Stock Market Returns and Annuitization.

A Case of Myopic Extrapolation.

Alessandro Previtero, *UWO Ivey School of Business*

Ifid, November 2011

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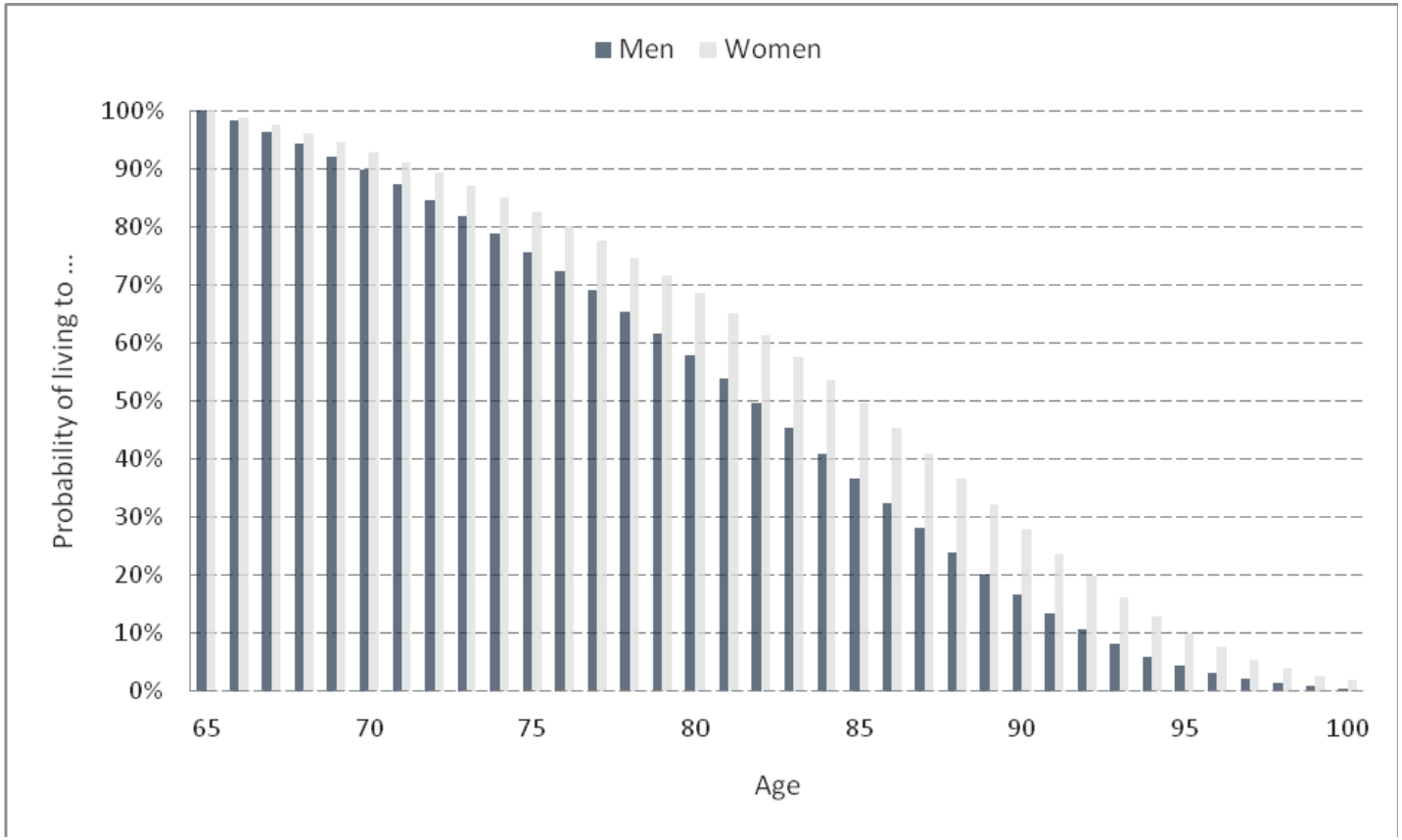
- Life expectancy at later ages has increased over the last century
  - Life expectancy at age 65 has increased of four years since 1950s
  - What about the distribution of life expectancy?

Variation in life expectancy at age 65 is stunning



Source: Benartzi, Previtero, Thaler, Journal of Economic Perspectives (forthcoming)

One potential solution for longevity risk...

A better solution

- Annuities that pay lifetime income are the simplest way to hedge longevity risk
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  - Collective pension forms did not traditionally offer multiple payout options

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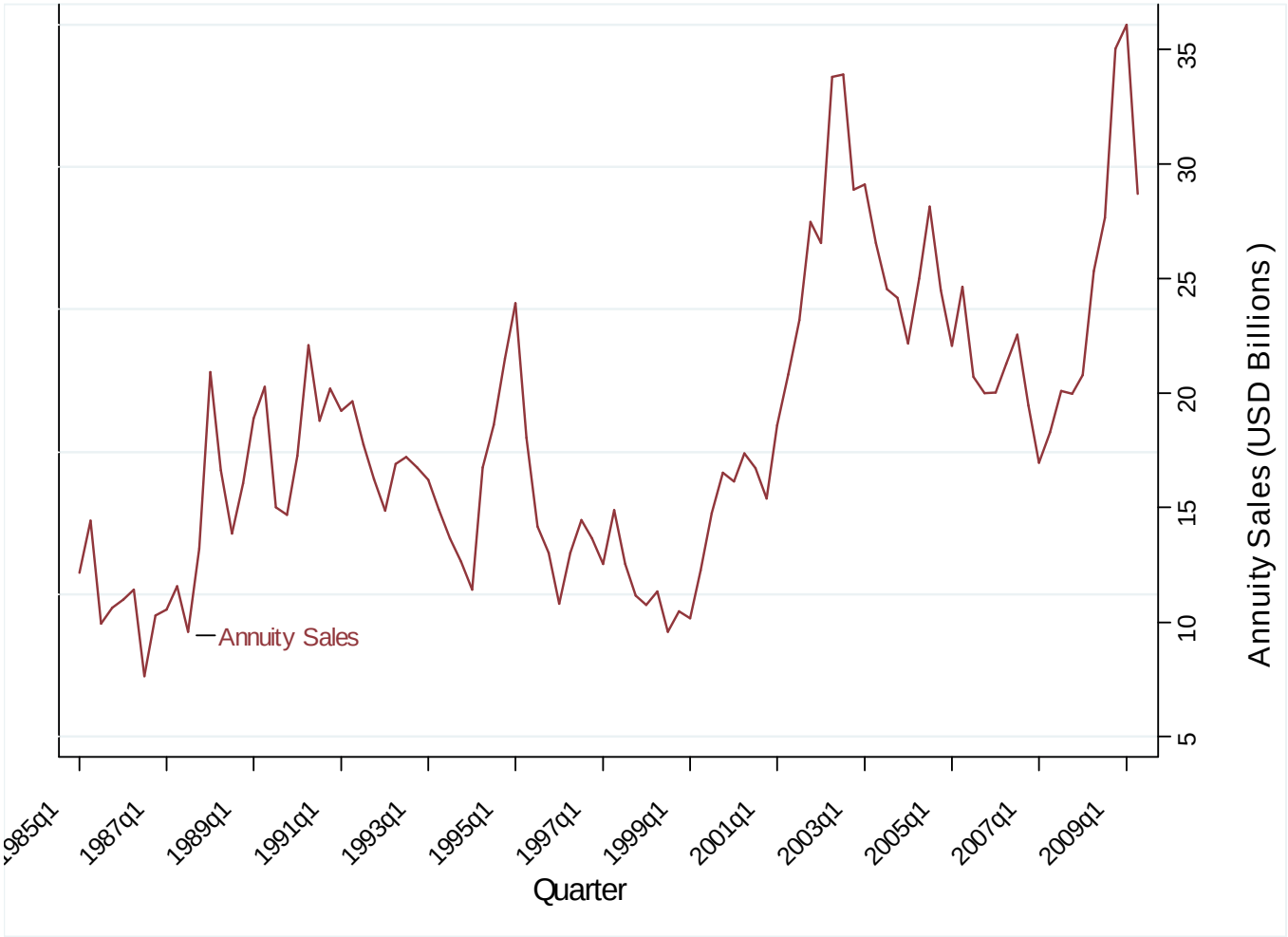
▸ Empirical Studies on Annuitization

- This paper investigates the (time-series) determinants of annuitization
  - Over 100,000 actual payout decisions between annuities and lump sums
  - In practice, no default option

Annuity sales dramatically vary overtime



Source: annuity sales (LIMRA Data)

Fixed annuity sales track stock market returns

Source: annuity sales (LIMRA Data); correlation: -0.748

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  - Marital status
  - Pre-existing level of annuitization
  - Precautionary or bequests motives

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- Thought experiment

Do stock market returns affect annuitization?

- How strong and robust is the effect of stock returns?
  - Over 103,000 actual payout decisions from 112 DB plans in seven years
    - ★ What past time horizon is relevant?
  - A retirement plan from IBM (with financial education)
  - Fixed annuity sales between 1985Q1-2009Q2

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Challenges in this study

- I do not observe the overall wealth of employees
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- I do not observe the overall wealth of employees
  - Real estate prices as proxy for wealth
  - Exogenous wealth shock caused by a natural disaster (Hurricane Katrina)
- I have no information on how employees invest the lump sum
  - Expectations about future returns cannot be inferred from actual decisions
  - Confidence Index as proxy for expectations

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  - **Sample description**
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This decision significantly impacts retirement wealth

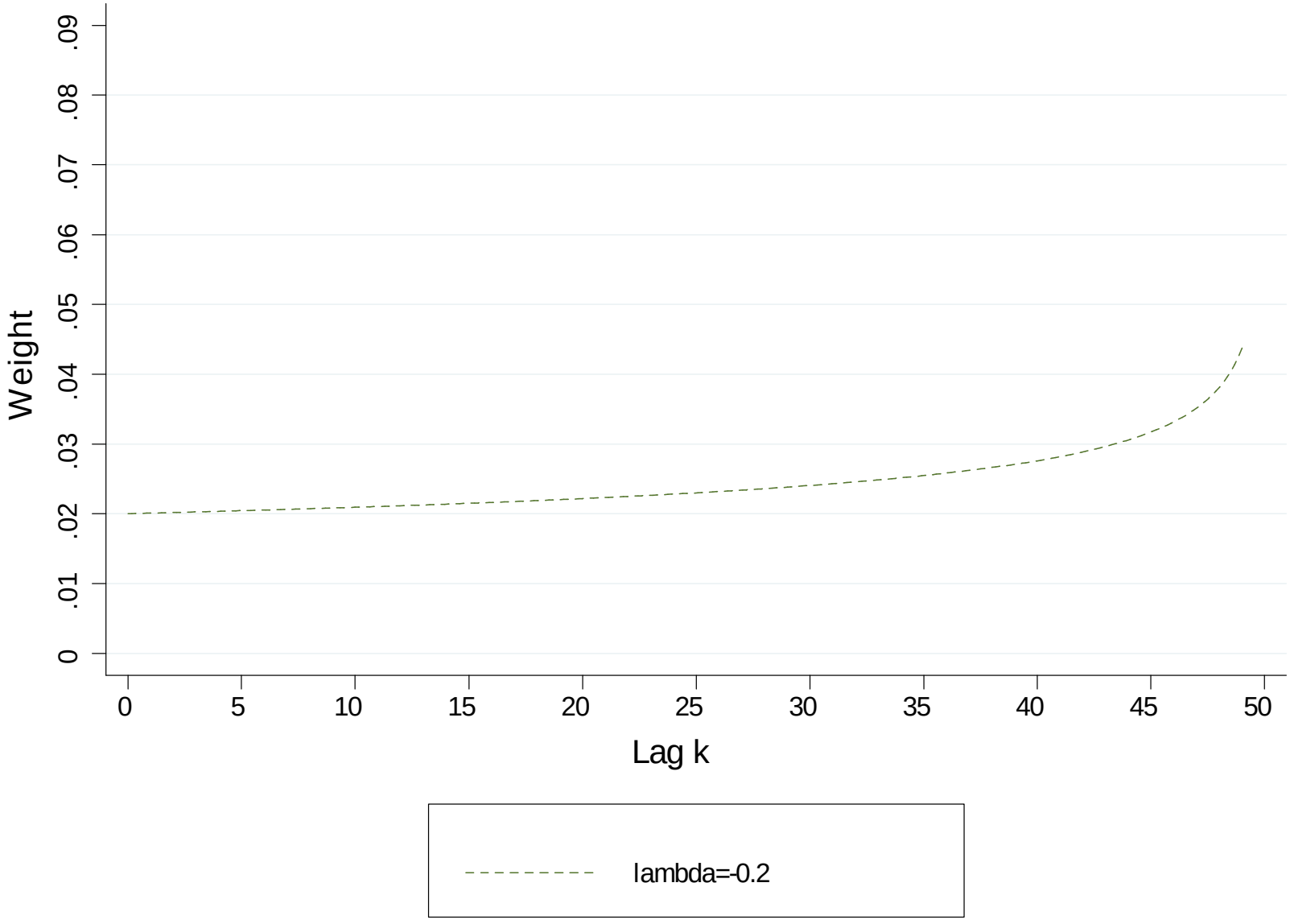
Sample:	Main Sample		IBM		SCF (age 50-75)	
	(1)	(2)	(3)	(4)	(7)	(8)
	Mean	Median	Mean	Median	Mean	Median
Annuity	0.49	0.00	0.88	1.00		
Age	59.83	60.00	58.33	57.86	60.63	59.60
Female	0.44	0.00	0.25	0.00	0.27	0.00
Tenure	24.52	25.66	28.92	30.59		
DB Benefits	188.13	86.46	413.04	387.1		
Net Finc. Wealth					262.79	6.72
Med. House Price	213.33	166.10				
Home Equity					163.89	87.4
Income			101.07	95.93		
Education (years)			15.22	16		
Bus. Education			0.12	0		
MBA			0.06	0		
Sample Size	103,516	103,516	18,688	18,688	5,835	5,835

Methodology: estimating equation

$$Ann_{ijt} = \alpha + \beta A_t(\lambda) + \gamma' x_i + \delta_j + \varepsilon_i \quad (1)$$

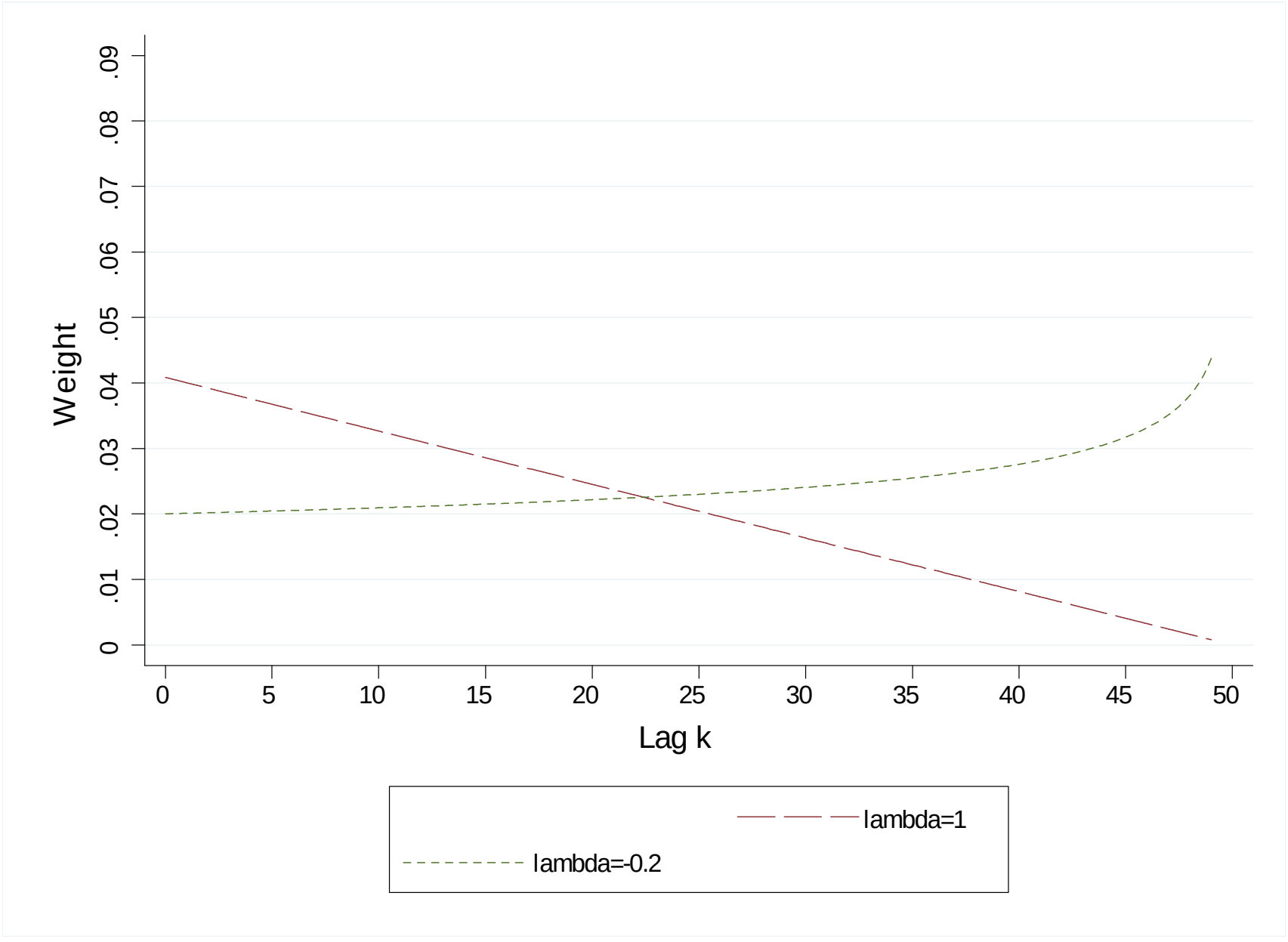
- where:
  - $A_t(\lambda)$ is the weighted average of past monthly returns
  - x_i is a vector of control variables
  - δ_j are plan fixed effects
  - ε_i is the error term

The weighting functional form is flexible I



Source: Malmendier and Nagel (2011)

The weighting functional form is flexible II



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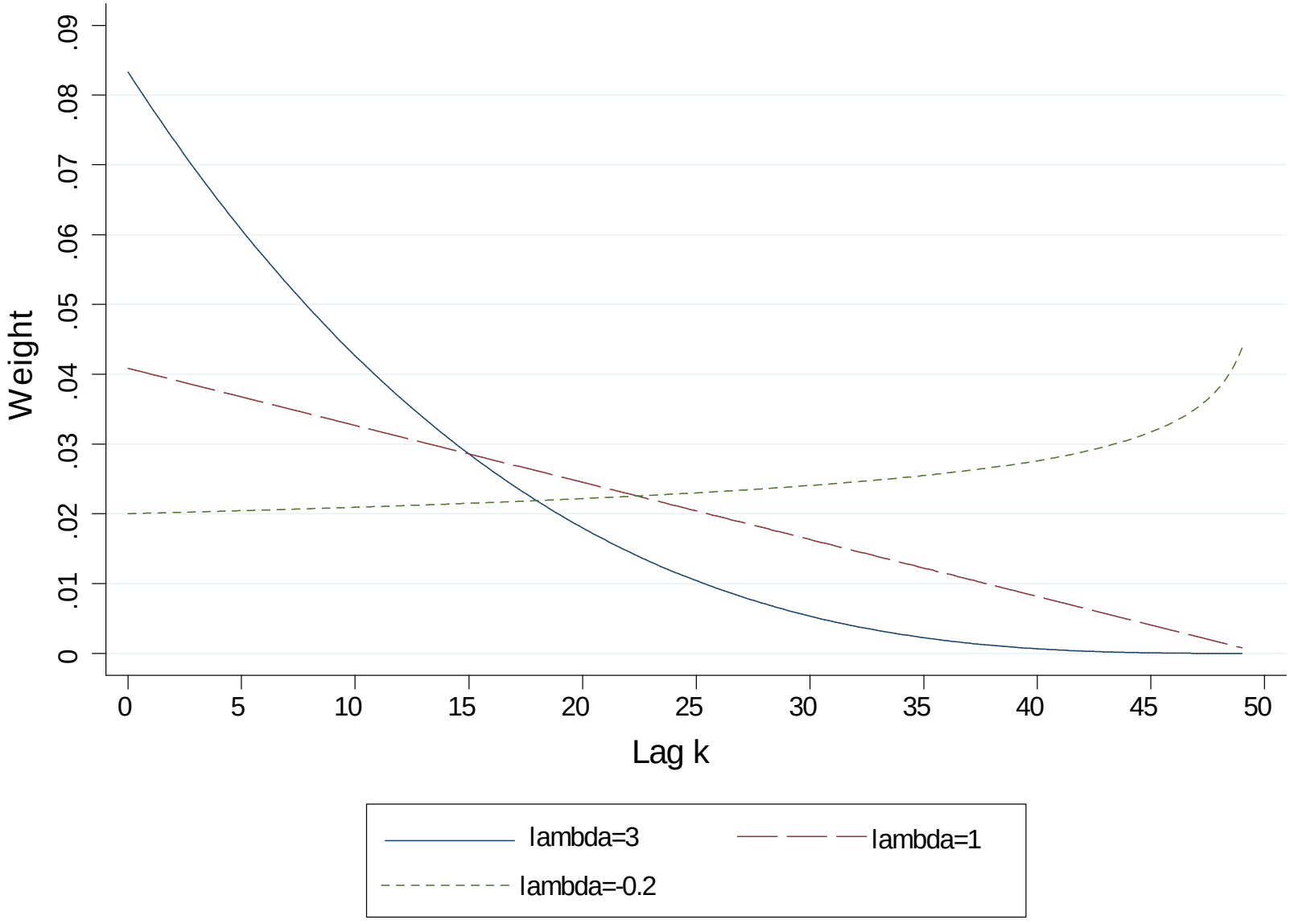

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Stock market returns affect annuitization

	(1)	(2)	(3)
Past stock return coefficient β	-5.627***	-4.336**	-4.815**
	(1.513)	(1.609)	(1.921)
Weighting parameter λ	5.163***	5.163	5.163
	(0.827)		
Demographic Controls	Yes	Yes	Yes
Interest Rates	Yes	Yes	Yes
Calendar Months F. E.	Yes	Yes	Yes
Years F. E.	Yes	Yes	Yes
Plan Controls	Yes	Yes	Yes
Plan F.E.	No	Yes	No
MSA F.E.	No	No	Yes
Observations	103,516	103,516	89,396
R-squared	0.192	0.39	0.242

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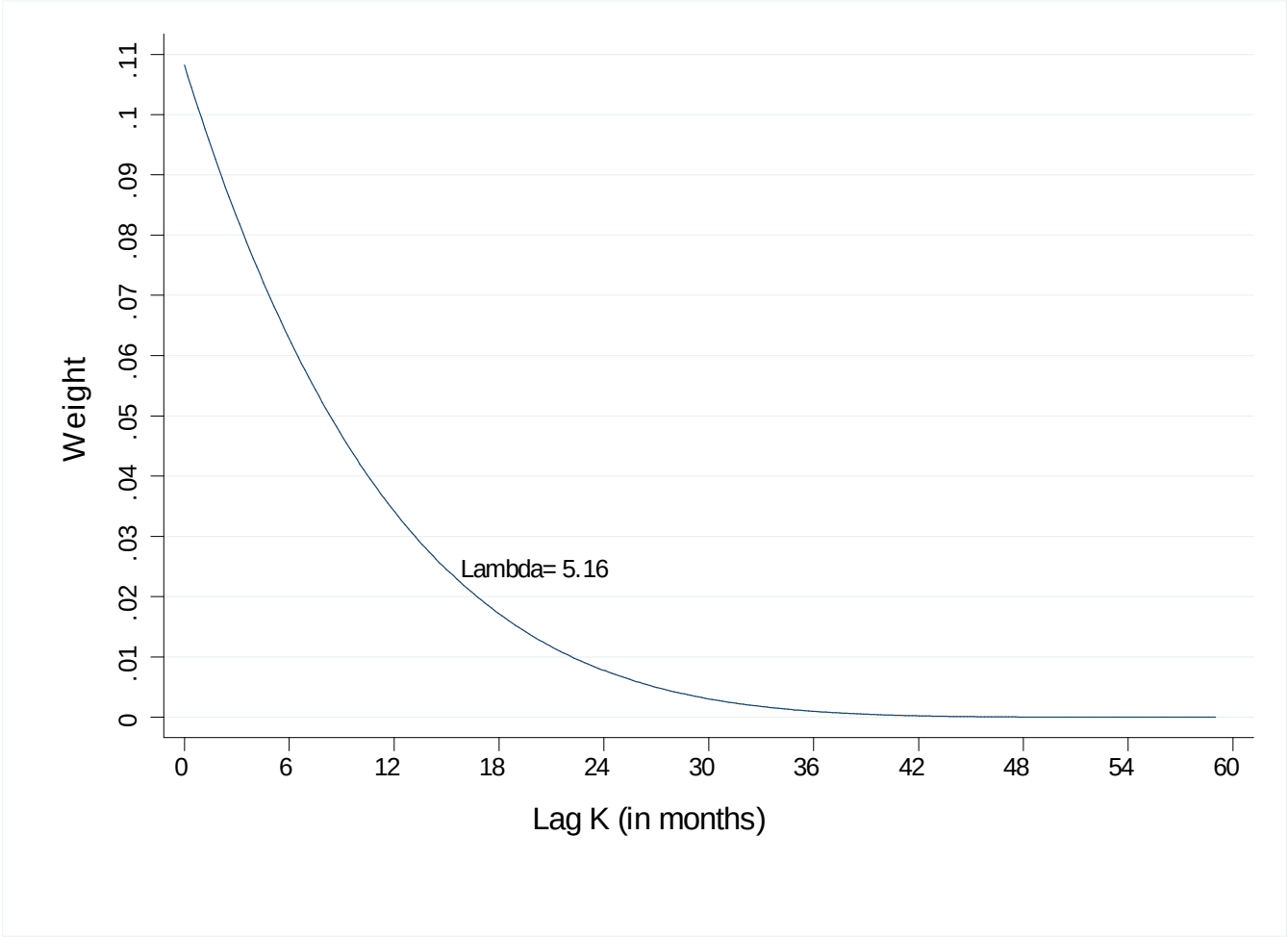
- From 25th to 75th Percentile of Returns: -5.627*1.71 pp $\approx$ -9.6 pp
- From 10th to 90th : -5.627*2.62 pp $\approx$ -14.8 pp

The weights quickly decrease overtime



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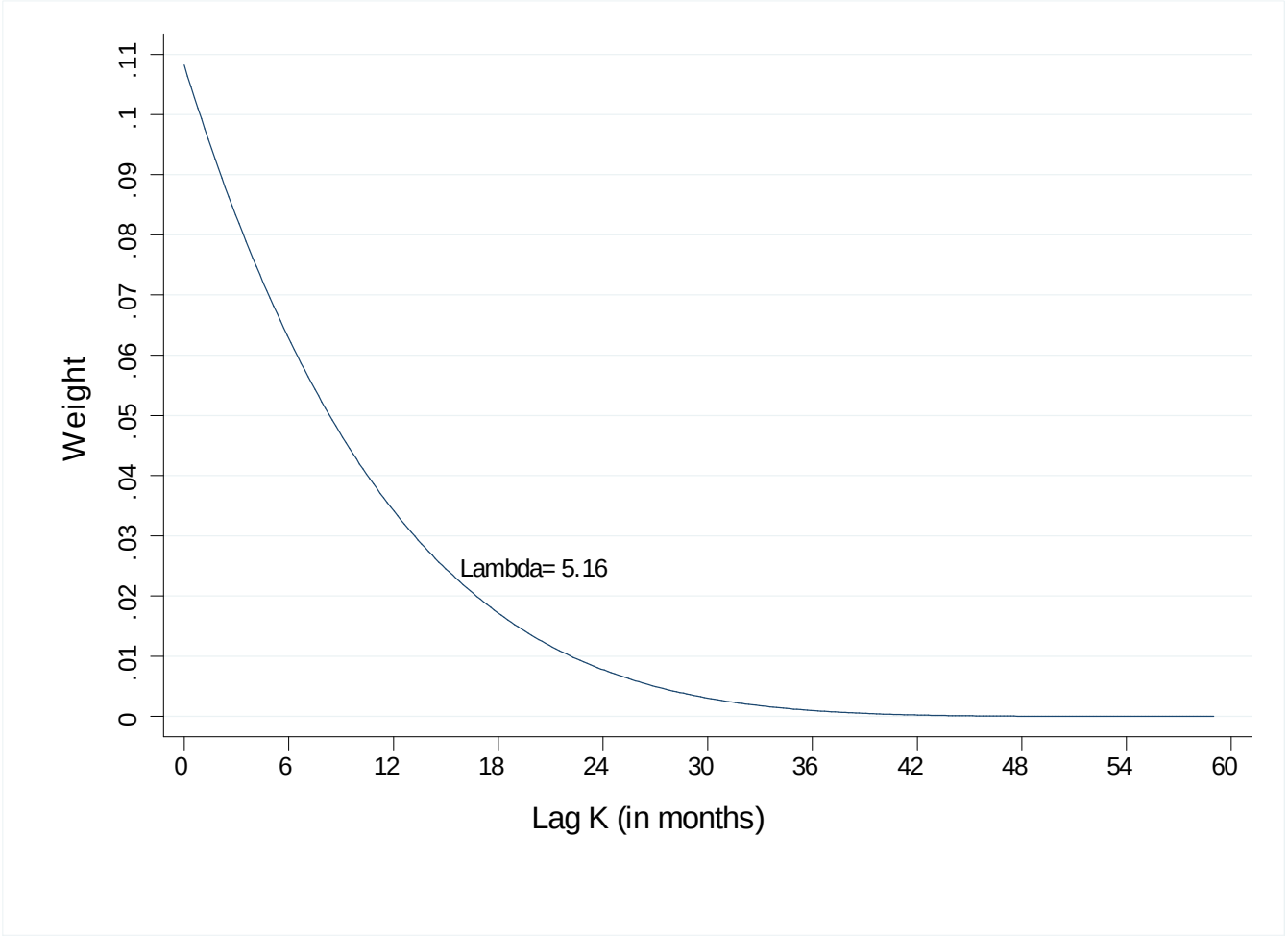

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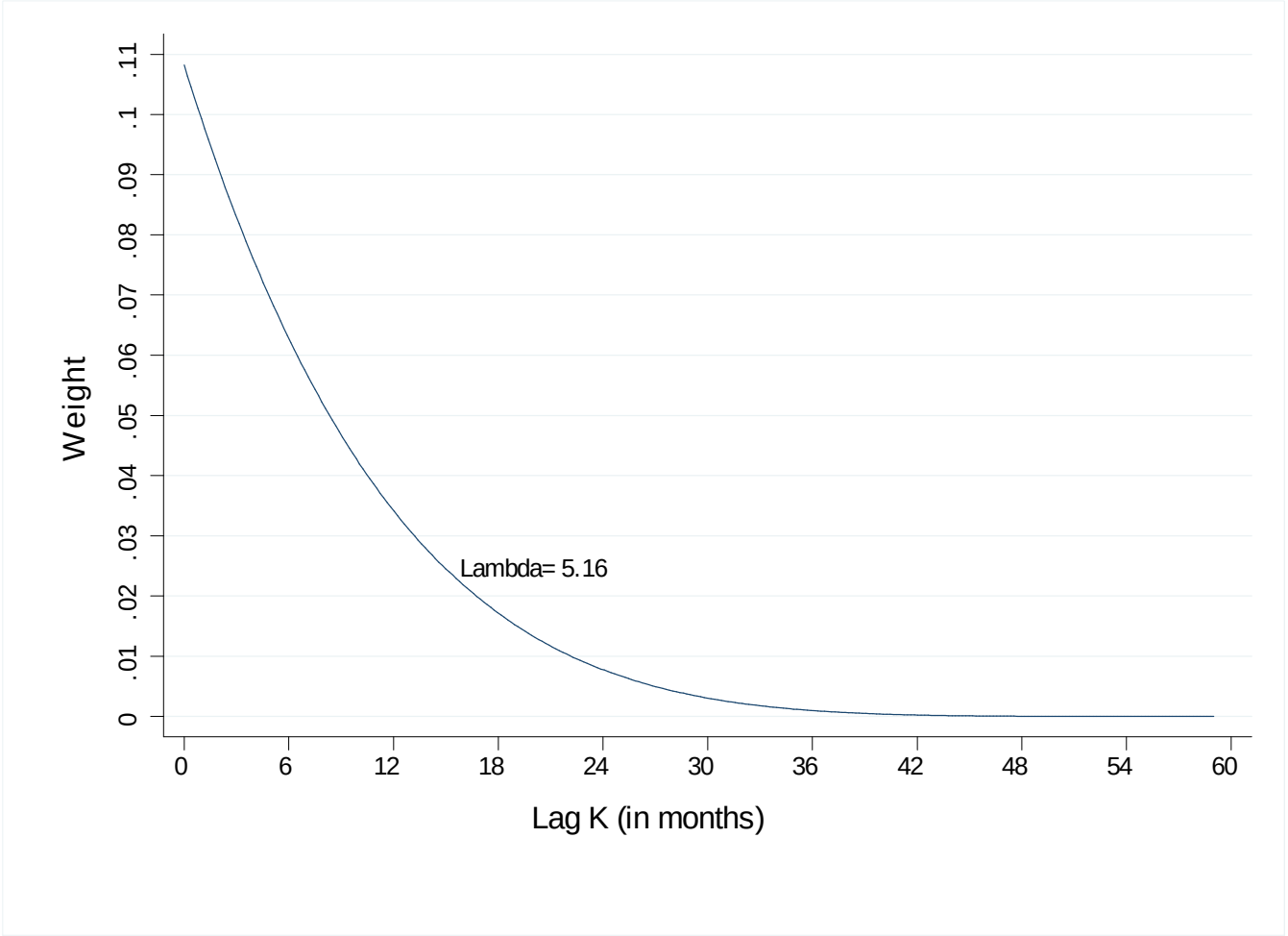

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- Almost no weight is assigned to returns older than two years

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- Bequests and precautionary motives might play an important role in annuitization
  - Bernheim (1991), Sinclair and Smetters (2004)
- Which of the two effects prevails is an empirical matter
  - I use real estate prices as a proxy for wealth
  - For a truly exogenous shock to wealth, I study the Hurricane Katrina event

Wealth effects are not likely to explain my results

Lag in Med. House Prices:	1 Year	2 Years	3 Years	1 Year
	(2)	(3)	(4)	(5)
Past stock return β	-6.079**	-5.963**	-6.135**	-4.730*
	(2.505)	(2.512)	(2.498)	(2.331)
Weighting parameter λ	5.095	5.095	5.095	5.095
Median House Price	-3.260***	-3.802***	-4.419***	-1.229**
	(0.720)	(0.795)	(0.861)	(0.473)
Var. Med. House Price	1.873*	1.122**	0.482	1.118**
	(0.951)	(0.437)	(0.429)	(0.509)
Additional Controls	Yes	Yes	Yes	Yes
Plan F.E.	No	No	No	Yes
Observations	58,897	58,897	58,897	58,897
R-squared	0.174	0.174	0.173	0.376

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- I use a differences-in-differences methodology to estimate the effect of this catastrophe on annuitization
- Other than an exogenous shock to wealth, the event might have caused:
  - An immediate need for liquidity
  - A revision of the life expectancy in the four and neighboring states (Fier and Carson, 2009)

The negative shock to wealth reduces annuitization

Sample:	All States	Without LA	All States	Without LA
	(1)	(2)	(3)	(4)
Past return β	-5.713**	-5.637**	-5.667**	-5.590**
	(2.062)	(2.079)	(2.072)	(2.088)
Katrina Date	3.708	3.434	3.911	3.639
	(3.422)	(3.284)	(3.601)	(3.458)
Katrina States	5.131*	4.196	5.918**	4.975*
	(2.544)	(2.342)	(2.600)	(2.396)
K.Date*K.States	-8.195***	-7.623***	-8.310***	-7.735***
	(2.195)	(2.183)	(2.104)	(2.170)
Neigh. States			3.427**	3.434**
			(1.353)	(1.375)
K.Date*N.States			-0.661	-0.662
			(2.227)	(2.239)
Observations	95,997	94,557	95,997	94,557
R-squared	0.197	0.195	0.197	0.195

Weighting parameter fixed at 5.163. Additional controls included.

Individual investors' beliefs affect the decision to annuitize

Sample:	Individual Investors	
	(1)	(2)
Confidence Index	-9.803**	-2.771
	(4.570)	(3.920)
Past return β		-5.168**
		(1.761)
Weigh. par. λ		5.163
Add. Controls	Yes	Yes
Observations	101,053	101,053
R-squared	0.186	0.19

▸ Go to Final Remarks

Beliefs affect the decision to annuitize: a placebo test

Sample:	Institutional Investors	
	(4)	(5)
Confidence Index	-3.217	-2.611
	(1.930)	(1.661)
Past return β		-5.732***
		(1.871)
Weigh. par. λ		5.163
Add. Controls	Yes	Yes
Observations	101,053	101,053
R-squared	0.184	0.19

▸ Go to Final Remarks

An extrapolation explanation

- The influence of past stock market returns has been documented in various settings
  - Investors' beliefs and stockholdings (Vissing-Jorgensen, 2003)
  - Investments by young mutual fund managers (Greenwood and Nagel, 2008)
  - Mutual funds flows (Chevalier and Ellison, 1997; Sirri and Tufano, 1998)
  - IPOs subscription (Kaustia and Knupfer, 2008)
  - Saving for retirement (Benartzi, 2001; Benartzi and Thaler, 2007, Choi et al, 2009)

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- Back-of-the-envelope calculation for someone annuitizing "too early"
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  - Men, age 65, with 20 years of tenure and $200,000 in benefits

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- What is the effect of stock returns on two employees: one retiring before the credit crises (12/2007) and the other a year later (12/2008)?
  - Men, age 65, with 20 years of tenure and $200,000 in benefits
- From my estimates the latter employee will be 24 percentage points more likely to choose an annuity
  - The probability of choosing an annuity in December 2007: 39 percent
  - In December 2008: 63 percent

Welfare implications can be serious

- Simulations show that investor can increase their retirement wealth if they defer annuitization to later in life from 20 up to 40 percent
  - Intuition: the longer I defer annuitization the more I can benefit from the equity premium (Milevsky and Young, 2007; Hornef et al., 2009)

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- From back-of-the-envelop calculations, the welfare reduction for the employee retiring in December 2008 is:
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  - 2 to 5 additional working years
- What about annuitizing "too late" or never?
  - For healthy individuals, access to (additional) annuitization can increase welfare by 16% (Yogo, 2011)

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  - It increases by 4 times in age 70-75

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  - It increases by 2.5 times in age 60-69
  - It increases by 4 times in age 70-75
- What are the effects of promoting annuitization on stock markets?
  - Elderly tend to reduce their equity exposure as they retire
  - Myopic extrapolation is a *different* channel that can potentially exacerbate the previous effect

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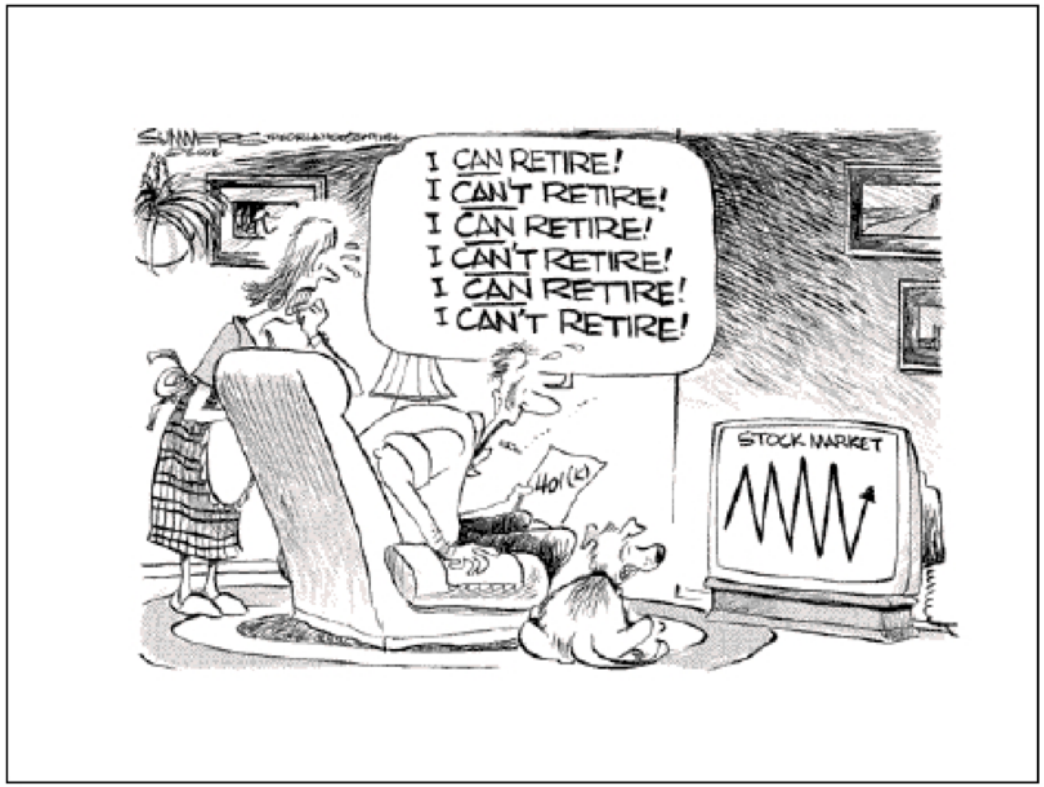
  - Very recent stock market returns matter most
- A belief-based story appears the most likely explanation
  - Myopic extrapolation
- These results have implications for:
  - Retirees' welfare
  - Policy makers wishing to promote annuitization

Thank you


I CAN RETIRE!
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401(K)
STOCK MARKET

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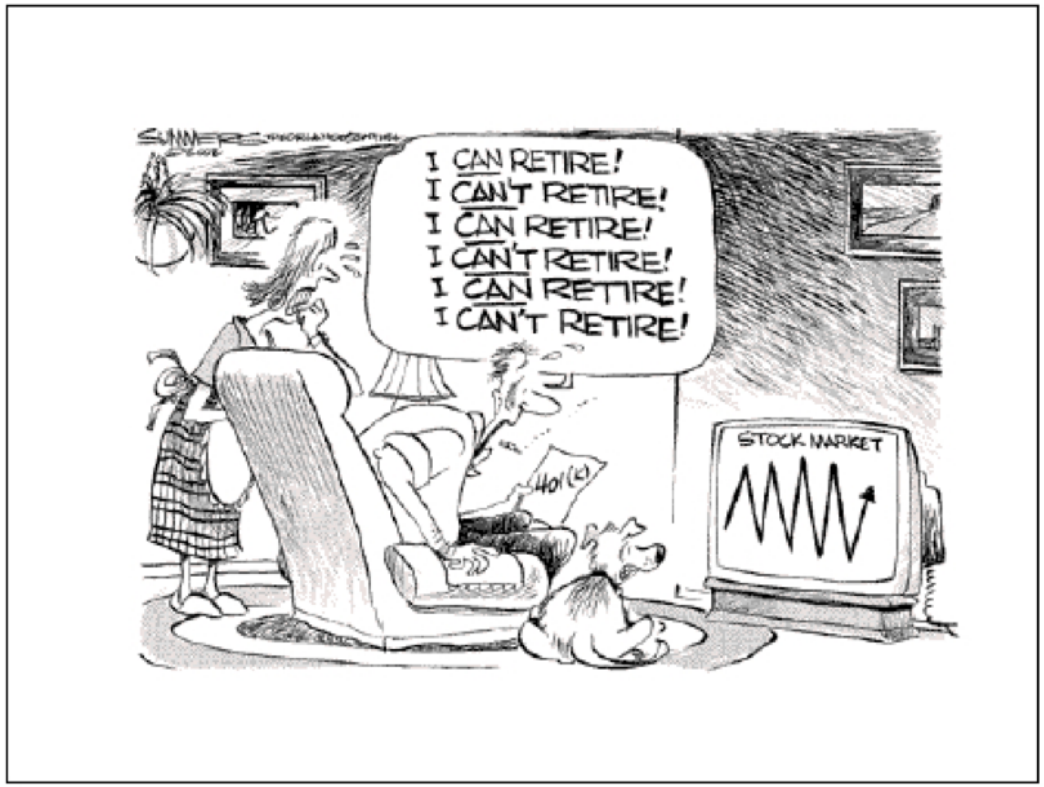

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I'LL TAKE THE ANNUITY!
I'LL TAKE THE LUMP SUM!

Empirical studies on annuitization

- US Evidence
  - Self-reported intentions from DC plans (Brown, 2001)
  - Actual decisions from Oregon public employees (Chalmers and Reuter, 2009)
- International Evidence
  - UK compulsory and voluntary annuity market (Finkelstein and Poterba, 2004)
  - UK voluntary annuity market (Inkmann et al., 2007)
  - Swiss employer-based pension plans (Bütler and Teppa, 2007)

References on annuitization

- Life expectancy, adverse selection and fair pricing
  - Mitchell et al. (1999), Finkelstein and Poterba (2004), Brown, Casey and Mitchell (2007)
- Risk sharing between couples
  - Kotlikoff and Spivak (1981), Brown and Poterba (2000)
- Pre-existing annuitization
  - Coile et al. (2002), Hurd(1990), Bernheim (1991), Dushi and Webb(2004)
- Bequests and Precautionary Motives
  - Bernheim (1987, 1991), Sinclair and Smetters (2004), Ameriks et al. (2009)