Final

May 6, 2009

Name:

I'm very sorry that I was not able to be at your final today. I had to organize a large meeting this week, and this was the only time that we could all meet.

You know the drill:

- Act with integrity and keep your eyes on your own work
- Sit so that you have as much space around you as possible (e.g., try to have an empty desk between you and other students.)
- Put your hats backwards and take off any sunglasses
- You may use a calculator
- Your answers should be detailed and well-written. Any graphs should be explained. Ask if anything is unclear.

If you are graduating, congratulations! If not, I hope to see you around campus. Have a wonderful summer.

1. (Short answer) Albuquerque Recycling is considering investing in a machine that will allow it to process recylables more quickly. It has been told by the city that it can only invest in the machine if the machine will pay for itself over time. The machine costs $500,000 and will last for 7 years. Buying the machine will increase revenues by $100,000 per year for each of the seven years. If the interest rate is 10%, should Albuquerque Recycling buy the machine?

2. (short-answer) Suppose Pat's utility function is $U = w^2$, where w is weekly income. Pat is currently earning \$100 per day. If Pat stays in this job, Pat will earn this income with certainty. Pat is offered a new job in the fishing industry. This job is riskier. With 0.5 probability Pat will not get injured and will earn a weekly income of \$150. With 0.5 probability Pat will get injured and will only earn \$10.

   (a) Should Pat take the job? Why or why not?

(b) We observe that Pat's friend Chris makes the opposite decision from Pat. Chris's utility function is $U = w^{0.5}$. Explain the fundamental reason why Chris and Pat make different decisions. (Note: I'm not expecting you to make calculations for Chris.)

3. (short-answer) In 1994, federal regulators mandated that the Manistee River in Michigan switch from peak-flow operations to run-of-river flow. Peak-flow maximizes water flow through hydropower turbines during periods of peak elec- tricity demand. Run-of-river flow tracks natural stream flow, with water releases from the dam approximately equal to water flows into the reservoir above the dam on a continu- ous basis. The benefits and costs of this this change were recently calculated and are reported in Table 4. Was the decision by the federal regulators economically justifiable? Why or why not? Is this conclusion robust?

TABLE 4

SUMMARY OF ANNUAL COSTS AND BENEFITS

Costs	$
Thermal electricity production	310,612
	[219,132–402,094]
Benefits	
Emission reductions	[67,756–246,680]
Recreational fishing	738,400
	[301,900–1,068,600]

Notes: Costs and benefits are reported in 2001 dollars. Numbers in brackets indicate the range of estimates. The range of estimates for the costs of thermal electricity production and recreational fishing benefits are based on 95% confidence intervals. Numbers not in brackets are point estimates. There is no point estimate for benefits of emission reductions.

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4. (essay) Green Bay has very high levels of PCBs. These PCBs are from pollution released by paper mills that used to operate in the area. PCBs have been passed through the food chain and now exist in very high levels in the fish, which can be passed through to humans through consumption. PCBs can cause learning developments in children who eat the fish. In addition, women who eat a lot of the fish can have children with developmental disabilities, even if they weren't yet pregnant when they ate the the fish. As a result, Michigan and Wisconsin have released Fish Consumption Advisories (FCA) that say how often the fish should be eaten. These FCAs vary by type of fish and range from 'Do Not Eat" to 'Eat as often as you would like'. The four most common fish that are caught in Green Bay are: Walleye, Yellow Perch, Trout/Salmon, and Bass. The federal government is suing the paper mills that released PCBs. In going to court, they want to ask the mills to pay an amount that would compensate Green Bay fishers for the losses they have experienced because of the PCBs.

   (a) Write a short essay comparing the pros and cons of the different possible methods for assessing this value.

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(b) What personal characteristics do you think might affect willingness to pay?