Brown Bag Lunch Meeting
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Economic vs. Psychological Forecasting
Evidence from Consumer Confidence Surveys

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Motivations

**Standard economic literature** assumes rationality - conditional on an information set (I) and as regards unbiasedness:

1. on average, subjective (E_{t,i} x_{t+k}) and objective (i.e. in some sense statistically optimal) expectations coincide. Expectations deal with statistics, much less with psychology:

\[ E_{t,i} x_{t+k} = E[x_{t+k} | I_{t,i}] + e_{t,i} \]

(where \( E_{t,i}[e_{t,i} | I_{t,i}] = 0 \))

Why this normative assumption?

1. Learning by doing (occasion);
2. Erring is costly (motivation).

Some considerations on standard economics rationality:

- Muthian expectations should show up both over time (\( T \to \infty \)) and across individuals (in some definitions, all agents have the same (rational) expectations, in some other the REH applies only to the **representative agent**). In any case, REH allows to aggregate (infinite, but statistically equivalent) individuals.

- the Homo Economicus is **supposed to behave** rationally because of cost/benefit analyses. The way in which people form expectations does not seem to be a topic of standard economics. This view is somewhat curious - everybody should agree that economics is first of all a behavioral science.
Some Anecdote on Lay People and Statistics

“The National Lottery is a tax on idiots.”
C. Benso Conte di Cavour (Italian Prime Minister, 1861)

“Most, probably, of our decisions to do something positive, the full consequences of which will be drawn out over many days to come, can only be taken as the result of animal spirits - a spontaneous urge to action rather than inaction, and not as the outcome of a weighted average of quantitative benefits multiplied by quantitative probabilities.”
J.M. Keynes (1936)

"There are two kinds of forecasters: those who don't know, and those who don't know they don't know."
J.K. Galbraith (1993)

Did you hear about the politician who promised that, if he was elected, he would make certain that everybody would get an above average income? Well, there was a standing ovation!!!
Unknown statistician
Cognitive psychology, arguably because of its more descriptive and less axiomatic approach, tells a different story about how people map information into expectations:

1. heuristic short-cuts create subjective probability judgments which deviate from objective statistical principles;

2. heuristic processes are not exceptional responses to problems of excessive complexity or to an overload of information; rather they are normal intuitive responses given by normal people to even the simplest questions about likelihood, frequency, and prediction. They are, therefore, both widespread among people and persistent over time: THEY ARE “FUNDAMENTALS”.

3. simple heuristics and intuitive strategies are reasonably effective some of the time, but they also produce biases and give rise to systematic biases.
Motivations (cont.)

Why?

- Humans receive and must arrange massive amounts of data. Most information is immediately discarded or abstracted away by neurological machinery. When new information is “zipped”, converted into symbolic format and memorized, it is subject to certain biasing effects.

- The problem is not the cost/availability of information but its handiness: “A wealth of information creates a poverty of attention” (Simon, 1971). Kahneman and Tversky (1973, 1974, 1982) and followers go even further - the processes of intuitive judgment are not merely simpler than rational models demand, they are categorically different in kind.

NB Usually psycho-driven behaviors are seen as unstable and unpredictable. Here, instead, I will show and focus on immanent psycho-biases.
Novelty and Aim

1. Appraise psychological findings on lay people’s judgments/expectations formation;

2. Test the presence of psycho-biases, taking advantage of long lasting Europe-wide CCS data.

3. Give an in-depth look at one of the most watched forecasting tool.
The Psycho-Analysis of Lay People's Judgments/ Expectations Formation

Why may people be **prospectively over optimistic** about (especially personal) financial evolutions?

- **The law of small numbers** (**over confidence**). People tend to believe that the mean value from a small sample also has a distribution concentrated at the expected value of the random variable (Shiller, 2000). This gives rise to a bias due to “over inference” from (too) short sequences of observations.

- **Illusion of control** (**over optimism**). People tend to believe that their own future situation will get better “against all odds”. Its definition is highlighting - “an expectancy of a personal success probability inappropriately higher than the objective probability would warrant” (Langer 1975, p. 313).

  NB Over confidence + over optimism = irrational exuberance, in Mr. Greenspan’s famous 1996 speech?

- **Depressive realism**. Non depressed people are more likely than depressed people to think that outcomes are contingent on their actions when they are not. Thus, non depressed individuals (hopefully, the majority) distort reality in an optimistic fashion (Alloy and Abramson, 1979).
Why may people be retrospectively over-critical about (especially macro) financial conditions?

- **Availability bias.** Just because an example is easily brought to mind or mentally "available", it is considered to be representative of the whole rather than just a single example in a range of data. So, the mere repetition of certain information in the media, regardless of its accuracy, makes it more easily available and therefore falsely perceived as more accurate.

- **Media bias** (or malady). The media tend to overweight bad economic news (Doms and Morin, 2004). This pertains to the nature itself of the news media, however, Blendon et al (1997) suggest that the public's biases can be attributed to the media's focus on bad news. Caplan (2002) and Curtin (2003) argue that the over-critic information flow may also run from people to media, while Blood and Phillips (1995) have found a reverse causality (in the USA). In any case, a perverse spiral might induce backward looking over pessimism.

NB Ex post, economy-wide actual conditions are objectively equal for everyone. Only psychological considerations allow, even in the long run, ex post objective conditions (i.e., actual past realizations) and their subjective judgments to be potentially dissimilar.
The Psycho-Analysis of Lay People's Judgments/Expectations Formation (cont.)

**Why may people be both over critical ex post and over optimistic ex ante when asked about financial stances?**

- **Mental accounting.** People mentally frame assets as belonging to either current or future income. Therefore, from the individual’s standpoint, judging and forecasting are “time separable” exercises that need not be self-consistent (Thaler, 1999).

- **Prospect theory.** People’s attitude toward risk is conditional on some neutral or status quo point, which may vary from situation to situation. If the reference point is defined so that an outcome is viewed as a “loss”, then the individual will be risk seeking. This could accentuate the gap between the retrospective and prospective views about the financial stance (Kahneman and Tversky, 1979).

- **Illusion of control & prospect theory.** An already suffered negative shock impact more deeply than a same-size, but still future (hence “illusion prone”), shock. So, the interplay of illusion of control and prospect theory suggests that over optimistic expectations could be associated with over critical judgments - (real or psychological) economic hardships might enlarge the forecast error.
Testable Structural Psychological Indications

1. The Survey Forecast Error (SFE, i.e. the difference between ex post and ex ante views) on the economic situation is not a zero-mean variable.

1. SFEs are consistently greater in bad than in good times.

2. The Future is perceived to be systematically more bullish (or less bearish) than the Past.

3. The personal economic situation is perceived to be structurally brighter (or less dark) than the economy-wide one.
Data


QUERIES:

Q1=How has the financial situation of your household changed over the last 12 months? It has ...

Q2=How do you expect the financial position of your household to change over the next 12 months? It will ...

Q3=How do you think the general economic situation in the country has changed over the past 12 months? It has ...

Q4=How do you expect the general economic situation in the country to develop over the next 12 months? It will ...

Why Q1…Q4?
Vagueness => Heuristics? => Biases?
Same time window (one year)
<table>
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<td>E</td>
<td>stayed/stay the same</td>
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<tr>
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<td>got/get a little worse</td>
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<td>got/get a lot worse</td>
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<td>don't know</td>
</tr>
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Basic data are percentages of respondents having chosen the corresponding option so that LB+B+E+W+LW+N=100.
A First Structural Look at the Data
The Long-Run Distribution of “the” European’s View on Economic Conditions

Europe=Belgium, Germany, Ireland, Greece, France, Italy, Finland, Spain, Netherlands, UK.

Two preliminary structural considerations (nation-wide and sub-sample distributions are similar):

1) Why E-modal (as, in fact, usually found in the literature)?
   a) CCS deal with “changes”: it is hard to think about ever changing conditions;
   b) Respondents’ reluctance to admit lack of an attitude: E is chosen even by uninterested/uninformed interviewees.

2) Despite the lack of incentives, an expected result on people’s “uncertainty” emerges:
   \[ Q1_N < Q2_N; \quad Q1_N < Q3_N; \quad Q2_N < Q4_N; \quad Q3_N < Q4_N \]
Implementing Psycho-Theories into CCS data.  
First Testable Implication: the SFE

\[
SFE_{PER} = (Q1_Z_t - Q2_{Z_{t-12}}) = \beta_{Z,PER} \\
SFE_{GEN} = (Q3_Z_t - Q4_{Z_{t-12}}) = \beta_{Z,GEN}
\]

\( Z = LW, W, B, LB \)

E.g., January 2000:
the share of citizens **expecting** that the economic situation will be “a lot worse” in the next 12 months is \( Q4_{LW} = 35\% \).

People respond according to the REH if
January 2001:
the share of citizens **judging** that the economic situation has got “a lot worse” in the previous year is \( Q3_{LW} = 35\% \).

**ECONOMICS** => \( \beta_Z \to 0 \)

**PSYCHO** => \( \beta_Z > 0 \) for \( Z = LW, W \); \( \beta_Z < 0 \) for \( Z = B, LB \). Why?
E.g., \( Q3_{LW_t} > Q4_{LW_{t-12}} \) (i.e. \( \beta_{LW_{GEN}} > 0 \)); \( Q3_{LB_t} < Q4_{LB_{t-12}} \) (i.e. \( \beta_{LB_{GEN}} < 0 \))

=> judgments (Q3) turn out to be consistently darker than expectations (Q4).
The Manski Critique: Although the subjective (ex ante) and actual (ex post) distributions coincide, the expectations and realizations variables are not directly comparable.

Suppose that:
65% respondents think there is a 40% chance of the outcome “a little worse” and 60% of “a little better”,
35% think there is a 60% chance of “a little worse” and a 40% chance of “a little better”.

Then, (50% threshold) expectations will be:
35% will predict “a little worse”, 65% will predict “a little better”.

If everyone has rational expectations (and there are no aggregate shocks), then the realizations will be:
47% \((=0.65\times40+0.35\times60)\) will experience “a little worse”,
53% \((=0.65\times60+0.35\times40)\) will experience “a little better”.

With the data at hand, thus, a non-zero mean SFE may be coherent with RE.
Large Residuals. Respondents are randomly selected over time => no genuine re-interviews. This inflates the residuals via the measurement error affecting the LHS variable => potential unknown heteroschedasticity.

NB The lack of re-interviews potentially affects all comments/studies based on month-by-month “changes” in confidence measures. Instead, I focus on long-run issues.

AR Residuals: I use monthly data on one-year forecasts. This naturally induces serial correlation – respondents will definitively know their expectations are in err only twelve months after the initial projection.

No individual-level data: Basic data refers to proportions of respondents.

Temporary/Localized data issues: German reunification, sampling errors, time inconsistencies due to shocks hitting consumers after they made the forecast and before they made the retrospective judgment.
The Manski critique? It merely warns about the possibility to obtain non-zero SFE even under RE formation. However,

- Psychological indications are much richer about the SFE (I have four testable implications) – it is unlikely that evidence supporting all the psychological suggestions be affected by the critique.

- The critique only deals with personal/independent conditions: ex post, economy-wide conditions are objectively equal for everyone. The psycho-point is: are these conditions subjectively equal for everyone too? In the long run, only psychological considerations allow ex post objective conditions (=realizations) and subjective judgments to be potentially dissimilar.

- As argued by Katona, CCS should/could collect information on sentiment. In the economic literature, in fact, a typical task is to test whether the sentiment index add independent (i.e. beyond economic data/models) information about the economy. To the extent replies reflect moods they are not economic forecasts, and the SFE can be addressed/interpreted via extra-economic (psychological) arguments.
Measurement errors? When regressing only on a constant, which is necessary and sufficient for my aim, OLS estimate is unbiased.

Hetero/AR residuals? I use Newey-West HAC standard errors.

No individual data? Psycho distortions are diffuse and persistent - their enduring presence should be detected by long-lasting surveys aimed at capturing the statistical citizen.

Temporary/Localized data issues? My identification strategy relies on the logic that the only (main) factors captured by the intercepts are psycho-biases. This is so because:
1) I look for natural traits (the iron law of attitudes)
2) I take advantage of a very large dataset aimed to capture the representative agent.
3) I perform several tests for several countries.
Finally, these data issues are disparate and, if any, affect the results only occasionally and partially.
It is time to Recall the First Testable Implication

$SFE\_PER = (Q1\_Z_t - Q2\_Z_{t-12}) = \beta_{Z,PER}$

$SFE\_GEN = (Q3\_Z_t - Q4\_Z_{t-12}) = \beta_{Z,GEN}$

**ECONOMICS** => $\beta_Z \rightarrow 0$

**PSYCHO** =>

$\beta_Z > 0$ for $Z = \text{LW, W}$;

$\beta_Z < 0$ for $Z = \text{B, LB}$. 
Do psycho-biases induce lay people to commit systematic forecast errors?

Newey-West P-val. ***<.01; **<.05; *<.10

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Preliminary Comments on the Results.

1. Evidence strongly supports the psychological suggestions.

2. The less univocal outcomes refer to LB. There is a numerical reason for that: LB are very small and little volatile time series. Moreover, data are rounded up to the first decimal. All that implies that data somewhat resembles to zero-one binary time series, clearly increasing the probability of observing zero SFEs just by chance.
Second Testable Implication:
Are SFEs consistently greater in bad than in good times?

\[(\beta_{LW\_Per} + \beta_{W\_Per}) - (\beta_{LB\_Per} + \beta_{B\_Per}) = \text{Bad-Good} = \beta_{\_Per} (>0 \Rightarrow \text{yes})\]

\[(\beta_{LW\_Gen} + \beta_{W\_Gen}) - (\beta_{LB\_Gen} + \beta_{B\_Gen}) = \text{Bad-Good} = \beta_{\_Gen} (>0 \Rightarrow \text{yes})\]

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Newey-West P-val. ***<.01; **<.05; *<.1
So far, we have contrasted the ex ante/post views of different representative consumers about the same year (which needs two different surveys, but gives “proper” SFEs).

In the following Table 3 we examine judgments and expectations referring to the beliefs of the same synthetic respondent on different years/situations. (which does not give “proper” SFEs but uses the same surveys, offering, inter alia, a robustness check).

LOGIC:
Owing to innate psycho-biases, past/general situations always tend to be darker than future/personal ones. So, it is worth testing whether people relentlessly repeat the following mantra:

“As usual, it has got worse than I expected. Especially for the others. Nonetheless, I still think that it will get better. Especially for me.”
More Specifically

NB Balance: $Q_i t = 2^{\times} LB_t + B_t - W_t - 2^{\times} LW_t$ (i=1,...4).

**SAME RESPONDENT ON PERSONAL vs GENERAL STANCES**

(Q1-Q3)>0: s/he judges that her/his financial condition (Q1) has, on average, gone better (or less bad) than the economy-wide one (Q3). This is consistent with the presence of media & availability biases.

(Q2-Q4)>0: s/he expects her/his future economic condition (Q2) will be systematically better (or less bad) than the economy-wide one (Q4). This is consistent with the presence of illusion of control.

**SAME RESPONDENT ON PROSPECTIVE vs RETROSPECTIVE VIEWS**

(Q2-Q1), (Q4-Q3)>0: s/he believes that the next year will always be economically better (or less worse) than the last one. This is consistent with the effect of both illusion of control and availability/media biases.

(Q2-Q3)>0: it is a sort of “mini-max” test: all psycho distortions tend to minimize Q3 and to maximize Q2. Accordingly, this gap should show the greatest positive values.
<table>
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<tr>
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<th>Q1-Q3</th>
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### Summary

1. Temporary/localized data issues, as well as disparate economic developments may affect, hampering, cross-countries comparisons (not continental-wide evidence).

2. Several tests are performed, and then replicated for ten countries.

3. The results confirm previous studies based on genuine (but short and single nation wide) panels.

4. The results univocally point to a nonrandom structural framework whereby people’s ex ante/post views are hard-to-explain from an objective, statistical, standpoint.

5. In contrast, psycho-biases are able to offer a fully comprehensive interpretation of the immanent background noise.
A Tentative Agenda

It seems ironically Muth-irrational for economists/forecasters to waste the findings of psychology (Do economists suffer from heuristics-biases?). So, e.g.,

- one could think of balances which take into account, and "sterilize", the effect of the illusion of control (and the like) on people’s replies.

Psycho-biases affect the representative agent. So, why do not consider - not in a shy way - psycho-theories in formal economic models? E.g.:

- one could tentatively think that a large share of consumers is persistently inattentive (Reis, 2004). Or
- one could insert cognitive elements in the small but growing literature called “news approach to business cycles” (Beaudry and Portier, 2004 and 2006; Jaimocich and Rebelo, 2006).
Thank you for your attention and...
...comments(?)

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