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# The Challenge of Retirement Saving in a Low-Return Environment

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James Poterba

MIT, NBER, and TIAA

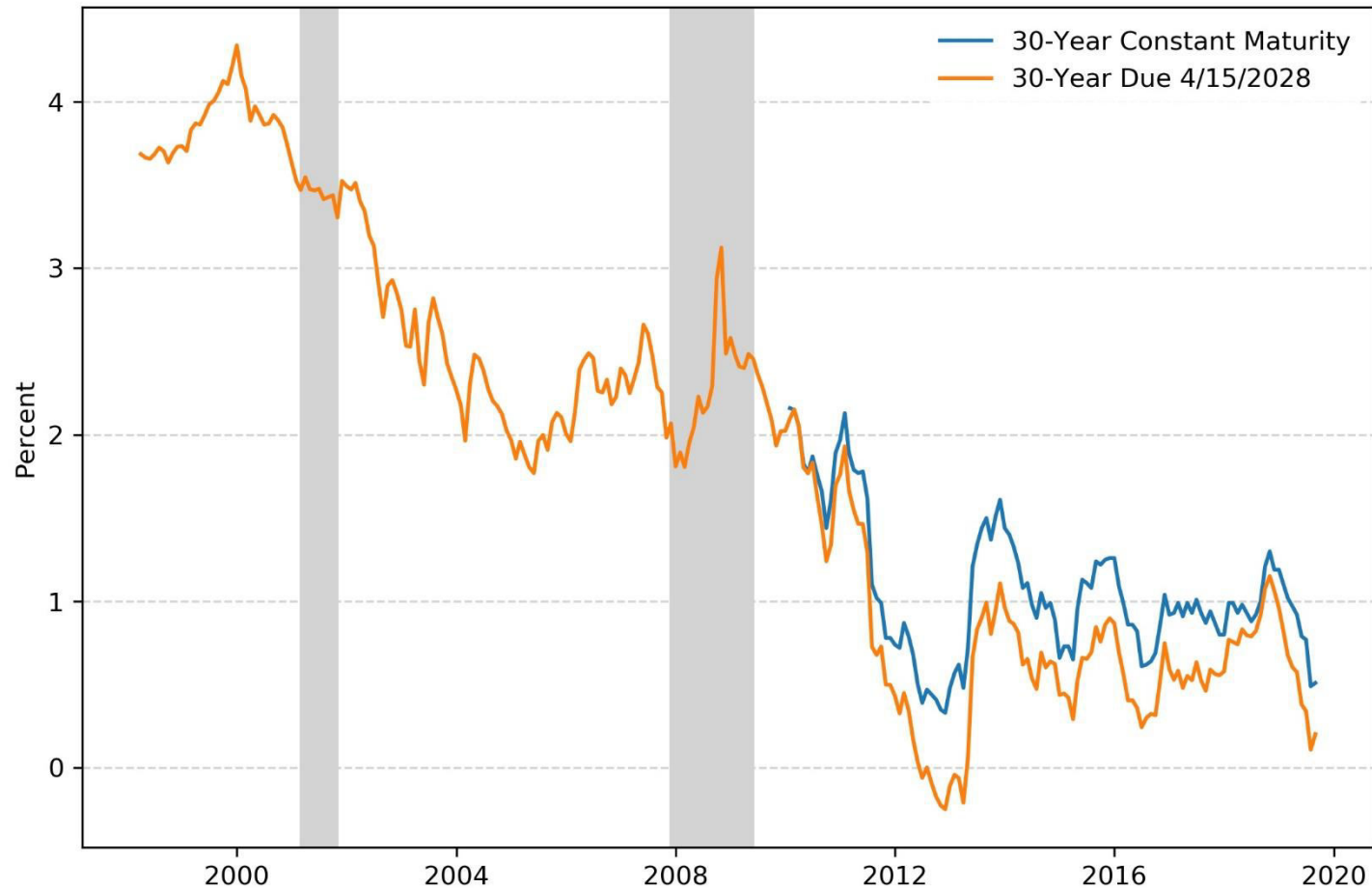
7 November 2019

# 10-Year U.S. Treasury Yield



Source: Board of Governors of the Federal Reserve System (US), 10-Year Treasury Constant Maturity Rate [GS10], retrieved from FRED, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/series/GS10>, October 11, 2019.

# 30-Year TIPS Yield



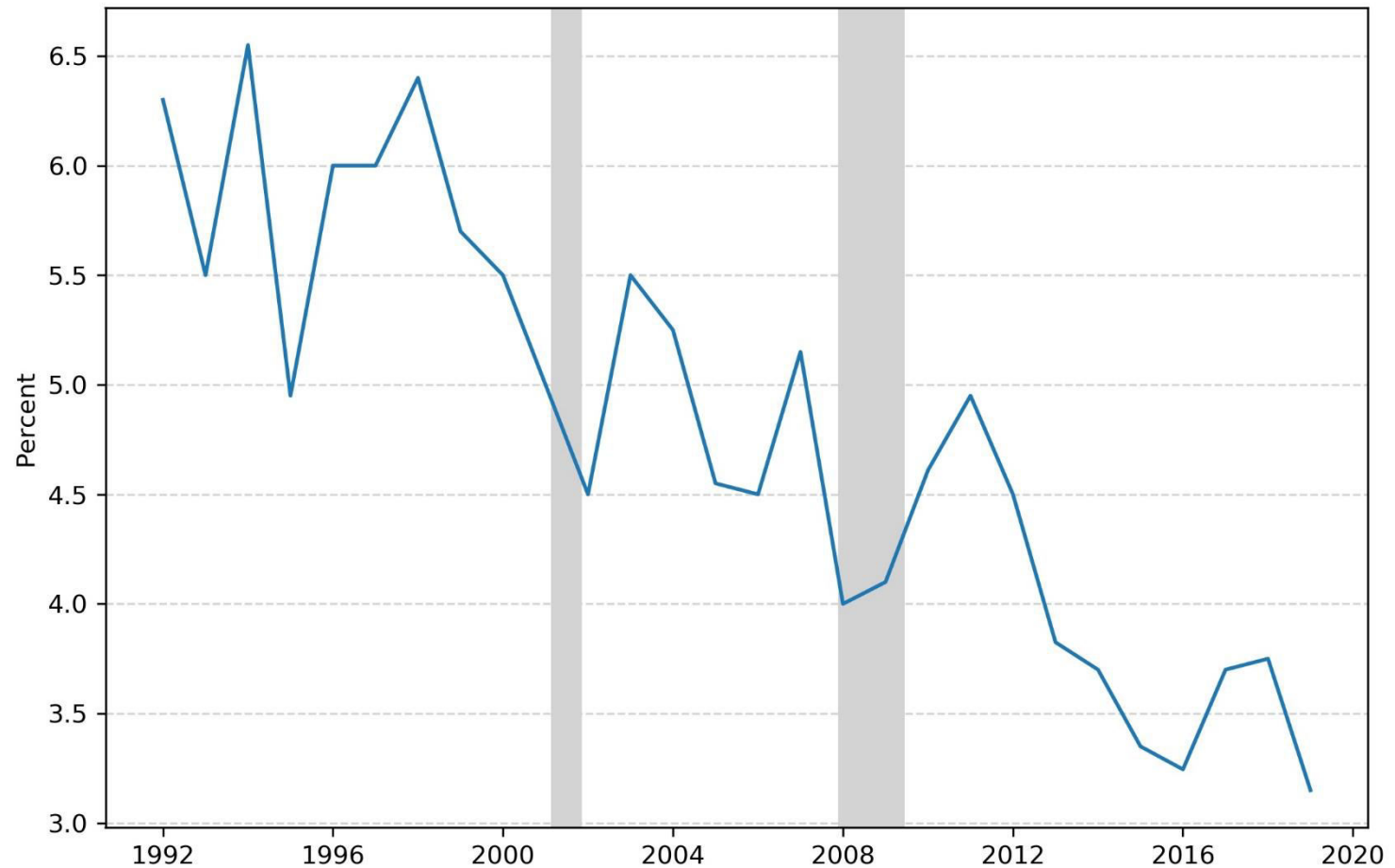
Source: Haver Analytics, 30-Year 3-5/8% Treasury Inflation-Indexed Bond, Due 4/15/2028 [TP30A28], retrieved from FRED, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/series/TP30A28>, October 11, 2019. Board of Governors of the Federal Reserve System (US), 30-Year Treasury Inflation-Indexed Security, Constant Maturity [FII30], retrieved from FRED, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/series/FII30>, January 14, 2018.

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# Index-Linked Bond Yields: 6 November 2019

- Canada (2021): 0.44%
- Sweden (2022): -2.05%
- United States (2028): 0.20%
- United Kingdom (2035): -2.17%

# Expected Real Stock Return for Next 10 Years



Source: Federal Reserve Bank of Philadelphia, Survey of Professional Forecasters, 10-Year CPI Inflation Rate (CPI10) (Median Responses), 10-Year Annual Rate of Returns to Equities (S&P 500) (STOCK10), October 11, 2019. <https://www.philadelphiafed.org/research-and-data/real-time-center/survey-of-professional-forecasters/historical-data/median-forecasts>

# Real Returns, Pre- and Post-Tax, 1990-2019

Year (June, but Oct '19)	10-Year Treasury Yield	Tax Rate on Interest (Fed + S/L)		Expected 10-Year Inflation	Real Pre-Tax Interest Rate	Real After- Tax Inter- est Rate	
		75 <sup>th</sup> Perc.	90 <sup>th</sup> Perc.			75 <sup>th</sup> Perc.	90 <sup>th</sup> Perc.
1990	8.48%	30.9	35.7	4.20%	4.28%	1.66	1.25
2000	6.10	30.9	33.8	2.50	3.60	1.72	1.54
2010	3.20	28.0	30.9	2.40	0.80	-0.10	-0.19
2017	2.19	28.0	30.9	2.30	-0.11	-0.72	-0.79
2019	1.75	26.0	28.0	1.70	0.05	-0.41	-0.44

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# Why Such Low Riskless Returns?

- Global Savings Glut (Bernanke)
- Scarcity of Safe Assets (Caballero)
- Changing Risk Profile of Treasury Bonds – Better Hedge Today than in 1990 (Campbell/Pflueger/Viceira)

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# How a Low-Return Environment Challenges Retirement Security

- Low returns slow accumulation of assets during the work life
- Low returns depress the payout from annuities and the income from assets in retirement
- Low returns may shift retirees away from annuitization



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# Adaptation Strategies for Low-Return Environment

- Raise Saving Rates
- Work Longer: Double Effect, More Saving & Shorter Payout Period
- “Reaching for Yield” by Investors Seeking to Reach Accumulation Targets
- Intergenerational Risk-Sharing? Are Low Returns a “Negative Shock” for Current Cohorts?

# Accumulating with Low Returns

- Earnings Grow 1% Each Year, Normalize to 1 at Age 65
- Wealth at Age 65/Final Salary If Save 1% of Earnings in Defined Contribution Plan at Age  $a$ :  
 $(1.01)^{a-65} (1+r)^{65-a}$
- Saving 1% of Earnings Every Year Starting at Age  $(65 - T)$  Yields (DC Wealth / Wage at 65):  
 $W(T) = \sum_{a=65-T}^{65} (1.01)^{a-65} * (1+r)^{65-a}$
- Pre-Tax Environment

# Retirement Wealth/Final Earnings Per 1% of Salary Saved Per Year

Accumulation Period	$r = 0.03$	$r = 0.01$	$r = 0$
20 Years	0.24	0.20	0.18
30 Years	0.40	0.30	0.26
40 Years	0.60	0.40	0.33

Calculations assume annual real wage growth of 1% per year.  $r$  denotes the real interest rate.

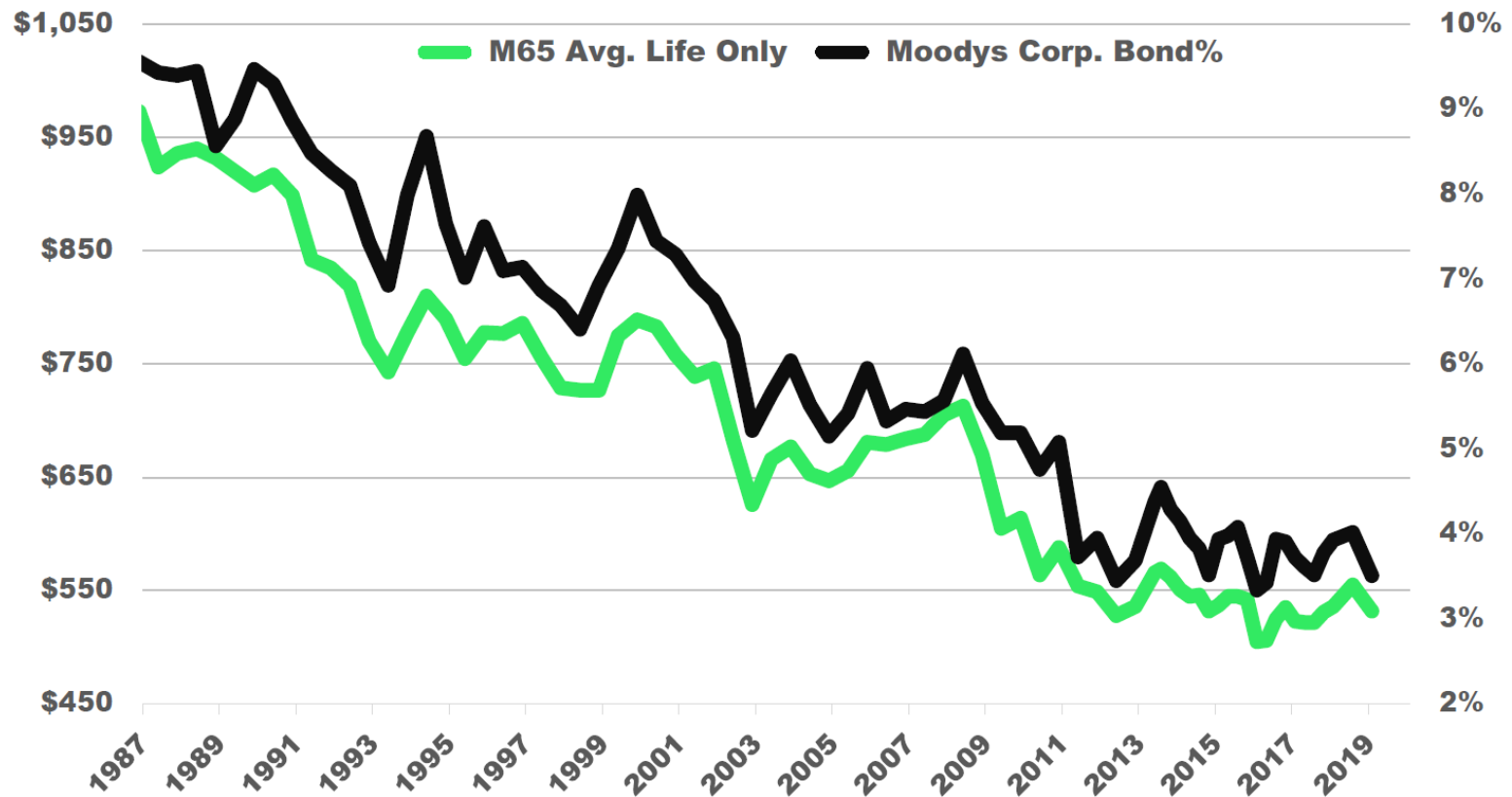
# Annual SPIA Payout Rates Per \$1 Premium, June 2019

	<b>Basic Life Annuity</b>	<b>Annuity with 3% Escalation</b>	<b>Annuity 20 Years Certain</b>
Male, Age 65	0.064	0.046	0.058
Female, Age 65	0.061	0.043	0.057
100% J&S, M 65/F 60	0.051	0.034	0.051

Source: Annuity Shopper Buyer's Guide, July 2019.

# SPIA Payouts and Interest Rates

Male Age 65 Single Life Annuity  
Monthly Income per \$100,000 Premium (in left margin) and  
Yield on Moody's Seasoned AAA Corporate Bonds (in right margin)



# Annual Annuity Payout as Percent of Final Earnings Per 1% Saved

Saving Period	$r = 0.03$	$r = 0.01$	$r = 0$
20 Years	0.018	0.011	0.008
30 Years	0.030	0.017	0.011
40 Years	0.045	0.022	0.015
Annual Annuity Payout/ Accumulated Dollar	0.075	0.055	0.045

Calculations assume annual real wage growth of 1% per year and mortality rate of 0.045 per year for annuity purchase.  $r$  denotes the real interest rate.

# Saving Rate That Replaces 50% of Final Earnings with Annuity

Saving Period	$r = 0.03$	$r = 0.01$	$r = 0$
20 Years	0.275	0.455	0.625
30 Years	0.165	0.303	0.455
40 Years	0.111	0.227	0.333

Calculations assume annual real wage growth of 1% per year.  $r$  denotes the real interest rate.

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# Recent Trends in Retirement Income Choices at TIAA: Annuity Demand by DC Plan Participants

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Jeffrey Brown, Illinois and TIAA

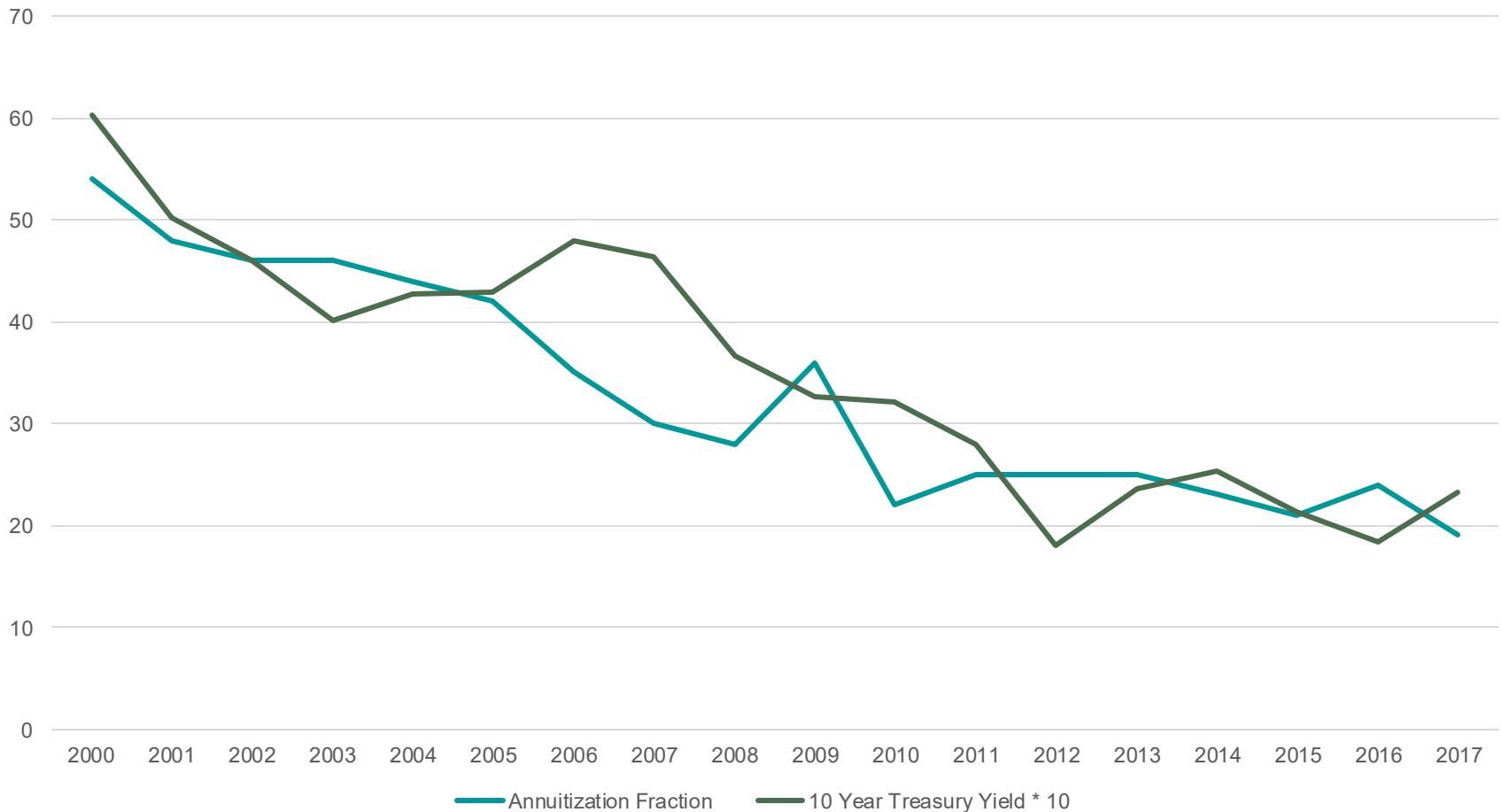
James Poterba, MIT and TIAA

David Richardson, TIAA

September 2019



# Interest Rate & Annuitization Share at TIAA-CREF



Source: J. Brown, J. Poterba & D. Richardson, "Recent Trends in Retirement Income Choices at TIAA," September 2019.

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# TIAA Data

- TIAA is the second-largest annuity provider in the U.S. (after Social Security)
- Annuity decisions in TIAA have been studied before (King, Ameriks & King)
- Important questions of generalizability
  - Few 401(k)s provide annuity option
  - TIAA has some unique structures

# TIAA Participant Sample

- 1.76 million participants over age 55 in 2016
- 0.29 million receive annuity payouts, 1.47 million “potential annuitants”
- 0.41 million receive non-annuity payouts
- Age distribution of sample:
  - 58% are 55-64, 20% 65-69
  - 12% 70-74, 10% > 75

# Are TIAA Participants Representative of US Households?

- All TIAA participants have access to a retirement annuity. At Vanguard, 15% of participants in 12% of DC plans do.
- Account balances for all 65+:

Provider	Mean (000s)	Median (000s)
TIAA	\$304.1	\$95.1
Vanguard 2016	\$196.9	\$60.7

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# Accumulation: TIAA Traditional

- TIAA = very low risk investment option in retirement plans
  - 3% nominal guarantee
  - Returns >3% based on investment performance
  - Backed by TIAA general account
    - About \$250 billion in assets in general account
    - Participants can only withdraw assets over 10 years - allows TIAA to invest in longer duration, illiquid assets
    - 85% invested fixed income, 15% less liquid alternatives
- Numerous payout options at retirement

# Non-annuity Payout Options

- Annuity Certain: Fixed stream of payouts
- IPRO (Interest Payment Retirement Option): Pays out only interest each year
- MDO/RMD (Minimum Distribution Option/ Required Minimum Distribution): Pays out smallest amount required by RMD rules
- SWAT (Systematic Withdrawals and Transfers): Plan of payouts designed by participant ( $\geq$  RMD each year)
- TPA (Transfer Payout Annuity): Set of equal distributions over fixed number of periods

# Annuity Payout Options

- “Outside funds”: If accumulate outside of TIAA and buy a TIAA life annuity, pricing is very similar to rest of the SPIA market
- “Inside funds”: When annuitize accumulated TIAA assets, initial payout is significantly higher than rest of market
  - Set asides / reserves are returned only to those who convert to life an annuity
  - Annuitants benefit from reserves of those TIAA accumulators who did not annuitize

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# TIAA's "Vintage" System

- "Vintages" – A vintage is defined as a period of time during which contributions are made (e.g., a calendar year)
- TIAA keeps track of each individual participant's mix of vintages, asset returns by vintage, and "set asides" for each vintage
- "Set asides" are contributions to reserves
- Unused reserves are ultimately returned to annuitants during payout phase (by vintage)

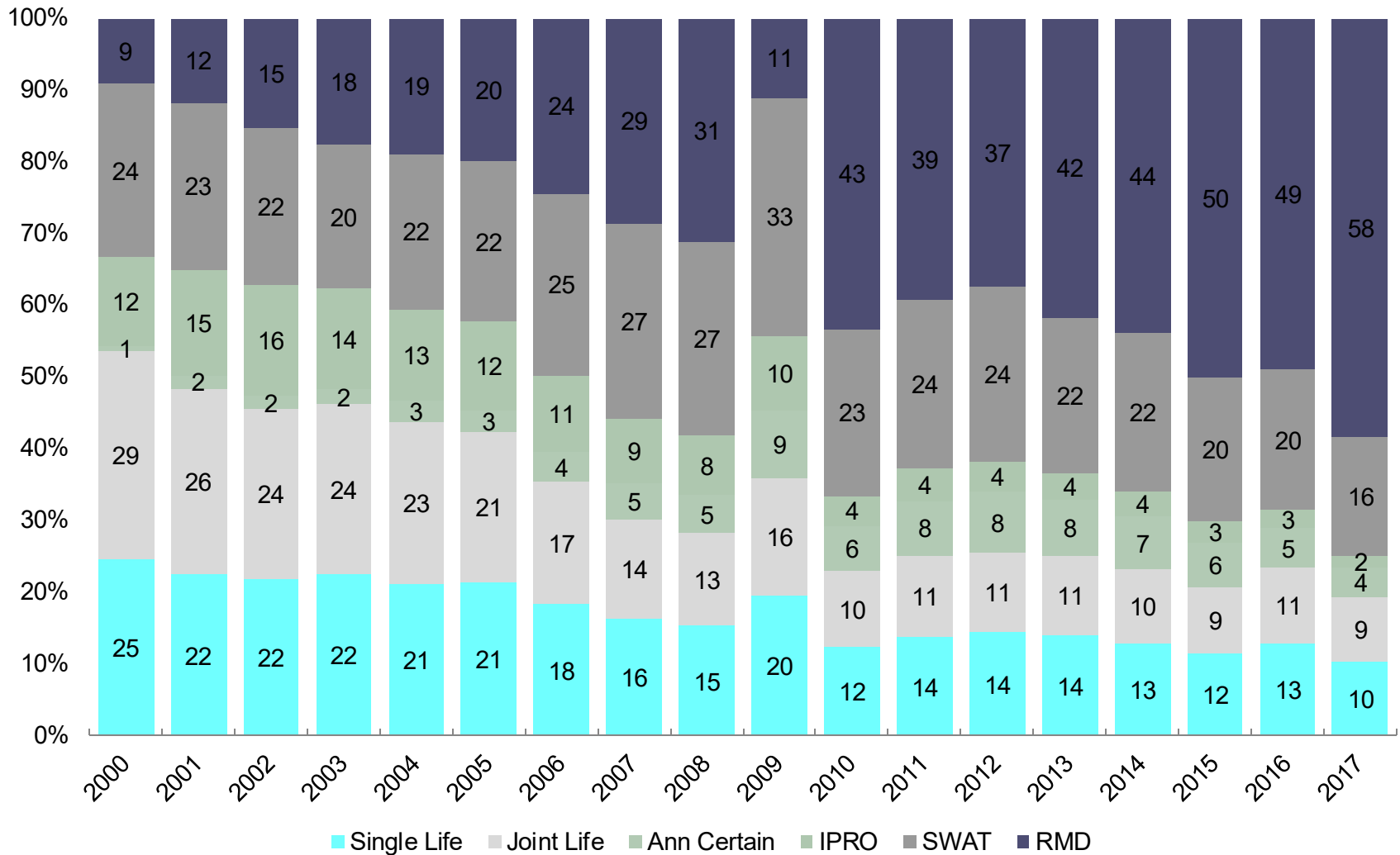


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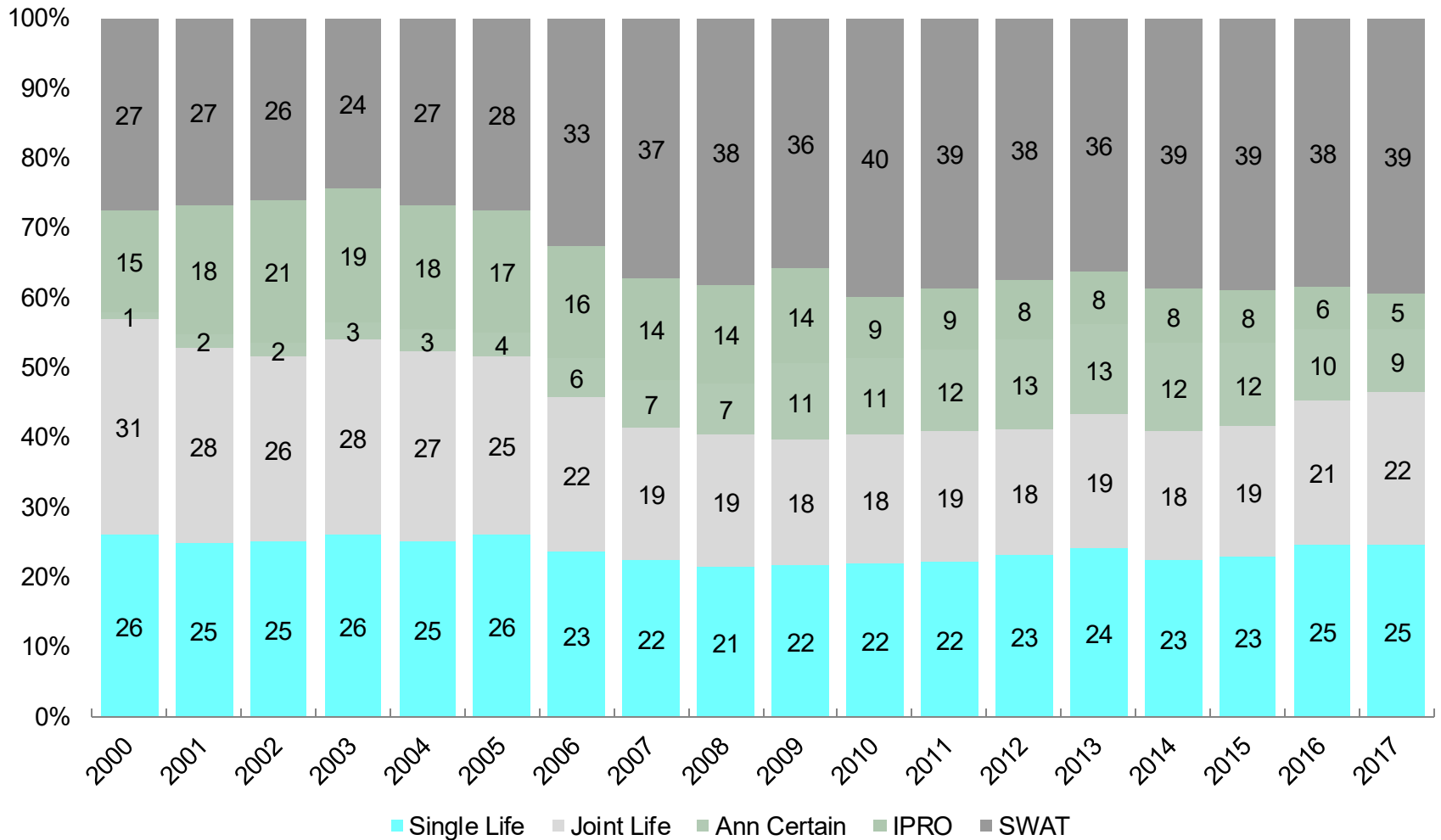
# Accumulation: CREF

- Suite of variable annuity products that invest in stocks and bonds
- More flexible than TIAA at retirement
  - Lump sum distribution option or partial lump sum available
  - Variable annuity: Annuitize at date  $t$ , annual payout rises or falls in proportion to return on portfolio investor selects

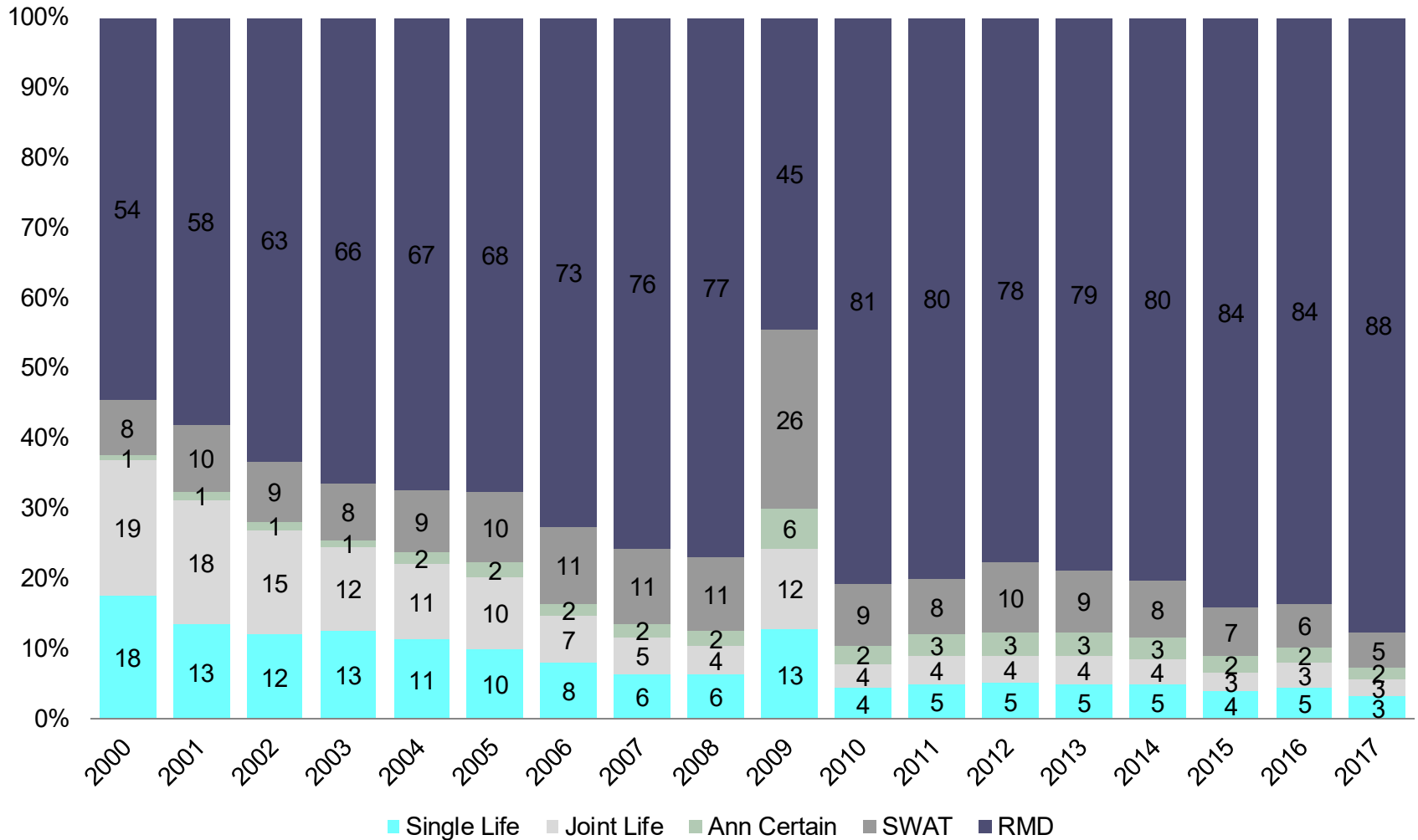
# Income Choices at “First Draw”



# Income Choices, Under 70s



# Income Choices, 70+

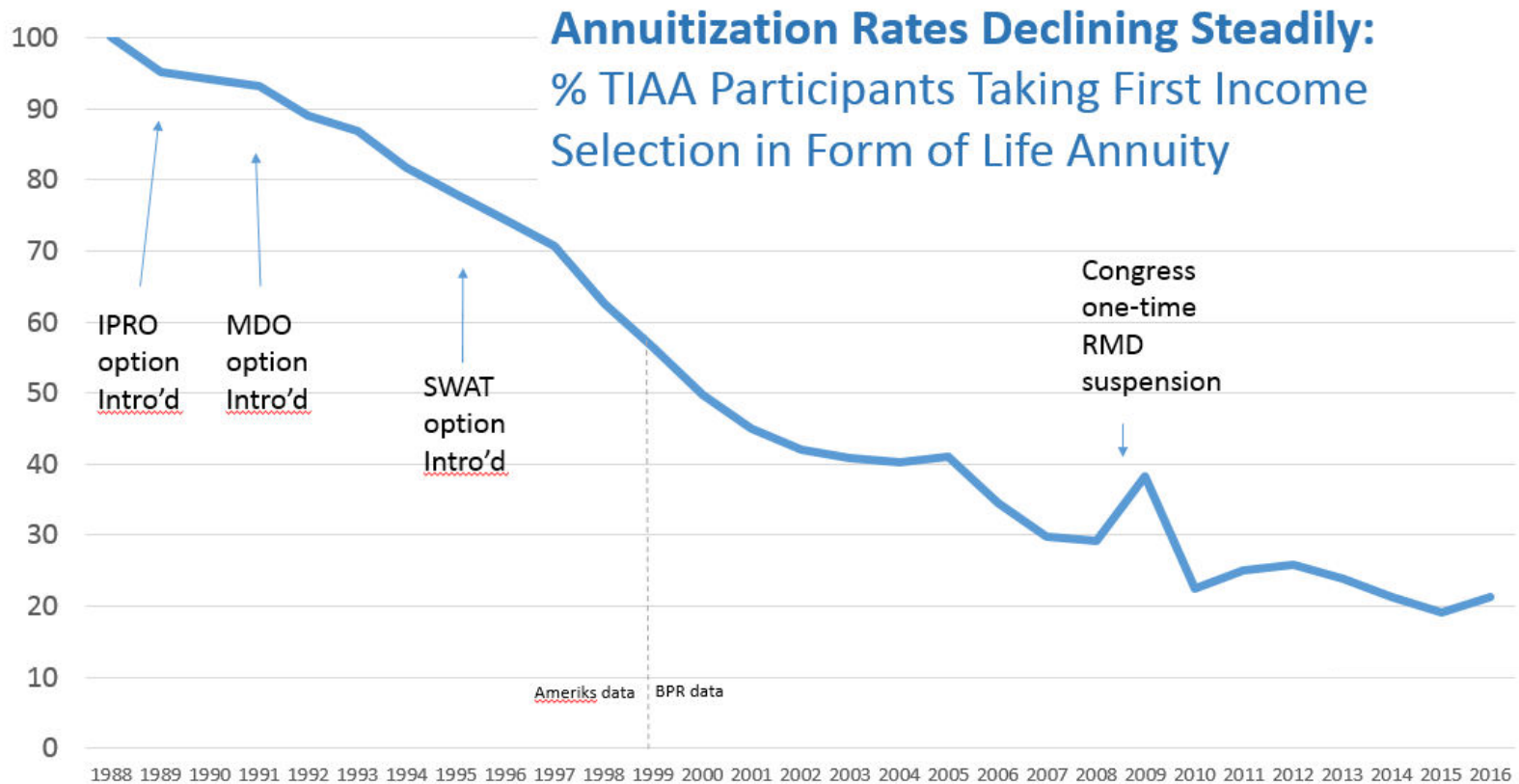


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# Questions We Address

- What explains the dramatic decline in annuitization over the past few decades?
  - Introduction of alternative payout options
  - Changing demographics of TIAA sample
  - Falling interest rates
- What explains the cross-sectional pattern of payout decisions, and which models of lifecycle saving behavior are consistent with it?

# Introduction of New Payout Options & Declining Annuitization Rates



# Attributes of Participants Drawing Income for First Time

	1999	2007	2017
% Annuitizing	56.7%	29.5%	17.8%
Age	65.2	66.7	70.0
% Female	41.1	48.9	54.3
Years as Contributor	23.4	24.8	26.7
Account Balance	363.2	319.2	262.1

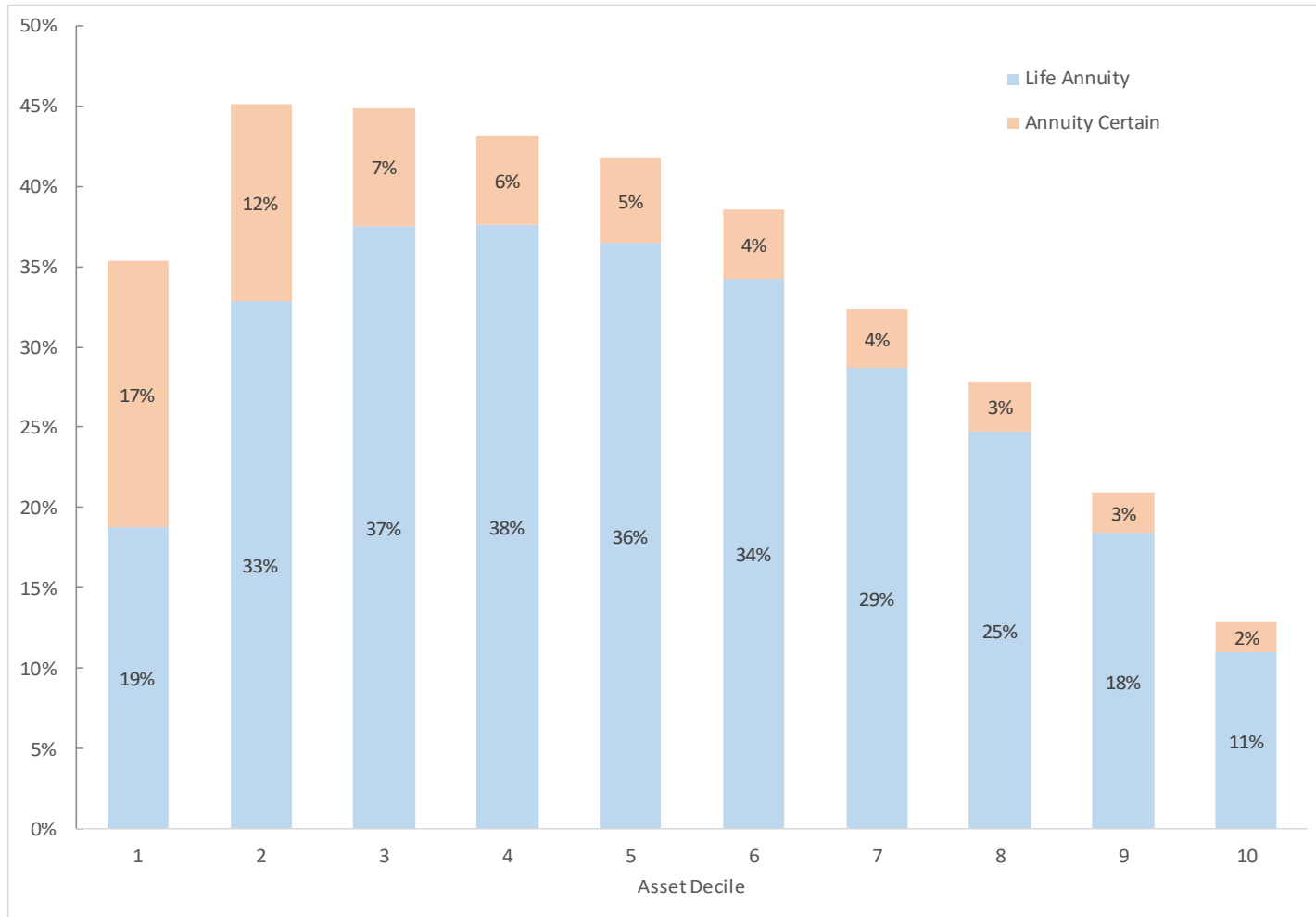
# Cross-Sectional Determinants

Variable in Linear Probability Model	Coefficient (Standard Error)
Account Balance (\$M, \$1999)	-0.134 (0.0016)
Years as Contributor	0.003 (0.0001)
Contributor is Female	0.023 (0.001)
Age (relative to < 55)	
- 55-59	0.126 (0.004)
- 60-64	0.252 (0.003)
- 65-69	0.312 (0.003)
- 70-74	-0.177 (0.003)
> 75	-0.139 (0.003)

Specification includes year fixed effects, estimated 1999-2017.



# Prob(Annuitize) by Account Size



# Type of Annuity Chosen, 2017

<b>Annuity Type</b>	<b>Men</b>	<b>Women</b>
<b>Single Life Annuity</b>	<b>35.7</b>	<b>69.8</b>
- No Guarantee	27.1	25.7
- 10 Year Guarantee	31.6	34.2
- 20 Year Guarantee	25.5	23.6
- Other Survivor Patterns	15.8	16.5
<b>Joint Life Annuity</b>	<b>64.3</b>	<b>30.2</b>
- Full to Survivor, No Guarantee	15.1	12.9
- Full to Survivor, with Guarantee	72.5	70.1
- Other Survivor Patterns	12.4	17.0

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# Conclusions

- Many annuitants annuitize only part (if any) of their accumulation
- Multi-step decision-making is common with regard to retirement payouts
- Many (and growing) share of participants follow RMD strategy which preserves option to annuitize at older ages
- Might annuitization at older ages rise in the future?

# Household Balance Sheets, 65-69 Year Olds in 2014

Per-centile	SS Wealth	DB Wealth	Non-Retirement Financial	IRAs & DC Plans	Home Equity	Net Worth
10	\$0	\$0	\$0	\$0	\$0	\$144K
25	120K	0	1K	0	19K	290
50	226	0	12	29K	105	615
75	355	160K	97	225	250	1271
90	462	445	330	705	555	2207

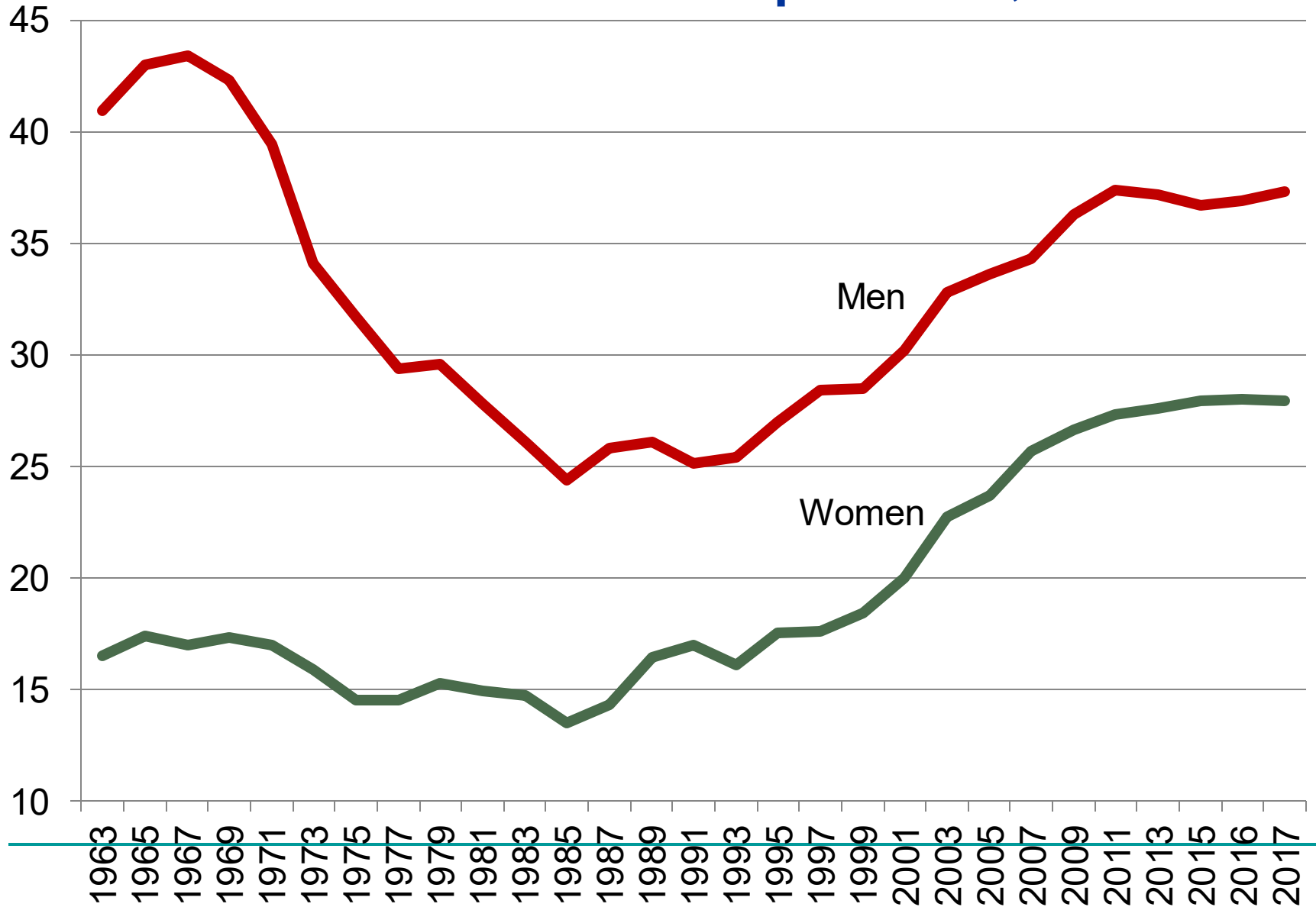
Source: Health and Retirement Survey 2014; updated from Poterba, Venti, & Wise (2013) Journal of Economic Perspectives.

# Social Security Replacement Rates

Earnings Tier	Career Average Earnings (\$2017)	Scheduled Benefits 2018 @62	Replacement Rate @ 62/NRA
Very Low	\$12,479	\$7,419	59.5%/75.6%
Low	\$22,463	\$9,704	43.2 / 55.0
Medium	\$49,917	15,992	32.0 / 40.8
High	\$79,868	21,223	26.6 / 33.8
Earnings cap	\$122,516	25,803	21.1 / 26.9

Source: M. Clingman, K. Burkhalter, and C. Chaplain, SSA Actuarial Note 2018.9, June 2018.

# Labor Force Participation, 65-69



# Life Expectancy at Age 65

Year	Men	Women
1960	13.2 years	17.4 years
1990	16.1	19.4
2010	18.6	21.1
2030 (projected)	20.0	22.4
2060 (projected)	21.8	23.9

Source: Social Security Administration, Office of the Actuary, 2017 Trustees Report.

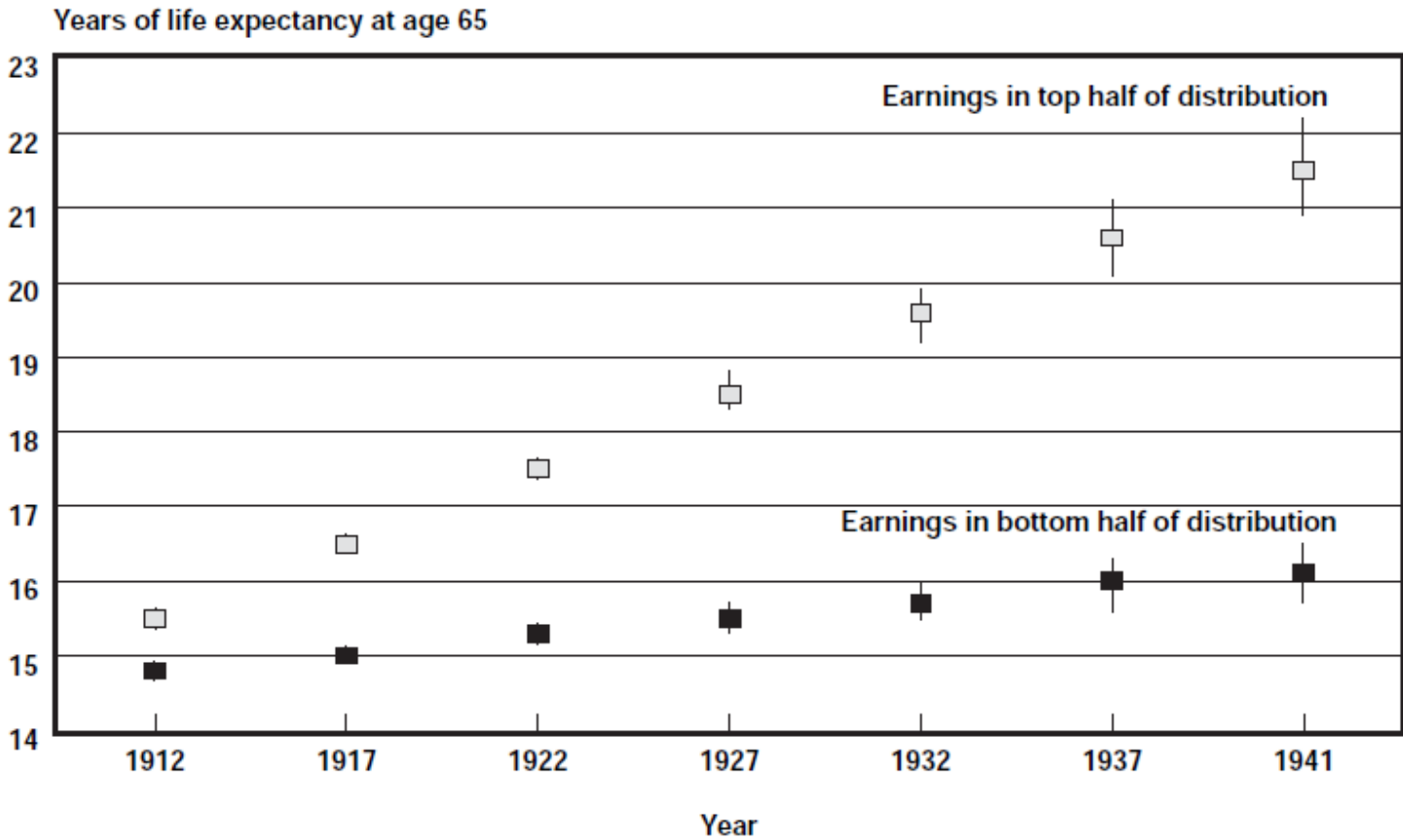
# Married Couple Longevity @ 65

	Poor Health		Average Health		Excellent Health	
	Either Alive	Both Alive	Either	Both	Either	Both
75	97%	69%	98%	75%	99%	79%
85	78	28	84	36	89	44
90	55	11	66	17	74	24
95	29	2	39	4	49	8
100	9	0	15	1	21	1

Source: [www.longevityillustrator.org](http://www.longevityillustrator.org) assuming married non-smoker couple both born 1/1/55.



**Chart 3.**  
**Cohort life expectancy at age 65 (and 95 percent confidence intervals)**  
**for male Social Security–covered workers, by selected birth years and earnings group**



SOURCE: Author's calculations using a matched 2001 Continuous Work History Sample.

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# Challenges of Low Returns & Longer Lifespans

- Middle and upper-middle income households face greatest challenges
- Relied on DB plans, now DC
- Lower returns make accumulation more difficult and reduce payouts in retirement
- Longevity has improved significantly