Econ 219b
Psychology and Economics:
Applications
(Lecture 14)

Stefano DellaVigna

May 4, 2005

Outline

1. Social Preferences II

2. Persuasion and Retirement Benefits

3. Overconfidence: Introduction

4. Overconfidence: Trading

5. Overconfidence: Mergers

6. Summary of Evidence

7. Some Advice

8. Course Evaluation

1 Social Preferences

- 219A. Emphasis on social preferences

- In the field?

  1. Pricing. When are price increases acceptable?

     – Kahneman, Knetsch and Thaler (1986)

     – Survey evidence

     – Effect on price setting

  2. Wage setting. Fairness toward other workers –>
     Wage compression

  3. Charitable Contributions.

– Contributions of money and time

– Survey by Andreoni (2004)

- Charitable contributions is only setting with good field evidence

- Andreoni (2004). Excellent survey of the theory and evidence on:

  - charitable contributions

  - contributions of time (short)

  - fundraising industry

- Stylized facts:

  - US Giving very large: 1.5 to 2.1 percent GDP!

  - Most giving by individuals (Table 1)

  - Slight trend to decrease in generosity (Figure 1)

  - Giving by income, age, and education (Table 2 – no controls)

* Giving as percent of income fairly stable

* Increase for very rich

– Giving to whom? (Table 3)

* Mostly for religion

* Also: human services, education, health

* Very little international donations

– Compare to giving in other countries (Figure 2)

* In US non-profits depend more on Charitable
contributions

over 183 billion dollars to charity, or 76% of the total dollars donated. The second biggest source, foundations, was responsible for 11.2% of all donations.

Table 1
Sources of Private Philanthropy, 2002

Source of gifts	Billions of dollars	Percent of total
Individuals	183.7	76.3
Foundations	26.9	11.2
Bequests	18.1	7.5
Corporations	12.2	5.1
Total for all Sources	240.9	100

Source: Giving USA, 2003

The trends in giving over the last 30 years can be seen in Figure 1. Total giving has been on a steady rise, with temporary jumps coming in 1986, along with a pronounced rise starting in 1996 trough 2001. When measured as a percent of income, however, giving seems much more stable. Since 1968 giving has varied from 1.5% to 2.1% of income. In the most recent years, however, giving has risen from 1.5% of income in 1995 to 2.1% in 2001. This rise coincided with a run up on stock-market wealth, which is the likely explanation for the latest increase in giving. Notice, however, that this latest rise in giving counteracts a longer trend of slowly falling generosity. The peak of giving in 2001 matches the former peak set back in 1963. Table 2 presents details on the characteristics of individual givers. The data, from the Independent Sector in 1995, show that 68.5% of all households gave to charity and that the average gift among those giving was $1081. Table 2 shows that the more income a household has, the more likely the household is to give to charity, and the more it gives when it does donate. This table also reveals an interesting pattern typically found in charitable statistics. Those with the lowest incomes give over 4% of income to charity. As incomes grow to about $50,000, gifts fall to 1.3% of income, but then rise again to 3.0% for the highest incomes. What could cause this "u-shaped" giving pattern? One explanation is that those with low incomes may be young people who know their wages will be rising, hence they feel they can afford more giving now. It may also be due to the composition of the types of charities people give to, since lower income people tend to give significantly more to religious causes. Hence, it will be important to account for all the factors that may explain giving before offering explanations for the averages seen in these tables.
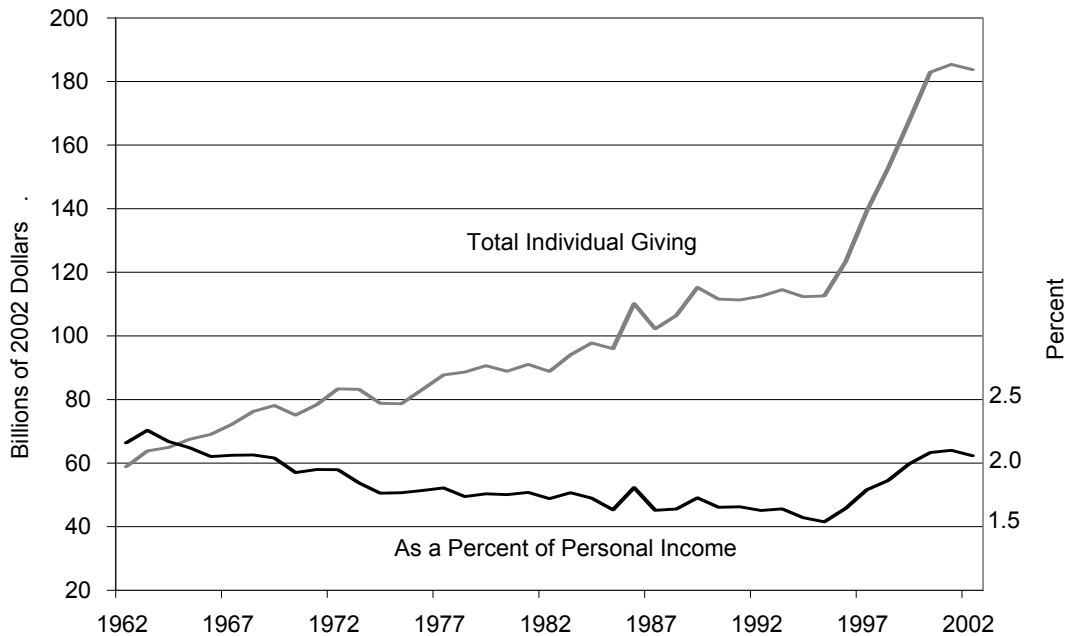
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Figure 1: Trends in Individual Giving.
Source: Giving USA 2003.

Table 2 also illustrates that giving varies significantly with the age and educational attainment of the givers. As people get older they are typically more likely to give to charity and to give a greater fraction of their incomes. Likewise, those with more education give more often, give more dollars, and generally give a higher fraction of income. Note that the table does not show a smooth acceleration of giving with age. Again, age, education, and income all vary with each grouping in the table and will have to be considered jointly.

In 1997 over 45,000 charitable, religious and other non-profit organizations filed with the US government (see Bilodeau and Steinberg in this volume). Table 3 attempts to categorize these charities by the types of services they provide. This reveals that, among all types, households are most likely to give to religious organizations and to give them the most money—48% of all households give to religion and 59% of all charitable dollars go to religion.

Table 2

Private philanthropy by income, age, and education of the giver, 1995

	Percent of households who give	Average amount given by those who give	Percent of household income
All contributing households	68.5	1,081	2.2
Household Income			
under $10,000	47.3	324	4.8
10,000–19,000	51.1	439	2.9
20,000–29,999	64.9	594	2.3
30,000–39,999	71.8	755	2.2
40,000–49,999	75.3	573	1.3
50,000–59,999	85.5	1,040	1.9
60,000–74,999	78.5	1,360	2.0
75,000-99,999	79.7	1,688	2.0
100,000 or above	88.6	3,558	3.0
Age of Giver			
18–24 years	57.1	266	0.6
25–34 years	66.9	793	1.7
35–44 years	68.5	1,398	2.6
45–54 years	78.5	979	1.8
55–64 years	71.7	2,015	3.6
65–74 years	73.0	1,023	2.9
75 years and above	58.6	902	3.1
Highest Education of Giver			
Not a high school graduate	46.6	318	1.2
High school graduate	67.2	800	1.9
Some college	74.1	1,037	2.1
College graduate or more	82.3	1,830	2.9

Source: Author's calculations, data from Independent Sector 1995.

Table 3
Private Philantropy by Type of Charitable Organization, 1995.

Type of Charity	Percent of Households who give	Average amount given by those who give	Percent of total household contributions
Arts, culture and humanities	9.4	221	2.6
Education	20.3	335	9.0
Environment	11.5	110	1.6
Health	27.3	218	8.1
Human Services	25.1	285	9.5
International	3.1	293	1.1
Private and community foundations	6.1	196	1.4
Public or Societal benefit	10.3	127	1.7
Recreation	7.0	161	1.4
Religious	48.0	946	59.4
Youth Development	20.9	140	3.8
Other	2.1	160	0.3

Source: Author's calculations, data from Independent Sector, Giving and Volunteering, 1995.

2.2. International Statistics

A difficult aspect of comparing data from across countries is the varied sources of information and the inconsistent definitions of charitable giving and non-profit organizations. Using data from Johns Hopkins Comparative Nonprofit Sector Project[6], we can nonetheless attempt to gain some perspective on the differing size of the charitable sectors of various economies.

Figure 2 shows reports of cash revenues of non-profits from philanthropy. The experience varies widely around the globe. The US, however, stands out as being the most reliant on private donations, at 21 percent of all revenues. With the exception of Spain, European countries are much lower, varying from 3 to 11 percent. The South American countries of Argentina and Brazil rely heavily on philanthropy (about 18 percent), while Mexico does not (6 percent).

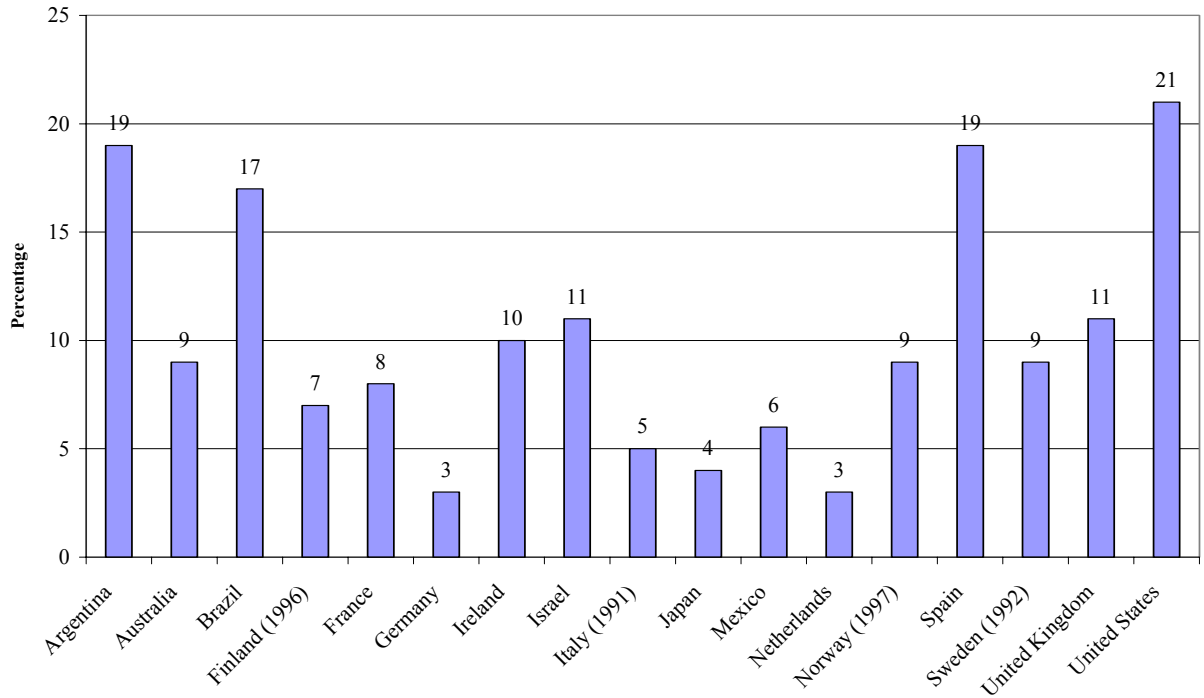[6]See their web-site, http://www.jhu.edu/~cnp/.

Figure 2: Percentage of Cash Revenues of the Nonprofit Sector Received from Philanthropy: 1995.

Figure 3 provides a different perspective by looking at the total expenditures of the non-profit sector. Here the US falls closer to the middle of the pack, at 7.5 percent of GDP. The Netherlands and Israel have the largest non-profit sectors, while Mexico and Brazil have the smallest.

- Do poorer people receive more? Not obvious

- Donate to person with highest marginal utility in more general model

- Table 3: Very little international donations −> Limited donations to poorest countries

- Additional prediction of model – Crowding out

- If government spends on income of Mark, Wendy will donate less.

- What is the evidence of crowding out?

- Mixed evidence – open question

- Some open questions for field data work:

- Why do people donate?

  - Altruism?

  - Warm glow? What does it mean?

  - Social pressure?

  - Emotional connection?

- How sensitive are donors to features of charities?

  - Expense ratio

  - Marginal utility of recipient

  - (Psychological) Distance of donor from recipient

- Seed money (last lecure)

- Gifts

- Non-profits are willing to run field experiments (they do them anyway)

2 Persuasion and retirement benefits

- How do employees choose their savings plan?

- Take 'advice' of firm?

- Benartzi and Thaler (2001) and Huberman and Jang (forthcoming)

Naïve Diversification Strategies in Defined Contribution Saving Plans
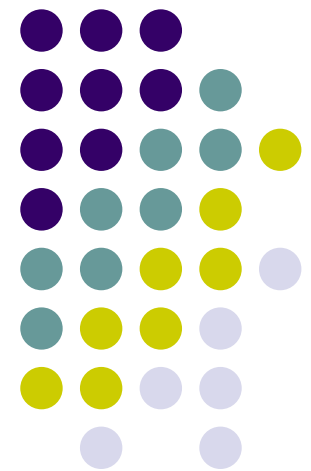
Shlomo Benartzi and Richard H. Thaler
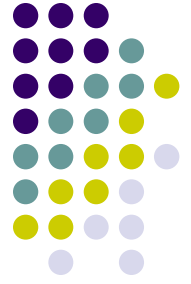
AER, Vol. 91 No. 1 (Mar. 2001)

Presented by Brian Chen

Econ 219B Psychology and Economics
Professor Stefano DellaVigna

May 4, 2005

Outline of Presentation

- Summary & Motivation
- Description of Empirical Testing – Methods and Results
  - Questionnaires
    - Verbal descriptions
    - Graphical descriptions
    - Verbal descriptions with multiple fund choices
  - Data Analysis
    - Cross-sectional analysis
- Discussion, Possible Alternative Explanations and Conclusion
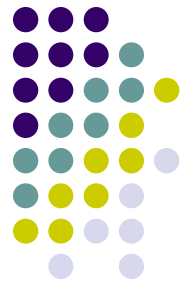- Critiques?

Summary of Article & Motivation
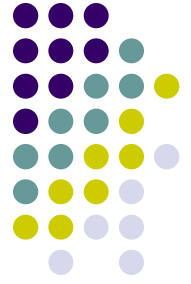
- Summary
  - With respect to diversification, some investors follow the "1/n strategy." That is, they divide their contributions evenly across the funds that are offered in the defined contribution savings plan

- Motivation
  - Trend toward defined contribution savings plan
  - Growing interest in privatized Social Security Plans
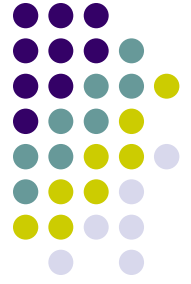
Empirical Testing:

Three Questionnaires

Panel A1: Stock Fund (A) & Bond Fund (B)

Panel A2: Stock Fund (A) & Bond Fund (B)
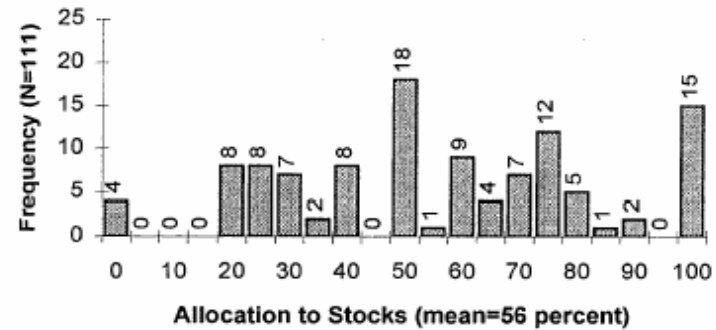
Panel B1: Stock Fund (A) & Balanced Fund (B)
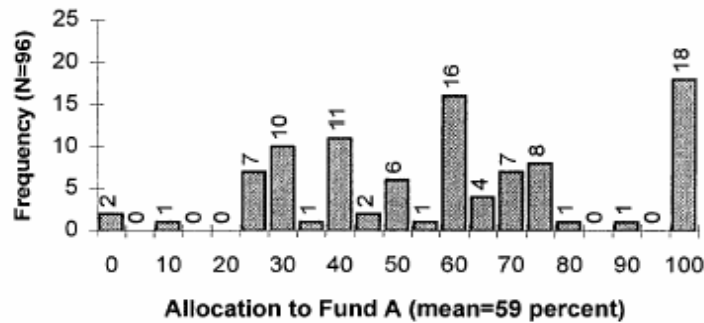
Panel B2: Stock Fund (A) & Balanced Fund (B)
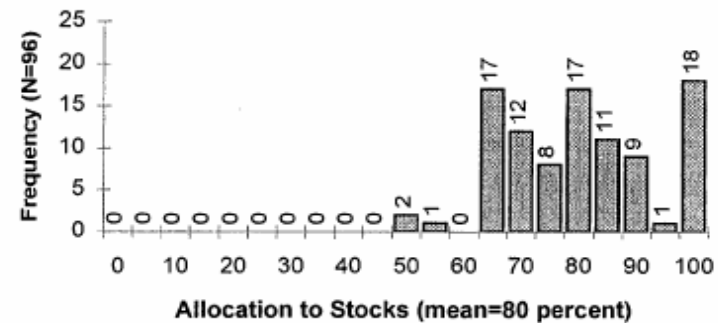
Panel C1: Balanced Fund (A) & Bond Fund (B)
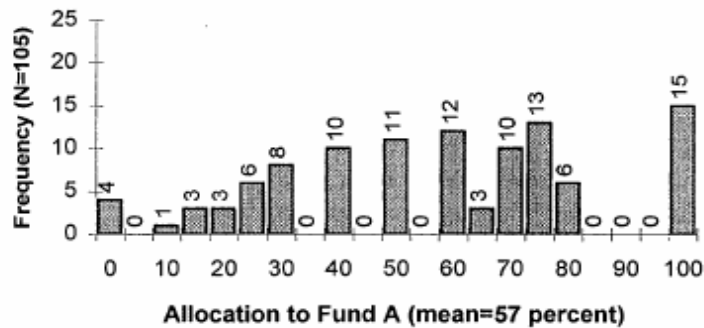
Panel C2: Balanced Fund (A) & Bond Fund (B)
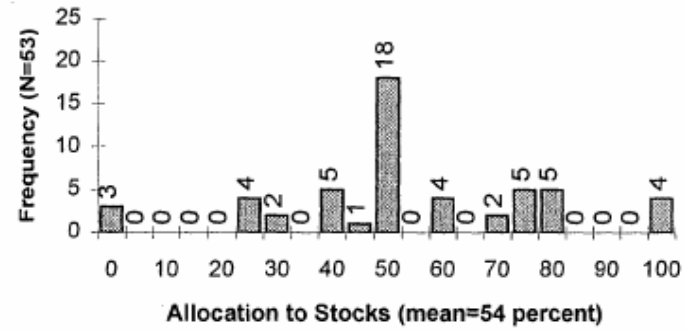
Questionnaire: First Experiment Results

Panel A1: Stock Fund (A) & Bond Fund (B)

Allocation to Fund A (mean=56 percent)

Panel A2: Stock Fund (A) & Bond Fund (B)

Allocation to Stocks (mean=56 percent)

Panel B1: Stock Fund (A) & Balanced Fund (B)

Allocation to Fund A (mean=59 percent)

Panel B2: Stock Fund (A) & Balanced Fund (B)

Allocation to Stocks (mean=80 percent)

Panel C1: Balanced Fund (A) & Bond Fund (B)

Allocation to Fund A (mean=57 percent)

Panel C2: Balanced Fund (A) & Bond Fund (B)

Allocation to Stocks (mean=29 percent)

Questionnaire: Second Experiment Results

Questionnaire: Third Experiment Results

TABLE 3—VERBAL SAVINGS QUESTIONNAIRE WITH MULTIPLE FUNDS PER ASSET CLASS: MEAN ALLOCATION TO EQUITIES

| Version | N | Fund description and mean allocation: | | | | | Mean allocation to equities (Median) |
		Fund A	Fund B	Fund C	Fund D	Fund E	
Multiple fixed-income funds	179	Money markets 14 percent	Savings 14 percent	Insurance contracts 11 percent	Bonds 18 percent	Diversified equity 43 percent	43 percent (40 percent)
Multiple equity funds	169	Diversified fixed-income 32 percent	Conservative equity 15 percent	Equity index 16 percent	Growth stock 26 percent	International equity 11 percent	68 percent (75 percent)

Discussion of Results – Possible alternative explanations?

- Perhaps the 1/n heuristic is rational?
  - May not be a poor choice if employer provides good options
    - Do employers do this?
    - Employee heterogeneous risk attitudes?

- Good diversification strategy?
  - Rational mean-variance optimizing investor and choice
  - Addition of large-cap → 50% to 54%; addition of two large-cap funds → 50% to 57%; addition of small-cap → 50% to 47%

Analysis of Actual Data

- Proprietary database from the Money Market Directories (MMDs).
- Major limitation: Data set does not include allocation of annual contributions
- Weighted aggregate proportion of investment in equities: 62.22%; proportion of equity investments offered: 61.76%

TABLE 5—MEAN ASSET ALLOCATION FOR THE MMD SAMPLE OF 401(k) PLANS AS OF 6/30/96

Type of Investment	Plans not offering company stock as an investment option ($N = 103$)	Plans offering company stock as an investment option ($N = 67$)	All plans ($N = 170$)
Money market	7.06 percent	3.14 percent	4.74 percent
Stable value	33.16	10.24	19.61
Bonds	4.26	9.64	7.44
Company stock	0.00	41.98	24.81
Domestic equity	45.95	27.41	34.99
International equity	3.24	1.85	2.42
Multi-asset	4.63	0.86	2.40
Other	1.66	4.84	3.54
Total	100.00	100.00	100.00

Note: The mean allocation is weighted by plan assets.

Some complications

- *To recap: goal is to examine the relation between funds offered and the asset allocation of the participants*

- Data on total fund assets, not new flows, so two complications:

  - Change of options over time

  - Participants change new contributions more than old

  - To correct for above: weight the number of each type of investment option by "duration" and "performance" to obtain "relative number of equity investments"

Results of Analysis

TABLE 6—THE RELATIVE NUMBER OF EQUITY-TYPE INVESTMENT OPTIONS AND ASSET ALLOCATION USING THE MMD SAMPLE OF 401(k) PLANS (AS OF 6/30/96)

Relative number of equity-type investment options	N	Mean relative number of equity investment options	Mean allocation to equities
Low	54	0.37	48.64 percent
Medium	54	0.65	59.82
High	54	0.81	64.07
p-value (ANOVA test)			0.01

Note addition of two funds: 48.64% → 64.07%, where rational investor should be 50%→ 57%

Analysis of data in a regression framework

- WLS estimation shows that coefficient on the relative number of equities is significantly positive at the 1% level.

- Fixed effects model did not change the results

TABLE 7—THE RELATIVE NUMBER OF EQUITY-TYPE INVESTMENT OPTIONS AND ASSET ALLOCATION: A REGRESSION ANALYSIS
(DEPENDENT VARIABLE: THE PERCENTAGE OF PLAN ASSETS INVESTED IN EQUITIES)

WLS regression model	Intercept	Relative number of equity options	Indicator whether the plan offers company stock	Log of the plan assets in thousands	Adjusted R^2
		Panel A: No Industry Indicators ($N = 162$)			
1	22.09	63.14			34.61 percent
	(4.94)	(9.28)			
2	29.72	36.75	15.05		43.45 percent
	(6.73)	(4.49)	(5.10)		
3	10.57	36.77	14.78	1.40	44.16 percent
	(0.89)	(4.52)	(5.03)	(1.74)	
		Panel B: Including Industry Indicators Based on 2-Digit SIC Codes ($N = 142$)			
4		58.68			55.12 percent
		(8.29)			
5		43.90	12.93		58.91 percent
		(5.39)	(3.26)		
6		47.07	9.09	4.13	61.79 percent
		(5.93)	(2.25)	(2.96)	

Alternative Explanations?

- Different equity funds have different investment purposes

    - Not supported by data

- Firms choose array of funds to meet the desires of plan participants

    - Random treatment, should be no systematic differences in risk preferences across the groups

    - No apparent demographic differences between industries

Is Naïve Diversification Costly?
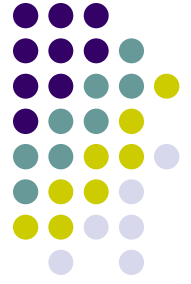
- Naïve diversification may be costly for two reasons:
  - (1) Portfolio not on efficient frontier
  - (2) Investors might pick the wrong point along the frontier.
    - Possible welfare loss from picking portfolio that does not match risk preferences.
    - Though difficult to pinpoint, authors estimate welfare loss as large as 35-40%
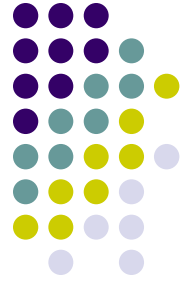
Conclusion

- Some employees apparently spread their contributions evenly across investment options *regardless* of the particular mix of options.

- This can produce a reasonable portfolio, but does not assure sensible or coherent decision making.

- The results have profound implication for the design of retirement saving plans, both public and private.
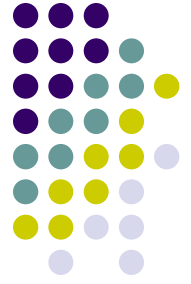
Critiques

- Do different yield rates matter?
- What about investor behavior towards a full mutual fund company with a full array of options?
- Data limitation: No annual fund flows
- Is the weighting procedure to correct for the above adequate?
- Is the assumption on hybrid fund allocation realistic?
- Is the cross-sectional analysis rigorous?

- Huberman and Jiang (forthcoming) use Vanguard data to test BT (2001)

    - Half a million 401(k) participants

    - 640 DC plans

    - Year 2001

- Main findings:

    1. People do not literally do 1/n, definetely not for n large

    2. People do approximately 1/n on the *chosen* funds

3. Equity choice (most important):

   – For $n \leq 10$, BT finding replicates:

   $$\%Equity = \alpha + .292 * \%EquityOffered$$
   $$(.063)$$

   – For $n > 10$, no effect:

   $$\%Equity = \alpha + .058 * \%EquityOffered$$
   $$(.068)$$

- Psychologically plausible:

   – Small menu set guides choices

   – Large menu set does not

Table I. Summary statistics of individual- and plan-level attributes for the 572,157 401(k) participants records in 639 plans in 2001

NCHOSEN (*NCHOSEN95*) is the number of funds in which a participant chooses to invest all (at least 95%) of his balance. *%EQ* is the proportion of current-year contribution that a participant invests in equity funds. (A balanced fund counts as a 0.5 equity fund.) *%EQOffered* is the proportion of equity funds out of all funds offered by a plan. *CONTRIBTUION* is the dollar amount that a participant contributed to his defined contribution plan in 2001. *COMP* is a participant's annual compensation. *WEALTH* is the average financial wealth of the nine-digit zip code neighborhood where a participant lives. *FEMALE* is the gender dummy variable. *AGE* and *TENURE* stand for a participant's age and his tenure with the current employer. *MATCH* is the average match rate by employer up to five percent of a participant's compensation. *COMPSTK* is a dummy variable for the availability of company stock among the offered funds. *DB* is a dummy variable for the presence of a defined benefit plan. *NCHOICE* is the number of funds available to the plan participants. *WEB* is the proportion of participants who register for web access to their DC accounts in a plan. *NEMPLOY* is the number of employees eligible to participate; it proxies for plan size.

	Unit	Mean	Std. Dev	Median
NCHOSEN	1	3.48	1.99	3
NCHOSEN95	1	3.12	1.69	3
%EQ	1%	66.84	35.40	78.94
%EQOffered	1%	66.42	7.73	68.18
CONTRIBUTION	$1,000	4.32	3.38	3.34
COMP	$10,000	6.44	6.67	5.25
WEALTH	$10,000	6.06	17.84	1.64
FEMALE	0-1	0.38	0.46	0
AGE	year	43.36	9.75	44
TENURE	year	11.06	9.25	9.08
MATCH	1%	68.25	26.68	50
COMPSTK	0-1	0.52	0.50	1
DB	0-1	0.62	0.48	1
NCHOICE	1	13.66	5.75	13
WEB	1%	28.68	11.73	26.21
NEMPLOY	100	169.77	222.53	56.8

Table II. Determinants of Number of Funds Used: Estimates of
$$NChosen_{i,j} = \gamma NChoice_j + \beta Controls_{i,j} + \varepsilon_{i,j}$$

NCHOSEN (*NCHOSEN95*) is the number of funds in which a participant chooses to invest all (at least 95%) of his balance. *NCHOICE* is the number of fund options available to employees of the plan. Definitions of control variables are the same as those in Table I. The coefficients and standard errors (S.E.) are multiplied by 100. Columns 1-3 use all participant records and columns 4 uses only records of new entrants in 2001. In column 3, the dependent variable is the smallest number of funds in which at least 95% of the participant's retirement assets are invested; in all other columns it is the total number of funds chosen by an individual. All regressions include plan-averages of individual characteristics as control variables. Compensation and wealth variables enter in logs. Standard errors adjust for both heteroskedasticity and arbitrary correlation of error disturbances clustered at the plan level.   The effective sample size for the coefficients on individual (plan) attributes is of the order of the number of individuals (plans). * indicates that the coefficient is statistically different from zero at the 5% level.

	All Participants						New Entrants	
	NCHOSEN				NCHOSEN95		NCHOSEN	
	(1)		(2)		(3)		(4)	
	COEF*100	S.E.*100	COEF*100	S.E.*100	COEF*100	S.E.*100	COEF*100	S.E.*100
NCHOICE	**0.95**	0.70	**1.03**	0.70	**0.56**	0.52	**-0.89**	0.78
CONTRIBUTION	**10.54***	0.56	--	--	**7.96***	0.43	**12.48***	1.73
COMP	**-0.02**	2.30	**33.05***	2.87	**-0.81**	1.57	**-6.14**	5.18
WEALTH	**1.20***	0.51	**3.90***	0.55	**1.09***	0.41	**1.18**	0.89
FEMALE	**14.51***	1.97	**14.84***	1.95	**10.71***	1.45	**7.84***	3.57
AGE	**-1.66***	0.10	**-1.35***	0.09	**-1.44***	0.09	**-1.46***	0.16
TENURE	**0.88***	0.26	**0.95***	0.26	**-0.27**	0.18	--	--
MATCH	**0.00**	0.24	**0.00**	0.23	**-0.01**	0.20	**0.10**	0.32
COMPSTK	**70.67***	12.72	**67.16***	12.68	**48.99***	10.74	**48.34***	18.10
DB	**-6.31**	15.35	**-6.06**	15.21	**-4.93**	11.83	**3.36**	16.50
WEB	**1.17**	0.71	**1.39**	0.71	**0.79**	0.51	**1.04**	0.82
NEMPLOY	**-10.28***	4.79	**-9.25***	4.73	**-8.83***	3.86	**-14.93***	5.22
Intercept	**1036.95**	284.44	**664.25**	290.06	**750.53**	173.14	**793.19**	262.33
# Individuals & plans	572157	641	572157	641	572157	641	38029	547
R^2	0.075		0.060		0.059		0.055	

Table III. The Conditional 1/n Rule: Prevalence of equal allocation among all *chosen* funds by 2001 new participants who chose ten funds or fewer

The Herfindahl index $H_i = \sum_{j=1}^{n_i} s_{i,j}^2$ measures adherence to the conditional 1/n rule; the

variables are as follows: $s_{i,j}$ is the share of individual i's contribution in fund j out of his total

contribution, and n_i is the total number of funds chosen by individual i. Company stock is excluded.

$\underline{H}$ ($\bar{H}$) represents the lower (upper) bound of the Herfindahl index values classified as conditional

1/n allocation: $\underline{H}(n)$ is $1/n$; and $\bar{H}(n)$ is equal to an index value that would result from a portfolio

in which the total deviation from a strict $1/n$ allocation is 20% of $1/n$ (that is,

$$\bar{H}(n) = \max\left\{ \sum_{j=1}^{n} s_j^2 : \sum_j \left| s_j - \frac{1}{n} \right| \leq \frac{20\%}{n} \right\}).$$ $Freq_1$ is the empirical frequency of individuals falling into

the interval $[\underline{H}, \bar{H})$. $\max_{j \neq 1}\left(Freq_j \right)$ is the frequency of individuals falling into an interval, with equal

length, out of $[\underline{H}, \bar{H})$ that receives most observations. * indicates that the ratio is significantly greater

than one at less than 2.5% significance level using 1,000 nonparametric re-sampling bootstraps. There

are 37,798 new entrants in 2001 who contribute positive amount to non-company-stock funds.

(1) # funds chosen	(2) % of new entrants	(3) $\underline{H}$	(4) $\bar{H}$	(5) $Freq_1$	(6) $Freq_1 / \max_{j \neq 1}\left(Freq_j \right)$
1	38.6%	1	1	--	--
2	17.5%	0.5	0.505	64.0%	12.81*
3	15.6%	0.3333	0.3356	17.9%	1.78*
4	13.2%	0.25	0.2513	37.4%	8.89*
5	7.3%	0.2	0.2008	26.6%	8.19*
6	3.5%	0.1667	0.1672	1.3%	0.25
7	1.8%	0.1429	0.1433	1.0%	0.19
8	1.1%	0.125	0.1253	3.9%	1.14
9	0.6%	0.1111	0.1114	5.1%	1.20
10	0.4%	0.1	0.1002	53.3%	13.50*

Table IV. Sensitivity of Equity Allocation to Equity Exposure: Estimates of

$$\%EQ_{i,j} = \gamma\,\%EQOffered_j + \beta Control_{i,j} + \varepsilon_{i,j}$$

The dependent variable, *%EQ*, is the percentage of current year contribution that goes to equity funds. The key independent variable, *%EQOffered*, is the percentage of equity funds out of all funds offered. Company stock is excluded from both variables. In regressions with controls, the control variables are: (1) individual attributes: savings rate, log compensation, log wealth, gender, age, tenure, registration for web access; (2) plan policies: match rate, availability of company stock, presence of restricted match in company stock, presence of a DB plan, and the number of funds offered; (3) plan average of individual attributes. Estimates are obtained through censored median regression (Powell (1984)) to account for the constraint that *%EQ* falls within [0, 100%]. The standard errors are adjusted for both heteroskedasticity and arbitrary correlation of error disturbances clustered by plan. * indicates that the coefficient is statistically different from zero at 5% level.

	(1)		(2)		(3)		(4)	
	All *NFunds*				*Nfunds* <= 10		*Nfunds* > 10	
	COEF	S.E.	COEF	S.E.	COEF	S.E.	COEF	S.E.
Panel A: Full Sample—Uniform Sensitivity								
%EQOffered	**0.175**	0.274	**0.177***	0.088	**0.292***	0.107	**0.058**	0.09
R-squared	0.000		0.061		0.063		0.068	
Panel B: Full Sample—Sensitivity Varying with Tenure								
%EQOffered	**0.141**	0.154	**0.222***	0.106	**0.184**	0.136	**0.146**	0.099
*TENURE * %EQOffered*	**-0.005**	0.002	**-0.005**	0.008	**0.011**	0.01	**-0.009**	0.008
R-squared	0.000		0.062		0.063		0.068	
Controls?	N		Y		Y		Y	
# Individuals & plans	549,341	638	549,341	638	152,283	297	397,058	341
Panel C: New Entrants								
%EQOffered	**0.004**	0.842	**0.182**	0.201	**0.197**	0.227	**0.204**	0.172
R-squared	0.000		0.065		0.078		0.065	
Controls?	N		Y		Y		Y	
# Individuals & plans	37,558	548	37,558	548	10,198	234	27,360	314

Figure 2(a): The relation between the Number of Funds Chosen vs. Number of Funds Offered
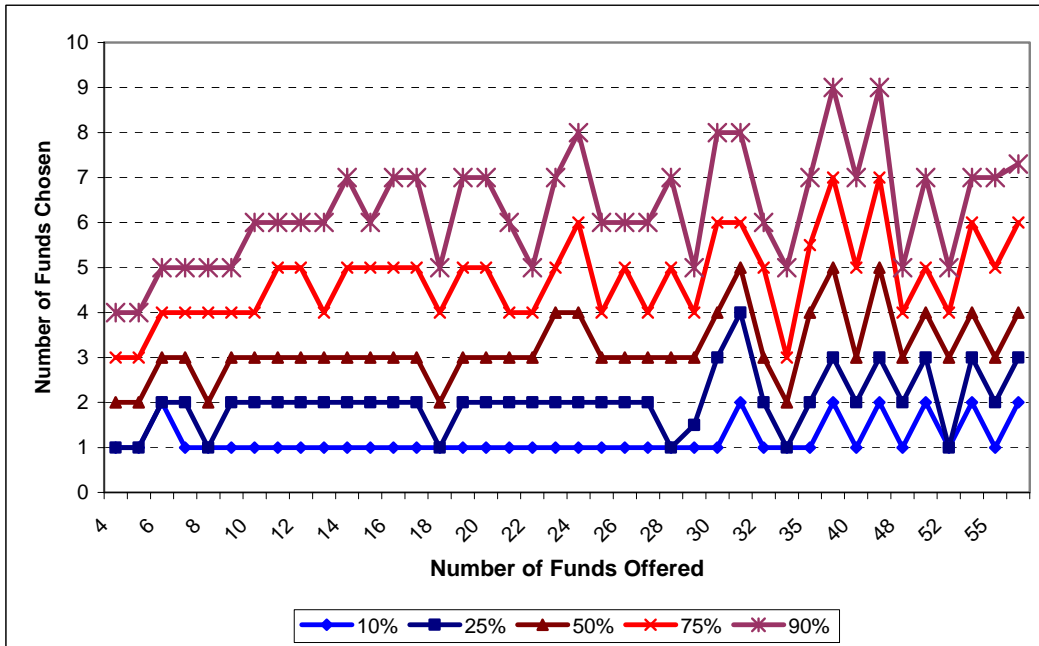
Figure 2(b): The Relation between the Number of Funds Chosen vs. Number of Funds Offered
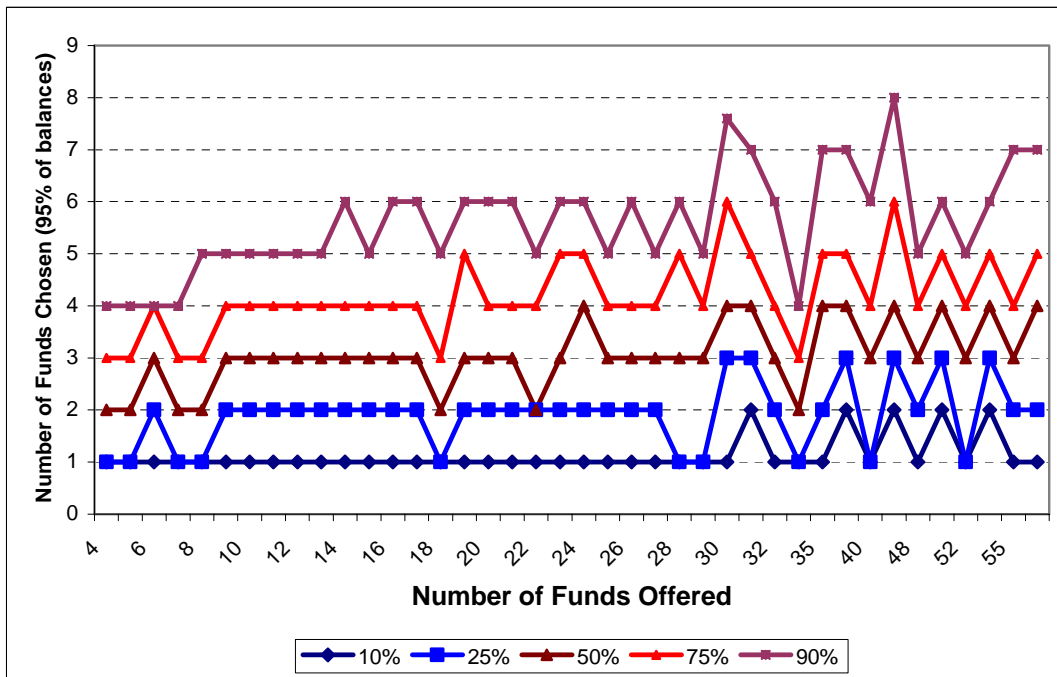
- Interpretation:

  1. Bounded rationality

  2. Persuasion – take advice of company

- Do employees take advice of co-workers?

- What are the effects of taking this advice?

- Duflo and Saez, *The Role of Information and Social Interactions in Retirement Plan Decisions: Evidence From a Randomized Experiment*

  - Target staff in prestigious university (Harvard? MIT?)

  - Randomized Experiment in a university:

* 1/3 of 330 Departments control group

* 2/3 of 330 Departments treatment group:

  · 1/2 not-enrolled staff: letter with $20 reward for attending a fair

  · 1/2 not-enrolled staff: no reward

- Measure of attendance to the fair

- Measure of effect on retirement savings

- Summary of effects:

  – Large effect of subsidy on attendance

- Large peer effects of subsidy on attendance

- People are willing to go along with colleagues

- Small effects of attendance on retirement savings

- Just explaining retirement savings not very effective at getting people to save

- Effect of changing default much larger

- Interesting variation: give opportunity to sign up at fair

TABLE I
DESCRIPTIVE STATISTICS, BY GROUPS

	Treated departments			Untreated departments (group $D = 0$)
	All (group $D = 1$)	Treated (group $D = 1$, $L = 1$)	Untreated (group $D = 1$, $L = 0$)	
	(1)	(2)	(3)	(4)
PANEL A: BACKGROUND CHARACTERISTICS				
TDA participation before	0.010	0.009	0.011	0.012
the fair (Sept. 2000)	(.0015)	(.0021)	(.0022)	(.0024)
Observations	4168	2039	2129	2043
Sex (fraction male)	0.398	0.400	0.396	0.418
	(.0076)	(.0109)	(.0107)	(.011)
Years of service	5.898	5.864	5.930	6.008
	(.114)	(.161)	(.16)	(.157)
Annual salary	38,547	38,807	38,297	38,213
	(304)	(438)	(422)	(416)
Age	38.3	38.4	38.2	38.7
	(.17)	(.24)	(.24)	(.24)
Observations	4126	2020	2106	2018
PANEL B: FAIR ATTENDANCE (REGISTRATION DATA)				
Fair attendance rate among	0.214	0.280	0.151	0.049
non-TDA enrollees	(.0064)	(.01)	(.0078)	(.0048)
Observations	4126	2020	2106	2018
Fair attendance rate for all	0.192			0.063
staff employees	(.0132)			(.0103)
Observations	6687			3311
PANEL C: TDA PARTICIPATION (ADMINISTRATIVE DATA)				
TDA participation rate after	0.049	0.045	0.053	0.040
4.5 months	(.0035)	(.0049)	(.0051)	(.0045)
Observations	3726	1832	1894	1861
TDA participation rate after	0.088	0.089	0.088	0.075
11 months	(.005)	(.0071)	(.007)	(.0065)
Observations	3246	1608	1638	1633

a. Standard errors are in parentheses.
b. The first part of Panel B includes all individuals not enrolled in the TDA by September 2000. The second part includes all employees (enrolled or not in the TDA).
c. The average fair participation in the nontreated departments was obtained from the registration information collected at the fair. Since only 75 percent of the participants registered, the participation was adjusted by a proportionality factor.
d. Demographic information and TDA participation are all obtained from administrative data.

In Panel B we can see that our inducement strategy had a dramatic effect on the probability of attending the fair: in treated departments, as many as 21.4 percent of individuals attended the

<div align="center">

TABLE II
REDUCED-FORM ESTIMATES (OLS)

</div>

	Dependent variable		
	Fair attendance (1)	TDA enrollment after	
		4.5 months (2)	11 months (3)
PANEL A: Average effect of department treatment			
Treated	0.166	0.0093	0.0125
Department dummy D	(.013)	(.0043)	(.0065)
Observations	6144	5587	4879
PANEL B: Effect of letter and department treatment			
Letter dummy L	0.129	−0.0066	0.0005
	(.0226)	(.0061)	(.0102)
Treated	0.102	0.0125	0.0123
Department dummy D	(.0139)	(.0054)	(.0086)
Observations	6144	5587	4879

a. Dependent variables are individual fair participation (column (1)), TDA enrollment 4.5 months and 11 months after the fair (columns (2) and (3)).

b. Independent variable in Panel A is the department treatment dummy D.

c. Independent variables in Panel B are the individual letter dummy L and the department treatment dummy D.

d. All regressions control for the triplet of the department, gender, year of service, age, and salary.

e. Standard errors (in parentheses) are corrected for clustering at the department level.

$$(2) \qquad y_{ij} = \alpha_2 + \beta_2 D_j + \eta_{ij}.$$

The estimates for β_1 and β_2 are reported on Panel A of Table II for fair attendance, (column (1)), and TDA enrollment after 4.5 months (column (2)) and 11 months (column (3)). These estimates correspond to the difference in fair attendance and TDA enrollment between treated and untreated departments reported in columns (1) and (4) of Table I, respectively. The regressions also include fixed effects for the stratification triplet (see Section III), as well as controls for background variables—gender, year of service, age, and salary. All standard errors are corrected standard errors for clustering at the department level.[14] Being in a treated department increases the probability of attending the fair by 16.6 percentage points. It also increases significantly the TDA

14. Adding the triplet dummies reduces the standard errors, by absorbing some unexplained differences across departments of similar size and prefair TDA enrollment rates. Baseline covariates are also included to improve the precision of our estimates.

3 Overconfidence: Introduction

- So far (mostly) technological deviations from standard model:

$$\max \sum_{i=1}^{N} p_i U\left(x|s_i, r\right)$$

  where $p_i = P\left(s_i\right)$ and r indexes the technological deviation:

  - self-control

  - reference dependence

  - social pressure

  - imperfect knowledge $->$ social learning

- What is importance of wrong expectations?

$$\max \sum_{i=1}^{N} \tilde{p}_i U\left(x|s_i\right)$$

  where $\tilde{p}$ is the subjective distribution of states S_i for agent.

- Distribution for agent may differ from actual distribution: $\tilde{p} \neq p$.

- Last semester: quasi-Bayesian updating

- Today: (static) focus on overestimation of good outcomes

- Examples:

  - Overestimate self-control (β and $\hat{\beta}$)

  - Underestimate response to social pressure

  - Overstimate ability to run company

  - Overestimate private information

4 Overconfidence: Trading

- Odean (1999)

- Dataset from discount brokerage house

- Follow all trades of 10,000 accounts

- January 1987-December 1993

- 162,948 transactions

- Traders that overestimate value of their signal trade too much

- Substantial cost for trading too much:

  - Commission for buying 2.2 percent

  - Commission for selling 2.76 percent

  - Bid-ask spread 0.94 percent

  - Cost for 'round-trip purchase': 5.9 percent (!)

- Stock return on purchases there most be at least 5.9 percent.

- Evidence: Sales outperform purchases by 2-3 percent!

- Results robust to excluding trades for liquidity reasons

- Huge cost to trading for individuals:

  - Transaction costs

  - Pick wrong stocks

5 Overconfidence: Mergers

- Malmendier and Tate (2003)

What Causes Mergers and Acquisitions?

Standard Stories

1. "Synergies"
2. Market Power (1920s)
3. Diversification (1960s)
4. Market Discipline (1980s)
5. Deregulation (1990s)

Efficiency-Driven

Alternatives: Departures from Rationality

Biased Market

Stock Price Bubbles
(Shleifer and Vishny 2001)

Biased Managers

The Hubris Hypothesis
(Roll 1986)

Many managements apparently were overexposed in impressionable childhood years to the story in which the imprisoned handsome prince is released from a toad's body by a kiss from a beautiful princess. Consequently, they are certain their managerial kiss will do wonders for the profitability of Company T[arget]…

We've observed many kisses but very few miracles. Nevertheless, many managerial princesses remain serenely confident about the future potency of their kisses—even after their corporate backyards are knee-deep in unresponsive toads.

-Warren Buffet
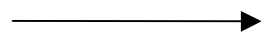(Berkshire Hathaway Inc. Annual Report, 1981)

Overconfidence

Overconfident CEOs overestimate their ability to generate returns
- In their own company
- In other companies

Implication for Mergers

Overvalue future returns of combined company $\longrightarrow$ Too eager to merge

Overvalue future returns of current company $\longrightarrow$ Reluctant to issue equity
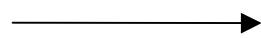
Evidence from Psychology on Overconfidence

1. "Better-than-average effect"
   - Abilities and Skills (IQ, driving skills)
   - Personal Situation (no severe illness, no divorce)

   } permanent,
   first moment

2. Overconfidence when
   - Noisy or Infrequent Feedback
   - (Illusion of) Control
   - Commitment

3. Other aspects of overconfidence
   (NOT in this paper)
   - overconfidence in precision (calibration)
   - time-variation

   } transitory,
   second moment

Evidence from Economics & Finance

- ## Overconfidence about abilities and self-control
  (Camerer-Lovallo 1999; O'Donoghue and Rabin 1999)

- ## Overconfidence of corporate decision-makers
  - Takeovers (Roll 1986)

  - Corporate Investment (Malmendier and Tate 2002)

  - Risk-tolerance (Goel and Thakor 2000)

Evidence from "the real world:" The AT&T Case
Takeover of NCR in 1990/91

- Red Flags of analysts

  – *Every* merger between telecommunication/computer technology firms had failed (e.g. IBM and Rolm; Burroughs Inc. and Sperry Univac).

  – *"No one I know can think of a single example of where a large high-technology merger has been really successful. And it's hard to see how AT&T's play for NCR would be any different."* (L.A. Times, 12/30/91)

- Target (NCR) Chairman Charles Exley: *"History has shown that such takeovers turn out to be calamities!"*

- Acquiring (AT&T) CEO Robert Allen: *"It's going to be tough not to repeat history. But the NCR deal offers AT&T unique opportunities …"*

→ Acquisition of NCR in 1991.

→ By 1996, AT&T lost $7 billion on its investment in NCR.

→ Spin-off of NCR in 1996.

Empirical Predictions

Rational CEO	Overconfident CEO
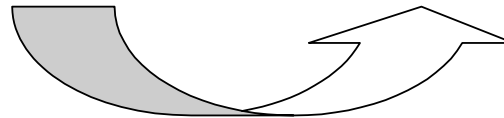
1. On average?
2. Overconfident CEOs do more mergers that are likely to destroy value
3. Overconfident CEOs do more mergers when they have abundant internal resources
4. The announcement effect after overconfident CEOs make bids is lower than for rational CEOs

Data

Data on private accounts

1. Hall-Liebman (1998)
   Yermack (1995)

Key: Panel data on stock and option holdings of CEOs of Forbes 500 companies 1980-1994

2. Personal information about these CEOs from
   - Dun & Bradstreet
   - Who's who in finance

Data on corporate accounts

1. CRSP/COMPUSTAT

   Cash flow, Q, stock price…

2. CRSP/SDC-merger databases

   Acquisitions

Overconfidence

On private accounts

- Hold on to options.

Idea: Rational CEO who is
- underdiversified
- risk averse

should
- exercise options early.

On corporate accounts

- Higher probability of acquiring another company, particularly when:
  - Merger has low expected value
  - Manager has lots of cash and untapped debt capacity

Primary Measure of Overconfidence

"Longholder"

(Malmendier and Tate 2003)

CEO holds an option until the year of expiration.

CEO displays this behavior at least once during sample period.

→ minimizes impact of CEO wealth, risk aversion, diversification

Robustness Checks:

1. Require option to be at least x% in the money at the beginning of final year

2. Require CEO to *always* hold options to expiration

3. Compare "late exercisers" to "early exercisers"

Empirical Specification

$$\Pr\{Y_{it} = 1 \mid X, O_{it}\} = G(\beta_1 + \beta_2 \cdot O_{it} + X'\gamma)$$

with
- i company
- t year
- Y acquisition (yes or no)

- O overconfidence
- X controls

☐ H_0: $\beta_2 = 0$ (overconfidence does not matter)
☐ H_1: $\beta_2 > 0$ (overconfidence does matter)

Identification Strategy

	Logit & Random Effects Logit	Fixed Effects Logit

Case 1:

David C. Farrell (May Department Stores)
- CEO for all 14 years of sample
- Longholder

```
    M                         MH    M        M        M
 <--|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-->
  1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994
```
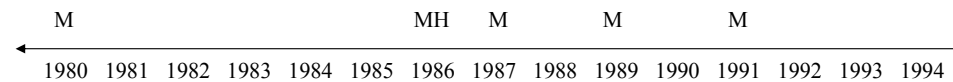
	Yes	No

J Willard Marriott (Marriott International)
- CEO for all 15 years of sample
- Not a Longholder

```
 <--|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-->
  1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994
```
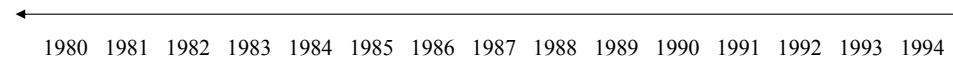
Case 2:

Colgate Palmolive
- Keith Crane CEO from 1980-1983 (Not a Longholder)
- Reuben Mark CEO from 1984-1994 (Longholder)
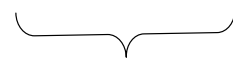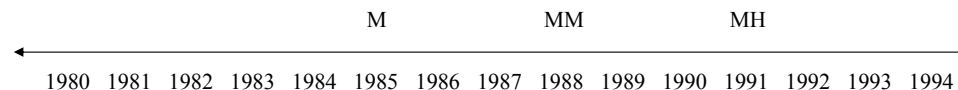
```
                          M        MM        MH
 <--|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-->
  1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994
       _____/ _____/
            Keith Crane                      Reuben Mark
```

	Yes	Yes

Table 4. Do Overconfident CEOs Complete More Mergers?

Longholder = holds options until last year before expiration (at least once)
Distribution: Logistic. Constant included.
Dependent Variable: Acquistion (yes or no); **Normalization:** Capital.

	logit with controls	random effects logit	logit with fixed effects
Size	0.8733	0.8600	0.6234
	(1.95)*	(2.05)**	(2.60)***
Q_{t-1}	0.7296	0.7316	0.8291
	(2.97)***	(2.70)***	(1.11)
Cash Flow	2.0534	2.1816	2.6724
	(3.93)***	(3.68)***	(2.70)***
Ownership	1.2905	1.3482	0.8208
	(0.30)	(0.28)	(0.11)
Vested Options	1.5059	0.9217	0.2802
	(1.96)*	(0.19)	(2.36)**
Governance	0.6556	0.7192	1.0428
	(3.08)***	(2.17)**	(0.21)
Longholder	1.5557	1.7006	2.5303
	(2.58)***	(3.09)***	(2.67)***
Year Fixed Effects	yes	yes	yes
Observations	3690	3690	2192
Firms	327	327	184

Alternative Explanations

1. Inside Information or Signalling
   - Mergers should "cluster" in final years of option term
   - CEOs should "win" by holding
   - Market should react favorably on merger announcement

2. Stock Price Bubbles
   - Year effects already removed
   - All cross-sectional firm variation already removed
   - Lagged stock returns should explain merger activity

Empirical Predictions
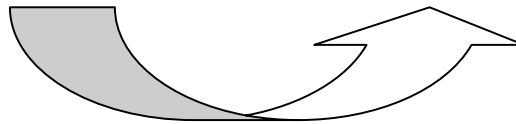
Rational CEO	Overconfident CEO

On average?

1. Overconfident CEOs do more mergers that are likely to destroy value

2. Overconfident CEOs do more mergers when they have abundant internal resources

3. The announcement effect after overconfident CEOs make bids is lower than for rational CEOs

Table 9. Diversifying Mergers

Longholder = holds options until last year before expiration (at least once)

Distribution: Logistic. Constant included; **Normalization:** Capital.

Dependent Variable: Diversifying merger (yes or no).

	logit	logit with random effects	logit with fixed effects
Longholder	**1.6008**	**1.7763**	**3.1494**
	(2.40)**	(2.70)***	(2.59)***
Year Fixed Effects	yes	yes	yes
Observations	3690	3690	1577
Firms	327	327	128

Dependent Variable: Intra-industry merger (yes or no).

	logit	logit with random effects	logit with fixed effects
Longholder	**1.3762**	**1.4498**	**1.5067**
	(1.36)	(1.47)	(0.75)
Year Fixed Effects	yes	yes	yes
Observations	3690	3690	1227
Firms	327	327	100

Regressions include Cash Flow, Q_{t-1}, Size, Ownership, Vested Options, and Governance. Industries are Fama French industry groups.

Empirical Predictions

Rational CEO	Overconfident CEO

On average?

1. Overconfident CEOs do more mergers that are likely to destroy value

2. **Overconfident CEOs do more mergers when they have abundant internal resources**

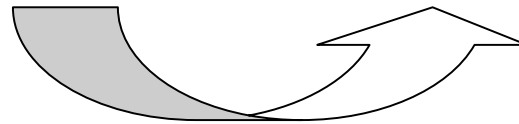3. The announcement effect after overconfident CEOs make bids is lower than for rational CEOs

Table 10. Kaplan-Zingales Quintiles

Longholder = holds options until last year before expiration (at least once)
Distribution: Logistic. Constant included.
Dependent Variable: Acquistion (yes or no); **Normalization:** Capital.
All regressions are logit with random effects.

	Least Equity Dependent		---------------------------------->		Most Equity Dependent
			All Mergers		
	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5
Longholder	**2.2861**	**1.6792**	**1.7756**	**1.9533**	**0.8858**
	(2.46)**	(1.48)	(1.54)	(1.50)	(0.33)
Year Fixed Effects	yes	yes	yes	yes	yes
Observations	718	719	719	719	718
Firms	125	156	168	165	152
			Diversifying Mergers		
	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5
Longholder	**2.5462**	**1.8852**	**1.7297**	**1.0075**	**1.0865**
	(1.89)*	(1.51)	(1.36)	(0.01)	(0.18)
Year Fixed Effects	yes	yes	yes	yes	yes
Observations	718	719	719	719	718
Firms	125	156	168	165	152

Regressions include Cash Flow, Q_{t-1}, Size, Ownership, Vested Options, and Governance.

Table 11. Do Overconfident CEOs Use More Cash?

Longholder = holds options until last year before expiration (at least once) **Distribution:** Logistic. Constant included. **Dependent Variable:** Acquistion (yes or no); **Normalization:** Capital.				
	logit (1)	logit (2)	logit (3)	logit (4)
Undervalued (UV)	**1.1016** (0.39)	**0.6976** (1.31)	**0.7037** (1.17)	**1.0911** (0.25)
Q_{t-1}		**0.5218** (3.61)***	**0.5201** (3.22)***	**0.5025** (3.38)***
Stock Ownership			**1.7834** (0.35)	**1.1349** (0.06)
Vested Options			**0.7112** (0.84)	**0.5941** (1.27)
Merger Size			**1.0011** (1.24)	**1.0012** (0.95)
Longholder	**0.7653** (1.14)	**0.782** (1.09)	**0.6909** (1.52)	**0.6456** (1.70)*
UV * Longholder	**4.2664** (2.71)***	**4.2177** (2.72)***	**3.9958** (2.57)**	**2.4728** (1.61)
Year Fixed Effects	no	no	no	yes
Observations	441	441	394	394

Do Outsiders Recognize CEO Overconfidence?

Portrayal in Business Press:

1. Articles in
   - New York Times
   - Business Week
   - Financial Times
   - The Economist
   - Wall Street Journal
2. Articles published 1980-1994
3. Articles which characterize CEO as
   - Confident or Optimistic
   - Not confident or not optimistic
   - Reliable or Conservative or Cautious or Practical or Steady or Frugal

Measuring Press Portrayal

$$
\text{TOTALconfident} =
\begin{cases}
1 & \text{if } [\text{"confident" + "optimistic"}] > [\text{"not confident" + "not optimistic + "reliable, conservative, cautious, practical, steady, frugal"}] \\
\\
0 & \text{otherwise}
\end{cases}
$$

Independent of the effects of coverage frequency

Market Perception versus CEO beliefs

- TOTALconfident positively and statistically significantly correlated with Longholder
  - Farrell and Mark are TOTALconfident
  - Marriott and Crane are *not* TOTALconfident
- TOTALconfident CEOs (like Longholders) are more acquisitive on average
  - Especially through diversifying mergers
  - Especially when they are financially unconstrained
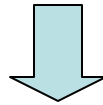
- Outsiders recognize CEO overconfidence
- Overconfidence – identified by CEO *or* market beliefs
 - leads to heightened acquisitiveness

Table 13. Press Coverage and Diversifying Mergers

Distribution: Logistic. Constant included; **Normalization:** Capital.
Dependent Variable: Diversifying merger (yes or no).

	logit	logit with random effects	logit with fixed effects
TOTALconfident	**1.6971**	**1.7826**	**1.5077**
	(2.95)***	(3.21)***	(1.48)
Year Fixed Effects	yes	yes	yes
Observations	3690	3690	1577
Firms	326	326	128

Dependent Variable: Intra-industry merger (yes or no).

TOTALconfident	**1.0424**	**1.0368**	**0.8856**
	(0.20)	(0.16)	(0.31)
Year Fixed Effects	yes	yes	yes
Observations	3690	3690	1227
Firms	326	326	100

Regressions include Total Coverage, Cash Flow, Q_{t-1}, Size, Ownership, Vested Options, and Governance. Industries are Fama French industry groups.

Empirical Predictions

Rational CEO	Overconfident CEO
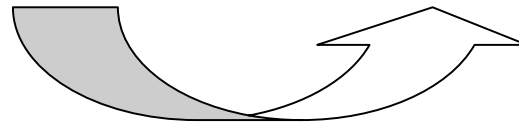
On average?

1. Overconfident CEOs do more mergers that are likely to destroy value

2. Overconfident CEOs do more mergers when they have abundant internal resources

3. The announcement effect after overconfident CEOs make bids is lower than for rational CEOs

Market Reaction

Does the stock price react differently following the announcement of a takeover bid by a CEO who excessively holds options?

Yes. The stock price drop following a takeover announcement from an overconfident CEO is 150% larger than for other CEOs

Table 14. Market Response

	OLS	OLS	OLS
Longholder = holds options until last year before expiration (at least once) **Dependent Variable:** Cumulative abnormal returns [-1,+1]			
	(1)	(2)	(3)
Relatedness	**0.0057**	**0.0050**	**0.0053**
	(1.67)*	(1.30)	(1.56)
Corporate Governance	**0.0079**	**0.0036**	**0.0073**
	(2.18)**	(0.64)	(1.98)**
Cash Financing	**0.014**	**0.0127**	**0.0145**
	(3.91)***	(2.60)***	(3.99)***
Age			**-0.0005**
			(1.46)
Boss			**0.0001**
			(0.04)
Longholder	**-0.0067**	**-0.0099**	**-0.0079**
	(1.81)*	(2.33)**	(2.00)**
Year Fixed Effects	yes	yes	yes
Industry Fixed Effects	no	yes	no
Industry*Year Fixed Effects	no	yes	no
Observations	673	673	673
R-squared	0.06	0.14	0.09
Regressions include Ownership and Vested Options.			

Conclusions

- Overconfident managers are more acquisitive.

- Much of this acquisitiveness is in the form of diversifying mergers.

- Overconfidence has largest impact if CEO has abundant internal resources.

- The market reacts more negatively to the mergers of overconfident CEOs

6 Summary of Evidence

- Update type of evidence encountered so far

1. Empirical evidence of type 1 (Benartzi and Thaler, 2004; Choi et al.:, 2001; Huberman and Regev, 2001; Madrian and Shea, 1999; Wolfers and Zitzewtiz, 2003):

   - **Time Series** (or **Event Study**) evidence

   - At time t, change in regime

   - Simple difference: Look at (After t - Before t)

   - Worries:

   (a) Endogeneity of change

   (b) Other changes occurring at same time

   (c) How many observations? Maybe $n = 1$?

2. Empirical evidence of type 2 (DellaVigna and Malmendier, 2004; Miravete, 2004; Odean, 1999; Sydnor, 2004; Souleles, 2004):

- **Contract choice** evidence

- Need to observe:

  (a) menu of options

  (b) later utilization

- Use revealed preferences to make inferences from contract choice in (a)

- Compare to actual utilization in (b)

- Worries: hard to distinguish unusual preferences (self-control) and wrong beliefs (naiveté, overconfidence)

3. Empirical evidence of type 3 (Ariely and Wertenbroch, 2002; Ausubel, 2004; Benartzi and Thaler, 2004; Duflo and Saez, 2003; Falk and Ichino, 2004; Fehr and Goette, 2004; Ho and Imai, 2004; Hossain and Morgan, 2003; List's work):

- **Field or natural experiment** evidence

  (a) Naturalistic setting

  (b) Randomize tratment

- Observe effect of treatment

- Plus: Randomization ensures clean identification

- Minus: Not easy to run

- Great if you can find natural experiment (Ausubel and Ho and Imai)

4. Empirical evidence of type 4 (Bertrand and Mullainathan, 2003; George and Waldfogel, 2002; DellaVigna and Kaplan, 2004):

- **Difference-in-Difference** evidence

  (a) Naturalistic setting

  (b) Compare effect of change in treated and untreated group

- Refined version of Empirical Evidence 1

- Minus: Worry whether control group is a good control

- Minus: Worry about endogeneity of change

5. Empirical evidence of type 5 (Barber and Odean, 2004; Camerer et al., 2001; DeGeorge et al., 1999; Farber, 2004; Genesove and Mayer, 2003; Malmendier and Tate, 2004; Odean, 1998):

- **Observational study**

  (a) Observe correlation between variables

  (b) (Estimate parameters)

  (c) Test prediction based on theory

- Most commonly available evidence

- Structural estimation?

- Minus: Hard to infer causality

- Minus: Hard unless theory makes sign prediction on correlation

7   Some advice

- How to complete a dissertation and be (approximately) happy

  1. Know yourself, and put yourself to work

     - Do you procrastinate?

     - Are you afraid of undirected research?

     - Not enough intuition?

     - Not enough technicality?

     - Work in team with a classmate!

2. Economics is about techniques, and about ideas.

   – Are second-price, affiliated combinatorial auctions not your bread?

   – Do you find it hard to derive asymptotic distribution of MSM estimators?

   – You are not alone!

   – But... anyone can have ideas (Levitt)

   – Start from new idea, not from previous papers

3. But...

   – No excuse not to know the techniques.

   – It will be much easier to learn and use them once you have an interesting problem at hand

4. What are good ideas?

   – 1% of GDP (Glaeser)

   – new questions (better) or unknown answers

   – questions you care about (comparative advantage!)

   – socially important topics, if you can

5. Look for occasions to learn:

   – Attend seminars

   – Attend job market talks

   – Do not read too much literature

   – Discuss ideas with peers, over lunch, with yourself

- Get started on some data set

- Be curious!

6. Above all, do not get discouraged!

- Unproductive periods are a fact of life

- Ideas keep getting better (and economics becomes more fun) with exercise

- Work hard

- Keep up the exercise!