

Decision theory assignment



**ASSIGN
BUSTER**

This course is about how to make good models as well as how to distinguish a good model from a bad one. In the study of models and how they relate to decision making we try to find the middle ground between the perspective of the parachutist and that of the truffle hunter. We focus on evaluating uncertainty, understanding the dynamic nature of decision-making, using historical data and limited information effectively and simulating complex systems. Since the topics are quantitative in nature it may be useful to summarize and dispose of the usual objections against them. Objection #1: Not everything can be reduced to numbers. True. But a great deal of importance can. Objection #2: Workable quantitative models cannot capture the complexities of real life. So what? The question is not whether a particular quantitative model accurately represents reality but whether there is an alternative model that is more accurate. How do we know that a decision arrived at by what we call instinct (or intuition, experience, etc.) has really acknowledged all the complexities of reality? Indeed, one of the beauties of quantitative models IS their explicitness.

Like Cromwell portrait they appear warts and all. ; Objection #3: The data requirements of quantitative models are prohibitive. This objection had some merit 20 years ago. Given the state of modern computing it is an excuse for laziness. One of the useful features of a quantitative model is that it tells the decision maker what information s/he should be collecting. ; Objection #4: Quantitative models ignore the context. Yes. However, there is no law that obliges one to follow the recommendations of a quantitative model that IS not appropriate to the context. Second, ignoring the context can be a good thing.

Frequently, the context of a decision is irrelevant. A quantitative model often captures the essence of a decision, say, the choice between a gamble and a sure thing. It does not matter whether the context is the stock market, a medical diagnosis or wildcatting. This allows for the transfer of insight from one setting to another. An example of this is the use by hotels of the same models and principles that airlines use for yield management. A more revealing example comes from experiments on auction behavior: The subjects were managers responsible for submitting bids on construction projects.

The goal was to see whether these managers made bids in accordance with the optimal bids of the standard (quantitative) auction model. As long as the auctions were couched in the context of the construction industry, the answer was yes. However, when subjects were presented with the same auction scenarios, but the context changed (for example, to oil leases) they did remarkably badly. Why? The bids they made were derived through the use of rules of thumb that were specific to their industry. When the context switched, their rules of thumb became useless.

One might argue that this is not important as few people are going to switch industries mid-career. Not so. Suppose that the rules of thumb are tied to characteristics of the industry at a particular time. As time changes, those characteristics change, until eventually those rules become useless. (Note: this is also the reason for having a course not tied to a particular functional area of business). Perhaps the most surprising thing that you will learn from this course is that simple quantitative models frequently provide profound qualitative insights into the process being modeled.

Thus, one may wish to build a model not so much to decide what to do, but to test and refine one's intuition about what is going on.

3 Grading There will be individual and group homework assignments (labeled accordingly). You are responsible for forming your groups, each with four people. Each group should hand in one submission for the whole group per group assignment. There will be a midterm exam that will be handed out at the end of class during week 6, and that will be due at the beginning of class during week 7. There will also be a cumulative final exam as per the Kellogg exam schedule. Ay " cold call" students in class. Therefore, keep up with what has been going on in class and be prepared for such questions. Your final grade will depend on ; Homework (20 %) ; Midterm (30 %) ; Final (50 9'0) Class Participation will be used at the margin. Homework assignments should be handed in at the beginning of class on the due date. Homework solutions should be entered into the template that will be provided on Blackboard. Submissions that are not will be penalized. In particular, please format your responses so that the answer appears first and is clearly demarcated, followed by an explanation.

No late work will be accepted. If you cannot attend class, you may email or fax your homework to me. Some homework will require you to download data files from the course homepage, which is accessible from the Blackboard course management yester. The final exam will take place according to Kellogg exam schedule and will be two hours long. Exams are individual, open-book, open-notes, and timed; computer use will be required. It is likely that I will be abroad during the week of the final (although I will be

accessible via email), so plan ahead and do not leave questions to the last minute.