Applied Behavioral Finance

Ing. Michal Stupavský, CFA

CFA Society Czech Republic, Member & Newsletter Manager
First Czech book about behavioral finance focusing on behavioral biases of individual investors

Prague
4 October 2013
AGENDA

• Foundations of behavioral finance
• Behavioral biases
• Behavioral corporate finance
Foundations of behavioral finance
Traditional finance versus Behavioral finance

**Traditional finance**

- Normative approach describing how real world should function
- Not able to explain real world interactions
- Homo oeconomicus, rationality
- Continuous dynamic optimization, equilibrium
- Efficient market hypothesis, Modern portfolio theory, mean-variance analysis (expected returns, volatility of returns), CAPM

**Behavioral finance**

- Positive approach describing how real world is functioning
- Based on academic research in cognitive psychology
- (Rational) irrationality
- Emotions, optimism, pessimism, gread and fear dominates all decision-making (under risk)
- Prospect theory (Kahneman, Tverky – 1979), cornerstone of behavioral economics, behavioral biases leading to suboptimal decision-making
Behavioral finance answers questions such as…

- Why do financial markets participants behave in a way which we can daily see?
- Why do investors achieve unsatisfactory returns?
- Why do they hold undiversified portfolios?
- Why do they trade too often?
- Why do they seek only information confirming their previous views and decisions?
- Why do investors tend to sell investments with paper profits too soon and hold losing positions too long?
- Why sunk costs matter?
- Why are corporate managers keen to continue losing (pet) projects?
- Why do they overpay in acquisitions?
- Why investors and managers do not learn from their past mistakes?
Prospect theory – Cornerstone of behavioral finance (Kahneman, Tversky – 1979)

- Fast and successful development of behavioral finance (economics) from 1970s
- Daniel Kahneman and Amos Tversky (academic psychologists) – The most famous paper *Prospect Theory: An Analysis of Decision under Risk* – Econometrica, 1979
- Prospect theory is cornerstone of behavioral finance, behavioral economics overall – descriptive alternative to mainstream expected utility theory
- Framing – Form versus substance, risk-seeking versus risk-aversion depending on losses or gains
- In 2002, Kahneman received the Nobel Memorial Prize in Economics, despite being a research psychologist, for his work in prospect theory, decision making and judgment under risk, i.e. in real world conditions. (Amos Tversky died in 1996)
Value function – Cornerstone of prospect theory (Kahneman, Tversky – 1979)

- Reference point (price), relative values (changes) are important, not absolute values
- Concave in gains, convex in losses
  => Risk-seeking in losses, risk-aversion in gains
- 2 – 2.5 times steeper in losses, people feel losses much more than gains
- Framing – format versus substance – frame can change your decision making completely!
- Mental accounting and disposition effect
Prospect theory versus mainstream expected utility theory

**Value function**
*(cornerstone of prospect theory)*

- Relative values (changes) matter, not absolute values
- Value = \( w_1 v(x_1) + w_2 v(x_2) + \ldots + w_n v(x_n) \)
- Concave in gains, convex in losses

=> Risk-seeking in losses, risk-aversion in gains
- Losses are felt 2 – 2.5 times more than gains of the same magnitude

**Utility function**
*(expected utility theory)*

- Absolute values matter, not relative changes (in wealth)
- Utility = \( p_1 u(x_1) + p_2 u(x_2) + \ldots + p_n u(x_n) \)
- General risk-aversion due to concavity
- Gains and losses are felt in the same way (magnitude)
Prospect theory – weighting function

Value function
(cornerstone of prospect theory)

Weighting function
(second cornerstone of prospect theory)

- Weighting function => Real perception of probability is biased, in contrast to mainstream expected utility theory
- Overweighting of low (and high) probabilities
- Underweighting of medium probabilities
- Value = \( w_1v(x_1) + w_2v(x_2) + \ldots + w_nv(x_n) \)

=> Consistent diversion from expected utility theory predictions within decision-making under risk (in real life)
Mental accounting and disposition effect

- Direct application of prospect theory (Kahneman, Tversky)
- Shefrin, Statman (1985) - The Disposition to Sell Winners Too Early and Ride Losers Too Long: Theory and Evidence
- Disposition effect = Predisposition of investors to hold investment positions with paper losses too long and sell investment positions with paper gains too early
  => In start contrast with mainstream finance; Sub-optimal decisions; Strong implications for corporate finance – sunk costs matter a lot, pet projects
- Loss aversion, risk-seeking in losses, regret aversion bias, confirmation bias
- Some investor will never sell anything with loss „Honey, come on, it will improve, it is only paper loss”
- „Transfer your assets“
- Use stop-losses!
Behavioral biases
Behavioral biases

- Inborn human characteristics/errors documented by academic research in cognitive psychology
- Leading to sub-optimal and irrational decisions – in contrast to standard economics of homo oeconomicus
Framing bias

What does it mean?
• People’s decisions are not based on the form/content of the information/data, but on the form in which it is presented
• => Inconsistent decisions/choices – It has been proved that when we ask people almost the same question, only if we formulate it differently, people consistently answer in a different way (Kahneman, Tversky) => suboptimal decisions

Real life example
• Lives saved versus lives lost – 1) A – 200 saved, B – 33% we save all 600 and 66% that all die => A (C equivalent) (risk aversion); 2) C – 400 certain death, D – 33% probability no one dies, and 66% probability that all die => D (B equivalent) (risk seeking)

Investing
• Investment with a loss, broker might say to a client : a) „Transfer your assets“ versus b) „Sell this losing position (mental account closed/loss aversion/regret aversion) and buy this new investment

How to make better decisions?
• Deep and complex analysis, try to formulate problems and questions differently
Overoptimism bias

What does it mean?
• Everybody wears „pink glasses“

Real life example
• 80% of drivers rate themselves as above-average

Investing
• „My investment performance will be ca 25% every year“

How to make better decisions?
• Think in terms of „probability distributions“
• DCF, Capital projects analysis – be conservative
Overconfidence bias

What does it mean?

• Poor calibration, too narrow confidence intervals => people are surprised more often compared to their expectations, predominantly on the downside; connected to fat-tail problem (VaR, stress testing, sensitivity analysis) and black-swan concept

Real life example

• State 90% confidence interval of number of Africa population => only 50% answers correct => poor calibration, frequent surprises

Investing

• Portfolio return range in one year -5% - 25% => unexpected underperformance of majority of investors
• Too frequent trading (Trading is hazardous to your wealth – Barber, Odean)), Men vs. Women

How to make better decisions?

• Investors should focus on long-term horizon of at least 5 years and do not gamble/speculate, avoid short-term gambling/casino
• DCF, Capital projects analysis – sensitivity analysis/scenarios analysis/stress testing/crash tests – worst case scenarios should be on average even much worse
Illusion of control bias

What does it mean?
• People think they can control random and/or uncontrollable events

Real life example
• Taleb (Fooled by Randomness, 2001) – The real world is much more unpredictable than we think. People interpret the reality in such a way that they form stories that puts well to each other.

Investing
• Internet and online trading (marketing campaigns tell us that it will improve our performance) – Various tools should improve our analytical skills and performance (Barber, Odean) => speculative investments, too often trading (overconfidence, overoptimism)

How to make better decisions?
• Realize that „Investing is probability activity“; world is much more complex and uncertain than you think
• Business strategy/capital project/DCF => pay much more attention to risk analysis/sensitivity and scenarios analysis, stress testing + add business decision making / business strategy complex thinking, do not bases your investment decision only on DCF/NPV
Confirmation bias

What does it mean?
• People generally look only for supportive evidence and disregard contradictory evidence

Real life example
• „My car is the best because this test showed that…, but this test's bad result is not relevant/it was wrong“

Investing
• Demo-account/online trading – 300% performance in 3 months => real investing will be also that good
• Mental accounting, disposition effect, loss aversion, regret aversion => we look for confirmation that our decision (and currently big paper loss) was right and avoiding contradictory evidence

How to make better decisions?
• 1) Why not invest in this asset – contra-confirmation, and then 2) why invest; take into account all facts and info, only this way of thinking and decision making will allow you to learn from past mistakes
• CAPEX management – Sunk cost problem, pet projects, regret aversion bias
Anchoring bias

- 21st Century Investor – Book signing on 25 September 2013 – Wladimir Klitchko example
- Forget about price you bought the share for
- Before any negotiation/discussion be well prepared and have your own strong view not to be anchored by the other party’s viewpoints
- Valuation – reverse engineered DCF models → what is the current market price implying/pricing, fundamentally justified price multiples

Self-attribution bias

- “Our successes are caused by our skills, knowledge and hard work“
- “But our failure are caused by some else or bad luck“
- => people do not learn from their past failures and mistakes!

Montier’s decision matrix:

<table>
<thead>
<tr>
<th>Good result</th>
<th>Bad result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge and good analysis (might have been good luck, but lets be generous)</td>
<td>bad luck / noise traders’ risk (irrationality of the masses)</td>
</tr>
<tr>
<td>Good judgment</td>
<td>Bad judgment</td>
</tr>
<tr>
<td>Good luck</td>
<td>Mistake/fault</td>
</tr>
</tbody>
</table>
Under-reaction and over-reaction

• People systematically underestimate and under-react to abstract, statistical and highly relevant information, and on the contrary, overweight and overreact to striking, noisy but much less relevant information and data.
• Stock market – Outperformance of losers and underperformance of winners (Werner de Bondt) – 1985 – Does stock market overreact? => contrarian investing rocks!
• Overreaction to earnings season compared with under-reaction to long-term fundamental trends in the company (industry)
• Noise-traders risk (irrational investors) – Big risk to fundamental (relatively rational) investors – market inefficiencies can even increase…yes, mean-reversion, but only in the very long-term horizon of several, rather many years

Conservatism bias

• We do not want to change much our opinions, our past decisions, and especially accept others’ opinions which differ/contradict to ours
• It causes slow decision making in investing, connected to under-reaction
• Do not procrastinate, be proactive, do not be among the average!

Ambiguity aversion bias

• People are too cautious, home-bias
• How to be better? => continuous studying on your own! Be expert in your area, be excellent!
Availability bias

- Deaths in the US – Sharks or fall airplane parts? Falling airplane parts 30 times higher probability!
- Barber, Odean (2007) – All that glitters – Investors are buying stocks that are somehow grabbing their attention

Endowment effect

- Professor of economics – French wine; MBA students – tea cups
- Causes disposition effect – „irrational premium“ to assets we have in our portfolio
- Experience lowers endowment effect

Hindsight bias

- James Montier – Tech bubble – „They invested into it, but regard it now as a bubble“
- A went up, because B went up, because C went down ⇒ story making
- ⇒ do not think in terms of stories, think rather in probability distributions; BUT when making interviews, speaking on CNBC, speaking rather in stories 😊
Behavioral corporate finance
Behavioral corporate finance – key issues

- Behavioral finance holds important implications for the practice of corporate decision-making.
- **Key behavioral biases in place:**
  - Overoptimism and overconfidence
  - Confirmation bias
  - Loss aversion
  - Framing bias
  - Self-attribution bias
- Despite the advice offered by Brealey and Myers (Principles of Corporate Finance), corporate decision-makers often treat sunk costs as relevant.
- Visibility, pet projects, loss aversion bias.
- Group (committee) decision-making often amplify individual errors.
- Agency costs – Separation of ownership and managerial control.
- Behavioral influences are akin to agency costs.
- Behavioral biases influencing managers can dominate financial interest of shareholders (owners).
Capital structure, IPOs

Pecking order of financial choices:
- Internally generated funds / retained earning
- Debt capital
- Equity capital (SPOs, capital increase)

Key features of initial public offerings (IPOs):
- Initial underpricing
- Hot markets
- Long-run underperformance

Long run underperformance of IPOs:
Overwhelming evidence suggest this is cause by serious investor over-optimism.
Under-reaction and over-reaction of investors

- Stock repurchases (stock buy-backs) are a signal that corporate managers feel the stock of their firm is seriously undervalued.

- Stock market appears to under-react to the information inherent in corporate announcements.


- „On thing is very clear, investors should in general be very sceptical of any firm seeking to raise funds in the market place. IPOs, SEOs (SPOs), convertible bonds, stock-finance mergers and acquisitions all bode badly for investors. Extreme caution should be exercised before investing in stocks that offer up a good story in return for further financing.“

=> Be contrarian investor!
Behavioral finance – References

SUMMARY

• To be an expert in standard mainstream finance is not enough to be top-tier finance professional in 21st century

• Good working knowledge of behavioral finance is an essential complement which pushes you up in the „league-table“ of finance experts

• Work on your „behavioral resistance“ and do not fall into behavioral traps

• Knowledge of behavioral finance, and behavioral biases in particular, is applicable in all areas of business, e.g. consulting, business negotiation, corporate communication, marketing, HR, etc., and significantly improves your performance.
Questions?

Ing. Michal Stupavský, CFA
michal.stupavsky@czechcfa.cz