

The Psychology and Economics of Household Investment Decisions



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Lecture 3
AEA January 2010

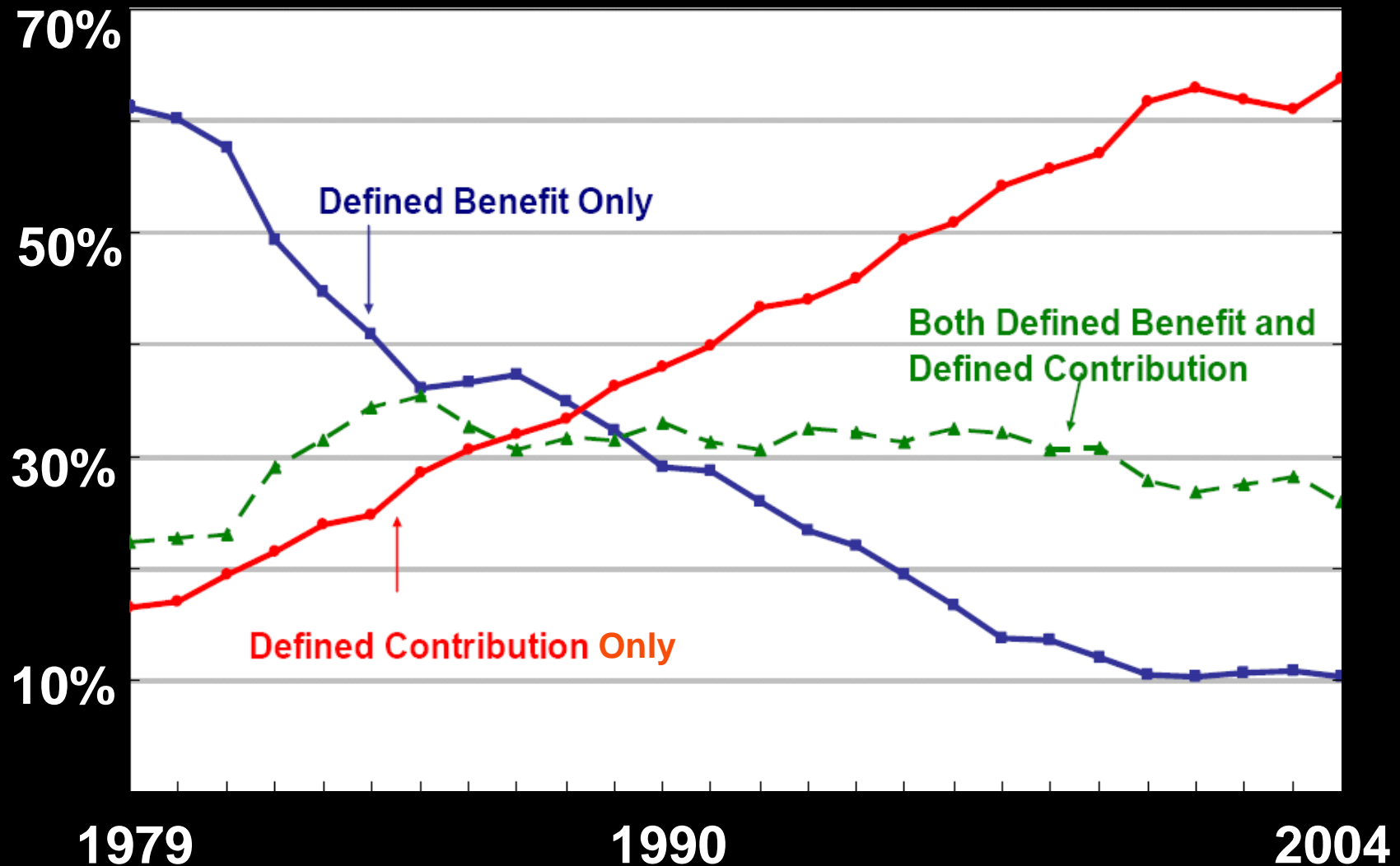
Should Defaults Influence Economic Outcomes?

- Standard neoclassical theory:
If transactions costs are small and stakes are large, defaults should not influence rational consumers.
- In practice, defaults make an enormous difference:
 - Organ donation (Johnson and Goldstein 2003)
 - Car insurance
 - Car purchase options
 - Consent to receive e-mail marketing
 - Savings
 - Asset allocation

US: Rising Role of DC Plans

Private-Sector Workers

Pension type (as a proportion of all pensioned workers)



Outline

1. Defaults affect all saving and asset allocation outcomes
2. Four psychological factors jointly contribute to the default effect
3. Alternative interventions are much less influential than defaults

This lecture: positive

Next lecture: prescriptive and normative

1. Defaults Affect Saving and Asset Allocation

- i. Participation**
- ii. Contribution rates**
- iii. Asset allocation**
- iv. Pre-retirement distributions**
- v. Decumulation / annuitization**

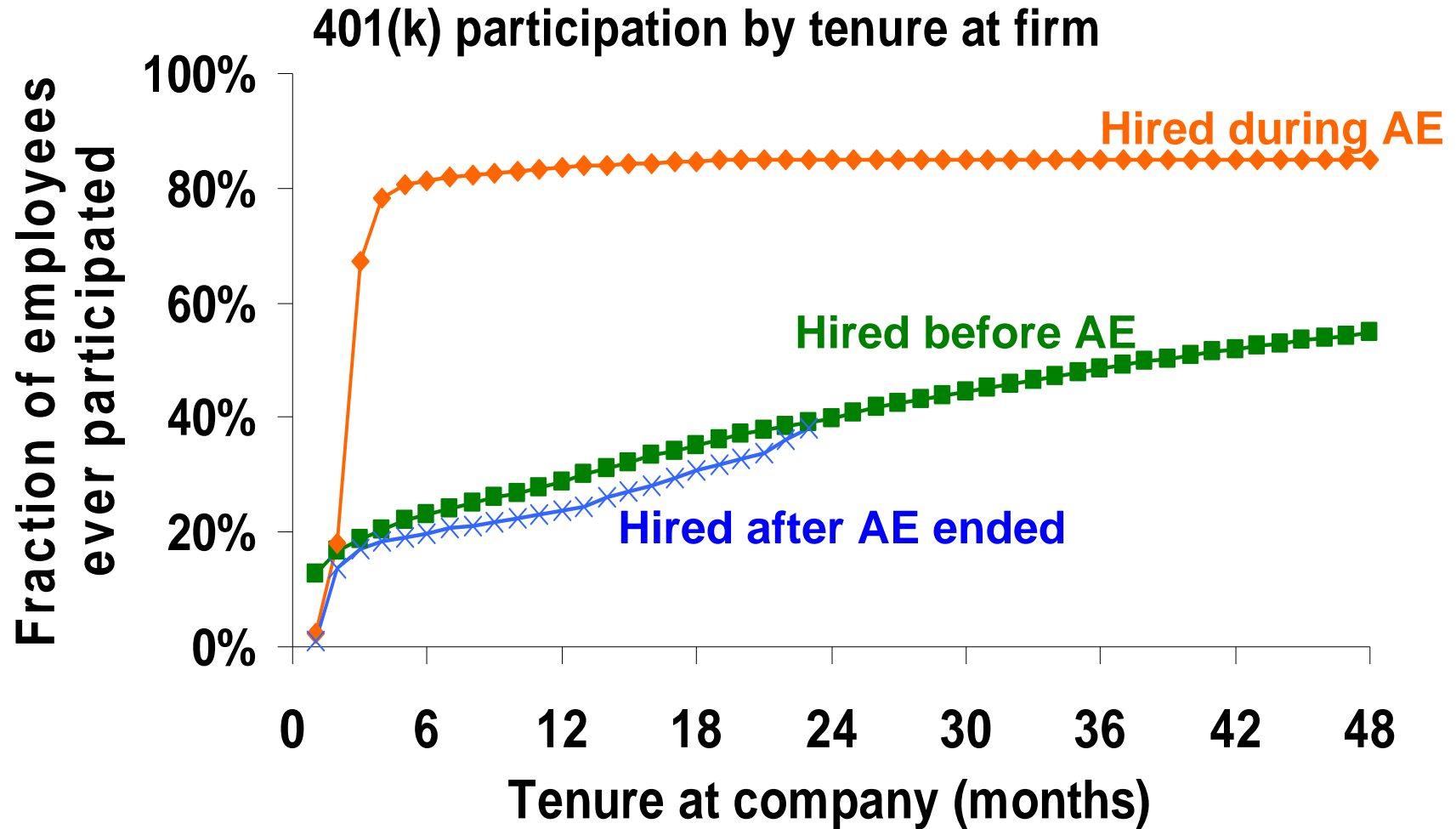
Participation, Contribution rates, and Asset Allocation

Automatic Enrollment in a US 401(k) plan

- Welcome to the company
- If you don't do anything...
 - You are automatically enrolled in the 401(k)
 - You save 2% of your pay
 - Your contributions go into a money market fund
- Call this phone number to opt out of enrollment or change your investment allocations

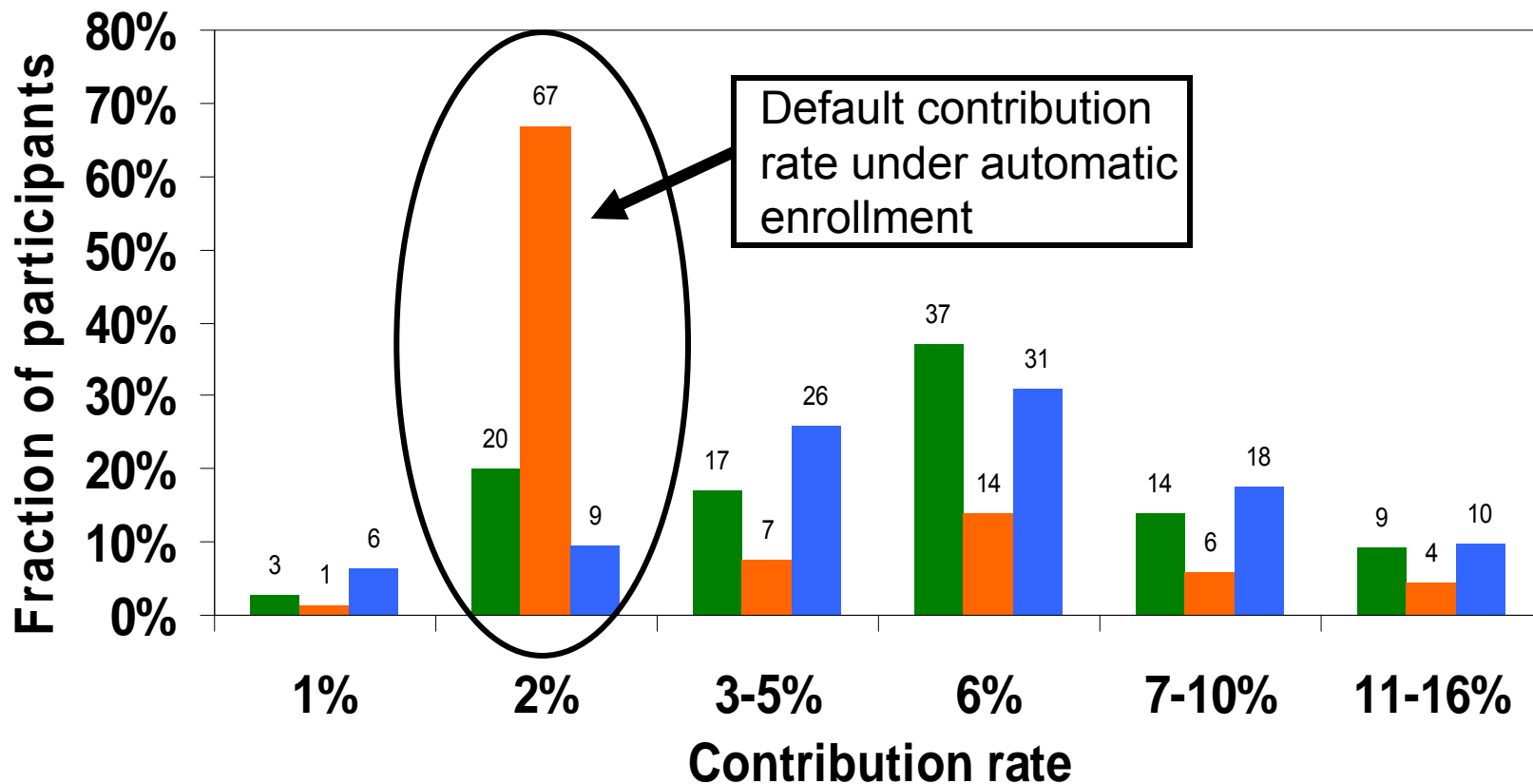
Madrian and Shea (2001)

Choi, Laibson, Madrian, Metrick (2004)



Employees enrolled under auto-enrollment cluster at the default contribution rate.

Distribution of contribution rates

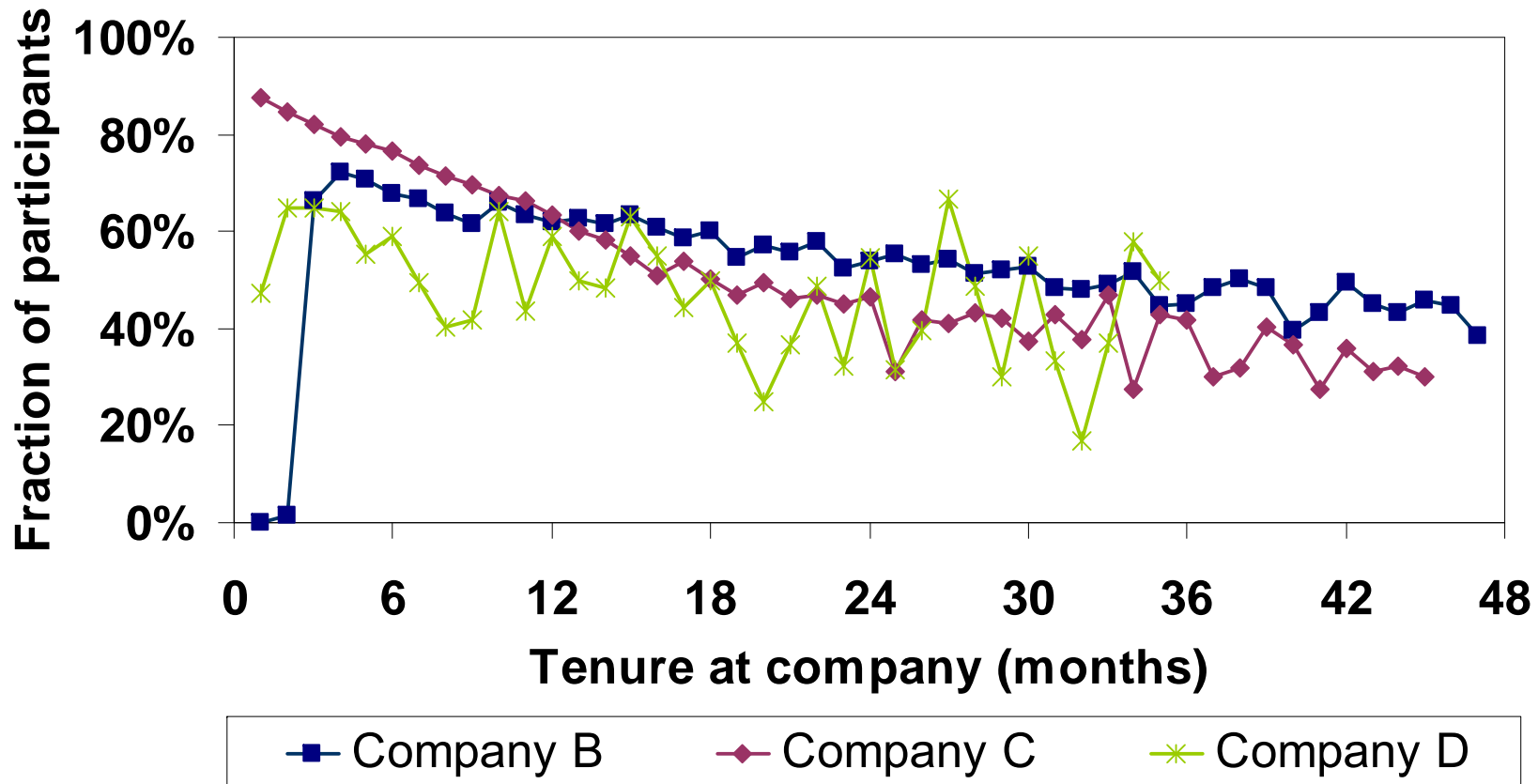


■ Hired before automatic enrollment
■ Hired after automatic enrollment ended

■ Hired during automatic enrollment (2% default)

Participants stay at the automatic enrollment defaults for a long time.

Fraction of participants hired during auto-enrollment at both default contribution rate and asset allocation



Automatic enrollment: Conclusions

- Automatic enrollment dramatically increases 401(k) participation
- Participants hired under automatic enrollment tend to stay at the automatic enrollment defaults
- Similar default effects are observed for auto-escalation otherwise known as SMART (Benartzi and Thaler, 2004)
- Also observe default effects for...
 - cash distributions at separation
 - saving rates at changing match thresholds

Do workers like automatic enrollment?

- In firms with standard 401(k) plans (**no auto-enrollment**), 2/3 of workers say that they should save more
- Opt-out rates under **automatic enrollment** are typically only 15% (opt-out rates rarely exceed 20%)
- Under **automatic enrollment** employers report “no complaints” in 401(k) plans
- 97% of employees in auto-enrollment firms approve of **auto-enrollment**.
- Among workers who opt out of **automatic enrollment**, approval is 79%.
- The US government just adopted **automatic enrollment**.

Additional evidence on Asset Allocation

- Private account component of Swedish Social Security system (Cronqvist and Thaler, 2004)
 - At inception, one-third of assets are invested in the default fund
 - Subsequent enrollees invest 90% of assets in the default fund
- Company match in employer stock (Choi, Laibson and Madrian, 2005b, 2007)

The Flypaper Effect in Individual Investor Asset Allocation (Choi, Laibson, Madrian 2007)

Studied a firm that used several different match systems in their 401(k) plan.

I'll discuss two of those regimes today:

Match allocated to employer stock and workers can reallocate

- Call this “default” case (default is employer stock)

Match allocated to an asset actively chosen by workers; workers *required* to make an active designation.

- Call this “no default” case (workers must choose)

Economically, these two systems are identical.

They both allow workers to do whatever the worker wants.

Consequences of the two regimes

	<u>Balances in employer stock</u>	
	<u>Match Defaults into Employer Stock</u>	<u>No Default</u>
Own Balance in Employer Stock	24%	20%
Matching Balance in Employer Stock	94%	27%
Total Balance in Employer Stock	56%	22%

Cash Distributions

What happens to savings plan balances when employees leave their jobs?

- Employees can request a cash distribution or roll balances over into another account
 - Balances $> \$5000$: default leaves balances with former employer
 - Balances $< \$5000$: default distributes balances as cash transfer
- Vast majority of employees accept default (Choi et al. 2002, 2004a and 2004b)
- When employees receive small cash distributions, balances typically consumed (Poterba, Venti and Wise 1998)

Post-Retirement Distributions

- Social Security
 - Joint and survivor annuity (reduced benefits)
- Defined benefit pension
 - Annuity
 - Lump sum payout if offered
- Defined contribution savings plan
 - Lump sum payout
 - Annuity if offered

Defined Benefit Pension Annuitization

- Annuity income and economic welfare of the elderly
 - Social Security replacement rate relatively low on average
 - 17% of women fall into poverty after the death of their spouse (Holden and Zick 2000)
- For married individuals, three distinct annuitization regimes
 - Pre-1974: no regulation
 - ERISA I (1974): default joint-and-survivor annuity with option to opt-out
 - ERISA II (1984 amendment): default joint-and-survivor annuity, opting out required notarized permission of spouse

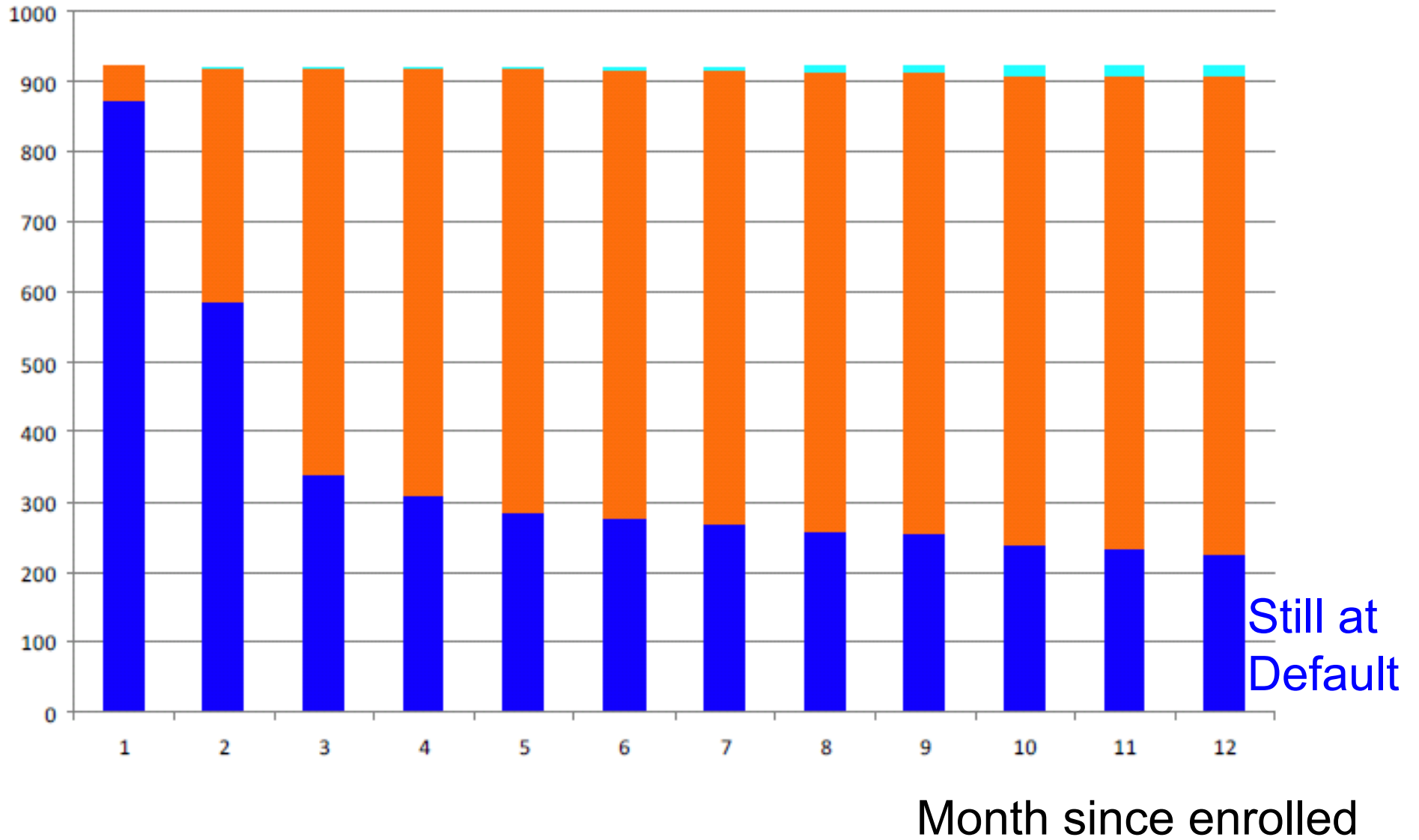
Defined Benefit Pension Annuitization

- Effect of joint-and-survivor default on annuitization
 - Pre-1974: Less than half of married men have joint-and-survivor annuity
 - Post-ERISA (I + II): joint-and-survivor annuitization increases 25 percentage points (Holden and Nicholson 1998)
 - Post-1984 amendments: joint-and-survivor annuitization increases 5 to 10 percentage points (Saku 2001)

However, there are limits to defaults

- Households opt out of DB annuitization
- Households generally opt out of highly unappealing defaults

Beshears, Choi, Laibson, Madrian 2010



Four psychological factors contribute to default effects

- i. Financial illiteracy
- ii. Endorsement
- iii. Complexity
- iv. Present-bias

i. Financial illiteracy

John Hancock Financial Services Defined Contribution Plan Survey (2002)

- 38% of respondents report that they have little or no financial knowledge
- 40% of respondents believe that a money market fund contains stocks
- Two-thirds of respondents don't know that it is possible to lose money in government bonds
- Respondents on average believe that employer stock is less risky than a stock mutual fund
- Two-thirds report that they would be better off working with an investment advisor than managing investments solo

Lusardi and Mitchell (2010)

- ‘I understand the stock market reasonably well’
- ‘An employee of a company with publicly traded stock should have a lot of his retirement savings in the company’s stock’
- ‘It is best to avoid stock of foreign companies’
- ‘If the interest rate falls, bond prices will rise’

Lusardi and Mitchell (2010)

- (30% agree): 'I understand the stock market reasonably well'
- (52% disagree) 'An employee of a company with publicly traded stock should have a lot of his retirement savings in the company's stock'
- (51% disagree): 'It is best to avoid stock of foreign companies'
- (40% agree) : 'If the interest rate falls, bond prices will rise'

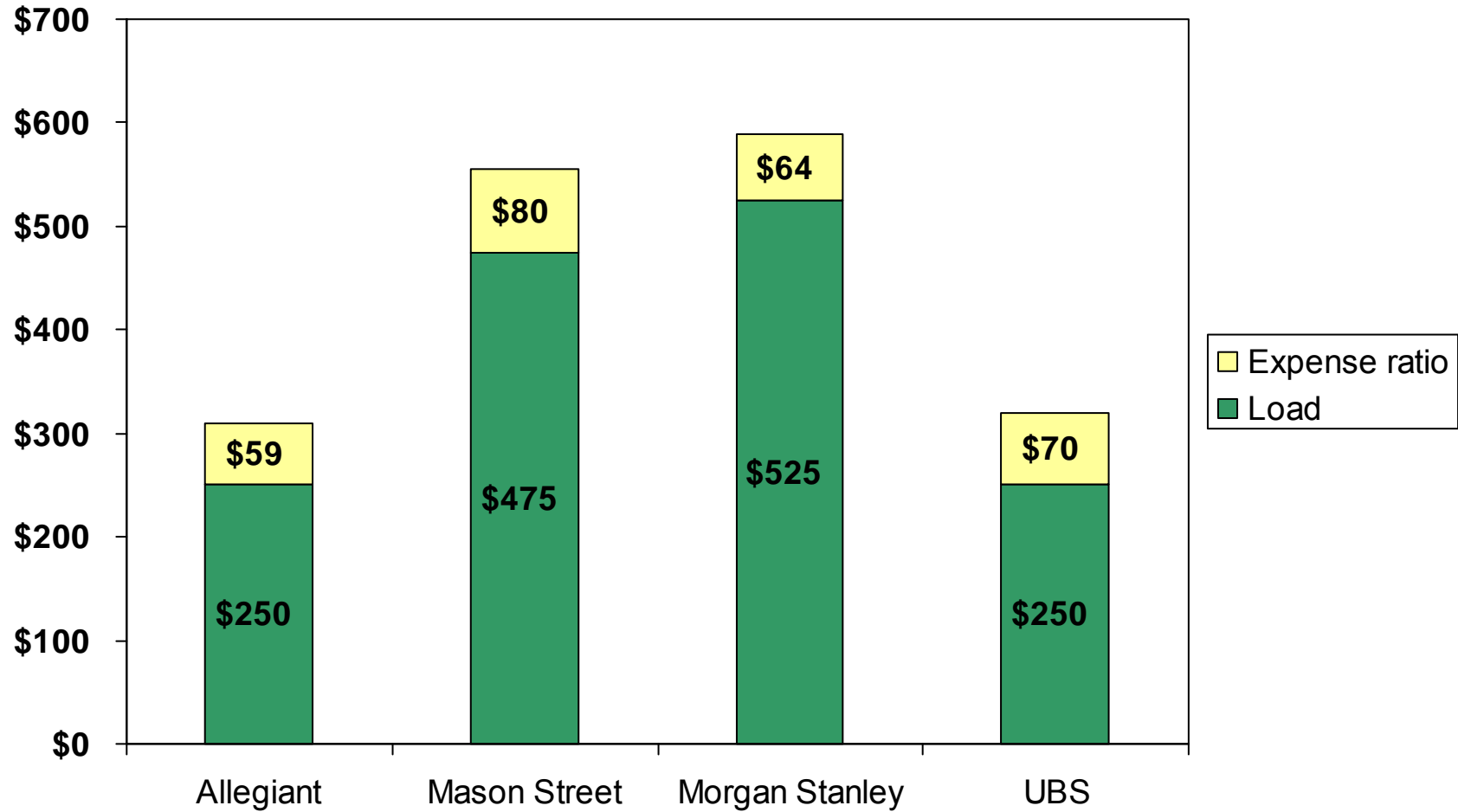
Sophisticated/correct answer to all questions: 5.8%

Financial illiteracy among Wharton MBA's

Choi, Laibson, Madrian (2006)

- Subjects allocate \$10,000 among four funds
- Randomly choose two subjects to receive any positive portfolio return during the subsequent year
- Eliminate variation in pre-fee returns
 - Choose among S&P 500 index funds
- Unbundle services from returns
 - *Experimenters* pay out portfolio returns, so no access to investment company services

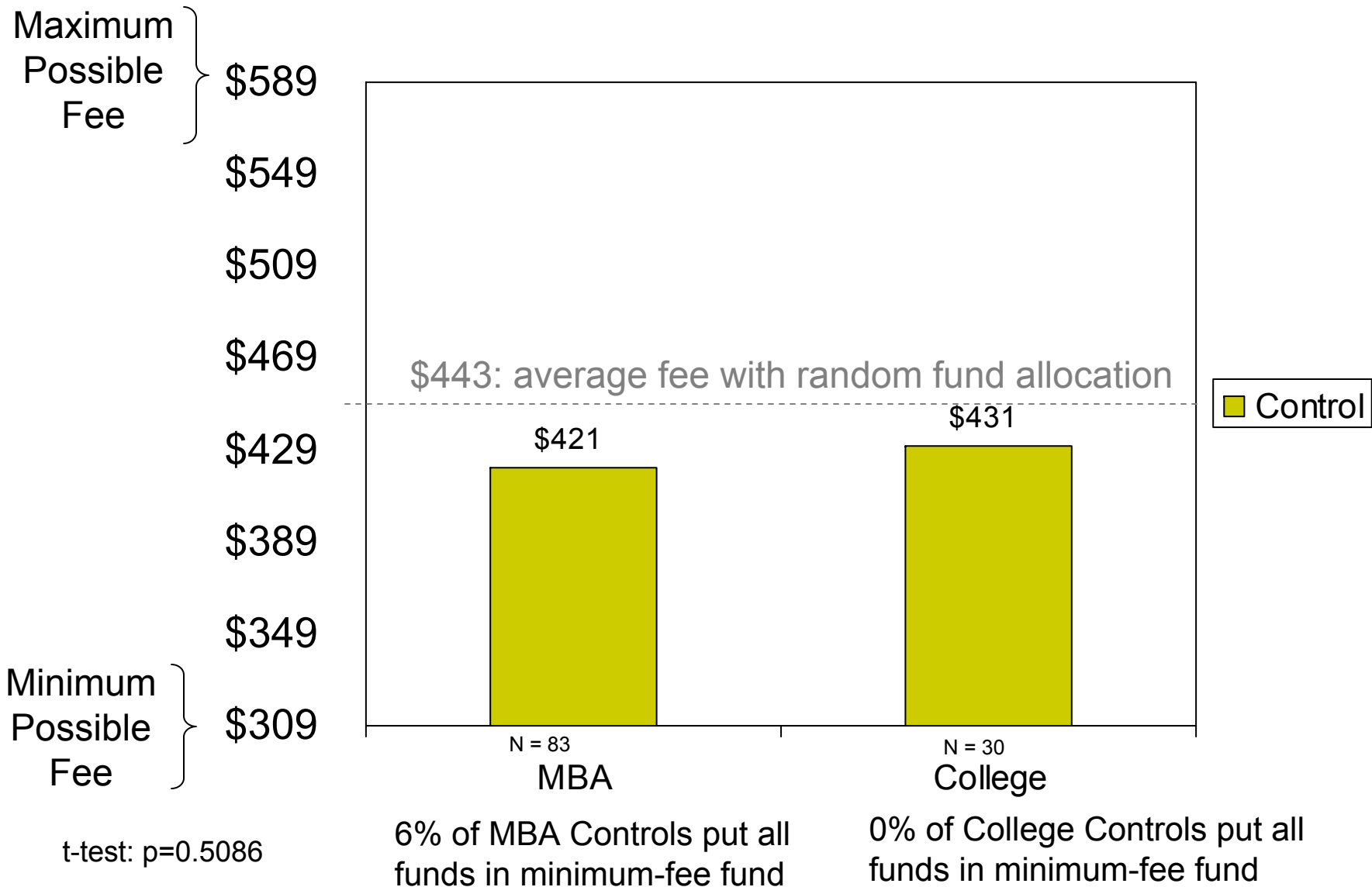
One year of index fund fees on a \$10,000 investment



Experimental conditions

- Control
 - Subjects receive only four prospectuses
 - Prospectuses are often the only information investors receive from companies
- Fees transparency treatment
 - Eliminate search costs by *also* distributing fee summary sheet (repeats information in prospectus)
- Returns treatment
 - Highlight extraneous information by distributing summary of funds' annualized returns since *inception* (repeats information in prospectus)

Fees paid by control groups (prospectus only)



Ranking of factor importance

MBA controls

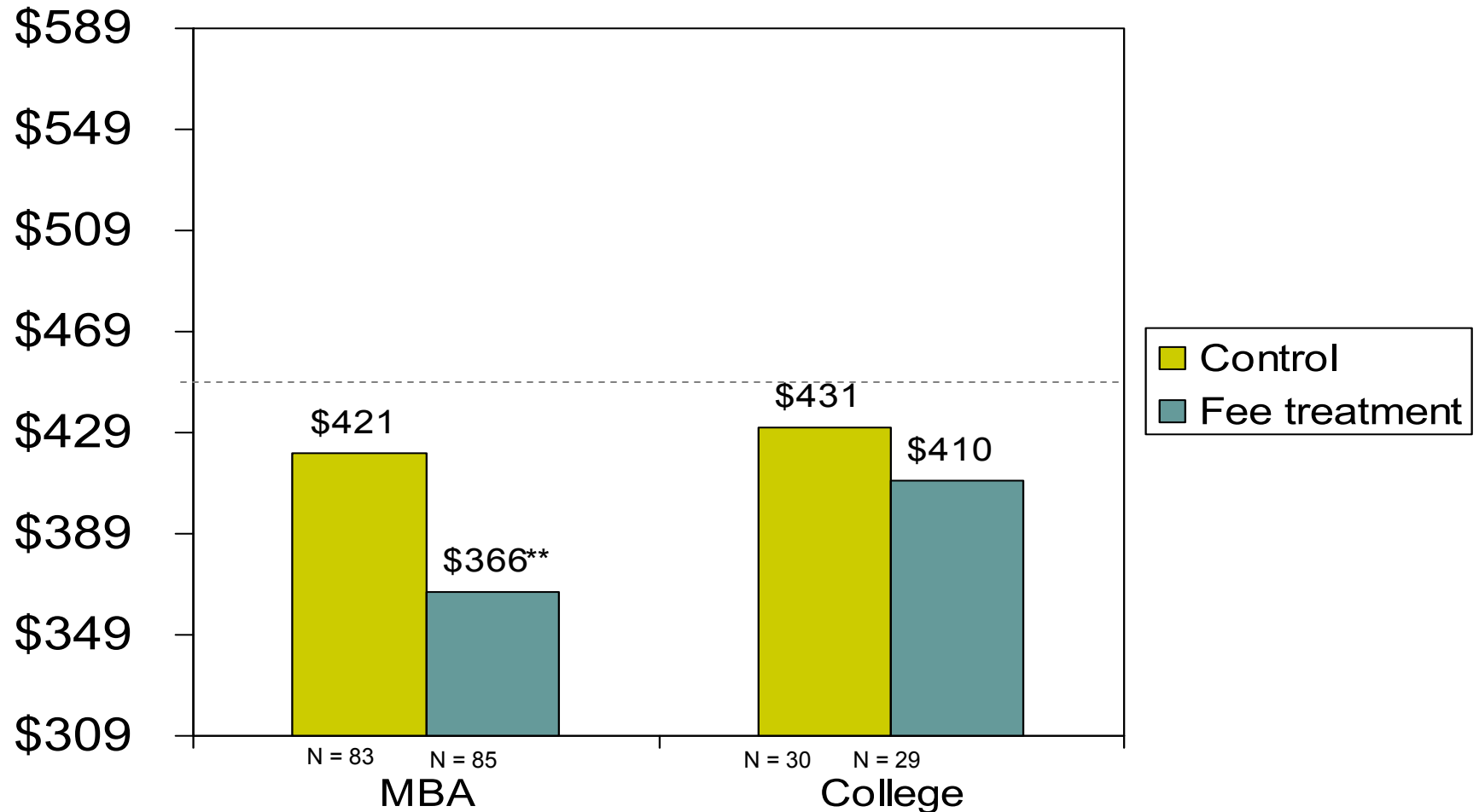
1. Fees
2. 1-year performance
3. Performance since inception
4. Investment objectives
5. Desire to diversify among funds
6. Brand recognition
7. Performance over different horizon
8. Past experience with fund companies
9. Quality of prospectus
10. Customer service of fund
11. Minimum opening balance

College controls

1. 1-year performance
2. Performance since inception
3. Desire to diversify among funds
4. Investment objectives
5. Quality of prospectus
6. Performance over different horizon
7. Brand recognition
8. Fees
9. Customer service of fund
10. Minimum opening balance
11. Past experience with fund companies

Effect of fee treatment

(prospectus plus 1-page sheet highlighting fees)



t-tests:

MBA: $p=0.0000$

College: $p=0.1451$

19% of MBA treatment put all funds in minimum-fee fund

10% of College treatment put all funds in minimum-fee fund

Ranking of factor importance

MBA fee treatment

1. Fees
2. 1-year performance
3. Performance since inception

MBA controls

1. Fees
2. 1-year performance
3. Performance since inception

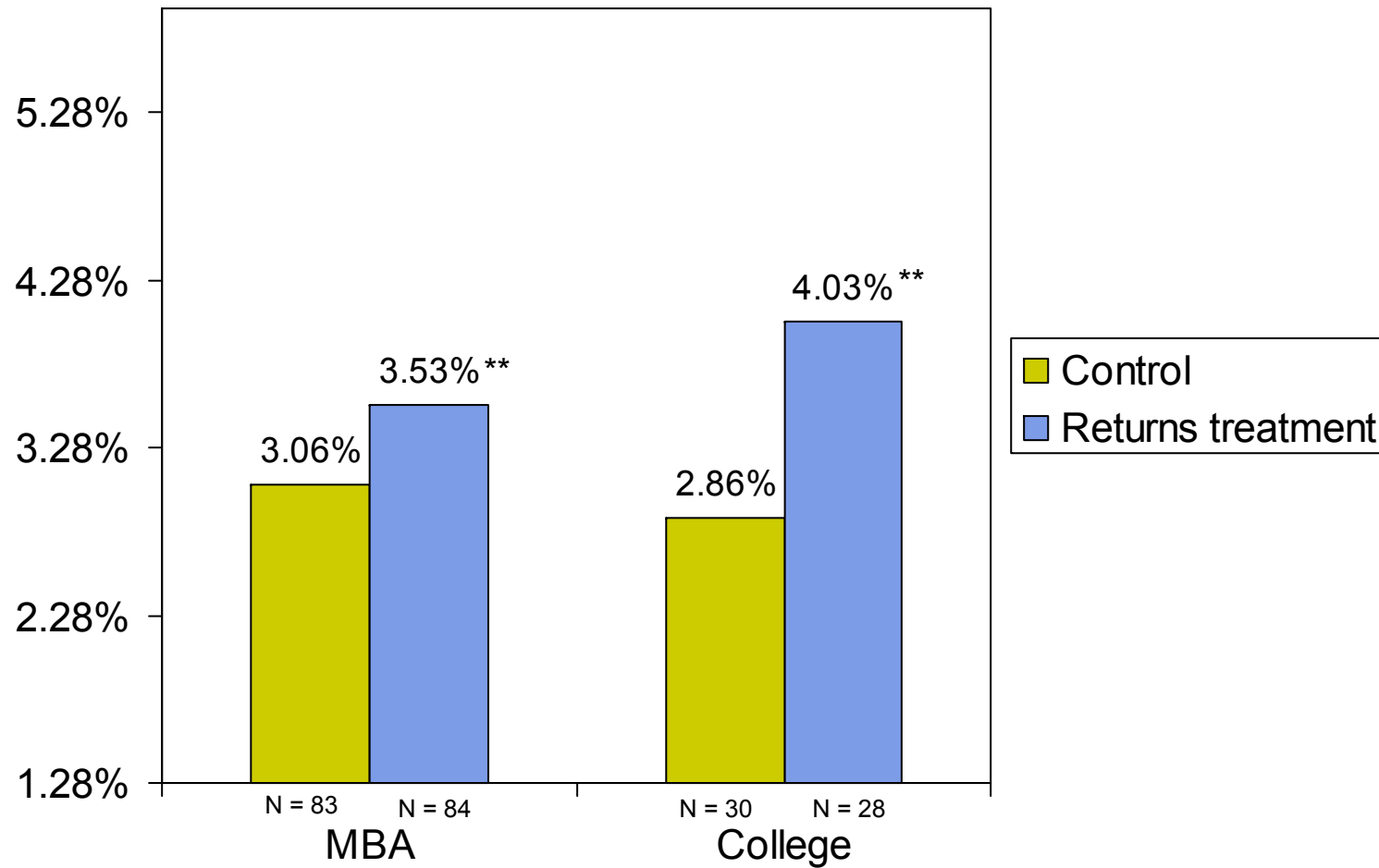
College fee treatment

1. Fees
2. 1-year performance
3. Performance since inception

College controls

1. 1-year performance
2. Performance since inception
3. Desire to diversify among funds

Returns treatment effect on average returns since inception

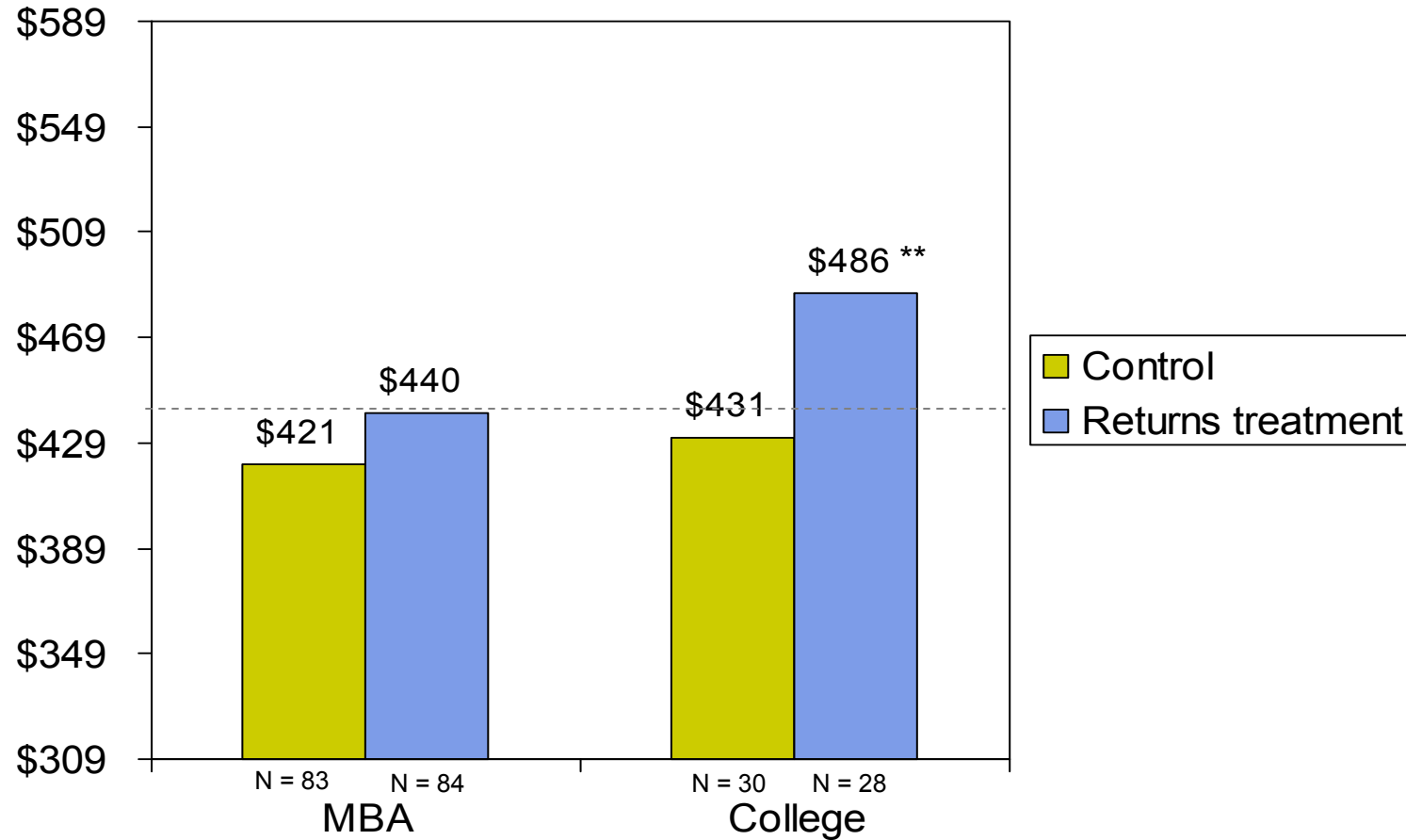


t-tests

MBA: $p=0.0055$

College: $p=0.0000$

Returns treatment effect on fees



t-tests

MBA: $p=0.0813$

College: $p=0.0008$

Ranking of factor importance

MBA return treatment

1. 1-year performance
2. Performance since inception
3. Fees

MBA controls

1. Fees
2. 1-year performance
3. Performance since inception

College return treatment

1. Performance since inception
2. 1-year performance
3. Desire to diversify among funds

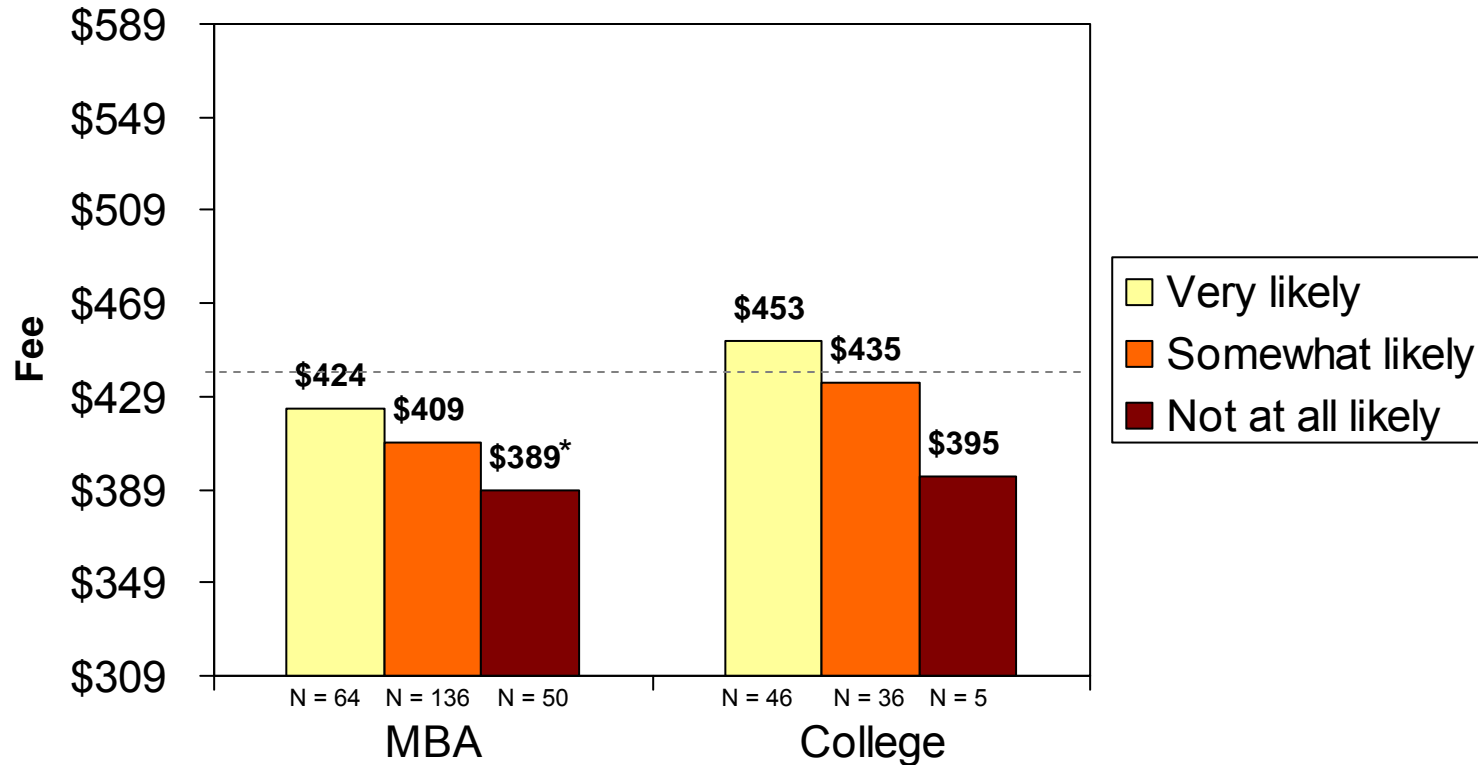
College controls

1. 1-year performance
2. Performance since inception
3. Desire to diversify among funds

Lack of confidence and fees

(all revealed preferences are not created equal)

How likely is it you would change your decision if you consulted a professional investment advisor?

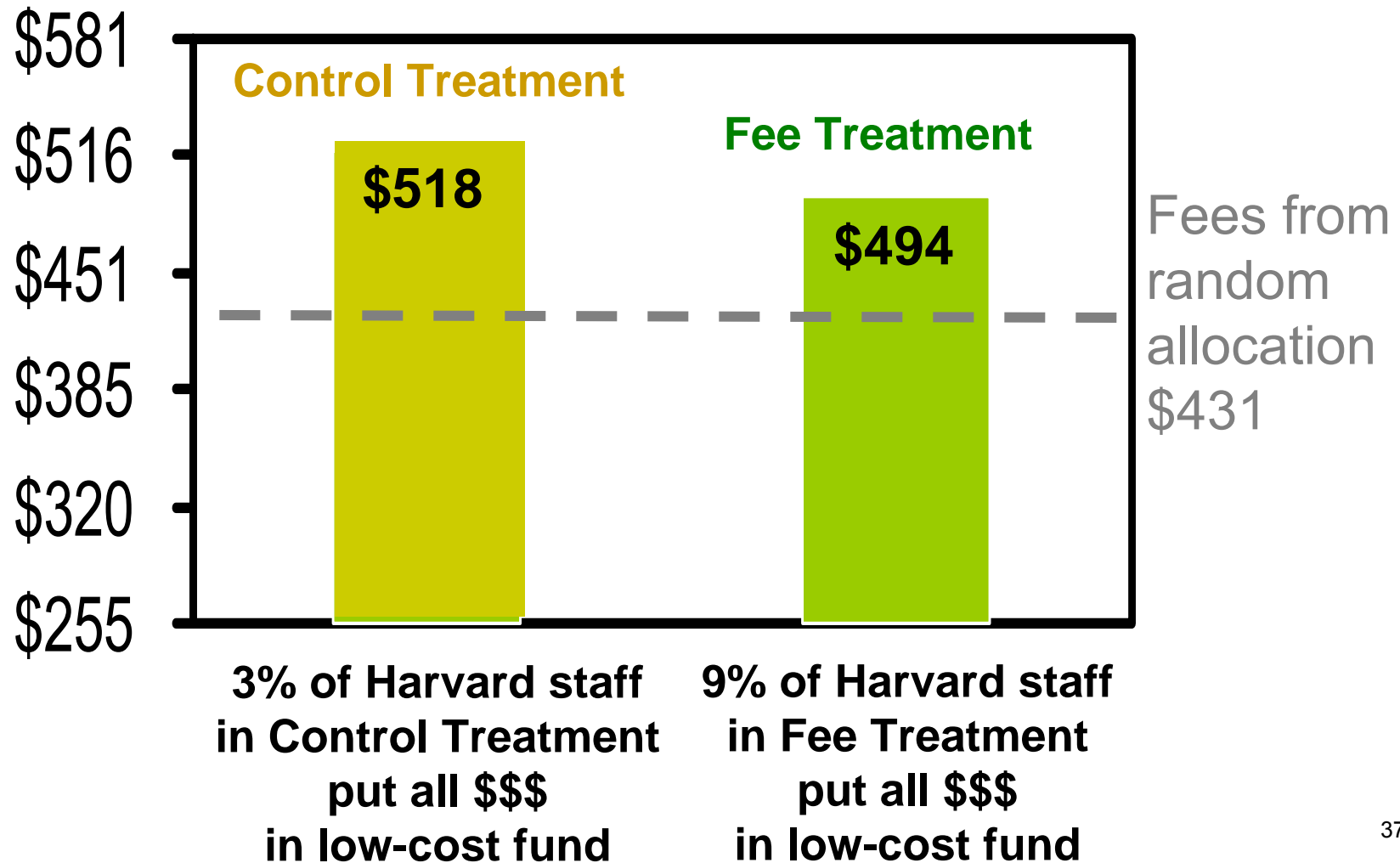


t-tests: MBA 1 vs. 2, $p=0.2013$; MBA 1 vs. 3, $p=0.0479$;
College 1 vs. 2, $p=0.2864$; College 1 vs. 3, $p=0.3335$

We conducted a similar experiment with Harvard staff as subjects

- In this new version we have 400 subjects (administrators, faculty assistants, technical personal, but not faculty)
- We give **every** one of our subjects \$10,000 and rewarded them with any gains on their investment
 - \$4,000,000 short position in stock market

Data from Harvard Staff



ii. Endorsement

- A non-zero default is perceived as advice
- Evidence
 - Elective employee stock allocation in firms that do and do not match in employer stock (Benartzi 2001, Holden and Vanderhei 2001, and Brown, Liang and Weisbenner 2006)
 - Asset allocation of employees hired before automatic enrollment (Choi, Laibson, Madrian 2006)

Choi, Laibson, and Madrian (2007)

Asset Allocation Outcomes of Employees Who are **Not** Subject to Automatic Enrollment

	Any balances in default fund	All balances in default fund
Company D		
Hired before AE, participated before AE	13%	2%

Choi, Laibson, and Madrian (2007)

Asset Allocation Outcomes of Employees Who are **Not** Subject to Automatic Enrollment

	Any balances in default fund	All balances in default fund
Company D		
Hired before, participated before AE	13%	2%
Hired before, participated after AE	29%	16%

iii. Complexity

Complexity → delay

- Psychology literature (Tversky and Shafir 1992, Shafir, Simonson and Tversky 1993, Dhar and Knowliss 1999, Iyengar and Lepper 2000)
- Savings literature: each additional 10 funds produces a 1.5 to 2.0 percentage point decline in participation (Iyengar, Huberman and Jiang 2004)
- Also results on complexity generating more conservative asset allocation (Iyengar and Kamenica 2007).
- Quick enrollment experiments

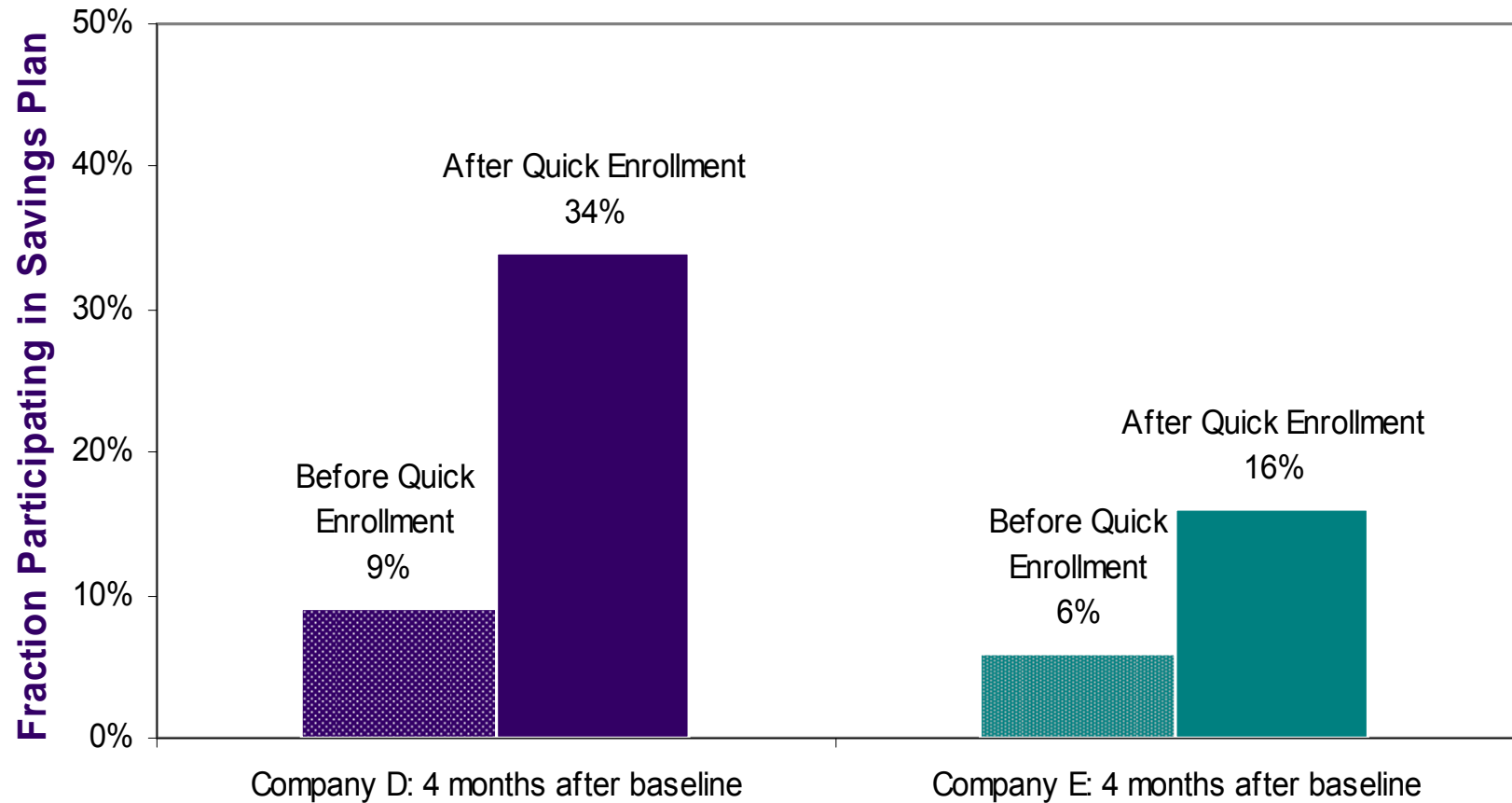
Complexity and Quick Enrollment

- Conceptual Idea
 - Simplify the savings plan enrollment decision by giving employees an easy way to elect a pre-selected contribution rate and asset allocation bundle
- Implementation at Company D
 - New hires at employee orientation: 2% contribution rate invested 50% money market & 50% stable value
- Implementation at Company E
 - Existing non-participants: 3% contribution rate invested 100% in money market fund

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 - New hires at employee orientation: 2% contribution rate invested 50% money market / 50% stable value
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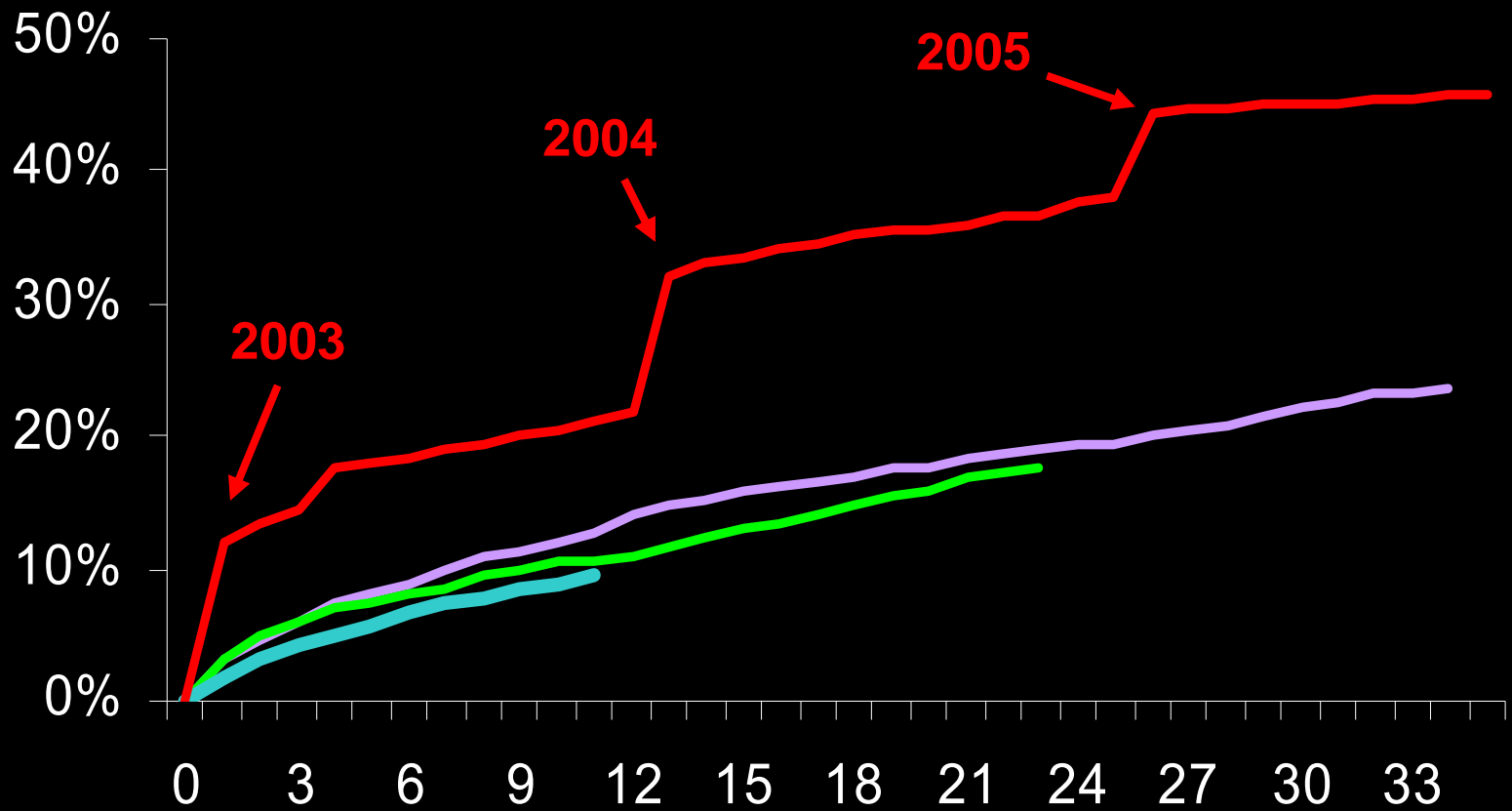
Quick Enrollment and Savings Plan Participation



Simplified enrollment raises participation

Beshears, Choi, Laibson, Madrian (2006)

Fraction Ever Participating in Plan



Time since baseline (months)

iv. Present-Biased Preferences

- Self control and savings outcomes: Why do today what you can put off until tomorrow? (Laibson 1997; O'Donoghue and Rabin 1999; Diamond and Koszegi 2003)
- Framework: exponential discounting with an additional factor, $\beta < 1$, that uniformly down-weights the future.

$$U_t = u_t + \beta [\delta u_{t+1} + \delta^2 u_{t+2} + \delta^3 u_{t+3} + \dots]$$

Lusardi and Tufano (2009)

How confident are you that you could come up with \$2,000 if an unexpected need arose within the next month?

- *I am certain...I could*
 - *I could probably...*
 - *I could probably not...*
 - *I am certain...I could not*
 - *Do not know.*
- } 47%
- } 53%

Laibson, Repetto, and Tobacman (2004)

Use MSM to estimate discounting parameters:

- Substantial illiquid retirement wealth: $W/Y = 3.9$.
- Extensive credit card borrowing:
 - 68% didn't pay their credit card in full last month
 - Average credit card interest rate is 14%
 - Credit card debt averages 13% of annual income
- Consumption-income comovement:
 - Marginal Propensity to Consume = 0.25
(i.e. consumption tracks income)

LRT Simulation Model

- Stochastic Income
 - Lifecycle variation in labor supply (e.g. retirement)
 - Social Security system
 - Life-cycle variation in household dependents
 - Bequests
 - Illiquid asset
 - Liquid asset
 - Credit card debt
-
- Numerical solution (backwards induction) of 90 period lifecycle problem.

LRT Results:

$$U_t = u_t + \beta [\delta u_{t+1} + \delta^2 u_{t+2} + \delta^3 u_{t+3} + \dots]$$

- $\beta = 0.70$ (s.e. 0.11)
- $\delta = 0.96$ (s.e. 0.01)
- Null hypothesis of $\beta = 1$ rejected (t-stat of 3).
- Specification test accepted.
- Moments:

	Empirical	Simulated (Hyperbolic)
%Visa:	68%	63%
Visa/Y:	13%	17%
MPC:	23%	31%
f(W/Y):	2.6	2.7

Procrastination (assume $\beta = \frac{1}{2}$, $\delta = 1$).

- Suppose you can join the plan today (effort cost \$50) to gain delayed benefits \$20,000 (e.g. value of match)
- Every period you delay, total benefits fall by \$10.
- What are the discounted costs of joining at different periods?

- Join Today: $-50 + \frac{1}{2} [0] = -50$

• Join t+1:	0	+ $\frac{1}{2} [-50 - 10]$	= -30
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- Join t+2: $0 + \frac{1}{2} [-50 - 20] = -35$

- Join t+3: $0 + \frac{1}{2} [-50 - 30] = -40$

Interaction with financial illiteracy

- Consider someone with a high level of financial literacy, so effort cost is only \$5 (not \$50)
- As before, every period of delay, total benefits fall by \$10.
- What are the discounted costs of joining at different periods?

- Join Today: -5 + $\frac{1}{2}$ [0] = -5
- Join t+1: 0 + $\frac{1}{2}$ [-5 - 10] = -7.5
- Join t+2: 0 + $\frac{1}{2}$ [-5 - 20] = -12.5
- Join t+3: 0 + $\frac{1}{2}$ [-5 - 30] = -17.5

Interaction with endorsement and complexity

- Consider a plan with a simple form, or an endorsed form, so the effort cost is again only \$5 (not \$50)
- As before, every period of delay, total benefits fall by \$10.
- What are the discounted costs of joining at different periods?

- Join Today: $-5 + \frac{1}{2} [0] = -5$
- Join t+1: $0 + \frac{1}{2} [-5 - 10] = -7.5$
- Join t+2: $0 + \frac{1}{2} [-5 - 20] = -12.5$
- Join t+3: $0 + \frac{1}{2} [-5 - 30] = -17.5$

Procrastination in retirement savings

Choi, Laibson, Madrian, Metrick (2002)

Survey

- Mailed to 590 employees (random sample)
- 195 usable responses
- Matched to administrative data on actual savings behavior

Typical breakdown among 100 employees

Out of every 100 surveyed employees

68 self-report saving too little

24 plan to raise savings rate in next 2 months

3 actually follow through



4. Alternative Policies

- Paying employees to save
- Educating employees

\$100 bills on the sidewalk

Choi, Laibson, Madrian (2009)

- Employer match is an instantaneous, riskless return on investment
- Particularly appealing if you are over 59½ years old
 - Have the most experience, so should be savvy
 - Retirement is close, so should be thinking about saving
 - Can withdraw money from 401(k) without penalty
- We study seven companies and find that on average, half of employees over 59½ years old are not fully exploiting their employer match
 - Average loss is 1.6% of salary per year
- Educational intervention has no effect

Financial education

Choi, Laibson, Madrian, Metrick (2004)

- Seminars presented by professional financial advisors
- Curriculum: Setting savings goals, asset allocation, managing credit and debt, insurance against financial risks
- Seminars offered throughout 2000
- Linked data on individual employees' seminar attendance to administrative data on actual savings behavior before and after seminar

Effect of education is positive but small

	Seminar attendees		Non-attendees
	% planning to make change	% actually made change	% actually made change
Those not in 401(k)			
Enroll in 401(k) Plan	100%	14%	7%
Those already in 401(k)			
Increase contribution rate	28%	8%	5%
Change fund selection	47%	15%	10%
Change asset allocation	36%	10%	6%

Effect of education is positive but small

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- Financial education effects are small
- Seminar attendees have good intentions to change their 401(k) savings behavior, but most do not follow through
- Financial education alone will not dramatically improve the quality of 401(k) savings outcomes
- Choi et al (2005) study the effect of the Enron, Worldcom, and Global Crossing scandals on employer stock holding
 - No net sales of employer stock in reaction to these news stories
 - These scandals did not affect the asset allocation decisions of new hires.
 - These hires did not affect the asset allocation decisions of new hires at other Houston firms.

Information and disclosure generally don't do much on their own

- Example
- New York City calorie disclosure
(*Elbel et al 2009*)

	Before	After
NYC (intervention city)	825	
Newark (control city)	823	826

Conclusion

- Defaults are not neutral for four key reasons:
 - Investors are not financially literate
 - Investors display an endorsement effect
 - Investors respond adversely to complexity
 - Investors are prone to procrastinate
- There may be other reasons: loss aversion?
- Employers/institutions will influence savings outcomes through the choice of defaults (whether the institution wants to do this or not)
- Society and firms should pick defaults carefully

Stop here

3. Optimal Defaults – public policy

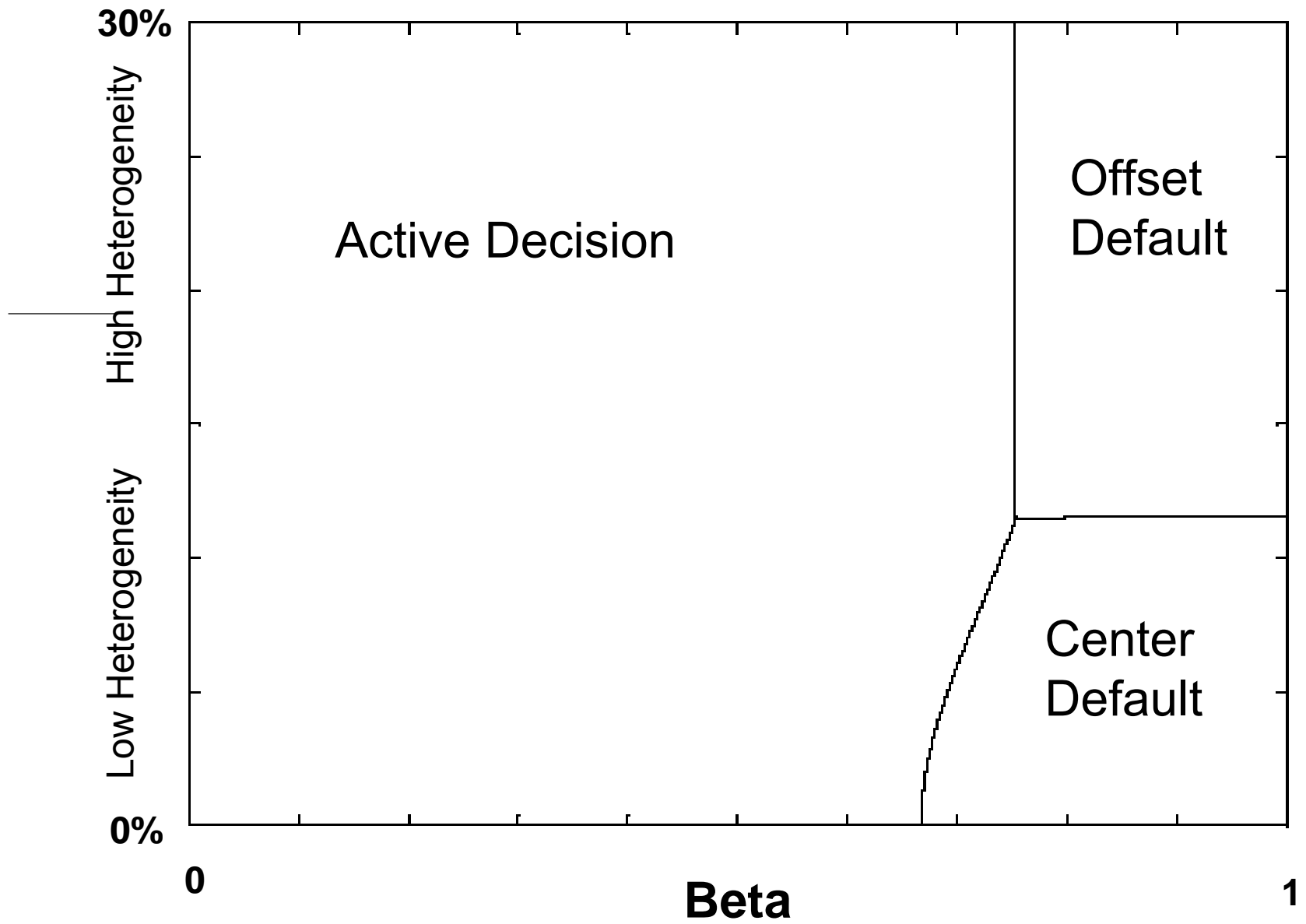
- Mechanism design problem in which policy makers set a default for agents with present bias (Carrol, Choi, Laibson, Madrian and Metrick 2007)
- Defaults are sticky for three reasons
 - Cost of opting-out of the default
 - Cost varies over time → option value of waiting
 - Present-biased preferences → procrastination

Basic set-up of problem

- Specify *behavioral* model of households
 - Flow cost of staying at the default
 - Effort cost of opting-out of the default
 - Effort cost varies over time → option value of waiting to leave the default
 - Present-biased preferences → procrastination
- Specify (dynamically consistent) social welfare function of planner (e.g., set $\beta=1$)
- Planner picks default to optimize social welfare function

Optimal ‘Defaults’

- Two classes of optimal defaults
 - Automatic enrollment
 - Optimal when employees have relatively homogeneous savings preferences (e.g. match threshold) and relatively little propensity to procrastinate
 - “Active Decision” — require individuals to make a decision (eliminate the option to passively accept a default)
 - Optimal when employees have relatively heterogeneous savings preferences and relatively strong tendency to procrastinate
- Key point: sometimes the best default is no default.



Lessons from theoretical analysis of defaults

- Defaults should be set to maximize average well-being, which is not the same as saying that the default should be equal to the average preference.
- Endogenous opting out should be taken into account when calculating the optimal default.
- The default has two roles:
 - causing some people to opt out of the default (which generates costs and benefits)
 - implicitly setting savings policies for everyone who sticks with the default

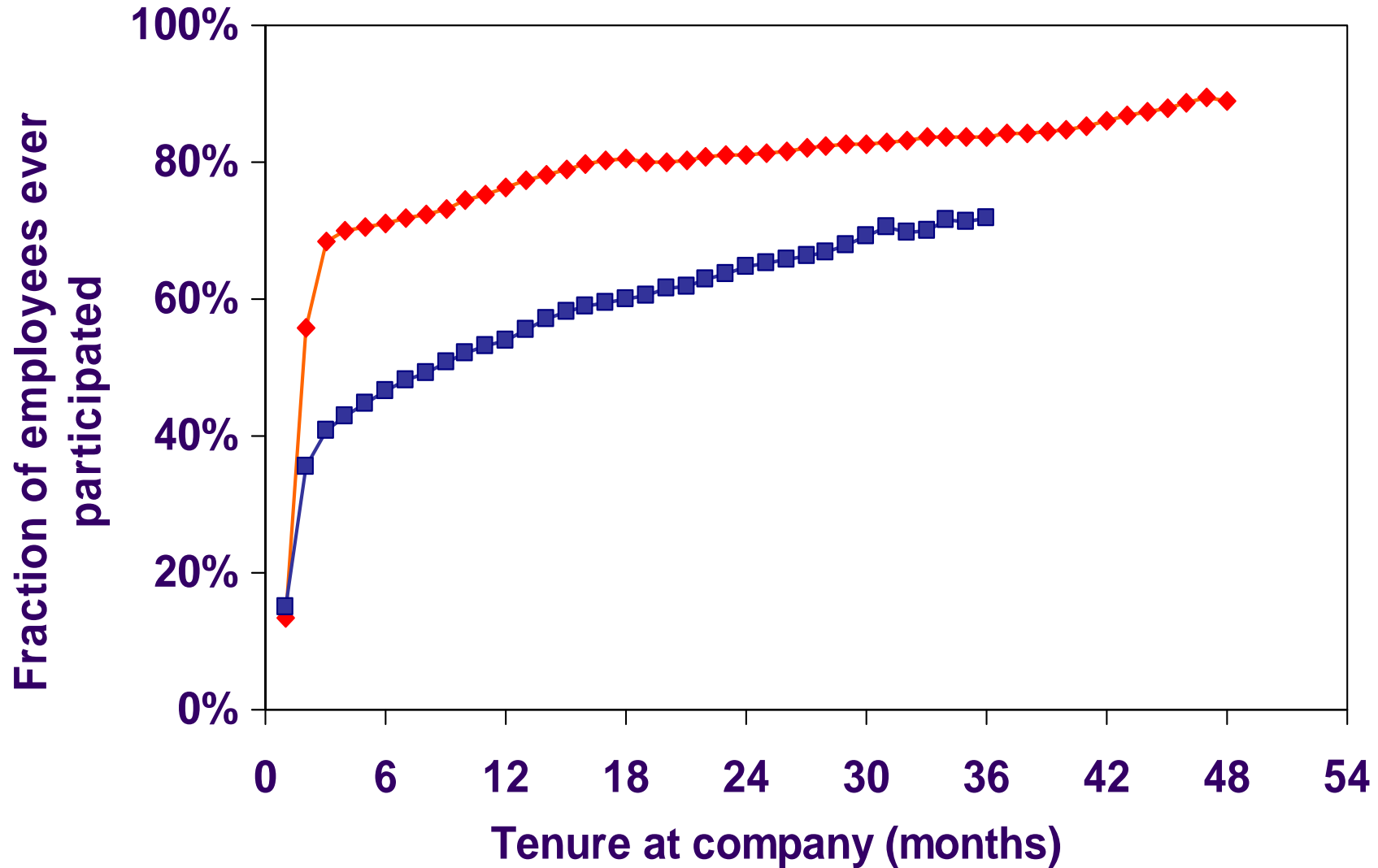
The power of deadlines: Active decisions

Choi, Laibson, Madrian, Metrick (2007)

Active decision mechanisms require employees to make an active choice about 401(k) participation.

- Welcome to the company
- You are *required* to submit this form within 30 days of hire, *regardless* of your 401(k) participation choice
- If you don't want to participate, indicate that decision
- If you want to participate, indicate your contribution rate and asset allocation
- Being passive is *not* an option

401(k) participation by tenure



◆ Active decision cohort ■ Standard enrollment cohort

Active decisions: conclusions

- Active decision raises 401(k) participation.
- Active decision raises average savings rate by 50 percent.
- Active decision doesn't induce choice clustering.
- Under active decision, employees choose savings rates that they otherwise would have taken three years to achieve. (*Average level as well as the entire multivariate covariance structure.*)

New directions for defaults

- Defaults for savings rate escalation
- Defaults with high savings rates
- Defaults for lifecycle rebalancing
- Defaults for annual rebalancing
- Defaults for employer stock
- Defaults at separation
- Defaults for annuitization
- Individualized defaults (savings rate and asset allocation)
- Defaults for employees not covered by DB/DC plans
- Defaults for investment of tax refunds

Public Policy and Defaults: Annuitization

- Interesting aspects of the joint-and-survivor Social Security annuity default discussed earlier
 - Differentiated default: singles vs. marrieds
 - Annuity election irrevocable
 - Implicit deadline—must either accept or opt-out of the default before receiving pension payments
- Note
 - Largely homogenous preferences
 - Similarities to active decision approach
 - Reduced scope for procrastination
 - Those who do opt-out of joint-and-survivor annuity appear to have economically sound reasons for doing so (Johnson, Uccello and Goldwyn 2003)

Public Policy and Defaults: Annuitization

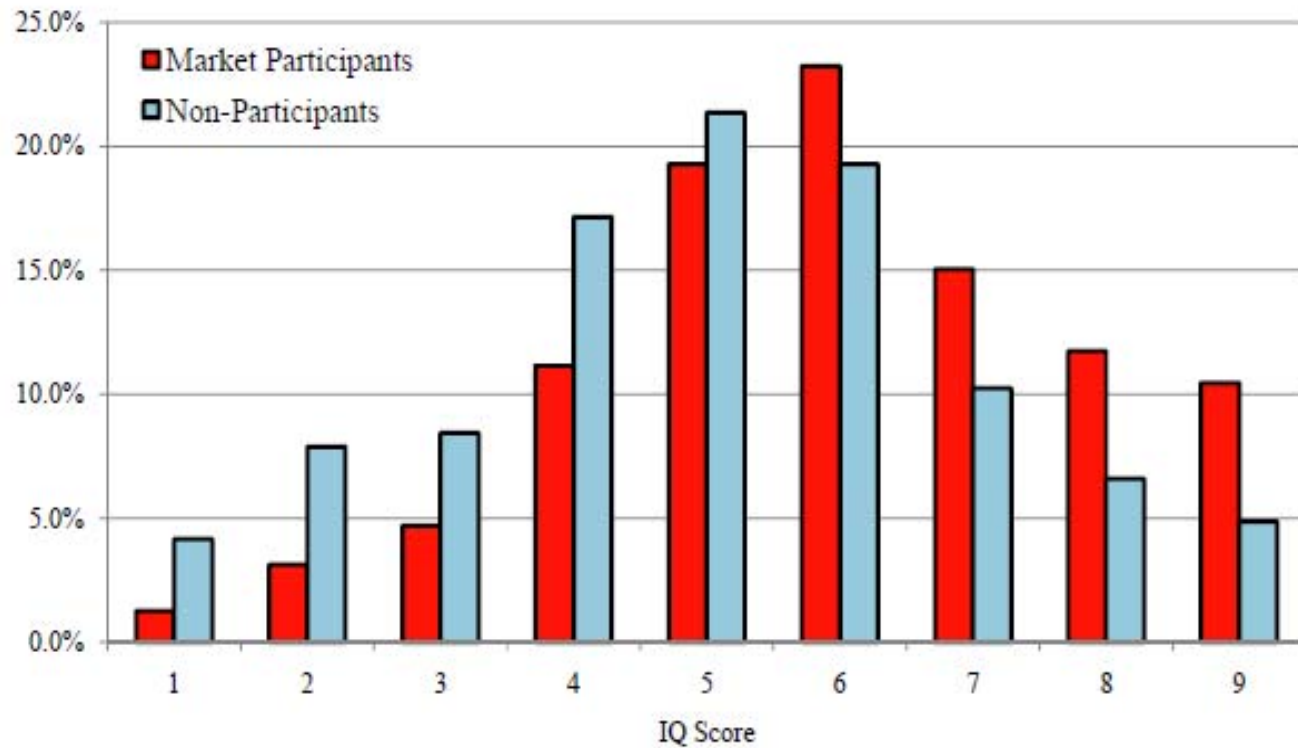
- Thinking more generally about retirement income annuitization and defaults in a defined contribution world
 - Understanding annuitization options is complicated for financial novices → strong endorsement effect likely
 - Taking a lump-sum is the only way to preserve option value
 - BUT, lump-sums → potential self-control problems
- Annuitization and defined contribution savings plans
 - Required annuitization up to \$200,000?
 - Default annuitization up to \$200,000?
 - Active decision? (Due to irreversibility.)

Public Policy and Defaults: Pre-Retirement Cash Distributions

- Cash distribution default for balances of less than \$5000
→ leakage from retirement savings
- Response: for balances of \$1000-\$5000
 - Employers can maintain these balances, or
 - Employers can roll them over into an IRA
- Default asset allocation for IRA rollover must preserve principal

Public Policy and Defaults: Match in Employer Stock

- Employer stock in defined contribution savings plan is only weakly regulated
- Employer stock in defined benefit pension plan is capped at 10% of total assets
- Strong evidence that employees misperceive the risks of employer stock (familiarity bias)
- Policy alternatives
 - Preclude employers from defaulting matching contributions into employer stock (e.g., preclude companies from choosing a single life annuity as a default for married individuals)
 - Create annual default rebalancing out of company stock



- ▶ 38.1% of **non-participants** in below-average IQ categories
- ▶ 19.5% of **participants** in these categories