

Today ...

- 1 Grand Unifying Theory (of preferences, self control, and thinking)
- 2 Narrow Bracketing
- 3 Revealed Preferences with Mistakes

↷

- KR (2006, 2007) follow others in obscuring, cheating, and fudging on:  $\Rightarrow$

Why do people have utility over money at all?  $\Rightarrow$

- In classical model, money only valued for consumption.  $\Rightarrow$
- Legitimate object of analysis as the indirect utility function.  $\Rightarrow$
- But not current consumption, which KR (2006, 2007) treat it as.

$\curvearrowright$

# Prospect-Theoryish Stuff

The psychology of disappointment and elation is about news.  $\Rightarrow$

- Not just contemporaneous consumption relative to expectations.  $\Rightarrow$
- But about changes in beliefs about future consumption.  $\Rightarrow$
- Money is ... news about future consumption.  $\Rightarrow$

**News Utility:** KR (2009): reference point is still recent expectations.  $\Rightarrow$

- But:  $\Rightarrow$  Rather than comparing outcomes to beliefs, people compare new beliefs to old beliefs.  $\Rightarrow$
- Although the full implications are far more complicated, the basic intuition for what this says about money is very simple:  $\Rightarrow$
- Money is future consumption so unexpected gains and losses of money are news about future consumption.



# Prospect-Theoryish Stuff

New parameter:  $\gamma \equiv$  the degree to which you care about “prospective gain-loss utility” compared to “contemporaneous gain-loss utility”. $\Leftarrow$

- Do revisions in beliefs before an outcome occur cause comparable sensations of gain and loss as surprises at time of outcomes? $\Leftarrow$

Prior analysis all implicitly assume  $\gamma = 0$ . $\Leftarrow$

- Depending on the context, analysis may be misleading.

$\rightarrow$

Not anticipatory utility a la Caplin-Leahy, Köszegi, Brunnermeier-Parker.  $\Rightarrow$

- Our prospective gain-loss utility is about utility from *changes* in expectations of future consumption.  $\Rightarrow$

Difference is going to matter *a lot*.  $\Rightarrow$  And further:  $\Rightarrow$

- Because people didn't have news-utility interpretation, obvious confound in evidence with anticipatory utility.  $\Rightarrow$
- Ceteris paribus — fixing this morning's expectations — obvious correlation with how optimistic you are about the future and how much more optimistic you have become about the future.

$\rightarrow$

# Prospect-Theoryish Stuff

Happiness (especially rich people) in September and October 2008?⇒

- Moments in world history where rich folk less happy than poor?⇒
  - 1789 France, ⇒
  - 1979 Iran?⇒
  - 2008 "developed world"
- But 2008 rich still had more comfortable future than 2008 poor.⇒
  - And surely knew it! ⇒
  - (1789 rich French folk had different future?)⇒
  - Not anticipatory utility, but prospective news utility.⇒
- Final twist: ⇒
  - Perhaps rational inference ... crisis even worse *news* for poor???⇒
  - Utility: changes in beliefs ... not whether those beliefs rational.

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# Prospect-Theoryish Stuff

As part of my screed against grand unifying theories,  $\Rightarrow$

- I ranted that we shouldn't think we can explain self-control problems and loss aversion by one theory.  $\Rightarrow$
- Forgot that I am trying to do so ...  $\Rightarrow$

Next week I will talk more about theories, what we want from them, **how to self-doubt**, how to ambit while doing normal science,  $\Rightarrow$

- All sits side by side with a religious zeal that iterative improvements on news-utility approach will have massive explanatory power.  $\Rightarrow$ 
  - Explain more why I think EBRD explains virtually everything much better than other reference-point models,  $\Rightarrow$ 
    - even in data sets where it looks like others do better,  $\Rightarrow$
    - and even if you prefer 8,000% theories rather than 8% theories  $\Rightarrow$
    - (which I think is very bad preference).  $\Rightarrow$



# Prospect-Theoryish Stuff

Hint: Other models incorporate expectations into  $r$ .  $\Rightarrow$

- E.g., not just huge degrees of freedom in choosing relevant experience  
...  $\Rightarrow$ 
  - the relevant experience is **always (!!!)** defined by embedding expectations.  $\Rightarrow$
- And **rational** expectations!  $\Rightarrow$ 
  - First make expectations 99.9% rational, **then** (rightly!) add in noticed errors  $\Rightarrow$
- All parallels why serious models must embed strongly the things economics has right.

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## Extended Non-Choice Example Illustrating the News-Utility Model

From January 1 to August 30, 2008:  $\Rightarrow$

- You believe  $\frac{1}{2}$  chance bonus on December 31, 2008 will be \$10,000,  $\frac{1}{2}$  chance \$15,000.  $\Rightarrow$

August 31:  $\Rightarrow$

- With probability .5 hear rumor inducing beliefs  $q > \frac{1}{2}$  that the December 31 bonus will be \$15,000, and with probability  $1 - q < \frac{1}{2}$  will be \$10,000.  $\Rightarrow$
- With probability .5 rumor that will be \$10,000 with probability  $q$  and \$15,000 with probability  $1 - q$ .  $\Rightarrow$

September 1 to December 30 you learn nothing more.

December 31: Find out bonus.  $\Rightarrow$

- And consume bonus on top of other income/wealth over the next 100 days (or something).  $\Rightarrow$
- Huh?  $\Rightarrow$ 
  - For now ignore the fact that the bonus is itself not immediate consumption, but just future consumption power.  $\Rightarrow$
- Assume no consumption choices or actions are taken in 2008 in response to news.  $\Rightarrow$

How happy are you at different times?

## “Classical DMU(W) Expected Utility”:

rumor → actual	Aug 31	Dec 31 gain-loss	Dec 31 consumption
good → good	0	0	$m(w + 15)$
good → bad	0	0	$m(w + 10)$
bad → bad	0	0	$m(w + 10)$
bad → good	0	0	$m(w + 15)$
average utility:	0	0	$\approx m(w + 12.5)$

≡

$m' > 0$ ,  $m'' < 0$  is standard consumption utility function. ≡

Note: Calibrational linearity (for less than \$10,000): Classical certainly says you'd prefer the 50/50 on the two bonuses to (say) \$12,450 for sure. ≡

Cheap shot at “classical PT”: proposes that all bonuses are gains... $\Rightarrow$

## “Status Quo Prospect Theory”:

rumor $\rightarrow$ actual		Aug 31	Dec 31	Rest of life
good $\rightarrow$ good		0	$+15 \cdot \eta$	$u(w + 15)?$
good $\rightarrow$ bad		0	$+10 \cdot \eta$	$u(w + 10)?$
bad $\rightarrow$ bad		0	$+10 \cdot \eta$	$u(w + 10)?$
bad $\rightarrow$ good		0	$+15 \cdot \eta$	$u(w + 15)?$
average utility:		0	$\approx +12.5 \cdot \eta$	$u(w + 12.5)?$

$\Rightarrow$

But now we say not all gains:

## Contemporaneous Gain-Loss Utility:

rumour → actual	Probability	December 31	
good → good	$\frac{1}{2}q$	$m(w + 15)$ $+(1 - q) \cdot \eta \cdot x$	≡
good → bad	$\frac{1}{2}(1 - q)$	$m(w + 10)$ $-q \cdot \lambda \cdot \eta \cdot x$	
bad → bad	$\frac{1}{2}q$	$m(w + 10)$ $-(1 - q) \cdot \lambda \cdot \eta \cdot x$	
bad → good	$\frac{1}{2}(1 - q)$	$m(w + 15)$ $+q \cdot \eta \cdot x$	
average utility:		$m(w + 12.5)$ $-q(1 - q)[(\lambda - 1) \cdot \eta \cdot x]$	

where  $x \equiv m(w + 15) - m(w + 10)$

Expectations ref point  $\rightarrow$  beliefs influence sensation gain and loss.  $\Rightarrow$

- A less-than-expected bonus is a loss, not a gain.  $\Rightarrow$
- Since  $\lambda > 1$ , gain-loss utility always negative on average.  $\Rightarrow$ 
  - As  $q \rightarrow 1$ , then no gain-loss utility.  $\Rightarrow$
  - As  $q \rightarrow \frac{1}{2}$ , then worst gain-loss utility.  $\Rightarrow$
- Note: Per always, gain-loss proportional to change in consumption utility.

## Prospective Gain-Loss Utility:

## KR (2009) Model

$r \rightarrow a$	August 31	Oct 31	December 31/beyond
$g \rightarrow g$	$+(q - \frac{1}{2})\gamma\eta x$	0	$m(w + 15)$ $+(1 - q)\eta x$
$g \rightarrow b$	$+(q - \frac{1}{2})\gamma\eta x$	0	$m(w + 10)$ $-q\lambda\eta x$
$b \rightarrow b$	$-(q - \frac{1}{2})\gamma\lambda\eta x$	0	$m(w + 10)$ $-(1 - q)\lambda\eta x$
$b \rightarrow g$	$-(q - \frac{1}{2})\gamma\lambda\eta x$	0	$m(w + 15)$ $+q\eta x$
ave u:	$-\frac{1}{2}(q - \frac{1}{2})\gamma(\lambda - 1)\eta x$	0	$m(w + 12.5)$ $-q(1 - q)(\lambda - 1)\eta x$

$r \rightarrow a$	August 31	Oct 31	December 31/beyond
ave $u$ :	$-\frac{1}{2}(q - \frac{1}{2})\gamma(\lambda - 1)\eta x$	0	$\frac{m(w + 12.5)}{-q(1 - q)(\lambda - 1)\eta x}$

$\Rightarrow$

Pleasant and unpleasant surprises about how future affects  $u$ .  $\Rightarrow$

- If  $\gamma \rightarrow 0$ , “old” model (Koszegi-Rabin (2006)).  $\Rightarrow$
- If  $\gamma \rightarrow 1$ , then care just as much about ‘prospective’ gain-loss utility as about contemporaneous.

$r \rightarrow a$	August 31	Oct 31	December 31/beyond
ave u:	$-\frac{1}{2}(q - \frac{1}{2})\gamma(\lambda - 1)\eta x$	0	$\frac{m(w + 12.5)}{-q(1 - q)(\lambda - 1)\eta x}$

$\Rightarrow$

Theme of K&R (2009): Preferences over resolution of information.  $\Rightarrow$

If  $\gamma = 1$ , then expected gain-loss utility over time same for  $q = \frac{1}{2}$  and  $q = 1$ , and worse for  $q = \frac{3}{4}$ .  $\Rightarrow$

- People prefer their information resolved all at once.  $\Rightarrow$
- This follows from loss aversion.  $\Rightarrow$
- Why?

$r \rightarrow a$	August 31	Oct 31	December 31/beyond
ave u:	$-\frac{1}{2}(q - \frac{1}{2})\gamma(\lambda - 1)\eta x$	0	$\frac{m(w + 12.5)}{-q(1 - q)(\lambda - 1)\eta x}$

$\Rightarrow$

If  $\gamma < 1$ ,  $q = 1$  better than  $q = \frac{1}{2}$ .  $\Rightarrow$

- If people more bothered by news about current consumption than future, they prefer information sooner rather than later.  $\Rightarrow$
- Intuition?  $\Rightarrow$

These are the key informational results.  $\Rightarrow$

Now move to choice behavior, most classical of all (macro)economic questions.

## Wealth and Consumption in Intertemporal Choice

- In more detail in K&R (2009). $\Rightarrow$
- See also Pagel (2013). $\Rightarrow$
- Consumer allocates consumption between periods 1 and 2. $\Rightarrow$
- Can't commit  $\Rightarrow$  ???  $\Rightarrow$
- Intertemporal budget constraint is  $c_1 + c_2 = W$ . $\Rightarrow$
- Consumption utility each period is  $m(c_t)$ , increasing and concave. $\Rightarrow$
- No discounting:  $U = u_1 + u_2$ . $\Rightarrow$
- Suppose that  $\gamma < 1$ : In period 1, consumers care equally about $\Rightarrow$ 
  - period-1 news about period-1 consumption utility $\Rightarrow$
  - period-2 news about period-2 consumption utility $\Rightarrow$
- But they care less about $\Rightarrow$ 
  - period-1 news about period-2 consumption utility

## *Overconsumption.* $\Rightarrow$

- Suppose first that  $W$  is deterministic.  $\Rightarrow$
- Optimal strategy: maximize consumption utility,  $c_1 = c_2 = W/2$ .  $\Rightarrow$
- Will consumer choose this?  $\Rightarrow$
- If  $\gamma < 1/\lambda$ , optimal to deviate, so (without commitment)  
 $c_1 > W/2$ .  $\Rightarrow$
- Intuition (first in Stone, 2005):  $\Rightarrow$ 
  - Give self surprise gain in current consumption at cost of what is now a surprise loss in future consumption.  $\Rightarrow$
  - But once future rolls around, absorbed into reference point.  $\Rightarrow$
  - If  $\gamma$  low, bad news about future doesn't bother you much.

$\Rightarrow$

# Prospect-Theoryish Stuff

- Behaviorally and welfare-wise similar prediction to present bias and to temptation disutility (Gul and Pesendorfer 2001). $\Rightarrow$
- But: $\Rightarrow$  No "our theories same (in contexts I've chosen...), therefore mine is better." $\Rightarrow$  No "only possible one thing can cause similar behavior." $\Rightarrow$  ... so I prove my theory is uniquely right by finding one instance where it is a better explanation for something than yours. $\Rightarrow$  No horse races. $\Rightarrow$

And: $\Rightarrow$

- Yes to proposing identification, then measure all. $\Rightarrow$
- One major prediction of  $\gamma < 1$  not in PB or TU: $\Rightarrow$

*Overconsumption exacerbated by ex ante uncertainty.* $\Rightarrow$

- When uncertainty resolved right before initial consumption, then: $\Rightarrow$
- Even though uncertainty resolved before first choice, can increase consumption above level for **all** wealth levels compared to case where known in advance.

# Prospect-Theoryish Stuff

Intuition?  $\Rightarrow$

- No uncertainty, deviating to consume too costly.  $\Rightarrow$
- With uncertainty, good realization  $W$ , deviating partly (merely) foregone again future consumption.  $\Rightarrow$

Or:  $\Rightarrow$

- May be able get self to jog in good weather if weather always good.  $\Rightarrow$
- But if chance tornados, then partly loss to jog, and loss of future health only partly loss.  $\Rightarrow$
- Harder to follow through.  $\Rightarrow$

But another lesson:  $\Rightarrow$

- May no longer want commit!  $\Rightarrow$
- Some of it consistency problem  $\Rightarrow$
- But good behavior more unpleasant when sometimes not required ...  $\Rightarrow$
- If we mistake people for naive present bias, may force commitments that make them worse off.



*Response to unexpected wealth shocks:*⇒

- Limiting case of low-probability events:⇒
  - suppose consumer had been expecting to have lifetime wealth  $W$  with probability one, but at the beginning of period 1 learns (to her surprise) that she actually has deterministic lifetime wealth  $W'$ .⇒
- Independently of  $\gamma$ , she will respond asymmetrically to these news:⇒
  - For small windfall income, person consumes all windfall immediately.⇒
  - But for small bad news, defers consumption loss entirely to future.⇒
- Intuition: surprises regarding current consumption are felt more heavily than prospective surprises regarding future consumption.⇒
- Reflects old Thaler intuition?⇒
- But see Pagel (2017) for countervailing forces.

↪

## *Precautionary Savings:*⇒

- Suppose uncertainty in lifetime wealth resolved only late in life.⇒
  - Consumers hate this uncertainty.⇒
  - Can't do anything about it, per se.⇒
  - But recall: gain-loss utility is proportional to consumption utility.⇒
  - The lower the marginal utility of wealth, the less painful are losses.⇒
  - Gives clear, first-order motive for precautionary savings.⇒
  - First-order effect based on  $2^{nd}$  derivative, in contrast to  $2^{nd}$ -order effect based on  $3^{rd}$  derivative!⇒
  - People save to avoid painfulness of bad news.⇒
  - Major benefit being rich is neutralizing news utility over money.

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Summarizing Savings and Consumption in KR (2009): $\Rightarrow$

- 1st-order precautionary savings based on 2nd derivative  $\Rightarrow$ 
  - vs. 2nd-order precautionary savings based on 3rd derivative. $\Rightarrow$
- Overconsumption due to time-inconsistencies $\Rightarrow$ 
  - exacerbated by ex ante uncertainty. $\Rightarrow$
- Consume unexpected wealth shocks, delay unexpected income drop.

$\curvearrowright$

# Prospect-Theoryish Stuff

- Some more implications ... ⇒

Check it out!⇒

- Iterative improvements on EBRD are going to help us:⇒
  - Put decisions back into decision theory⇒
  - Procedural models that actually make systematic predictions⇒
  - **Help develop models of hedonic costs of thinking about things** ⇒
    - Cost of finding out if cute guy across the room will go out with you isn't the effort cost of walking across the room.⇒
  - E.g.: ways in which is unpleasant to think about financial planning health, etc.⇒
    - (Existing papers start to do so!)⇒
  - And (always!) calibration: **intrinsic reason why contemplation costs may be increasing in benefit.**⇒



# Prospect-Theoryish Stuff

For those of us who have drunk Kool-Aid on news utility, see confounds everywhere... $\Rightarrow$

- Social comparison $\Rightarrow$
- Habit formation $\Rightarrow$
- Anticipatory utility $\Rightarrow$
- Present bias, temptation $\Rightarrow$
- Uncertainty aversion $\Rightarrow$

Grandiosity...but disciplined grandiosity. $\Rightarrow$

- Next week: $\Rightarrow$

We'll discuss how to drink the Kool-Aid (on your theories) safely ...

$\varphi \rightarrow$

## Decision Neglect & Narrow Bracketing

Life's a bitch \_\_\_\_\_, and then \_\_\_\_\_ you die.⇒

- Life's a bitch of a complicated expected-utility maximization problem, and then millions of isolated decisions taken and billions of potential decisions untaken later you die.⇒
- Life is long and complicated.⇒
  - The “official” notion of what economic models say is, arguably, as if we sit down and formulate a complete contingent plan of what we'll do.⇒
  - And then implement.

←P

# Decision Neglect and Narrow Bracketing

Not what we do!  $\Rightarrow$

- Two hard-to-distinguish departures:  $\Rightarrow$ 
  - Decision Neglect: We make choices in only infinitesimal percentage of infinity of choice sets we face, and  $\Rightarrow$
  - Narrow bracketing: We don't fully integrate our decisions with other decisions even when could increase utility from doing so.  $\Rightarrow$

Explicit, but not always emphasized, these two are crucial to prospect theory.  $\Rightarrow$

- Gained much more focus recent years.

$\leftarrow \mathcal{P}$

# Decision Neglect and Narrow Bracketing

- Nobody (including economists) thinks people do the Max-L thing.  $\Rightarrow$ 
  - But turns out our failure to do global maximization matters.  $\Rightarrow$
- This limit to rationality closest to complexity-based we look at:  $\Rightarrow$
- People must narrowly bracket, too complicated to broadly bracket.  $\Rightarrow$
- But, we'll show:  $\Rightarrow$ 
  - People narrowly bracket even in relatively simple settings.  $\Rightarrow$
  - **the way people narrowly bracket suboptimal within the class of narrow-bracketing rules of behavior**  $\Rightarrow$
  - **and worse than simpler rules.**  $\Rightarrow$
- Major caveat to some of below:  $\Rightarrow$ 
  - News Utility  $\Rightarrow$
  - We've been talking about wrong preferences.  $\Rightarrow$
  - We'll argue not full story.



# Decision Neglect and Narrow Bracketing

Life is an infinite series of (potential) choice sets,  $X_1, X_2, \dots, X_N, \dots$

- Suppose just two of these infinite number of potential choices.
- When facing choice sets  $X$  and  $Y$  :
  - **Should:**  $\text{Max}_{x,y \in X \times Y} u(x,y)$ .
  - **Instead might:**
    - **Decision Neglect:** “choose” some  $\bar{x} \in X$  without thinking, or
    - **Narrowly Bracket:**  $\text{Max}_{x \in X} u(x), \text{Max}_{y \in Y} u(y)$

DN and NB ubiquitous, relating to all preferences.

- But they are absolutely central for understanding risk preferences.

**Choose 50/50 lose \$80 / lose nothing over lose \$35 for sure?**⇒

- Per prospect theory, most people choose the 50/50 gamble.⇒
- This is throwing away expected value.⇒

Coins in your pocket? Could take the sure loss \$35, then play 50/50  $\pm$ \$40 with person next to you ...⇒ generates 50/50 lose \$75, gain \$5.⇒

- “Unambiguously” better than what most people do.⇒
- Change your answer?⇒
- If merely reminding you of a possibility changes your choice?

←P

# Decision Neglect and Narrow Bracketing

Inconsistent with rational, broad bracketing of *any* preferences to behave risk-lovingly over modest stakes.  $\Rightarrow$

- Why make such a claim?  $\Rightarrow$
- If market for fair bets, you can always take a sure loss, and just try to go shopping for fair bets to get back risk.  $\Rightarrow$

So, after thought you chose  $C\{50/50 \text{ lose } \$80/\text{gain } \$0, \text{ lose } \$35\}$   $\Rightarrow$

- $50/50 \text{ lose } \$80/\text{gain } \$0$   $\Rightarrow$

After no thought you "chose"  $C\{50/50 \text{ lose } \$40/\text{gain } \$40, \text{ lose } \$0\}$   $\Rightarrow$

- $\$0$ .  $\Rightarrow$

Had you thought of it would have chosen differently in **both** choice sets, but have done so in the first.  $\Rightarrow$

- This is **Decision Neglect**.

# Decision Neglect and Narrow Bracketing

Social preferences: Suppose choice between:  $\Rightarrow$

- 15 apples for self and 0 for an anonymous other vs. 9 for self and 4 for that same anonymous other.  $\Rightarrow$

Would you choose (0,15), or (4,9)?  $\Rightarrow$

- Why?  $\Rightarrow$

Could take the 15 apples and split them up any way you want.  $\Rightarrow$

- Didn't prevent you from own allocation choices afterwards.  $\Rightarrow$
- (0,15) isn't your final allocation if you don't want it to be.  $\Rightarrow$
- Why not turn (0,15) into (6,9)?  $\Rightarrow$

And what's up with the dictator games?  $\Rightarrow$

- How many \$10 dictator games did person to left play yesterday?  $\Rightarrow$

Note: Unclear these are mistakes, since unclear what true social pref.  $\Rightarrow$

- But raises challenges to models people have developed.

# Decision Neglect and Narrow Bracketing

These are cases of “Decision Neglect” . $\Rightarrow$

- Experimenters bring into focus relevant pies to pay attention to, and the relevant set of people to split it among. $\Rightarrow$
- But more generally in life such focus happens by accident, by the design of others, and occasionally by our own design.

$\leftarrow P$

# Decision Neglect and Narrow Bracketing

## Narrow Bracketing

Two general approaches to showing that people “narrowly bracket”:

- Direct—show people don’t combine problems they’d be better off combining.
- Indirect—combine presumptive facts about “background noise” to argue calibrationally that observed choices are “too non-linear” to be consistent with integrating with unobserved other parts of life.
  - Note: “Indirect” shows simultaneously that people don’t even narrowly bracket in as wise a way as they could.

←P

# Decision Neglect and Narrow Bracketing

Direct:

- Tversky and Kahneman (1986) ⇒
  - Large, hypothetical stakes ⇒
- Rabin and Weizsacker (2009) replication: ⇒
  - Real, small stakes. ⇒
- Wording simpler than the original. ⇒

TK (1986): “Imagine that you face the following pair of concurrent decisions. First examine both decisions, then indicate the options you prefer.” ⇒

- Note particularly the instructions’ use of “concurrent” and the request to FIRST examine both decisions. ⇒
- Following presentation slightly simpler form than TK. ⇒
- Also, RW make clearer the “independence” of the two lotteries.

# Decision Neglect and Narrow Bracketing

Choose between:  $\Rightarrow$

A: \$240

B: (.25 +\$1,000, .75 \$0)  $\Rightarrow$

Choose between:  $\Rightarrow$

C: -\$750

D: (.75 -\$1,000, .25 \$0.)  $\Rightarrow$

- Per prospect theory ...Behavior:  $\Rightarrow$ 
  - 84% A over B, 87% D over C.  $\Rightarrow$
- Claim: This is narrow bracketing!  $\Rightarrow$ 
  - Indication 1: same % as when choosing only 1 pair!

$\leftarrow \rho$



# Decision Neglect and Narrow Bracketing

Reminder:  $\Rightarrow$

- Much/**most** of what has been called NB or cousins (e.g., myopic loss aversion a la Benartzi and Thaler) may be rational news utility.  $\Rightarrow$
- But this form of narrow bracketing is (almost) surely an error.

$\leftarrow \rho$

## Rabin and Weizsacker Replication<sub>⇒</sub>

- Email from experimental recruiter, 24h before the experiment, announcing a show-up fee of £22, which “may be used as your endowment in the experiment.”<sub>⇒</sub>
- During the experiment, depending on your actions and chance, it might be possible to add to, or lose from, this amount. [...] You are about equally likely to make gains as losses (on top of the £22).”<sub>⇒</sub>

Slight reformulation (instructions make independence salient), scaled-down real stakes (paid 100% of time)

↵

# Decision Neglect and Narrow Bracketing

“You face the following pair of concurrent decisions.  $\Rightarrow$  First examine both decisions, then indicate your choices, by circling the corresponding letter.  $\Rightarrow$  Both choices will be payoff relevant, i.e. the gains and losses will be added to your overall payment.”  $\Rightarrow$

Decision (i): Choose between

A. sure gain of £2.40

B. 25% chance gain £10.00, 75% chance gain £0.00.  $\Rightarrow$

Decision (ii): Choose between

C. sure loss of £7.50

D. 75% chance lose £10.00, 25% chance lose £0.00.

$\leftarrow P$

# Decision Neglect and Narrow Bracketing

Results:

<u>A and C</u>	<u>21%</u>
<u>A and D</u>	<u>28%</u>
<u>B and C</u>	<u>11%</u>
<u>B and D</u>	<u>40%</u>

$\Rightarrow$

So 28% choose the joint lottery

$$AD : (-\$7.60, 0.75; +\$2.40, 0.25)$$

over the first-order stochastically dominating lottery

$$BC : (-\$7.50, 0.75; +\$2.50, 0.25) \Rightarrow$$

Note: Only 49% choosing A ... not as much as you'd predict by PT.  $\Rightarrow$

- All other examples, large-scale hypotheticals match PT better.



# Decision Neglect and Narrow Bracketing

Another feature of results:⇒

- More violations of dominance for large-scale hypotheticals than small-scale real.⇒
  - But could be large scale, **not** hypothetical that changes behavior⇒
  - Also found more violations of dominance for large-stake hypotheticals than small-stakes **hypotheticals**.⇒
- Researchers tend to crank up the stakes when hypothetical⇒
  - may be mis-identifying stake effects for hypotheticality effects.⇒
- But:⇒
  - I don't believe we'd see the same violations for large real stakes.

↶

# Decision Neglect and Narrow Bracketing

## So what?⇒

- People don't do impossible and completely integrate life choices!⇒

Answer 1: yes, impossible. And so we study it.⇒

- Claim is not that people are stupider than they have to be (but see below) given that they are subject to human constraints.⇒
- Humans on average make the mistakes that humans on average make.⇒
- The point is rather: people are less rational than economic models suppose, in ways that matter.⇒

Answer 2: in your face, and still don't integrate.⇒

- So we've learned something about how powerful it is.

←P

## Rebuttal 1: $\Rightarrow$

- We can trick people with just-so choice combinations.  $\Rightarrow$ 
  - that don't matter in utility terms?  $\Rightarrow$
  - People threw away **ten pence** in an experiment manifestly designed to get people to violate dominance.  $\Rightarrow$
  - Didn't bother with calculations... right not to do so.  $\Rightarrow$
- That rebuttal is largely valid  $\Rightarrow$ 
  - But ...

$\leftarrow P$

# Decision Neglect and Narrow Bracketing

Answer 3: Not about these preferences, or this pair! $\Rightarrow$

- Simple dominance with almost any preferences: $\Rightarrow$
- Narrow bracketers of course do not violate FOSD for most pairs of choices they face. $\Rightarrow$
- RW argue the violations $\Rightarrow$ 
  - can occur for arbitrarily small degrees of narrow bracketing $\Rightarrow$
  - can be economically significant $\Rightarrow$
  - appear in a wide range of experimental tasks $\Rightarrow$
  - Almost surely is exhibited massively in non-campus life.

$\leftarrow P$

# Decision Neglect and Narrow Bracketing

**Theorem (RW, 2009):** Suppose that utility  $v$  is not CARA (i.e., not  $\beta - \alpha e^{-rx}$  for any  $\beta, \alpha, r$ ). $\Rightarrow$  Then there is a pair of choices between binary 50/50 lottery and sure thing where the narrow bracketer violates FOSD. $\Rightarrow$

- In fact, the violation is the simple dominance of the form we observed above, and which is not explicable by any preferences. $\Rightarrow$

Intuition is quite simple, and does not depend on risk-lovingness. $\Rightarrow$

- Any change in risk attitudes, in sense of not having constant absolute risk aversion, exposes to dominance. $\Rightarrow$
- If take risk in range where less risk averse, but turn down same risk in range where more risk averse, could do better by flipping.

$\leftarrow \mathcal{P}$

# Decision Neglect and Narrow Bracketing

Suppose $\Rightarrow$

- CE of 50/50 (\$30,\$70)  $\approx$  \$48  $\rightarrow$  pay \$2 to avoid risk $\Rightarrow$
- CE of 50/50 (\$0,\$40)  $\approx$  \$14  $\rightarrow$  pay \$6 to avoid risk. $\Rightarrow$

So for same risk: $\Rightarrow$

- Sometimes you'll refuse to pay \$3, other times pay \$5 to avoid. $\Rightarrow$

I offer you 50/50 (\$30,\$70) vs. \$47, and you choose (\$30,\$70). $\Rightarrow$

- You don't pay \$3 to avoid risk. $\Rightarrow$

I offer you 50/50 (\$0,\$40) vs. \$15, and you choose \$15. $\Rightarrow$

- You pay \$5 to avoid risk. $\Rightarrow$

So you choose 50/50 (\$45,\$85). $\Rightarrow$  But you could have had (\$47,\$87).

$\leftarrow P$

## Indirect Evidence of narrow bracketing $\Rightarrow$

- Even if don't observe choices that are going uncombined ... $\Rightarrow$
- Any plausible background risk often implies that any “global preferences” ought be locally linear ... $\Rightarrow$
- Some data, through April 2002 (point would be much stronger with up-to-date data ...) Percentage of days that Stock Market (VWRETD) change: $\Rightarrow$

An underestimate of variability of stock portfolio: $\Rightarrow$

- 2% of time  $\Delta \in [-.01\%, +.01\%]$  (uniform), 98% outside
- 14% of time  $\Delta \in [-.1\%, +.1\%]$  (uniform), 86% outside
- 83% of time  $\Delta \in [-1\%, +1\%]$  (bellish), 17% outside.

$\leftarrow$

# Decision Neglect and Narrow Bracketing

Bracketing calibrations ... If have 2:1 loss aversion over total changes in wealth *today* ... what should be reaction to individual bets?  $\Rightarrow$

- That is, if you merely combine any particular gamble; bet in lab experiment, or the extended warranty if you go buy stereo, or the deductible on housing insurance if happen to be paying for the insurance today ...  $\Rightarrow$

If \$10,000 in stock market ...  $\Rightarrow$

should accept 50/50  $g$  \$10.25/ / \$9.75 bet.  $\Rightarrow$

If \$100,000 in stock market...  $\Rightarrow$

should accept 50/50  $g$  \$103/ / \$98 bet or

50/50  $g$  \$10.02/ / \$9.98 bet.  $\Rightarrow$

- Whatever modest-scale risk aversion appears not consistent with integrating these

$\leftarrow P$

## Indirect evidence of NB in social preferences. $\Leftarrow$

- (Don't know of any direct evidence for social preferences) $\Leftarrow$
- Consider: Charness and Rabin (2002): 45% of C's choose allocation to randomly chosen, unknown pair of (\$4, \$4) over (\$7.50, \$3.75). $\Leftarrow$
- How do we explain that? $\Leftarrow$ 
  - Suppose C has VN-M preferences  $U_C(W_A, W_B) = \text{Min}[W_A, W_B]$ , where  $W_i$  is the Person  $i$ 's wealth. $\Leftarrow$
  - Will broad-bracketing C ever choose  $(\Delta W_A, \Delta W_B) = (4, 4)$  over  $(7.50, 3.75)$  to random other parties? $\Leftarrow$
- Omitted calibration algebra, but I claim: no. $\Leftarrow$ 
  - 50% chance 7.50 going to poorer guy!

$\Leftarrow$

# Decision Neglect and Narrow Bracketing

- Given symmetric beliefs by  $C$ ,  $Exp\{\Delta Min[W_A, W_B] \text{ from } (7.50, 3.75)\} \geq p3.75 + \frac{1-p}{2}3.75 + \frac{1-p}{2}7.50$ , where  $p \equiv prob(|W_A^{init} - W_B^{init}| \leq 3.75)$ . $\Rightarrow$
- Then we can see if  $(7.50, 3.75)$  is a better idea than  $(4, 4)$  if  $p3.75 + \frac{1-p}{2}3.75 + \frac{1-p}{2}7.50 > 4.00$ , since she knows she is raising  $Min[W_A, W_B]$  by \$4 if she chooses  $(4, 4)$ . $\Rightarrow$
- Hence,  $(\Delta W_A, \Delta W_B) = (7.50, 3.75)$  better than  $(4, 4)$  if  $p < \frac{13}{15} \approx .87$ . $\Rightarrow$
- More generally: Even “global Rawlsians” should be piecemeal surplus-maximizers in all small-scale allocations. $\Rightarrow$

## Revealed Preferences & Revealed Mistakes<sub>⇒</sub>

Kőszegi and Rabin (2008), “Revealed Preferences and Revealed Mistakes” :<sub>⇒</sub>

- Just because people don't 100% maximize utility does not mean that there is no relationship between what they do and their preferences.<sub>⇒</sub>

One could simultaneously identify preferences and mistakes.<sub>⇒</sub>

- **Preferences often revealed by choice, even when not implemented by choice.**<sub>⇒</sub>
- Rabin and Weizsacker jointly estimate preferences and extent of narrow bracketing.<sub>⇒</sub>
  - Preferences estimated (not imposed): PT value function.<sub>⇒</sub>
  - $\frac{5}{6}$  bracket narrowly,  $\frac{1}{6}$  bracket broadly.

# Decision Neglect and Narrow Bracketing

In RW, estimating preferences while **imposing** broad bracketing:  $\Rightarrow$

- gibberish.  $\Rightarrow$

Estimate **jointly** with narrow bracketing:  $\Rightarrow$

- See clear (prospect theory) preferences.  $\Rightarrow$
- Note: bracketing jointly estimated, not imposed.  $\Rightarrow$
- For both normative *and* descriptive economics, allowing for errors aids us in revealing preferences.  $\Rightarrow$
- Fetishizing rationality undermines useful revealed preference.

# Decision Neglect and Narrow Bracketing

What combinations of preferences and types of mistakes could explain the general pattern of modest-scale risk non-neutrality we observe?  $\Rightarrow$

	DMU(W) (or its kin)	“Classical PT” Or KR I, II	“News-U PT” E.g., KR III	
Fully rational			(✓)	=
“Constrained optimal”			✓	
plausible constrained-suboptimal		(✓)	✓	
Implausible errors	✓	✓	✓	

- ✓  $\equiv$  could explain most/all instances.
- (✓)  $\equiv$  could maybe explain in a scientifically serious way some of what we observe.  $\Rightarrow$

End of aside...

↪

# Decision Neglect and Narrow Bracketing

- Let  $(x_H, x_T)$  represent a lottery that pays  $\$x_H$  and  $\$x_T$  if the next flip comes up heads or tails.  $\Leftarrow$
- When Fiona observes a coin just came up heads:  
 $(90, 109) \succ (100, 100)$ .  $\Leftarrow$
- When just came up tails:  $(109, 90) \succ (100, 100)$ .  $\Leftarrow$
- On a “new” coin:  $(100, 100) \succ (90, 111)$ ,  $(100, 100) \succ (111, 90)$ .  $\Leftarrow$

Conclude about Fiona's preferences?  $\Leftarrow$

- Maybe: coin-dependent risk attitudes (risk-loving on new coins, risk-averse on old)?  $\Leftarrow$
- Or ... possibly a well-known, common error: the gambler's fallacy.  $\Leftarrow$
- *And* we have observed that she is risk-averse.  $\Leftarrow$

Is Fiona better off new coin or old?

$\rightarrow$

# Decision Neglect and Narrow Bracketing

Suppose observe that Fiona chooses to bet on 'old' coins rather than new:  
she'd choose choice set $\Rightarrow$

$\{(90, 109), (100, 100), (109, 90)\}_{OLD}\Rightarrow$

over

$\{(90, 111), (100, 100), (111, 90)\}_{NEW}\cdot\Rightarrow$

- Which choice set makes her better off?

$\Rightarrow$

# Decision Neglect and Narrow Bracketing

How do we respond to Fiona?  $\Rightarrow$

- We could never ever talk about examples like Fiona.  $\Rightarrow$
- We could argue that the study of Fiona is not economics.  $\Rightarrow$
- We could take the moralistic stance, which seems at time the stance some economists are de facto taking:  $\Rightarrow$ 
  - If Fiona is an idiot, she deserved what she gets ...  $\Rightarrow$
  - Making empirical claim that incentives to make right choices work is not same as saying incentives righteous even when they don't work.

$\rightarrow$

# Decision Neglect and Narrow Bracketing

**Punchline:** Useful RP *Without* 100% Rationality.  $\Rightarrow$

Once making reasonable ancillary assumptions, then can use revealed preference without *maintaining* assumption of 100% rationality.  $\Rightarrow$

- We didn't see Fiona *implement* her risk attitudes.  $\Rightarrow$
- But she did *reveal* them.  $\Rightarrow$
- We have found out Fiona believes in GF **and** that she is risk averse!  $\Rightarrow$

Good theories of mistakes will lead to re-invigoration of revealed preference as a powerful tool for identifying people's (mistakes and) well being.

↪

# Decision Neglect and Narrow Bracketing

Suppose that both Ming and Yao are each observed choosing among options  $x$ ,  $y$ , and  $z$  this semester.  $\Rightarrow$

- What are  $x$ ,  $y$ , and  $z$ ?  $\Rightarrow$
- I'm not telling you.  $\Rightarrow$

Suppose that we observe their choices richly:

Choice Set	Ming's Choice	Yao's Choice
$\{x, y\}$	$x$	$x$
$\{y, z\}$	$y$	$y$
$\{x, z\}$	$z$	$z$
$\{x, y, z\}$	$y$	$x$

$\Rightarrow$

- Is Ming fully rational? Is Yao fully rational?  $\Rightarrow$
- What are their preferences?  $\Rightarrow$
- Same or different preferences?  $\Rightarrow$
- Which choice set makes them happiest?  $\Rightarrow$
- What if I told you  $\{x, y, z\}$  was really  $\{x, \{y, z\}\}$ ?  $\Rightarrow$

# Decision Neglect and Narrow Bracketing

Ming's and Yao's Choice Set:  $\{x \equiv \text{Don't volunteer for seminar};$   
 $y \equiv \text{Volunteer for seminar, prepare 10 hours, give bad seminar};$   
 $z \equiv \text{Volunteer for seminar, prepare 20 hours, give good seminar}\}.$

Choice Set	Ming's Choice	Yao's Choice	
$\{x, y\}$	$x$	$x$	
$\{y, z\}$	$y$	$y$	
$\{x, z\}$	$z$	$z$	$\Rightarrow$
$\{x, \{y, z\}\}$	$y$	$x$	
$\{\{x, y, z\}, \{z\}\}$	$y$	$z$	

What is going on which each of these guys?

Maybe funky preferences. Or maybe misprediction. If present-biased based, then we think

- They are both present-biased, and prefer  $z$  to  $x$ .
- Yao is sophisticated, Ming not.

# Decision Neglect and Narrow Bracketing

Ming's and Yao's Choice Set:  $\{x \equiv \text{Don't volunteer for seminar};$   
 $y \equiv \text{Volunteer for seminar, prepare 10 hours, give bad seminar};$   
 $z \equiv \text{Volunteer for seminar, prepare 20 hours, give good seminar}\}.$  $\Rightarrow$

Choice Set	Ming's Choice	Yao's Choice	Hsu's Choice	
$\{x, y\}$	$x$	$x$	$x$	$\Rightarrow$
$\{y, z\}$	$y$	$y$	$y$	
$\{x, z\}$	$z$	$z$	$x$	
$\{x, \{y, z\}\}$	$y$	$x$	$x$	
$\{\{x, y, z\}, \{z\}\}$	$y$	$z$	$x$	

- Compare to their abstract choices—we predict for Ming his "most revealed" is his least favorite! $\Rightarrow$
- And neither chooses most preferred from  $\{x, y, z\}.$  $\Rightarrow$
- But Hsu seems to prefer  $x.$  $\Rightarrow$
- No idea what doctrinaire economist who disallows such observations would infer ... but see taste for  $z$  despite non-implementation.

## The P-Word<sub>⇒</sub>

- A more scientific, humbler “if-then” welfare conclusions about policy.<sub>⇒</sub>
- Typically does not lead to unambiguously smaller choice sets.
  - Sin Taxes vs. Ramsey Taxes: *different* triangles.
  - Sin Taxes vs. sugar blight: different genesis of the triangles
  - Other examples: replacing it with a *strictly larger* non-triangle (e.g., facilitating commitment devices).<sub>⇒</sub>
  - Mostly: “cautious paternalism”, regulations that interfere very little with rationals, but help people making mistakes.<sub>⇒</sub>
- Keep in mind, via habit formation, changed lives, huge amount of life outcomes determined  $<$  age 18.

