BeFi Web Seminar for February 27, 2008
Risk Questionnaires and Behavioral Portfolios
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Risk questionnaires and behavioral portfolios

Meir Statman
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The plan for this session

Compare
Mean-variance portfolio theory
to
Behavioral portfolio theory

Provide tools for behavioral questionnaires and portfolios
The plan for this session

Going Beyond Behavioral Portfolio Theory

Preferences beyond risk and expected returns

Domestic stocks or international stocks?
Socially responsible stocks or conventional stocks?

Other investor needs
Reduce regret
Increase hope
Reduce fear
Increase self-control
Generate income (Without dipping into capital)
Financial advisors as financial physicians

- Listen (What does this investor really want?)
- Diagnose (What does it mean in terms of money?)
- Educate (This is what investments can do and this is what they cannot. Here are some common cognitive biases and emotions)
- Prescribe (This is what I can do for you. This is what you need to do)
Question

If you could increase your chances of having a more comfortable retirement by taking more risk, would you:

a. Be willing to take a little more risk with all your money?

b. Be willing to take a lot more risk with some of your money?
If you could increase your chances of improving your returns by taking more risk, would you:

\[
\text{Risk} \times \text{Money} = \text{Addition to portfolio risk}
\]

a. A little more risk \times All of your money = Addition to portfolio risk

b. A lot more risk \times Some of your money = Addition to portfolio risk
Mean-variance portfolio theory

Investors consider portfolios as a whole.

Investors care only about expected returns and risk (standard deviation) of the overall portfolio.

Investors are always averse to risk.
Behavioral Portfolio Theory

Investors care about reaching ultimate goals (retirement, education, travel, charity)

(Expected returns and standard deviations are only intermediate goals. “So I’m on the mean-variance efficient frontier. Now what?”)

Investors consider their portfolios not as a whole but as a pyramid of distinct layers, arranged by goals

Investors are not always averse to risk

(Investors buy both insurance policies and lottery tickets)
Behavioral Portfolio Theory
A pyramid of mental accounts arranged by goals

- Charity
- Travel
- Children’s Education
- Retirement
Behavioral Portfolio Theory
Securities are associated with goals

Upside-Potential Layer (contains, for example, foreign stocks, aggressive growth funds, IPOs, options, lottery tickets.)

Downside-Potential Layer (contains, for example, T-bills, CDs, money market funds)
Behavioral portfolio theory
Core and satellite

A LOT more risk with SOME of your money
Behavioral Portfolio Theory
Core and satellite

Satellite
Hope

Core
Freedom from fear
Mean-Variance Portfolio Theory
It all mixes in the stomach
Investors want highly nourishing and low cost meals.

Behavioral Portfolios Theory
Portfolios from the perspective of the palate as well as the perspective of the stomach. Investors want highly nourishing and low cost meals. But they also want palatable meals.
Mean-Variance Portfolio Theory
Efficient frontier and optimal choice

Expected Return

Utility function

Efficient frontier

Risk (standard deviation)
Mean-variance portfolio theory
Efficient frontier and optimal choice

The one and only question to investors. What is your utility function?
Or, more intelligibly, which of the combinations of expected return and standard deviation for your overall portfolio is optimal for you?

Have you ever seen a question like this in any investor questionnaire?

<table>
<thead>
<tr>
<th>Expected Return</th>
<th>Standard Deviation</th>
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<tbody>
<tr>
<td>5%</td>
<td>3%</td>
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<tr>
<td>6%</td>
<td>5%</td>
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<tr>
<td>7%</td>
<td>10%</td>
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<tr>
<td>12%</td>
<td>18%</td>
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<tr>
<td>14%</td>
<td>20%</td>
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</table>
Insights from investment questionnaires
What you are likely to see is a question like this in the Vanguard questionnaire:

Generally, I prefer investments with little or no fluctuations in value, and I’m willing to accept the lower return associated with these investments

- Strongly disagree
- Disagree
- Somewhat agree
- Agree
- Strongly agree

Is the question about the portfolio as a whole?

Does it guide you to the right portfolios on the efficient frontier?
Insights from investment questionnaires
What you are likely to see is a question like this in the Fidelity questionnaire:

Which of these statements would best describes your attitude towards risk?

1. I can tolerate a very low degree of risk, as capital preservation is crucial to me.
2. I can tolerate a low degree of risk and look for some capital growth to keep pace with inflation.
3. I can tolerate some risks and look for moderate capital growth above inflation.
4. I can tolerate a high degree of risk and look for the highest capital growth potential.

What is risk?
Where is standard deviation?
It is a question about goals?
Capital preservation as downside protection and capital growth potential as upside potential.
Behavioral portfolio theory
Questions about goals

Different probabilities for different goals

Risk is the probability of not reaching the threshold level of a goal

I’m virtually sure that my downside is protected
(Almost 100% chance to reach the threshold level of this goal)

I have some chance of upside potential
(20% chance to reach the goal)

I’m virtually sure that my downside is protected
(Almost 100% chance to reach the threshold level of this goal)
Behavioral portfolio theory
How much of your portfolio would you allocate to each goal

- Retirement: 75%
- Education: 13%
- Travel: 7%
- Charity: 5%
# Behavioral portfolio theory

Proportion allocated to each goal

<table>
<thead>
<tr>
<th>Year</th>
<th>Retirement</th>
<th>Education</th>
<th>Travel</th>
<th>Charity</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>75%</td>
<td>12%</td>
<td>7%</td>
<td>5%</td>
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<td>2</td>
<td></td>
<td>$30,000</td>
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<td>5</td>
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<td>...</td>
<td>$70,000</td>
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<td>$1,000</td>
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<table>
<thead>
<tr>
<th>Desired probability of reaching the threshold level of the goal</th>
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<tr>
<td>98%</td>
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</table>
Implementing Behavioral Portfolio Theory

Use Monte Carlo Simulation to find the best sub-portfolio for each goal.

The overall portfolio is the sum of the sub-portfolios
If each of the sub-portfolios is on the mean-variance efficient frontier the overall portfolio is also on the mean-variance efficient frontier.
Question about risk tolerance in the portfolio as a whole

Suppose that you are given an opportunity to replace your current investment portfolio with a new portfolio. The new portfolio has a 50-50 chance to increase by 50% your standard of living in each year during your lifetime. However, the new portfolio also has a 50-50 chance to reduce by X% your standard of living in each year during your lifetime. Circle the maximum X% reduction in standard of living you are willing to accept.

3% 6% 9% 12% 15% 18% 21% 24% 27% 30%

Adapted from Barsky et al (1997)
Risk tolerance around the world
A survey of students in 16 countries and high net-worth investors in 3 countries.

The average downside $X$ is approximately one-quarter of the 50% upside

Men are more risk tolerant than women.

Risk tolerance declines with age.

People are more risk tolerant about their portfolios than about their jobs.

Weber and Hsee’s “cushion hypothesis” holds.
People in “individualist” countries are less willing to tolerate risk than people in “collectivist” countries.
Overconfidence (Unrealistic optimism)
Does good stock picking come from skill or luck? (Asked only in the U.S.)

Some people believe that success in picking stocks that earn higher-than-average returns is mostly due to skill. Other people believe that success in picking stocks that earn higher-than-average returns is due mostly to luck. Please indicate your belief by circling the number on a scale ranging from “Strongly believe that success is due to skill” to “Strongly believe that success is due to luck.”

1  2  3  4  5  6  7  8  9  10

Strongly believe that success is due to *skill*  Strongly believe that success is due to *luck*
Overconfidence (Unrealistic optimism)
Are *you* able to ‘beat the market’?
(Asked only in the U.S.)

Some people believe that they can pick stocks that would earn higher-than-average returns. Other people believe they are unable to do so. Please indicate your belief by circling the number on a scale ranging from “Strongly believe I cannot pick higher-than-average stocks” to “Strongly believe I can pick higher-than-average stocks.”

1 2 3 4 5 6 7 8 9 10

Strongly believe that I *cannot* pick higher-than-average stocks

Strongly believe I *can* pick higher-than-average stocks
Overconfidence (Unrealistic Optimism) and Risk Tolerance

People who think that the stock market is a game of skill tend to think that they can beat the market.

People who think that they can beat the market are more willing to tolerate risk.

(Do we measure risk tolerance or overconfidence?)
Do we have stable attitudes toward risk?

What was investors’ risk tolerance in late 1999?

What was investors’ risk tolerance in early 2003?

The role of fear and exuberance (lack of fear) in risk tolerance.
Insights from investment questionnaires

From August 31, 2000, through March 31, 2001, stocks lost more than 25%. If I owned a stock investment that fell more than 35% in 7 months, I would

- Sell all of the remaining investment
- Sell a portion of the remaining investment
- Hold on to the investment and sell nothing
- Buy more of the investment

From the Vanguard questionnaire
Insights from investment questionnaires

Fear increases our aversion to risk

Is memory of past fear identical to fear we feel right now?
Do you think that now is a good time to invest in the financial markets?

Percent of investors who said Yes

Percent

Source: UBS Index of Investor Optimism
Question

Please rate your level of agreement with the following statement on a scale ranging from “Strongly Disagree” to “Strongly Agree”

“Now is a good time to invest in stocks”

1 2 3 4 5 6 7 8 9 10
Strongly Disagree          Strongly Agree
Affect

Positive affect, like exuberance, increases risk tolerance.
Please circle the number that reflects your perception of the expected return of these investments, from 1 for a low expected return to 10 for a high expected return.

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<th>Low Return</th>
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<td>Google Stock</td>
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<td>General Motors Stock</td>
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<td>Stock Mutual Funds</td>
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</table>
Please circle the number that reflects your perception of the risk of these investments, from 1 for a low risk to 10 for a high risk.

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Affect

Are you attracted to hedge funds? 
Do they seem to offer high expected return with low risk? 
Are you influenced by the positive affect of hedge funds?
The relationship between assessments of expected returns and assessment of risk of 210 companies
Expectations about future returns and realized past returns
Expectations about future returns and realized future returns
Beyond attitudes toward risk
Attitudes toward socially responsible stocks.
The affect of social responsibility
How inclined are you to seek out or avoid companies with a history of the following practices and policies?

<table>
<thead>
<tr>
<th></th>
<th>Seek</th>
<th>Neutral</th>
<th>Avoid</th>
<th>Hold for advocacy</th>
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</thead>
<tbody>
<tr>
<td>In support of abortion rights</td>
<td></td>
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<tr>
<td>Against abortion rights</td>
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<td>Use of animals in development and testing of consumer products</td>
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<tr>
<td>Use of animals for meat, fur or leather</td>
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</table>

Source: First Affirmative
How easily do you adapt when things go wrong financially?

1. Very uneasily
2. Somewhat uneasily
3. Somewhat easily
4. Very easily

Is this a question about risk?

Source: FinaMetrica
Question about regret

“Whenever I make a choice, I try to get information about how the other alternatives turned out and feel bad if another alternative has done better than the alternative I have chosen.”

Please rate your level of agreement with this statement by circling a number on a scale ranging from “Strongly disagree” to “Strongly Agree.”

1 2 3 4 5 6 7 8 9 10
Strongly Disagree Strongly Agree
Question about maximization

“I always want to have the best. Second best is not good enough for me.”

Please rate your level of agreement with this statement by circling a number on a scale ranging from “Strongly disagree” to “Strongly Agree.”

1 2 3 4 5 6 7 8 9 10

Strongly Disagree

Strongly Agree
Attitudes toward regret, maximization and risk

Maximizers tend to feel regret but attitudes toward maximization and regret are not correlated with attitudes toward risk.
Using questionnaires to educate investors before asking for their preferences
Education about global diversification

A combination of international stocks with domestic stocks diversifies portfolios and tends to reduce their risk since returns of international stocks and domestic stocks have historically moved in dissimilar patterns. Examine the graph below to see periods when domestic stocks outperformed international stocks and also periods when international stocks outperformed domestic stocks.
Moving 5-year difference between the returns of the EAFE Index and the S&P 500 Index
Education about global diversification

Domestic investors are often reluctant to allocate much of their portfolios to international stocks because they are less familiar with international stocks than with domestic stocks. Moreover, investors often feel more regret when they experience losses on their international stocks than when they experience losses on their domestic stocks.
Which statement best reflects your concerns over losses on international and domestic stocks?

- I am actually more concerned about losses on domestic stocks than about losses on international stocks.
- I am concerned equally about losses on international and domestic stocks
- I am somewhat concerned about losses on international stocks than about losses on domestic stocks
- I am much more concerned about losses on international stocks than about losses on domestic stocks
- I am extremely concerned about losses on international stocks
Conclusion
The plan for this session

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