

Written Exam for the M.Sc. in Economics, Winter 2010/2011

Behavioral Economics and Finance

Master's Course

(2-hour, closed book exam)

The exam consists of 3 different questions (with sub-questions). Answer as much as you can.

Good luck.

(1) Heuristics: When people make judgments about the likelihood of uncertain events they use heuristic rules (e.g. Kahneman & Tversky (1972), De Bondt (1993))

(1a) Explain the “representativeness heuristic” and how this is used to explain the “hot-hand”- and “gambler’s”-fallacy.

Answer: Many decisions that we have to take depend on beliefs concerning uncertain events. We usually express these beliefs as odds or subjective probabilities. Traditional economic theory assumes that these subjective probabilities are determined using Bayes rule.

See lecture 5 for a definition of Bayes rule.

However, psychologist and experimental economists have found that people use heuristics to determine these subjective probabilities. Heuristics are rules of thumb. One of these heuristics is called representativeness heuristics. Definition of the representativeness heuristic: A person who relies on representativeness evaluates the probability of an uncertain event by the degree to which it is: (i) similar in essential properties to its parent population and (ii) reflects the salient features of the process by which it is generated (see also the required reading to lecture 5).

Using the representativeness has (among others) two consequences: First, in cases where people do not know the data-generating process, they will tend to infer it too quickly on the basis of too few data points: Hot-hand fallacy. Example: people using this heuristic will come to believe that a financial analyst with four good stock picks is talented because four successes are not representative of a bad or mediocre analyst. Second, in cases where people do know the data-generating process, a second consequence of using representativeness is: the gamblers fallacy. Gamblers fallacy is the belief that if deviations from expected behavior are observed in repeated independent trials of some random process then these deviations are likely to be evened out by opposite deviations in the future. Example “Gamblers fallacy”: If an observer is sure that a particular fund manager invests successfully close to half the time even over short intervals, then he thinks that success in one year implies less than 1/2 chance of success in the following year.

(1b) The representativeness heuristic influences forecasts of financial risk and return. De Bondt (1993) studies the return expectations and the risk perceptions of financially unsophisticated agents. Explain his analysis and results.

Answer: The detailed answer can be found in the description of De Bondt’s analysis in De Bondt (1993), ‘Betting on trends: Intuitive forecasts of financial risk and return’, International Journal of Forecasting 9, 355-371.

In synthesis: De Bondt presents different studies in which people had to make forecasts of stock prices and exchange rates. The analysis supports two major results. First, many individuals

predict asset prices by extrapolating from past trends. Second, the subjects exhibit caution in their projections of the range of future prices. They hedge their forecasts. If a large price increase is predicted, the subjective probability distribution of future prices is left-skewed, recognizing a possible decline (and, vice versa, if a price decrease is expected).

(2) Prospect Theory: Against the background of a lot of experimental evidence at odds with “expected utility theory” Kahneman and Tversky (Econometrica, 1979 and Journal of Risk and Uncertainty, 1992) developed “prospect theory”.

(2a) Explain the difference between “expected utility theory”, “prospect theory” and “cumulative prospect theory”.

Answer: Expected utility theory is the traditional theory used to analyze choices under risk and uncertainty in economics. However, in the last 30 years a lot of experimental evidence has been generated suggesting that certain assumptions underlying expected utility theory do not hold in reality. Two important assumptions that do not seem to hold in reality are the independence axiom (see lecture 6 for a definition) and the fact that people evaluate risky objects using absolute levels of e.g. wealth. Against this background Kahneman and Tversky (Econometrica, 1979) suggest a descriptive model of choices under risk and uncertainty which takes into account these and other experimental findings: prospect theory.

See lecture 6 and 7 for a definition of the original version of prospect theory. **Note**, the answer should contain some definition/description of prospect theory, so as to better understand the difference between the theories asked for in the question.

In 1992 Kahneman and Tversky (Journal of Risk and Uncertainty, 1992) present a new extended version of prospect theory that employs cumulative rather than separable decision weights. This version, called cumulative prospect theory, applies to uncertain as well as to risky prospects with any number of outcomes, and it allows different weighting functions for gains and for losses.

See Kahneman and Tversky (Journal of Risk and Uncertainty, 1992) and lecture 7 for a definition of cumulative prospect theory. **Note**, the answer should contain some definition/description of prospect theory, so as to better understand the difference between the theories asked for in the question.

One important difference between the original version of prospect theory and cumulative prospect theory is the fact that in the cumulative version of prospect theory extreme outcomes are overvalued and not small probabilities as in the original version. See also the example in Lecture 7 slide 26.

(2b) In the original version of prospect theory Kahneman and Tversky (Econometrica, 1979) introduce the assumption of “subcertainty”, “subadditivity” and “subproportionality”. Explain what these assumptions are and why Kahneman and Tversky introduced them.

Answer: Subcertainty, subadditivity and subproportionality are assumptions Kahneman and Tversky (Econometrica, 1979) make with regard to the decision weights. Decision weights are functions of probabilities indicating how people perceive outcomes that occur with certain probabilities. Kahneman and Tversky (Econometrica, 1979), for example, report the finding that people overweigh outcomes that occur with very small probabilities. All in all, the assumptions of subcertainty, subadditivity and subproportionality capture some persistent experimental findings concerning the way people perceive probabilities / weigh outcomes. For a definition see Kahneman and Tversky (Econometrica, 1979):

- page 280-281 for ‘Subadditivity’
- page 281-282 for ‘Subcertainty’
- page 282 for ‘Subproportionality’

Note, the answer should contain some definition/description of these concepts.

(3) Behavioral Corporate Finance:

(3a) Baker et al. (2004) describe that when investors are irrational and, hence, mispricings exist in markets, the objective of rational/smart managers extends beyond fundamental value maximization. Explain what other objectives rational investors might have and how they depend on their planning horizon.

Answer: See lecture 11 slides 10 – 16.

(3b) Consider the following problem: there is a company that is debt constraint, i.e. it cannot take on any debt, but it has 400 mill DKK in resources that it can either spend on an investment project or to e.g. repurchase stocks. The manager in this company believes that the stock of the company is undervalued by 10%. He has to decide whether to finance a project which costs 400 mill DKK and has a net present value of 100 mill DKK or use the cash to repurchase shares. What should he do? What is the implicit hurdle rate that an investment project would need to be worth more than repurchasing stocks?

Answer: The manager can either invest the resources he/she has into the project which will give him a (net of investment) payoff of 100 mill DKK. If he uses the funds to repurchase the undervalued shares he will generate (net of investment) payoff of 40 mill DKK (10% of 400 mill DKK) when the shares go back to the fundamental value. Hence, the manager should use the funds to invest into the project rather than buying the undervalued shares.