(0.0156)	(0.0123)	(0.0138)	(0.0140)	(0.0234)	(0.0268)
Years in SPP^2/100	-0.141***	-0.702***	-0.0580	0.375***	0.372***	0.384***	0.342***	0.304***
	(0.0380)	(0.0790)	(0.0516)	(0.0415)	(0.0471)	(0.0478)	(0.0780)	(0.0894)
Constant	4.678***	0.675**	4.699***	8.245***	9.414***	10.57***	12.01***	12.73***
	(0.134)	(0.275)	(0.177)	(0.147)	(0.176)	(0.184)	(0.281)	(0.325)
Observations	12,983	12,983	12,983	12,983	12,983	12,983	12,983	12,983
R-squared	0.518	0.337	0.461	0.275	0.134	0.081	0.026	0.019

Notes: Robust standard errors are in parentheses. *p<0.10, **p<0.05, ***p<0.01. All the regressions include dummy variables for AFP and birth year cohorts.

- Risk awareness (=financial literacy) has stronger effects on higher quantiles
- Rethink how the default pension risk should be designed

Conclusions

- We observe that in Peru, there is a large gender gap in pension savings in the IRA system
- Even the gender wage gap reduces across cohorts, the capitalization process of the IRA system and the lack of minimum benefits may reverse this improvement
- Low financial literacy (captured by risk awareness) also contributes to expand the gender gap across the distribution of pension funds
- We should rethink the design of the default option of pension fund risks at age 60. It seems that the current design is penalizing women
- Tackling the increasing gender gap in pension savings in an IRA system would require introducing guaranteed benefits and/or subsidizing contributions for women