



ECONOMICS AND FINANCE OF PENSIONS

Lecture 6

BEHAVIOURAL ECONOMICS AND FINANCE

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Today's lecture

- History of behavioural economics
- Broad behavioural biases
- Empirical work on behavioural biases in (mainly DC) pensions
- Living with behavioural effects



Evaluating economic models

- Neo-classical economists are not often great philosophers (and I am not either)
 - So often they don't spend a lot of time thinking about exactly what it is they are doing
 - A lot of the time they rest on a paper by Milton Friedman (1953) "The methodology of positive economics"
 - You judge models not by their *assumptions*, but by their *predictions*
 - Good models made testable predictions but could be based on tenuous assumptions (e.g. costless utility maximisation)



Assumptions versus predictions

- Logically, there is not much difference between an assumption of a model and its predictions
 - A model is just a way of turning assumptions into predictions in a logically consistent way
 - So choosing model assumptions is logically exactly equivalent to choosing a model's predictions (although more indirect)
- Therefore, if we are to apply a model's predictions to an empirical test, we should also be prepared to subject its assumptions to the same test



Criteria to evaluate economic models

- Stigler (1965) (we'll come across his other ideas next week or the week after) said economic models should be judged by:
 - Congruence with reality
 - Generality
 - Tractability
- The first point implies that we subject both the assumptions and the predictions of models to empirical tests, remembering that models, by their nature, are abstractions
- In order to be useful models need to be general and tractable



Neoclassical economics

- Emphasises the tractability of models, sometimes at the expense of realism
- Is *axiomatic* in approach (which has definite advantages)
 - “The very definition of an economic concept is usually subject to a substantial margin of ambiguity. An axiomatized theory substitutes for an ambiguous economic concept a mathematical object that is subject to entirely definite rules of reasoning.” (GERARD DEBREU)*
- Behavioural economics subjects the (often implicit) assumptions of neoclassical economics to empirical testing
- There is room for both approaches (in fact both are essential)



First behavioural example: discounting

- Neoclassical economists typically assume inverse exponential discount factors (as we have done so far)
- However, when researchers examined how people actually discounted the future, they discovered that people (and many animals!) have a declining discount rate
- In other words, the relative importance attached to, say, consumption at two equidistant points in the future increases as these points get further away
- So the inverse of the discount factor is *hyperbolic*, rather than exponential



It's important to remember that...

...when exponential discounting was first introduced into neo-classical economics its simplification and lack of realism was recognised

- Ramsey (1928) and Samuelson (1937), who introduced exponential discounting into economics, explicitly commented on its psychological implausibility
- Over time, economists trained on these models came to accept them as *a priori* accurate models of human behaviour, i.e. they became canonised
- So in some sense behavioural economics is returning the discipline to its origins (Adam Smith wrote *The Theory of Moral Sentiments* as well as *The Wealth of Nations*)



What is behavioural economics?

- An attempt to increase the realism of the psychological underpinnings of economics
- Can be viewed as a modification of one or two core tenets of rational, neo-classical economic model we have used so far, such as:
 - the idea that people only care about monetary wealth, or even only about themselves
 - the idea that computation is costless
 - the idea that discounting is exponential and constant
- BUT the modifications are based on experiment and observation



Methodology

- Behavioural economists
 - Identify normative assumptions used by classical economists
 - Demonstrate clear violations of the assumptions in question, and painstakingly rule out alternative explanations
 - Create alternative theories which generated more realistic behavioural predictions
- These behavioural models can then be subjected to tests and be refuted as well

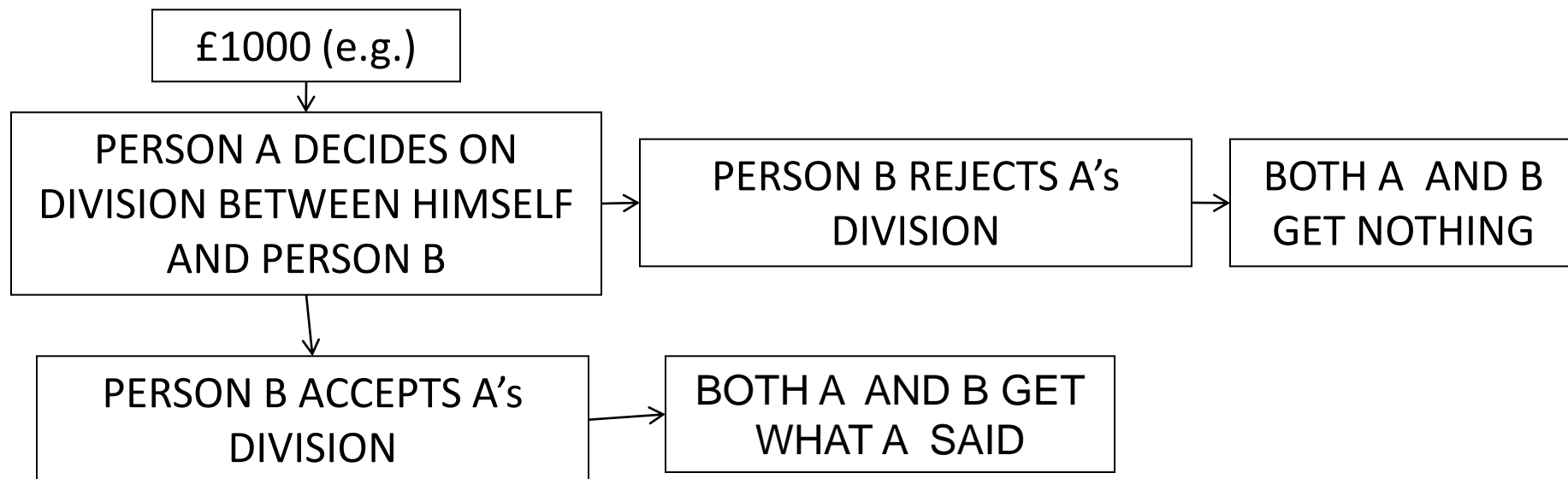


Bad behavioural economics

- Just ends up listing anomalies
- Doesn't consider their equilibrium implications
- In non-rational models, someone can always be ripped off (in other words, you can take advantage of behavioural biases; there are many hedge funds that try to do this in markets, with varying degrees of success)
 - *This causes professional challenges*
- Can be vague, ambiguous and contradictory (which is why economics was axiomatised in the first place)

Economic experiments

- Behavioural economists introduced the idea of experiments into economics
- Famous example: the ultimatum game





The ultimatum game

- Has been repeated across the world, with sums of money that are large in local terms (e.g. several week's wages, or \$400 in the US)
- Consistently, offers of 20% or less of the total sum are rejected about half the time, even in non-repeated games where the identity of the players is not revealed to the participants
- Rejection rate decreases as the division becomes fairer, and as the amount being divided increases
- What would a neoclassical utility function with only wealth as an argument predict should be the outcome of the game?
 - *Fairness* is a good that people value.



Behavioural economics and pensions

- Pensions offer a lot of avenues of research for behavioural economists
 - Influences on choices
 - Defaults
 - Self control
 - Procrastination
 - Time value of money
 - The evaluation of risk
 - Subjective probabilities
 - Loss aversion and the disposition affect



Our plan for today

- Look at each part of the life-cycle
 - Accumulation
 - Savings rates
 - Participation
 - Contribution rates
 - Asset allocation
 - Decumulation
 - Pre-retirement cash distributions
 - Decumulation / annuitisation
- Then look at the implications for pension plan design and communication



Savings rates

- Households don't seem to be that good at choosing a savings rate which will meet their retirement needs
 - US and UK workers suffer a drop in consumption when they retire
 - This drop cannot be explained in terms of the life-cycle model by: anticipated mortality, work-related expenditure, the substitution of leisure for income, drops in health-care consumption (in the US), preferences
 - US work uses food consumption as a proxy for total consumption; UK work looks at total consumption

Drop in consumption at retirement: US

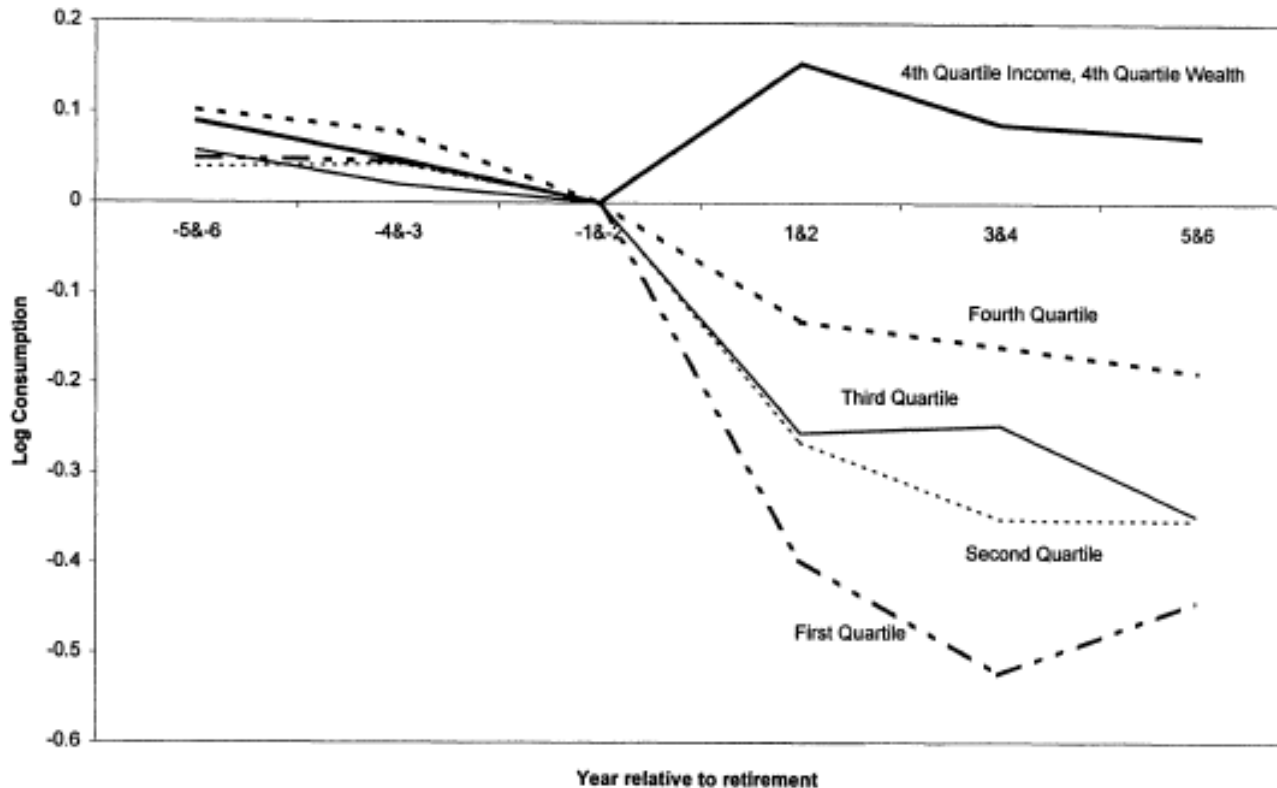


FIGURE 5. CHANGE IN CONSUMPTION AT RETIREMENT, BY INCOME QUARTILE

- From Bernheim (et al), AER (2001)

Drop in consumption at retirement: UK

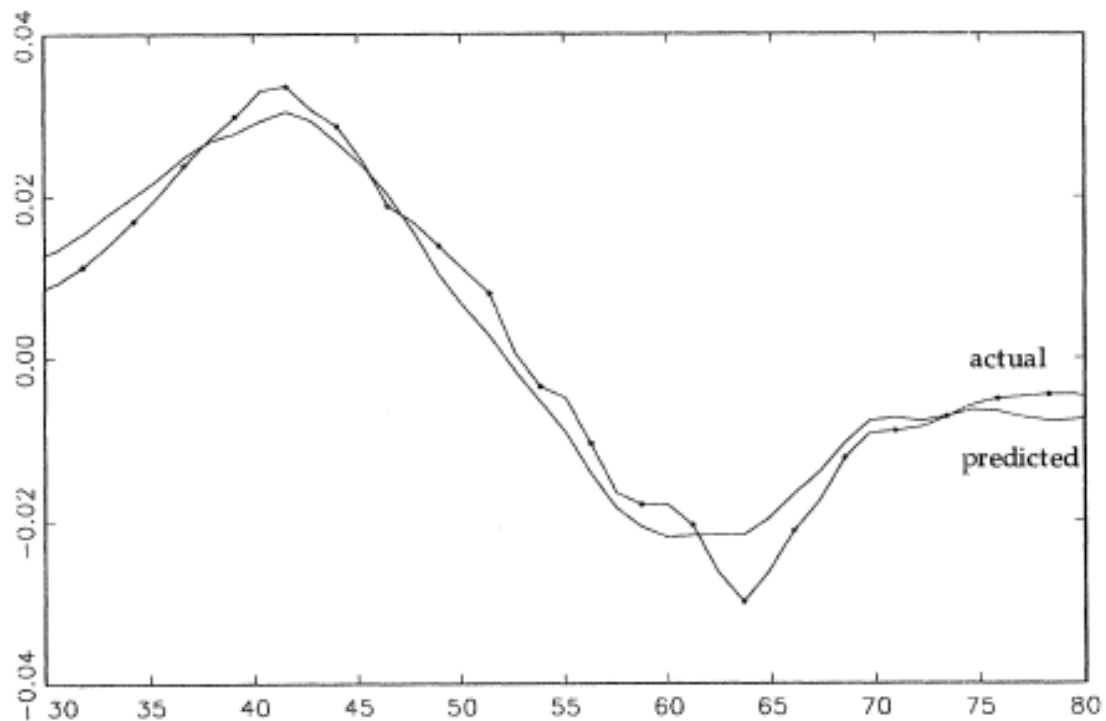


FIGURE 6. ACTUAL AND PREDICTED CONSUMPTION GROWTH, BY AGE CONTROLLING FOR DEMOGRAPHICS, MORTALITY RISK, AND LABOR SUPPLY

- From Banks et al, AER (1998)

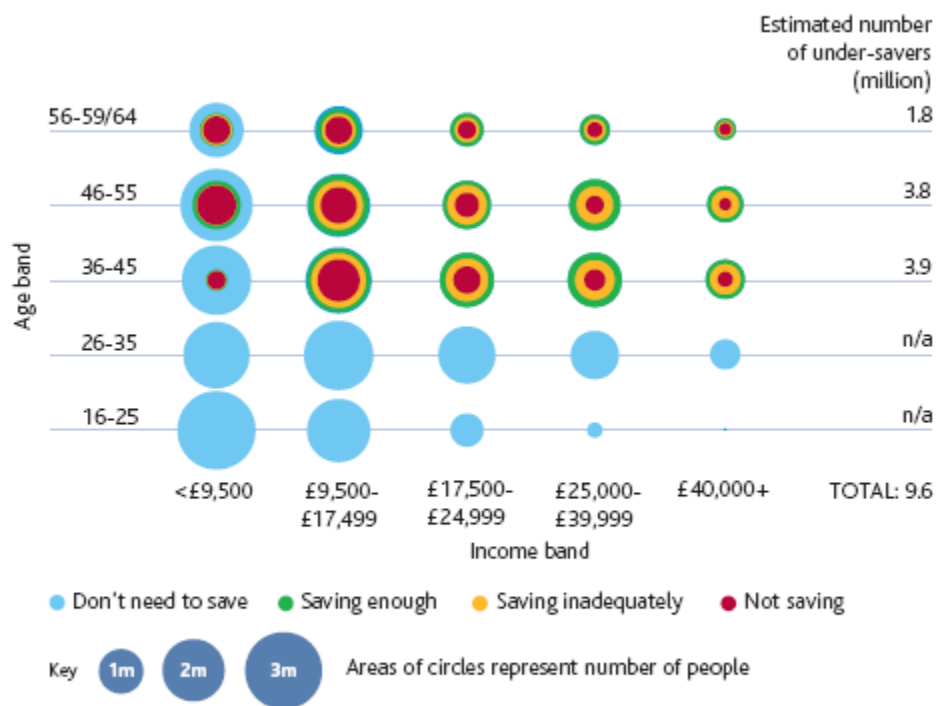


Other work

- Fewer than 40% of US workers have calculated how much they will need to retire on (EBRI, 2003)
- 30% of retirees are fully prepared for retirement at 65; 30% may have closed the savings gap by 65 (Mitchell and Moore, 2000)
- Pensions Commission: approximately 9.6m people in the UK are under-saving for retirement

Pensions Commission

Figure 4.16 Base Case Results: Savings Start at Age 35



Source: Pensions Commission analysis based on FRS 2002-03, NES, GAD and Inland Revenue data

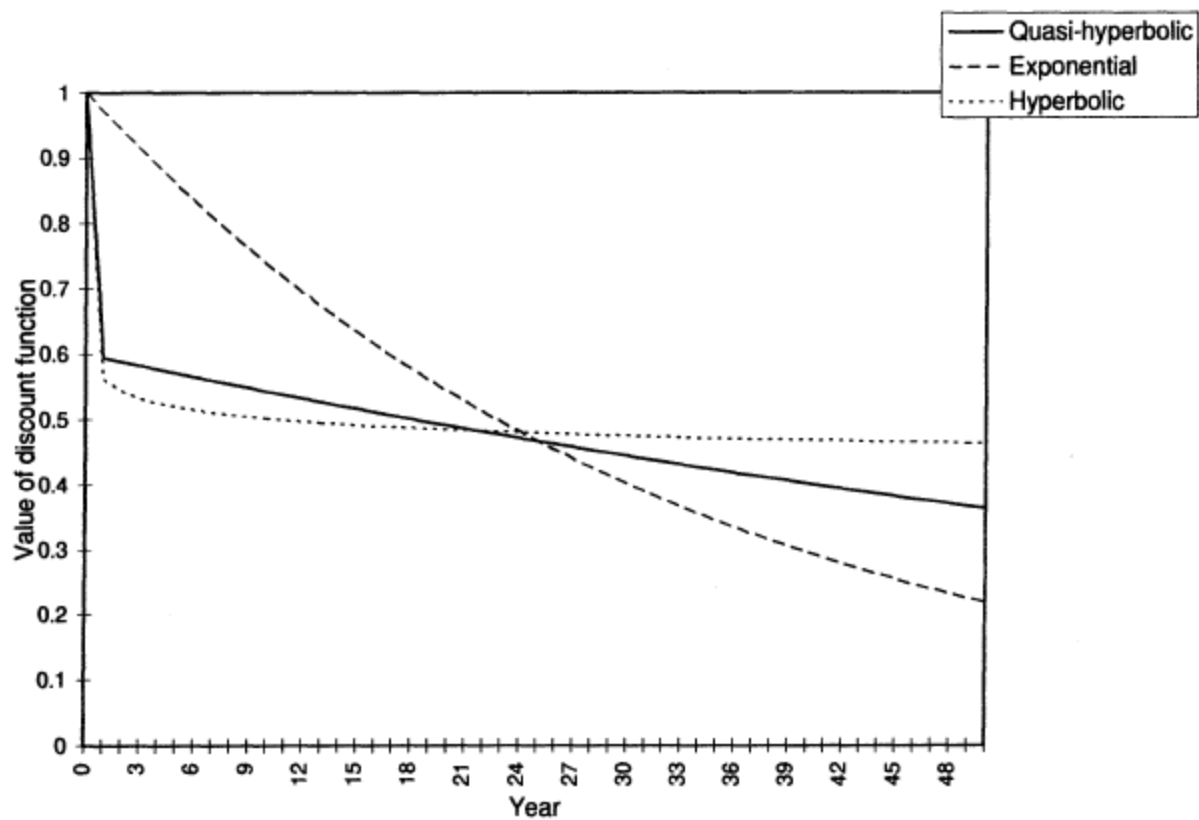
Note: See Appendix G for further details.
Under-savers includes those saving inadequately and those not saving.



Why?

- Bounded self-control
 - Near-term discount rates are higher than distant discount rates (Thaler & lots of others)
 - This means that if you offer people a choice of £100 in a year or £101 in a year and a week, most people will choose the second option
 - If you offer the choice of £100 now and £101 next week, most people will choose the first option
 - Implication: subjective discount rates decline as the time horizon lengthens

Hyperbolic discounting



- Hyperbolic discounters have self control problems (why?)



Time-inconsistent preferences

- Non-exponential discounters project themselves making different decisions to the decisions that they actually make (exponential discounters don't do this)
- Unpleasant decisions are routinely deferred into the future (procrastination)
 - Smoking and drug use
 - Dieting and exercising
 - Saving
- And they often never end up happening!
- Key is that benefits and costs occur at different times, so discounting needs to be done



Laibson (1997)

- Introduced quasi-hyperbolic discounting

$$U_t = E_t \left[u(c_t) + b \sum_{i=1}^{T-t} r^i u(c_{t+i}) \right]$$

The immediacy
effect

Our usual
exponential
discounting factor

- Examined the equilibrium consumption paths of consumers with these preferences
 - Introduced “commitment devices” which people use to overcome time inconsistency of preferences



Commitment devices

- These are devices which we use to enforce commitment when we know we should do something but we also know we will lack willpower when the time comes
 - “If I ever do that, shoot me”
 - Joining the army; getting married
 - Christmas Clubs; gym fees; Weight Watchers
 - Insurance policies with low surrender values; mortgages
 - Pensions, with payroll deduction

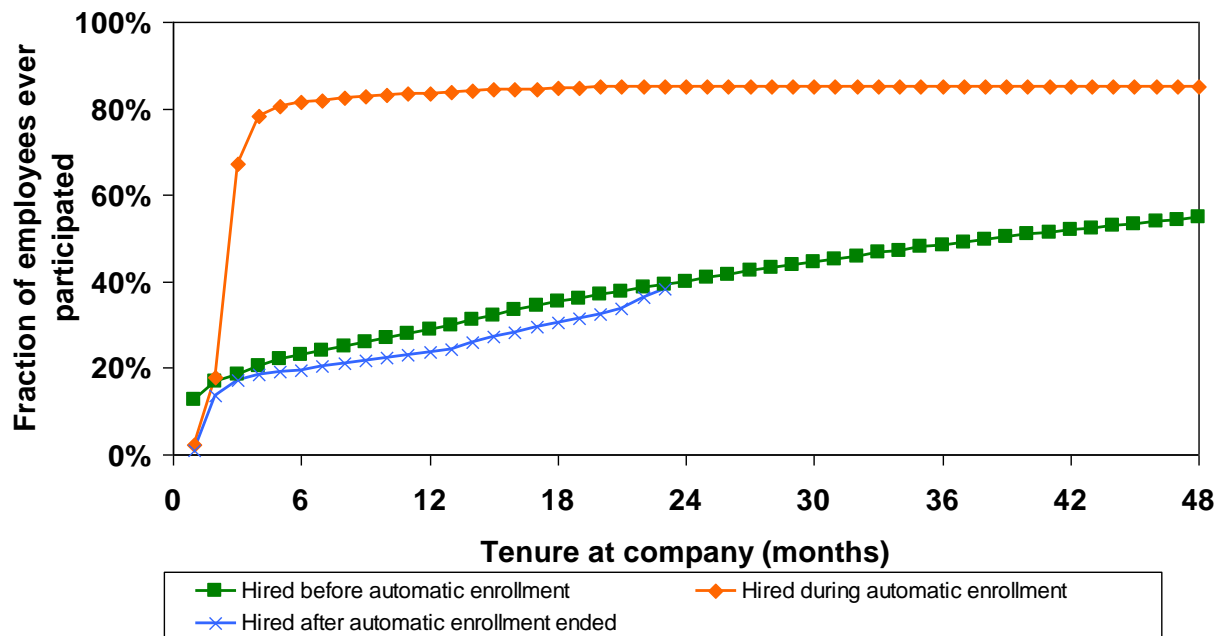


Attitudes to saving and actual saving

- Choi et al (2001)
 - Average respondent said they *should* be saving 14% of income for retirement (in this case in 401(k) plans)
 - Average saving rate was 6%
 - Individuals recognised this difference: around 68% said that their savings rate was “too low”
 - Of respondents who said that they intended to increase their savings rate in the next few months, only 14% actually did so

Plan participation

401(k) participation by tenure at firm



- Madrian and Shea (2001)
- Choi, Laibson, Madrian, Metrick (2004)



Defaults matter

- Defaults are very important determinants of behaviour
 - Framing / anchoring / reference dependence
 - The way a question is asked changes many people's responses
 - Implicit endorsements
 - Complexity
 - Financial illiteracy

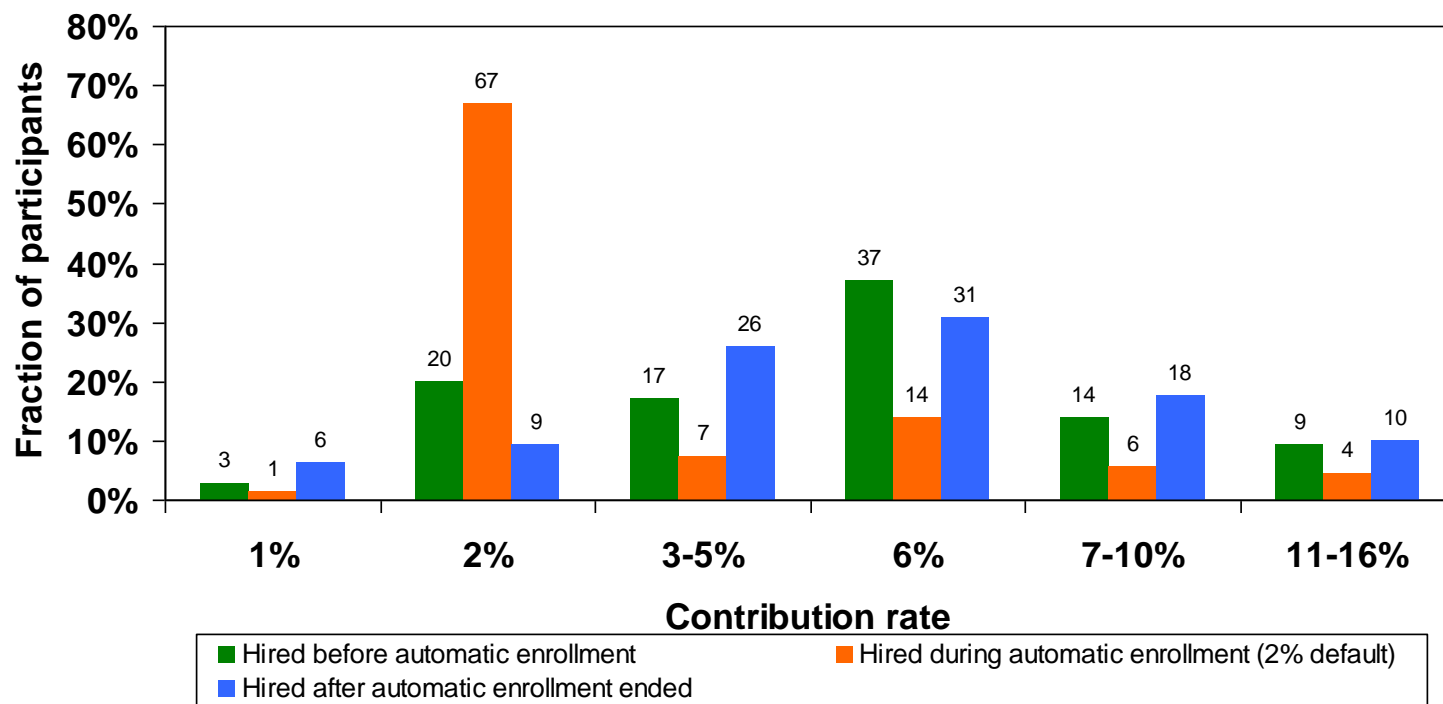


Framing

- Asian disease problem (Kahneman & Tversky 1981)
 - (A) Save 200 out of 600 lives for sure or all 600 w.p. $1/3$, 0 w.p. $2/3$
 - (B) 400 out of 600 die for sure or $2/3$ chance of 400 dying and $1/3$ chance of no-one dying
- Anchoring effects
 - How much you pay for a bottle of wine depends on your social security number (!)
- Reference dependence (endowment effect)
 - Mug or pen given randomly; could switch later; only 22% elected to do so

Optimal asset allocation in plans

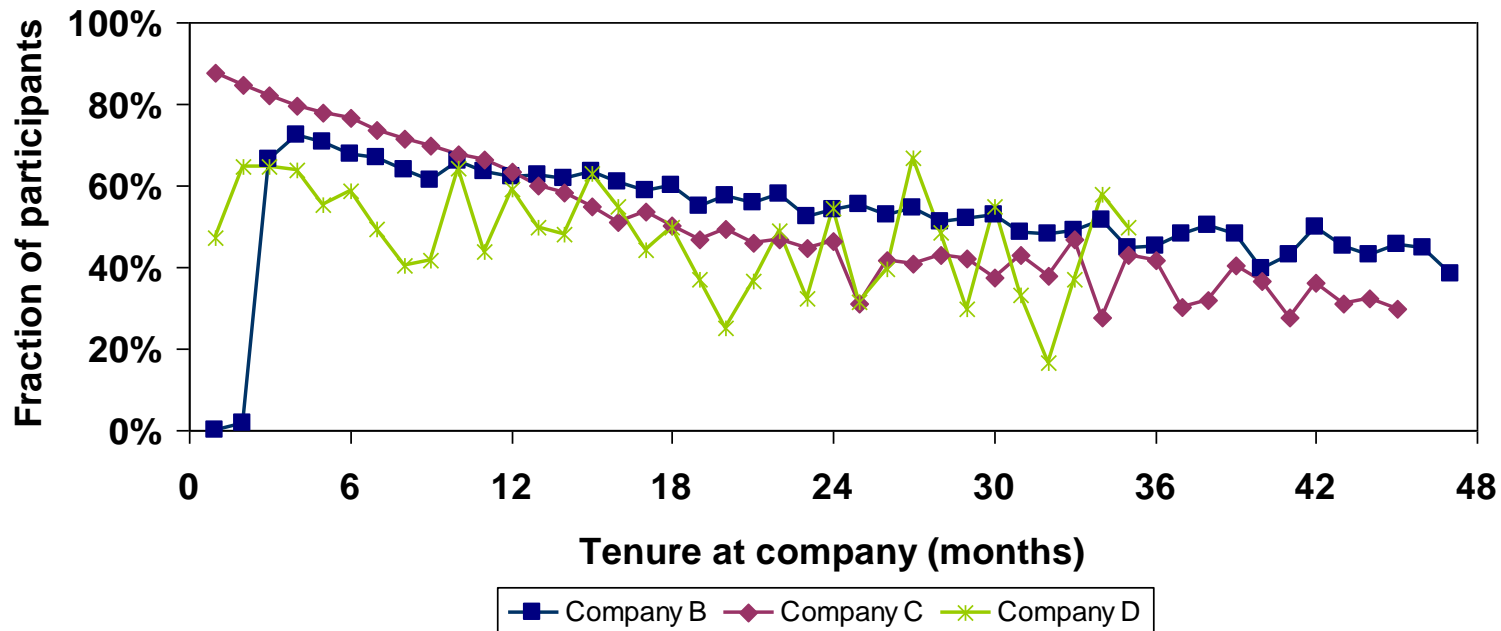
Distribution of contribution rates



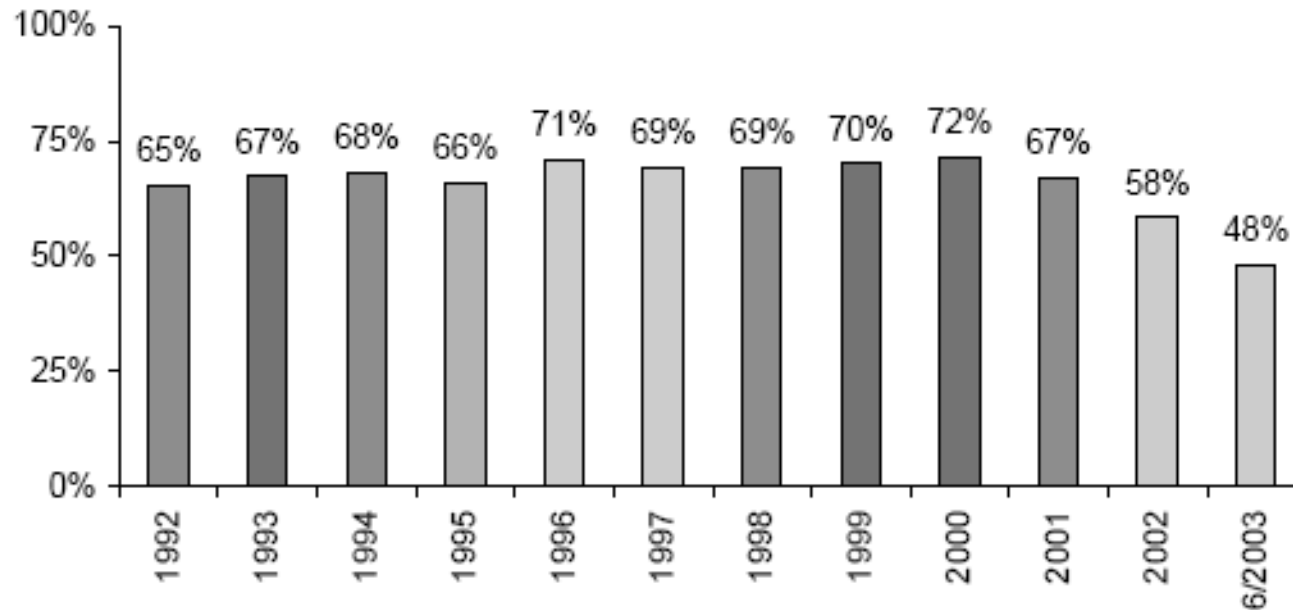
- Madrian and Shea (2001)
- Choi, Laibson, Madrian, Metrick (2004)

Heavy inertia

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



Heavy inertia (Vanguard, 2003)



- Graph shows 2003 allocation to equities of 2.3million Vanguard plan participants by entry date
- When did the market in the US fall?
- What does financial theory say about this?



Swedish pension reform

- DC pension reform
- Heavily marketed initially
 - At inception 1/3 of assets invested in the default fund
- Marketing scaled down
 - Subsequent enrollees invest 90% of assets in the default fund
- (Sweden has one of the highest direct stockholdings of any country on earth)
- Cronqvist & Thaler (2004)



Framing effects in asset allocation

- Bernartzi and Thaler (1999,2001,2002)
 - The menu of choices offered to employees significantly affects the outcome
 - Use of naïve heuristics is common (“avoid extremes”; “pick the middle option”; diversify across all available options”, (whatever they are)
 - How the information is presented makes a difference
 - Given one-year return profiles, individuals allocate assets differently to when presented with 30-year return profiles



Implicit endorsements

- A non-zero default is perceived as advice
- Evidence
 - Elective employer 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 compared with otherwise similar employees hired after automatic enrollment



Employer stock

- Large numbers of investors in the US invest heavily in company stock
- (Even post-Enron)
- Is this rational on the part of workers?
 - Agency costs / incentive alignment
 - Higher risk => Higher reward
- Perceptions of employees highly coloured by past performance ignoring risk (Benartzi, 2001)
 - Ex ante outcome and ex post outcomes are confused
 - Nassim Taleb's *Fooled by Randomness*



Employer stock

Would you say that your employer's stock is more risky, less risky or about the same level of risk as an investment in a diversified stock portfolio with many different stocks?

Participant reported perceived level of risk in company stock	% of participants	Actual 5-year std dev in return of company stock	Actual 5-year annual return in company stock
More risky	33%	0.40	-0.088
As risky	42%	0.36	-0.020
Less risky	22%	0.31	0.22
Don't know	3%	0.35	-0.06
n=415			
S&P 500		0.18	-0.011

Source: Vanguard Group (2003)



Financial illiteracy

- Taxi drivers in New York
 - Should they work longer or shorter hours on slow days?
 - What do you think is actually observed?
 - How does this change as the drivers become more experienced?
- What happened to DC contribution rates after the introduction of matching contributions (Laibson, 1997)?
 - What “should” have been observed if contribution behaviour was rational?
 - Has paying employees to save been effective?



Choi, Laibson, Madrian (2004)

- 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

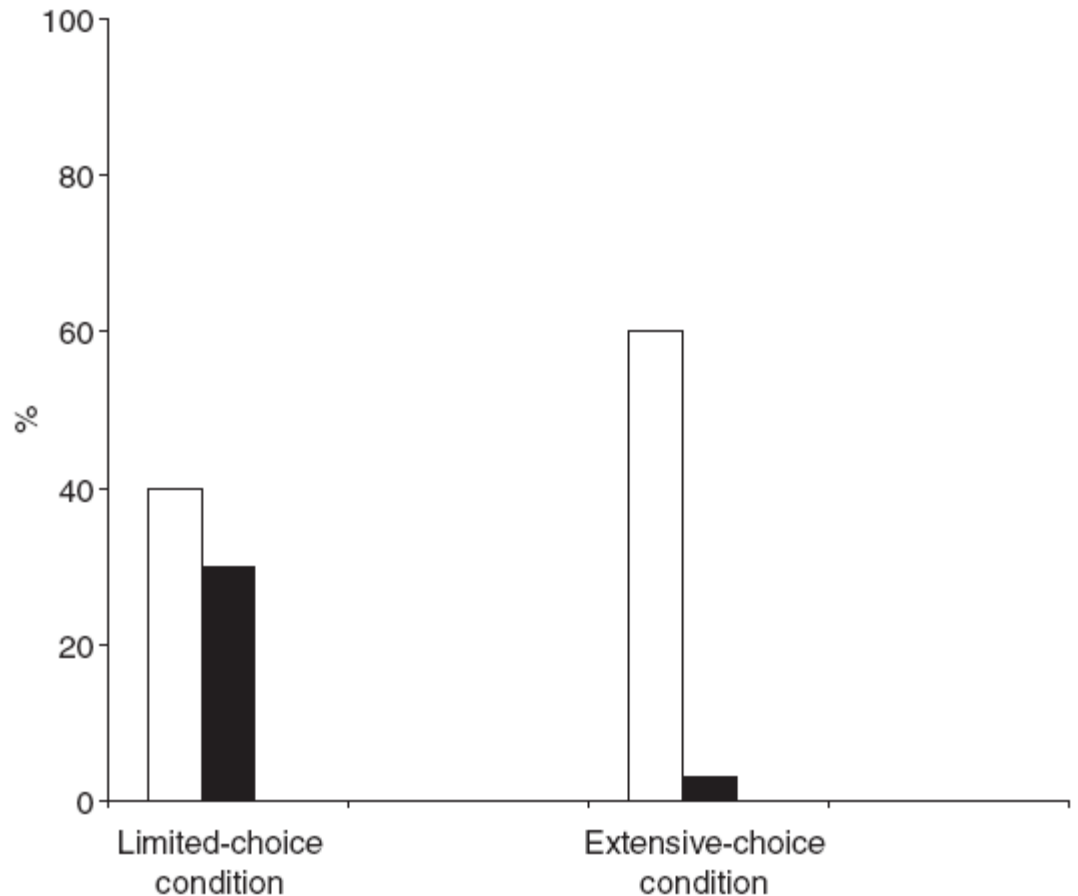


Complexity

- Complexity increases delay
 - Psychology literature (Tversky & Sharif 1992)
 - Experimental economics literature (Classic supermarket jam experiments, Iyengar & Lepper (2000) & Haagen-Dasz decision)

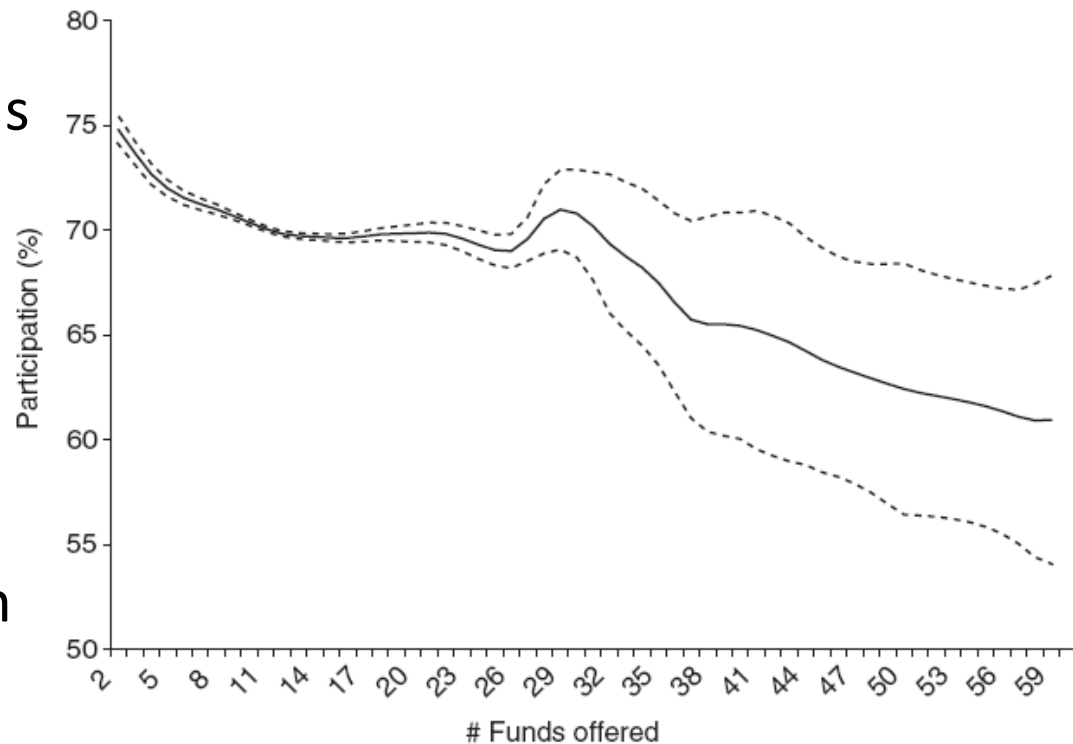
More choice inhibits action: jam

- White bars: proportion of shoppers who approached booth
- Black bars: proportion of approachers who subsequently purchased jam
- (6 or 24 jams at table)



Fund choices and participation

- Iyengar (2004)
- ~1million individuals
- Had DC account balances at Vanguard
- Designated “participators” if they contributed an amount > 0 in current plan period





Complexity

- Increases decision-making costs
 - Substantial time and effort required to make truly informed comparisons
- Increases chance of regret if the decision made turns out to have been sub-optimal
 - “Regret aversion” is an important factor affecting individual decisions



Prospect theory

- Individuals systematically value losses differently from gains
 - Evaluation is performed relative to a reference point
 - Gain function is concave (so people are risk-averse in “gain” space)
 - Loss function is convex, with a steeper slope
 - Individuals experience loss more acutely than gains
 - Typical loss-aversion coefficient is ~ 2.5 (i.e. individuals value losses roughly 2.5 times worse than equal gains)



Consistent with prospect theory.....

- Disposition effect
 - Individuals don't sell losers but only winners
- Mental accounting (Thaler, 1980)
 - Individuals struggle with the fungibility of money
 - They divide money into different accounts and treat balances in these accounts differently



Annuitisation, again

- The failure of most people to annuitise might be caused by loss aversion
 - What happens if I do annuitise and then die early, leaving my heirs with nothing?
- or by heavy initial discount rates (hyperbolic discounting)
 - US Navy experience (Warner & Pletter, 2001)
- or by systematic mis-evaluation of probabilities



Probability assessment

- “Availability heuristic”
 - The easier something is to recall or imagine, the more likely it must be
 - Tversky’s Californian earthquake
- “Hindsight bias”
 - Confusion of *ex ante* and *ex post* outcomes (what actually happened must have been the most likely outcome and hence will happen again)
 - Similar to “law of small numbers” (smoking)
- “Curse of knowledge”
 - People are more confident than they often have any right to be



Problem of adaptation

- All our cognitive abilities were developed in response to some environmental need to confer advantage on us
 - Hence, the fact that an observed human heuristic is apparently inappropriate when solving one problem does not mean that it is sub-optimal overall
 - “ecologically rational”
 - “Satisficing” (Herbert Simon)



Summary so far

- Looked at the following psychological biases
 - Framing
 - Probability assessment
 - Prospect theory / loss aversion
 - Inertia / procrastination
 - Financial illiteracy
 - Complexity
 - Mental accounting



Summary so far

- And examined how these affect the following decisions
 - How much to save
 - Whether to join a company pension or not
 - How much to contribute
 - What to invest in
 - Whether to take cash when you leave the plan or not (US only)
 - Whether to annuitise or not
- Now we will look at what we can do to ameliorate these problems



Ameliorating behavioural biases

- Choose default options carefully
- Design communication with behavioural biases in mind
- SMarT
- Quick / active enrollment
- Financial education
- Sometimes you can't ameliorate behavioural biases but you can *use* them to achieve your desired goals



Default options

- THERE WILL ALWAYS BE A DEFAULT EFFECT
- Have a substantial effect on behaviour
 - Decision to join
 - Contribution rate
 - Investment decision
 - Decumulation decision
- The implication is that choosing defaults carefully can result in better behaviour



“Conditional” defaults

- Defaults can be tailored around individual member circumstances
 - A good example might be an investment strategy tailored on age (lifestyling)
 - But you could tailor it based on any other individual characteristic
 - Tenure at the firm
 - Salary



Optimal defaults

- Choi et al (2005)
- Depends on two parameters
 - Degree of heterogeneity in population
 - Homogenous => universal default
 - Propensity of agents to procrastinate
 - Low => no default
- Laibson says set defaults to maximise average well-being
 - Not to equal average preference
 - Take account of endogenous opting out



Framing options

- THERE WILL ALWAYS BE FRAMING EFFECTS IN EMPLOYEE COMMUNICATIONS
- When designing communication with employees, frame the options well
 - Include information the employees need to make decisions ready to hand
 - Take care about over-loading employees
- Be aware of menu effects
- Note that the firm's objective may actually be to keep contribution rates *down* rather than up (why?)
 - What should your professional response be?



SMarT

- Benarzi and Thaler (2004)
 - Save More Tomorrow
 - Workers were given the option of either increasing savings rates today, or choosing to dedicate a certain fraction of pay increases to savings until they reached their target goal (called SMarT)
 - ~ 300 people signed up for counselling; 240 were told to increase their savings ratios; 80 elected to do so immediately; 160 signed up to SMarT
 - Uses commitment devices; recognises inertia and money illusion



NPSS

- Lord Turner's Pension Commission recommended this to increase UK retirement savings
 - Implemented in the most recent Pensions Act
- National Pensions Savings Scheme
 - DC scheme with investment choice
- Workers will be opted in unless they choose to opt out
 - Inertia
 - Procrastination
 - Implicit endorsement effect



Quick / active enrolment

- Make the enrolment process as easy as possible to reduce procrastination
 - Reduce all the decisions down to one
 - Control loss aversion
- Even better, impose a deadline on people to make the decision
 - “active” enrolment
- Laibson has results on the effects of active and quick enrolment on behaviour
 - Can be quite large



Financial education

- Not proven terribly effective at changing behaviour
- Laibson's Wharton MBA's could not successfully allocate money to low-fee providers (leaving on average \$112 on the table)
 - And Wharton undergraduates were as good as random



Financial education: Duflo & Saez

- Individual behaviour very strongly influenced by peer groups rather than financial education *per se*
- Opens the door to cultural effects on savings decisions
- Letter sent to 50% of individuals in treated departments inviting them to attend a financial planning fair and rewarding them for attending
 - Subsequently, those individuals, *but also members of their departments who did not attend the fair*, had a higher participation rates than those in untreated departments

Duflo & Saez (2004)

- Individual behaviour is affected by their peers
- Although the overall effect of financial education is small

	<i>Untreated Departments (Group D = 0)</i>	<i>Treated Departments</i>		
		<i>All (Group D = 1)</i>	<i>Treated (Group D = 1, L = 1)</i>	<i>Untreated (Group D = 1, L = 0)</i>
<i>Panel A: Benefits fair attendance^a</i>				
Fair attendance rate ^b among non-401(k) enrollees	0.049 (0.005)	0.214 (0.006)	0.280 (0.01)	0.151 (0.008)
Observations	2,018	4,126	2,020	2,106
<i>Panel B: 401(k) participation^c</i>				
401(k) participation rate after 4.5 months	0.040 (0.005)	0.049 (0.004)	0.045 (0.005)	0.053 (0.005)
Observations	1,861	3,726	1,832	1,894
401(k) participation rate after 11 months	0.075 (0.0065)	0.088 (0.005)	0.089 (0.0071)	0.088 (0.007)
Observations	1,633	3,246	1,608	1,638
<i>Panel C: Response rate to additional questionnaire</i>				
Response rate	0.352 (0.0402)	0.452 (0.018)	0.440 (0.0201)	0.464 (0.0405)
Observations	142	765	612	153



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%



Financial Education

- 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.



Conclusion

- Behavioural effects are a very important part of the pension economists toolbox
- They have a major effect on pension plan design and on national policy
- Remember that individuals can change the way they behave (professional art dealers vs amateurs; experienced taxi drivers vs newbies)
- In many cases, behavioural influences are unavoidable and inevitable
- Behavioural tendencies can be used and abused, so beware