SURVEY METHODS IN MACROECONOMICS

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Problems that economists have often talked about in theoretical works but never approached empirically for want of data are now investigated with consumer surveys.

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Contributions of Survey Methods to Economics (1954)

Surveys in Economics

- Surveys with objective, behavioral data standard

  - employment, income, wages, prices, wealth, etc.

  - official surveys, SRC surveys

  - widely used in econometric studies

- Subjective surveys meet great skepticism in economics

  - preferences, attitudes, opinions, expectations, etc.

Skepticism about survey subjective responses

- Revealed preference, not reported preference

- Inability to elicit accurate survey responses

- No incentive to give correct responses on surveys

- Preferred evidence in economics

  - data on market transactions
  - lab experiments
  - field experiments

"A final question. Would you put your money where your mouth is?"

Outline of Lecture: Identifying Parameters with Surveys

I. Surveys about preferences

II. Surveys about policy responses

III. Surveys about expectations

IV. Directions for future work

I. Surveys to Infer Preference Parameters

Survey-based Gedanken Experiments

- Hypothetical responses to economic choices

- Survey questions structured using economic theory

- Responses allow identification of individual-specific preference parameters

- Parameters difficult or prohibitively costly to identify experimentally or based on behavioral data

Domains for preference parameter questions

1. Labor supply

2. Intertemporal choices about consumption

3. Risk tolerance

1. Labor supply

How responsive are hours worked to wage and wealth changes?

Labor supply survey question

- Addresses nearly intractable identification problem with variation in labor in response to changes in wages:

  --Higher wages increase labor (substitution effect)
  --Higher wages decrease labor (wealth effect)

- Survey response gives wealth effect

- Use theory to back out substitution effect

Labor supply survey question

Suppose you won a sweepstakes that will pay you an amount equal to your current family income every year for as long as you live. We'd like to know what effect the sweepstakes money would have on your life. Would you

Quit work entirely?

If not, would you work fewer hours?

If work fewer hours, how many fewer hours?

Would you quit your job if you won the sweepstakes?

"If I won forty-seven million dollars in the lottery, I wouldn't change a thing. Not at first."

Labor Supply Responses to Winning the Sweepstakes
(Percent of Responses)

Change in labor	Total
No change	**21.3**
Reduce hours	**22.5**
By	
≤ 10%	0.4
10-25%	5.3
26-49%	9.3
50%	6.1
> 50%	1.4
Quit	**56.3**

Source: Kimball and Shapiro (2005).
Data from *Health and Retirement Study* experimental module.

Implications

- Labor supply responsive: >75% quit or reduce hours
  (Similar to actual lottery winners)

- Implies high labor supply elasticity
  (Frisch elasticity about 1)

- Econometric evidence (from wage changes) yields much
  lower elasticities

High elasticity means large response of labor to tax changes,
productivity shocks, etc.

2. Intertemporal choices about consumption

Hypothetical choice:
Consume more now versus consume more in retirement

Survey design:

- Change interest rate (higher interest rates reward saving)

- Ask respondents to make choices of consumption paths with different interest rates

- Mode is graphical: Paper or Internet

Economic theory of intertemporal choice

$$consumption\ growth = s(r - \rho)$$

s = elasticity of intertemporal substitution

r = interest rate

ρ = discount rate (impatience)

Identification problem again

Substitution effect positive:

    Save more/borrow less when interest rates increase

Wealth effect ambiguous:

    Savers consumer more when interest rates increase

    Borrowers consume less

Intertemporal choice question: Setup

- Lifetime income of $3,000 per month

- Save or borrow to consume more or less in retirement

- Health costs fully insured; no inflation

- Vary interest rate to change (implicitly) return to saving

- Choices shown graphically

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Recall that you can afford *any* of the spending patterns shown in Chart 1 below. Which pattern of spending do you like most among A, B, C, D and E in Chart 1?

Please click first in the white box of your first choice pattern and then in the box of your second choice pattern or use the 'choose' buttons.

Choose	Choose	Choose	Choose	Choose

Chart legend: Age 50-65 (blue), Age 65-80 (yellow)

Bar values:
- A: 3500 (blue), 2500 (yellow)
- B: 3000 (blue), 3000 (yellow)
- C: 2500 (blue), 3500 (yellow)
- D: 2000 (blue), 4000 (yellow)
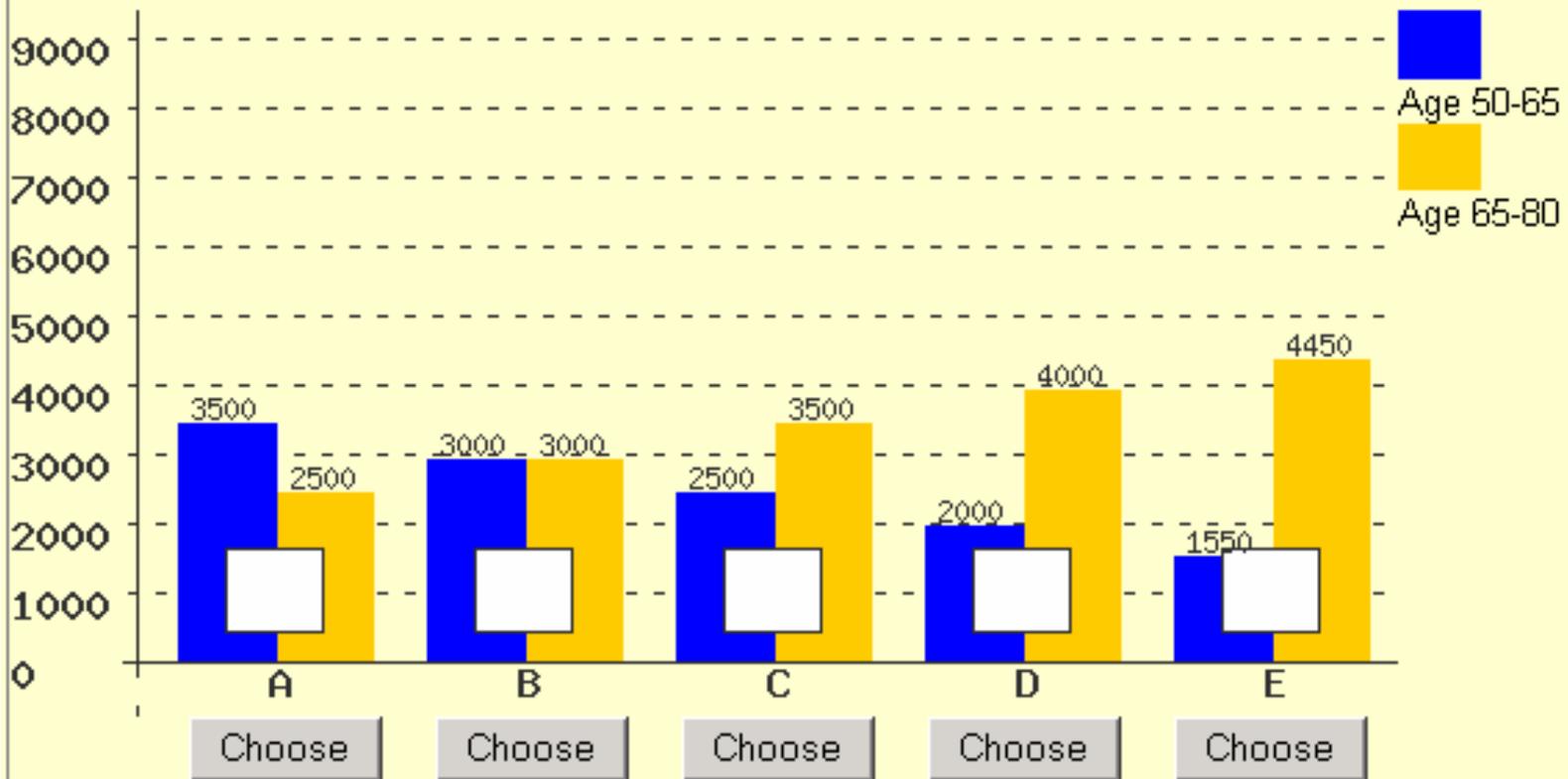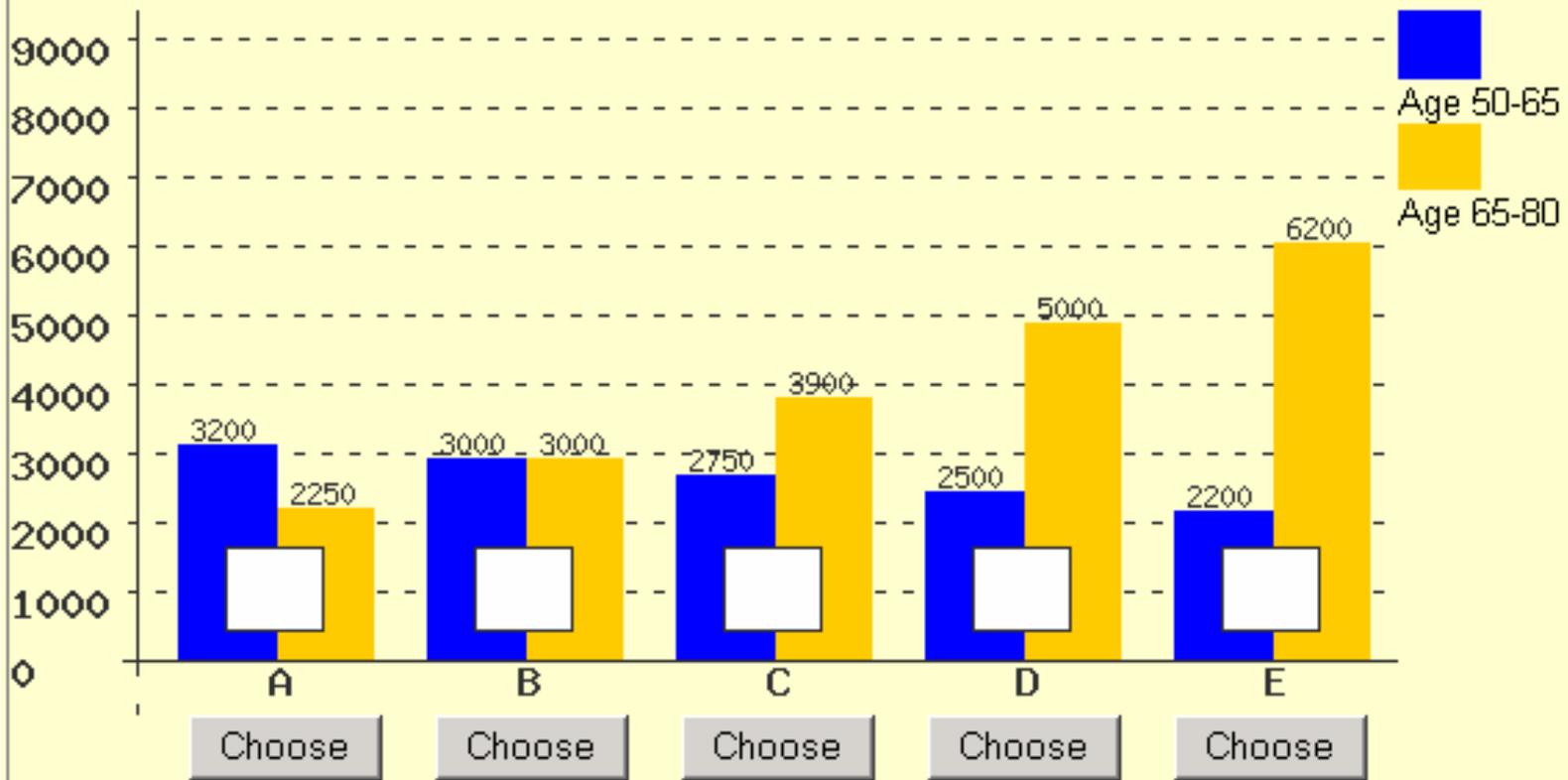- E: 1550 (blue), 4450 (yellow)

MLSA

Chart 3

Which pattern of spending do you like most among A, B, C, D and E in Chart 3 below?
**Please click first in the white box of your first choice pattern and then in the box of
your second choice pattern or use the 'choose' buttons.**

Legend:
- Age 50-65 (blue)
- Age 65-80 (yellow)

Pattern	Age 50-65	Age 65-80
A	3200	2250
B	3000	3000
C	2750	3900
D	2500	5000
E	2200	6200

Choose · Choose · Choose · Choose · Choose

Result 1: Negative discount rate (positive patience)

Individuals prefer either flat or upward sloped consumption profiles

Result 2: Low response to changes in interest rate ($s \approx 0.2$)

Individuals respond little to even large increases in interest rates

Implications

- Consumers resist change in consumption

- Saving not very sensitive to interest rates
  (Near zero elasticity of intertemporal substitution s)

3. Risk tolerance

Key parameter for choices, e.g.,

- Investing in stock
- Taking jobs with risky wages
- Having insurance
- Undertaking risk activities (smoking, immigrating)

Difficult to identify experimentally because relevant gambles are over *lifetime income*

Survey design: gambles over lifetime income

Suppose that you are the only income earner in the family. Your doctor recommends that you move because of allergies, and you have to choose between two possible jobs.

- The first would guarantee your current total family income for life.
- The second is possibly better paying, but the income is also less certain. There is a 50-50 chance the second job would double your total lifetime income and a 50-50 chance that it would cut it by a third.

Which job would you take—the first job or the second job?

Risky Job Question (continued)

If reject risky job, ask if would accept a downside risk of a cut in income by 1/5.

If accept risky job, ask if would accept a downside risk of 1/2.

Risky Job Question

- Developed by Barsky, Juster, Kimball, and Shapiro (1997)

- First implemented in the *Health and Retirement Study*

- Now also on *Panel Study of Income Dynamics, NLSY,* and other surveys (including internationally)

Compare Qualitative Questions about Risk

from *Survey of Consumer Finances*

Which of the statements comes closest to the amount of financial risk that you are willing to take?

1. take substantial financial risks expecting to earn substantial returns
2. take above average financial risks expecting to earn above average returns
3. take average financial risks expecting to earn average returns
4. not willing to take any financial risks

Risk Tolerance Categories Implied by Risky Job Responses

	Downside Risk		Fraction of Responses
Risk Tolerance:	Accept	Reject	
None to low	None	1/5	65%
Low to moderate	1/5	1/3	11%
Moderate to high	1/3	1/2	11%
Very high	1/2	None	13%

Source: *Health and Retirement Study*, multiple waves.
Barsky, Juster, Kimball, and Shapiro (1997); Kimball, Sahm, and Shapiro (2006).

Quantitative Analysis of Survey Responses

- Estimate preference parameters for individuals from an economic model

- Multiple responses allow modeling response errors

- Use preference parameters to explain differences in behavior

Inferring Preference Parameters from Hypothetical Choices

C   = current consumption

π = downside risk (fraction of income)

θ = coefficient of relative risk tolerance [Arrow/Pratt]

$$U(C) = \frac{C^{1-1/\theta}}{1-1/\theta} = \text{utility function}$$

Accept risky job if $\frac{1}{2}U(2C) + \frac{1}{2}U((1-\pi)C) \geq U(C)$

$\longrightarrow$ Choices in survey bound value of relative risk tolerance θ

Distribution of Risk Preferences across Individuals

	Risk Tolerance θ	Risk Aversion $1/\theta$
Mean	0.206	8.2
Std. Dev.	0.172	6.8

Memo: Signal-to-noise ratio = 36%

Source: Kimball, Sahm, Shapiro (2006). [Update of Barsky, et al.]

Application 1: Equity Premium Puzzle

- Excess return of stocks over bonds requires very high risk tolerance, e.g., relative risk aversion = $1/\theta >> 50$

- Survey evidence: $1/\theta \cong 8$

- Enough risk-tolerant survey respondents to leave equity premium a puzzle

Application 2: Stock portfolios across households

α_i = share of assets in stocks

θ_i = individual estimate of risk tolerance from survey

$$\alpha_i = \beta\theta_i + X_i\gamma + \varepsilon_i$$

Application 2: Stock portfolios across households

$$\alpha_i = \text{ share of assets in stocks}$$

$$\theta_i = \text{ individual estimate of risk tolerance from survey}$$

$$\alpha_i = \underset{(0.06)}{0.15}\theta_i + X_i\gamma + \varepsilon_i$$

Source: *Health and Retirement Study* data;
Kimball, Sahm, and Shapiro (2006)

Summary: Use of hypothetical questions to infer preferences

- Identify parameters that are hard to infer from behavioral data

- Provide basis for calibrating aggregate models

- Control for individual heterogeneity

**II.   Survey Measure of Response to Policy**

Ask about response to an actual policy

- Not a hypothetical

- Still heterodox, i.e., ask consumers for a *ceteris paribus* response

The Policy

- Treasury sent checks—typically $600 per household—during the summer of 2001

- Advance payment of part of 2001 income tax cuts

- $600 a substantial fraction of income

- Meant to stimulate the economy—2001 a recession year
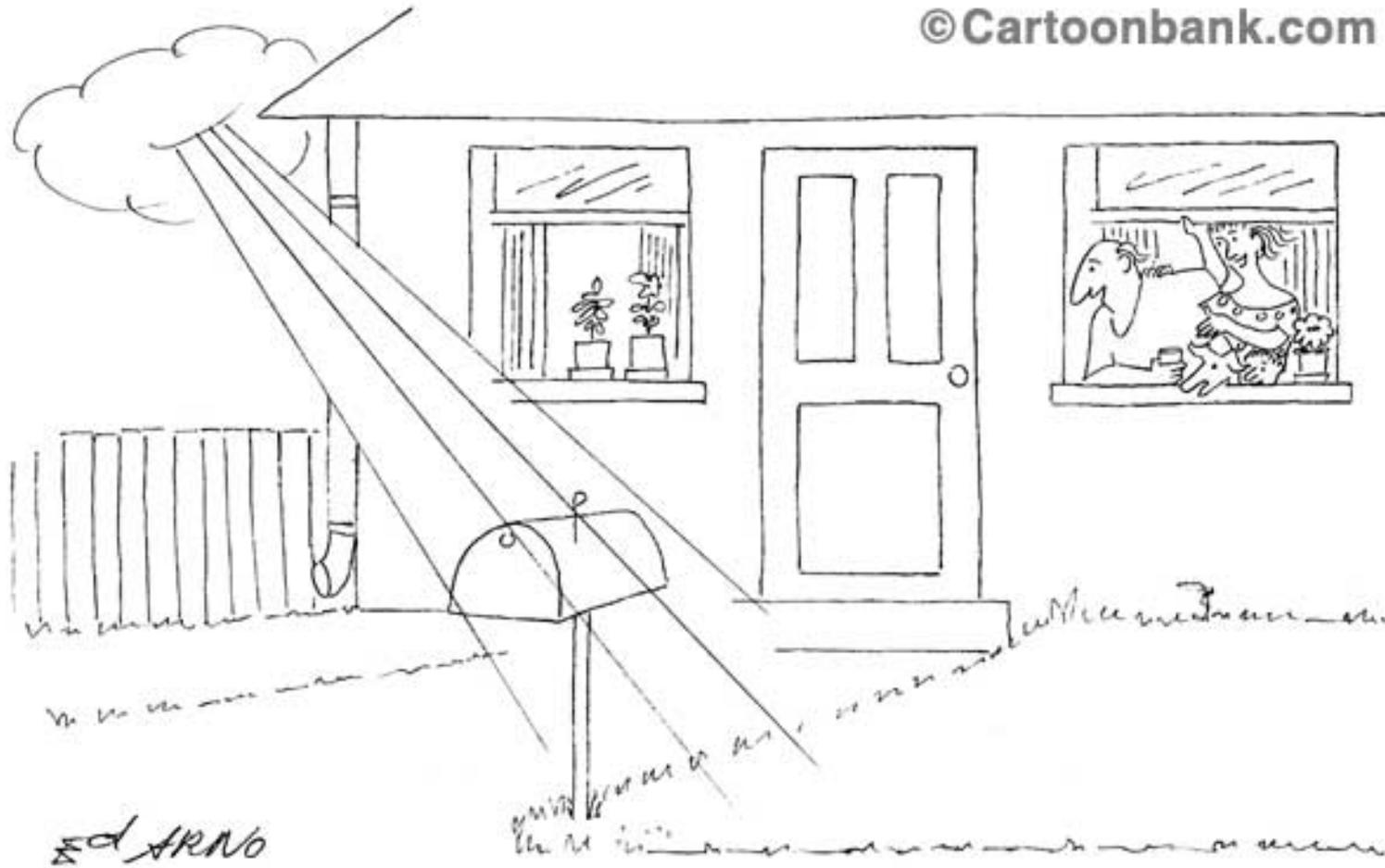
"My guess is our tax rebate has arrived."

Spending question

Earlier this year a Federal law was passed cutting income tax rates and expanding certain credits and deductions. The tax cuts will be phased in over the next ten years. This year many households will receive a tax rebate check in the mail. In most cases, the tax rebate will be $300 for single individuals and $600 for married couples.

Thinking about your (family's) financial situation this year, will the tax rebate lead you mostly to increase spending, mostly to increase saving, or mostly to pay off debt?

Spending Rate: Survey Results

Number of respondents

Total Responses	Spend Rebate	Save Rebate	Pay Debt With Rebate	Will Not Get Rebate	Don't Know/ Refused	Spend Percentage
1506	267	423	563	204	49	21.3%

Survey of Consumers, August-October 2001
Shapiro and Slemrod, *American Economic Review* (2003)

Validation of Survey Evidence

- Follow up survey

- Aggregate saving data

- Household spending data

Consistency of Survey Responses Across Time

|		Number of Respondents Second Wave		
		Mostly Spend	Mostly Not Spend	Total
First Wave	Mostly Spend	**47**	29	75
	Mostly Not Spend	41	**183**	225
	Total	88	212	300

Survey of Consumers, First wave (Aug-Oct 2001), Second wave (Mar-Apr 2002)
Shapiro and Slemrod, *Tax Policy and the Economy* (2003b)

Consistency of Survey Responses with Aggregate Data

Personal Saving Rate

Lightly shaded area is portion of saving accounted for by tax changes.
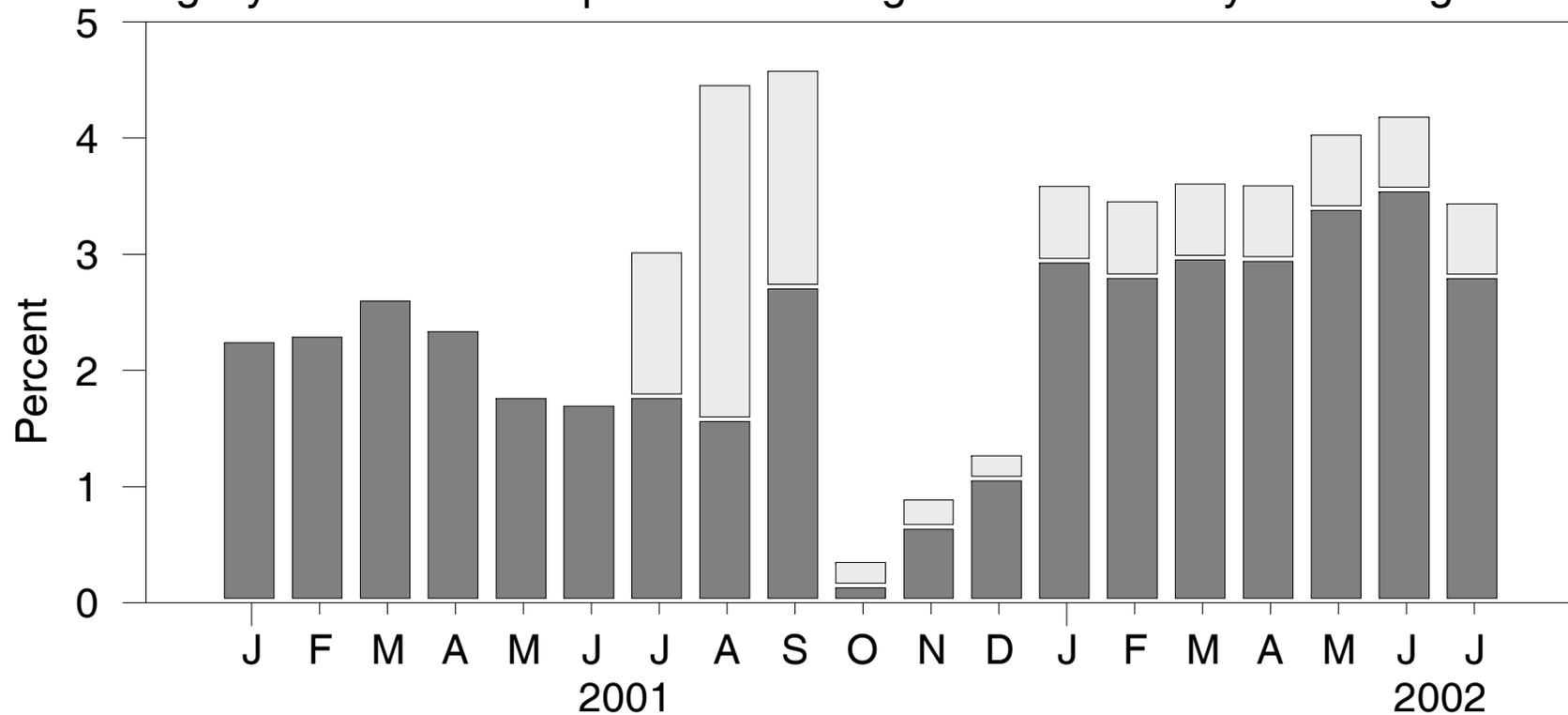
Consistency of Survey Responses with Behavioral Data

Data from *Consumer Expenditure Survey* (*CEX*)

Special question on size and timing of rebate check

$$\Delta Consumption_{it} = \beta Rebate_{it} + X_{it}\gamma + \varepsilon_{it}$$

Consistency of Survey Responses with Behavioral Data: Results

$$\Delta Consumption_{it} = \underset{(0.115)}{0.239 Rebate_{it}} + X_{it}\gamma + \varepsilon_{it}$$

Source: Johnson, Parker, and Souleles, *American Economic Review* (2005). Results for strictly nondurable consumption.

CEX data on timing and magnitude of rebates

$\longrightarrow$ unusual check on survey results

Survey Design Allows for Testing of Hypotheses

Little correlation of spending with:

- Expected income growth (liquidity constraints)

- Expected government spending (Ricardian equivalence)

III. Expectations from surveys

- Overall outlook for the economy

- Outlook for individual economic situation or purchases: Consumer Sentiment

- Expectations about particular variables

  - Income
  - Unemployment
  - Inflation
  - Stock returns

Role of Expectations

- Determinant of current decisions

    - Consumption, saving, and investment
    - Price setting
    - Work/location

- Asset demand

    - Stocks and bonds
    - Housing

Stock Return Expectations

Percent chance questions (Manski-Dominitz):

Suppose you have $1,000 invested in a mutual fund holding a diversified portfolio of stocks.

What do you think is the *percent chance* that this $1,000 investment will increase in value in the year ahead, so that it is worth more than $1,000 one year from now?

Percent chance questions

- Asks for a point in cumulative distribution function (CDF), not an expectation

- Could ask for multiple points in CDF, e.g., percent chance that $1,000 is worth more than $1,100 is a year

- Stock and income expectations questions implemented in *Survey of Consumer* from May 2002 to present

Relation of Expectations to Stock Returns

Survey respondents cannot forecast stock returns!

$$\log(P_{t+365}/P_t) = 10.8 - 0.030 PercentChance_{i,t} + \varepsilon_{i,t}$$
$$(0.002)$$

What determines expectations?

Ultimately we may even hope to determine a more fundamental set of variables and relations showing how expectations are formed, but this type of study has not yet been made.

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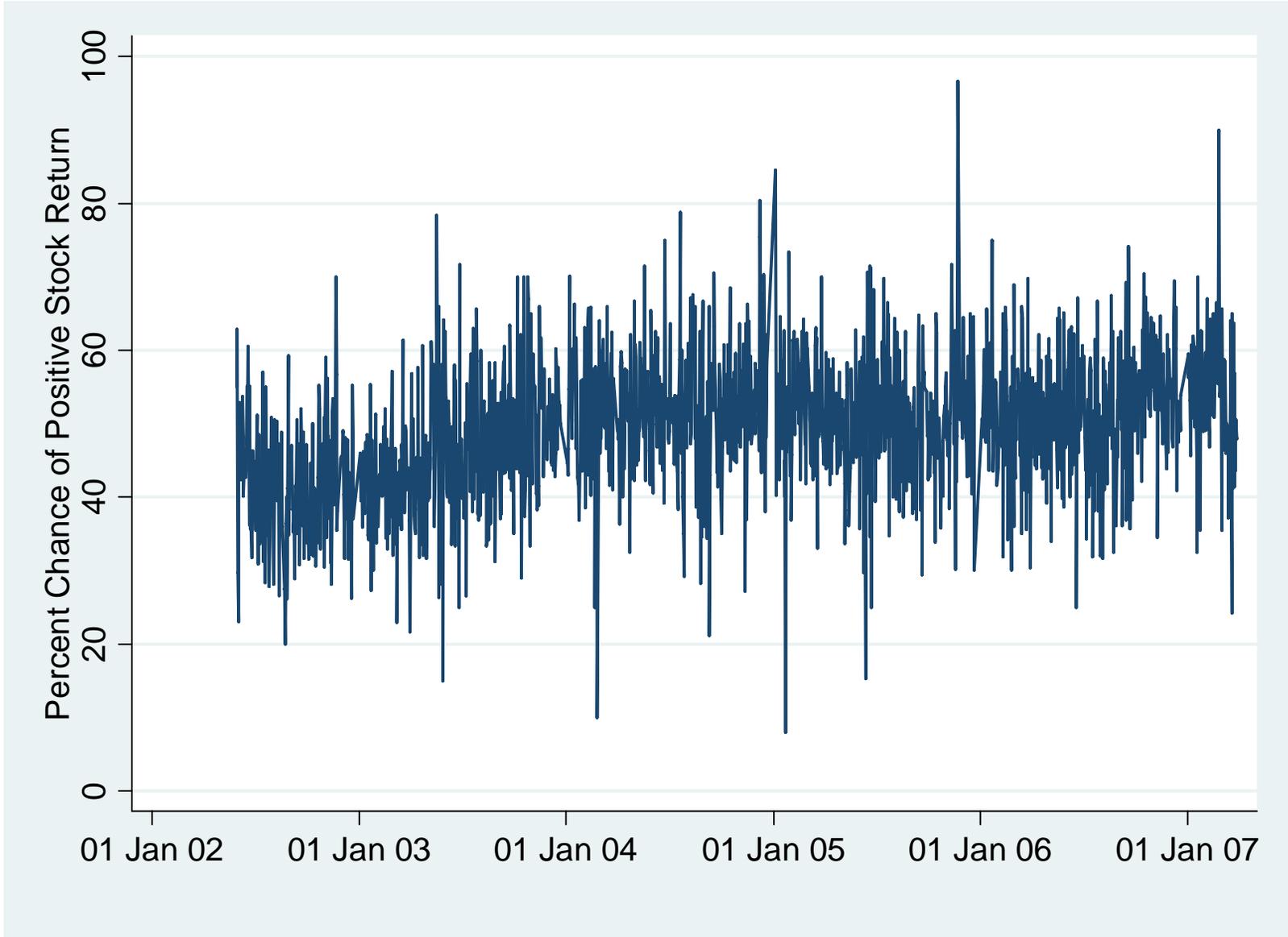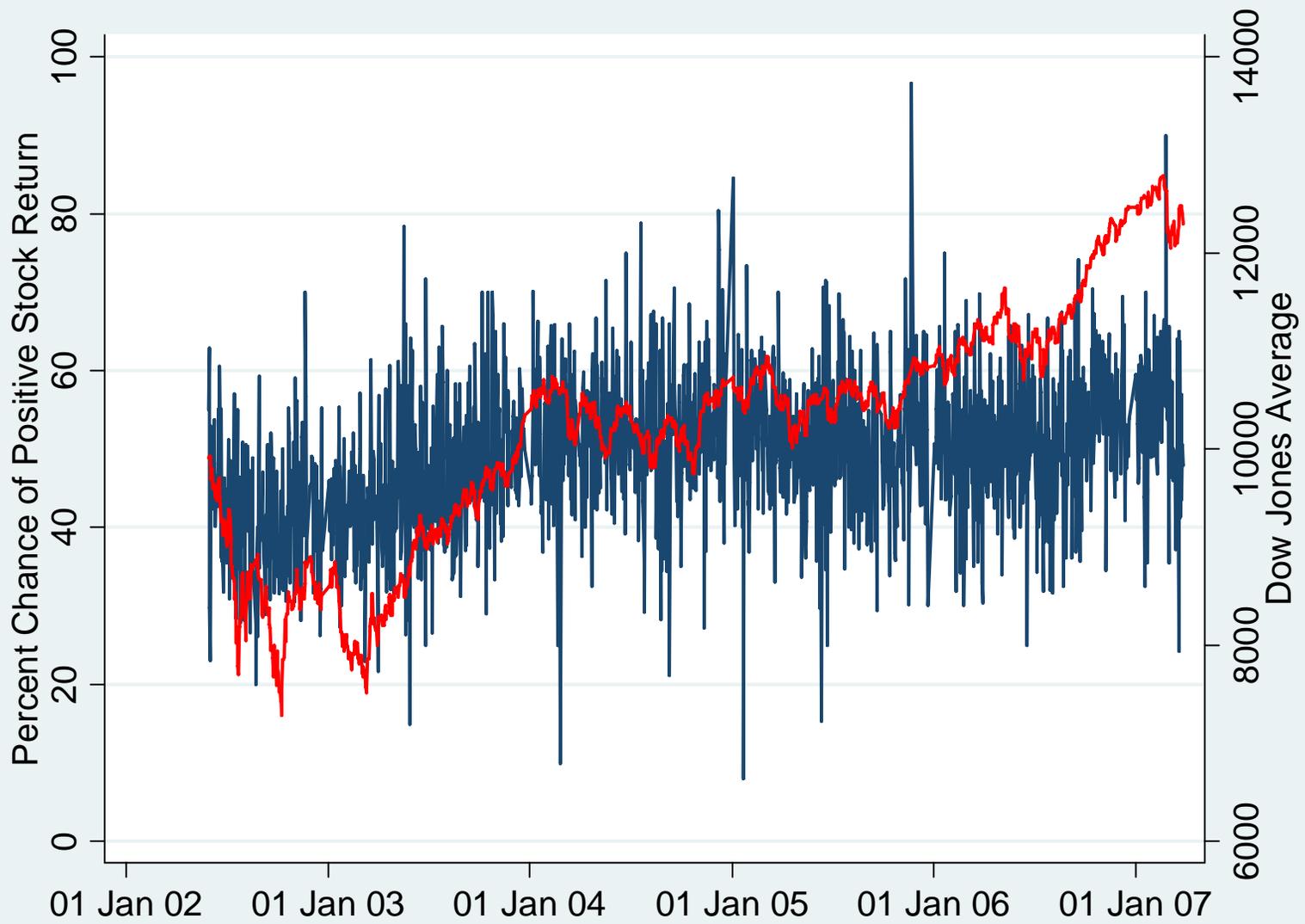*Contributions of Survey Methods to Economics* (1954)

Hypothesis:

Expectations of future stock market performance change with recent history of the stock market

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"His mood is pegged to the dollar."

Regression analysis:

Explain *percent chance of a stock market gains* with recent stock returns

- Daily responses to survey yield powerful test

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Explaining Percent Chance of a Stock Market Gain

	(1)	(2)	(3)	(4)
Stock return:				
Today	0.23			0.12
	(0.29)			(0.19)
Last month		0.18		0.14
		(0.05)		(0.05)
Last year			0.13	0.12
			(0.02)	(0.02)
Stock level today (log)	0.32	0.31	0.23	0.22
	(0.02)	(0.02)	(0.02)	(0.02)

Regression coefficients. Constant not reported.
(Standard errors in parentheses.)

Consumers update probabilities based on recent stock market performance

- Increase in stock market of 1% raises reported *percent chance* of a gain by about 0.5%

- Expectations poorly anchored

- Challenge to standard theories of the stock market

- Momentum investors, not contrarian investors

IV. Future work

Toward a more complete understanding of portfolio choice

- Preferences

- Actual portfolio choice and saving behavior

- Expectations

- Link economic parameters to cognitive/intelligence measurement