

### Skeletal Solutions to Problem Set 3

1) The key thesis of the Blois article is that computers will be useful for making decisions in very narrow contexts, but will not be able to handle situations in which a “broad” knowledge base and perspective is required. Recall Figure 1, the horn-shaped diagram representing problems of varying complexity. The question is whether we think (ex ante) that predicting recidivism requires a narrow or broad base of knowledge. Meehl’s results (reported in Blois) suggest the former. You might choose to believe the latter, but the onus is on you to square that belief with Meehl’s results (one attempt follows).

It is curious that the parole board would not do as least as well as the regression, given that they have access to the same data and then some. This raises an interesting side question: should/does society allow the parole board to discriminate on the basis of the cited characteristics. Imagine the firestorm of controversy that would result from including not just age but also race or gender or religious heritage in the decision rule. It might be that the parole board is ignoring these immutable characteristics (due to societal or political pressures?) in favor of their assessment of the person’s “character.”

2a) Basically, it depends. Many different types of responses are possible. The two key questions you should ask (and speculate upon) are

1. How does the repair database affect the relative productivities of workers from different types skill categories?
2. How will the organization solve the “public good” problem and get mechanics to actually take their time to post new solutions to this database?

It seems reasonable to posit that the solutions will raise the productivity of low-skilled mechanics relative to high-skilled ones in certain circumstances, for a given repair job. This is, of course, provided that the low-skilled guys are sufficiently literate and numerate that they can work with the new information. On the other hand, the workers who know how to solve new problems and communicate those solutions to the rest of the organization become much more productive since their work can save lots of effort at other dealership. Whether this shows up in their wage depends on what this firm does about point 2.

2b) In this example, there is ostensibly a large benefit to pooling information across sites (parole boards in this case).

2c) Since the TA himself does not see an obvious analogy, any semi-sensible answer will be accepted here.

3a) You would start with the dataset containing detailed histories of credit-card use and information on whether any of that use had been fraudulent. These data could be used to “train” the neural net to recognize (statistically) circumstances in which fraud is likely taking place. Out of sample, the routine can then be fed the purchasing data and will “beep” when it encounters a pattern of data that resembles fraudulent use in the past.

3b) Obviously this same task could be programmed using rules-based statements. One advantage would be “transparency”: we’d know exactly what the decision rule is. A disadvantage is that we would have to specify all of the possible cases and work through the “optimal” decision in each one. The set of variables may be too numerous for this to be practical (combinatorics!).

4) Thesmar and Thoenig present a model of innovation in which firms face a choice between (i) an IRS technology with a high fixed cost and low marginal costs and (ii) a CRS technology with no up-front cost but high marginal costs. This generates a trade-off between efficiency and flexibility. In an unstable economic environment, firms will tend to opt for the flexible technology. On the other hand, in a stable environment firms will prefer the IRS technology since they can eventually recoup their fixed cost.

The question is: how does IT affect this trade-off? So many possibilities. One thought is that IT allows the IRS technology to be more flexible, thereby dulling your incentive to adopt the CRS technology. T&T have a different idea. A higher rate of technical change is like more instability and this biases adoption further towards the CRS technology. If IT has brought about more innovation...