Keeping Up with the Joneses Preferences: Asset Pricing Considerations

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Motivation

- Economics and Finance have developed a series of models and theories.
- Many of them, especially in finance, are very recent.
- Based on these models, we try to understand how investors and markets behave:
  - The predictive power of the models is not very good.
  - Even worse: we do not seem to be able to explain many events ex post.
- For example:
  - Market efficiency.
  - CAPM
Efficient Markets

- Concept: All relevant information is immediately incorporated into prices.
  
  Therefore, there is no gain to be attained by picking securities...

- Refinement: there are different levels of information and, therefore, market efficiency:
  
  1. Past prices:
     
     If prices immediately incorporate this information, markets are weakly efficient.
  
  2. Public information, available to everybody:
     
     semi-strong form.
  
  3. Public and private information:
     
     strong form.

- Non-informational events should not matter:
  
  For example, a big sale in the market.
Abnormal Returns Around Takeover Announcements

![Cumulative Average Residuals - Market Model - Companies Traded on an Organized Exchange](image)

**Figure**: From Keown and Pinkerton, Journal of Finance 1981
Similar failures.
Models assume some properties of investors that drive their economic decisions:

- **Monotonicity or non-satiation:**
  - More is better.
  - *But:* What about charities, philanthropy, volunteer work...?

- **Risk-aversion:**
  - The expected return of a risky decision is worth more than the risky decision.
  - *But:* What about gambles – either real gambles or through financial markets or similar?

The objective of the investor is represented by a *utility function*, for example:

\[
\max E \left[ \frac{X^{1-\gamma}}{1 - \gamma} \right]
\]

*X* represents wealth and *\( \gamma \)* the coefficient of risk-aversion.
Take utility function of an investor who cares about consumption over time (intertemporal consumption):

\[
\max E \left[ \sum_{t=0}^{T} \beta^t \frac{c(t)^{1-\gamma}}{1-\gamma} \right]
\]

- \( \beta < 1 \) is a subjective discount coefficient ("earlier is better"), 
  \( c(t) \) is consumption at moment \( t \) and \( \gamma \) is as before; 
- for a total of \( T \) periods (for example, years).

Many questions:

1. At time \( t \) only consumption \( c(t) \) matters?
2. Only a parameter, \( \gamma \) to decide choices?
3. Why is \( \beta \) constant?
4. Why is \( T \) fixed?
5. All the investors are identical?
6. . . .
Problems with Standard Preferences

- People preferences appear inconsistent with expected utility:
- One particular instance is Allais Paradox:
  - Offer people to choose one of the gambles from each experiment:

<table>
<thead>
<tr>
<th>Experiment 1</th>
<th>Experiment 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gamble 1A</strong></td>
<td><strong>Gamble 1B</strong></td>
</tr>
<tr>
<td>Prize</td>
<td>Chance</td>
</tr>
<tr>
<td>$1 M</td>
<td>100%</td>
</tr>
<tr>
<td>Nothing</td>
<td>1%</td>
</tr>
<tr>
<td>$5 M</td>
<td>10%</td>
</tr>
</tbody>
</table>

- The choices are often inconsistent with expected utility.
Rewrite the previous menu of gambles as follows:

<table>
<thead>
<tr>
<th>Experiment 1</th>
<th></th>
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<td>Chance</td>
<td>Prize</td>
<td>Chance</td>
<td>Prize</td>
</tr>
<tr>
<td></td>
<td>$1 M</td>
<td>89%</td>
<td>$1 M</td>
<td>89%</td>
<td>Nothing</td>
</tr>
<tr>
<td></td>
<td>$1 M</td>
<td>11%</td>
<td>Nothing</td>
<td>1%</td>
<td>$1 M</td>
</tr>
<tr>
<td></td>
<td>$5 M</td>
<td>10%</td>
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<td></td>
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</tr>
</tbody>
</table>

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- Independence axiom.
- Kahneman and Tversky developed the Prospect Theory to better capture these choices.
- It also has to do with *framing*.
Alternative Directions

The finance literature has suggested a number of reasons why classic models do not work:

1. Noise traders.
2. Limits to arbitrage.
5. Preferences.

In addition (not explicit in the behavioral finance literature):

1. Heterogeneity of economic investors.
2. Unusual incentives.
Prospect Theory is a first attempt to model consumers’ behavior outside the classic paradigm.

Other types of utility representations different from standard utilities have been developed.

Here are some examples:

- Recursive preferences.
- Habit formation.
- Keeping up with the Joneses.
- Rank-dependent utilities.
  - Cumulative prospect theory is one case.

...
Prospect Theory: Foundations

▶ Experiments conducted by Kahneman and Tversky in the 70's.
  ▶ Allais Paradox and others like the following.
▶ A group of people is asked same group both questions:
  (i) Choose between (percentage who chooses in parenthesis):
    A  Sure gain of $240 (84%).
    B  25% chance to gain $1000, 75% chance to gain zero (16%).
  (ii) Choose between (percentage who chooses in parenthesis):
    C  Sure loss of $750 (13%).
    D  75% chance to lose $1000, 25% chance to lose nothing (87%).
▶ The previous choices imply risk-aversion for gains, risk-love for losses.
▶ In fact, 73% chose A and D, only 3% B and C.
  ▶ However, B+C dominates A+D.
Value Function of Prospect Theory: Characteristics

- Decreasing sensitivities, both for gains and losses from the reference point:
  - The difference in value of possible gains of $100 and $200 is larger than the difference between $1100 and $1200.
  - The difference in value of possible losses of -$100 and -$200 is larger than the difference between -$1100 and -$1200.

- Characteristics of a value function for prospects:
  (i) Defined on deviations from reference point.
  (ii) Concave for gains, convex for losses.
  (iii) Steeper for losses than for gains.
The Value Function

PROSPECT THEORY

A less desirable neighborhood. Hence, the derived value (utility) function of an individual does not always reflect "pure" attitudes to money, since it could be affected by additional consequences associated with specific amounts. Such perturbations can readily produce convex regions in the value function for gains and concave regions in the value function for losses. The latter case may be more common since large losses often necessitate changes in lifestyle.

A salient characteristic of attitudes to changes in welfare is that losses loom larger than gains. The aggravation that one experiences in losing a sum of money appears to be greater than the pleasure associated with gaining the same amount. Indeed, most people find symmetric bets of the form (x,.50; -x,.50) distinctly unattractive. Moreover, the aversiveness of symmetric fair bets generally increases with the size of the stake. That is, if x > y : 0, then (y, .50; -y, .50) is preferred to (x, .50; -x, .50). According to equation (1), therefore,

\[ v(y) + v(-y) > v(x) + v(-x) \] and \[ v(-y) - v(-x) > v(x) - v(y). \]

Setting y = 0 yields \[ v(x) < -v(-x), \] and letting y approach x yields \[ v'(x) < v'(-x), \] provided \( v', \) the derivative of \( v, \) exists. Thus, the value function for losses is steeper than the value function for gains.

In summary, we have proposed that the value function is (i) defined on deviations from the reference point; (ii) generally concave for gains and commonly convex for losses; (iii) steeper for losses than for gains. A value function which satisfies these properties is displayed in Figure 3.

Note that the proposed S-shaped value function is steepest at the reference point, in marked contrast to the utility function postulated by Markowitz [29] which is relatively shallow in that region.

Figure: Value Function in Kahneman and Tversky (1979)
In the 90’s, Kahneman and Tversky refined prospect theory.

- Cumulative prospect theory.
- Adjust original probabilities:
  - By assigning weights.
  - Different for probabilities of gains and probabilities of losses.

This had a precedent in the work of Quiggin in the 80’s:

- Anticipated utility.

Some work in mathematical finance.

The Problem with Prospect Theory (and Similar Theories)

- They are *ad hoc* and not axiomatic.
- Need for axiomatic models.
- A good candidate: *Keeping Up with the Joneses* preferences.
Consider the following two worlds (Frank, JPubE, 2008):

A  You earn $110,000 per year, all others earn $200,000.
B  You earn $100,000 per year, all others earn $85,000.

Which one would you prefer.

Frequent choice is incompatible with standard utility theory.

Happiness and growth:

- Relative income is a better predictor of happiness than absolute income.
- First pointed out by Easterlin in 1974.
- Several studies are consistent with this observation.

Evidence that *income matters* for happiness.
Are Positional Externalities Different?

Figure: From R. Veenhoven, “Happiness in Nations,” IMF, 1993

The pattern shown in Figure 1, which consistently shows up in other countries as well, poses an apparent challenge for conventional economic models. If getting more income does not make people happier, why do they go to such lengths to get more income? Why, for example, do legal associates work 100 hours a week hoping to become partners in law firms? Why do tobacco company CEOs endure the public humiliation of testifying before Congress that nicotine is not addictive?

It turns out that if we measure the income-happiness relationship in a second way, income matters very much indeed. Consider Figure 2, which shows this relationship for the United States during a brief period during the 1980s. When we plot average happiness versus average income for clusters of people in a given country at a given time, as in the diagram, rich people are in fact substantially happier than poor people.
The patterns portrayed in Figures 1 and 2 are consistent with the view that relative income is a far better predictor of happiness than absolute income. Kahneman et al. (2006) argue that traditional happiness surveys may overstate the influence of income on happiness, because people may focus on their material well-being in attempting to answer the survey question. They show that income's influence is smaller when the dependent variable is reported mood during experience sampling rather than the response to a survey question. But even on their preferred measure, people with annual incomes under $20,000 reported being in a bad mood more than 50 percent more often than people with incomes over $100,000.

That relative income matters is often seen as a regrettable human frailty. Yet it is a mistake to view concerns about relative income in harshly pejorative terms. These concerns are much better understood as an unaviodable consequence of the

Figure: From Diener, Sandvik, Seidlitz, and Diener, SIR, 1993
Basic Idea

- People care about their consumption/wealth relative to other people’s consumption/wealth.
  - “Keeping up with the Joneses.”
- Some closely related issues:
  - Consumption in *positional* goods.
    - Also called *conspicuous* consumption.
  - Search for status.
- Differs from standard expected utility theory.
- A very large number of economic and financial implications.
  - In the choice of consumption.
  - In the choice of portfolios.
    - Through this, on security prices.
Mentioned by Adam Smith (The Wealth of the Nations):
“A creditable day-labourer would be ashamed to appear in public without a linen shirt, the want of which would be supposed to denote that disgraceful degree of poverty which, it is presumed, nobody can well fall into without extreme bad conduct.”

Veblen (The Theory of the Leisure Class, 1899).
- Introduces the expression *conspicuous consumption*.

- Introduces the *demonstration effect*.

Robert Frank (Choosing the Right Pond, 1985)
- Several books and research articles on the topic and its economic implications.
The investor chooses investments to achieve:

$$\max E \frac{c^{1-\gamma}}{1-\gamma} C^\alpha$$

- $c$ is the consumption of the investor.
- $C$ is the consumption of the peers.
- $\gamma$ is the risk-aversion, as in the standard case.
- $\alpha$ is a positive coefficient that measures the strength of the relative concerns:
  - The higher is $\alpha$ the more the consumer cares about the level of consumption of the peers.

Who are the peers?
- Neighbors? Family? Coworkers?
Economic Effects

- Wealth increase of one agent affects utility of other agents.
  - Negative (or positive?) externality on others.
  - Increases marginal utility.
- Relative wealth concerns lead to status seeking.
- Status seeking leads to purchase of positional goods.
- Positional goods displace other consumption.
  - Possible barrier to growth?
- Economic cascades (Robert Frank):
  - If someone spends on a positional good, it forces others to do so.
  - For example, median size of a newly constructed house.
    - 1600 feet in 1980.
    - 2100 feet in 2000.
  - Like an arms’ race?
Effects of Economic Cascades?

▶ Also suggested by Robert Frank.
▶ People are working longer hours.
▶ Longer commuting distances.
▶ Higher bankruptcy rates.
  ▶ In Frank, Levine, and Dijk (2010, wp).
  ▶ They study changes between 1990 and 2000 in bankruptcies filings across counties.
  ▶ They find positive correlation between filings and growth of income dispersion.
▶ Savings:
  ▶ According to standard theory, the savings rate should be independent of income.
  ▶ However, it has been dropping consistently in the US.
Usually when we talk about savings rate, we talk about the savings of our citizens. This personal “savings” rate should not be confused with money that is in savings accounts. No, the savings rate is a calculation based upon how much money is not being spent on other things. And this means that DEBT REPAYMENT generally counts as personal savings.

The personal savings rate went negative (although no longer reflected on the Fed’s charts), but since this crisis began has turned back positive, the result of citizens pulling in their spending while deleveraging by paying off debt. Below is the chart of the Personal Savings rate, it is currently just below 5%:

The next chart shows the personal savings AMOUNT in billions of dollars:

Figure: From BEA
Consider a setting in which agents care about each other’s wealth.

Suppose that the wealth of at least some of them is correlated with security prices.

- For example, software engineers who receive bonuses depending on the performance of the company.
- Their income will be highly correlated with the price of the stock of their company.
- In general, with prices of high-tech companies.

Buying stock correlated with wealth/income of reference group will be optimal strategy.

In such a setting, investors will be willing to overpay for stock that helps them “keep up with their peers.”
Consider a CAPM type of equation,

\[ \bar{r}_i = r_f + \beta_i(\bar{r}_M - r_f) \]

Re-write,

\[ \bar{r}_i = a + \beta_i \bar{r}_M \]

With relative wealth concerns we get,

\[ \bar{r}_i = a + \beta_i^M \bar{r}_M + \beta_i^I f^I \]

where \( \beta^M \) is as before,

\( \beta^I \) is the correlation with the income of the peers,

\( f^I \) measures the “premium” associated with the correlation with income.

Is negative.

If there are “different groups of peers,”

\[ \bar{r}_i = a + \beta_i^M \bar{r}_M + \beta_i^1 f^1 + \beta_i^2 f^2 + \ldots \]
Further Issues

▶ Explains relation between stock returns and labor income.
▶ Risk premia are stronger (in absolute value) in areas of lower population density.
▶ Is the effect stronger in areas of lower population density?
▶ There is evidence that this is the case.
  ▶ Luxury car purchases are strongly influenced by luxury car purchases of neighbors in areas of lower population density.
▶ In areas of low population density is easy to identify peers.
▶ Stronger peer pressure.
Many questions on the economic front:

- *Keeping Up or Catching Up?*
- Who is the reference group?
- ...

On the mathematical front:

- Very little work.
- Exceptions:
  - Chan and Kogan (JPE 2002), a dynamic version of Campbell and Cochrane (JPE 1999).
  - Benchmarking models (for example, work of Basak and coauthors).