

Increasing Online Student Engagement with Gamified Economics Logic Puzzles

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Puzzle 1: Where Did Nigel Go?

Discuss the following puzzle with the folks around you.

Nigel, your eccentric British friend, tells you about a recent American holiday:

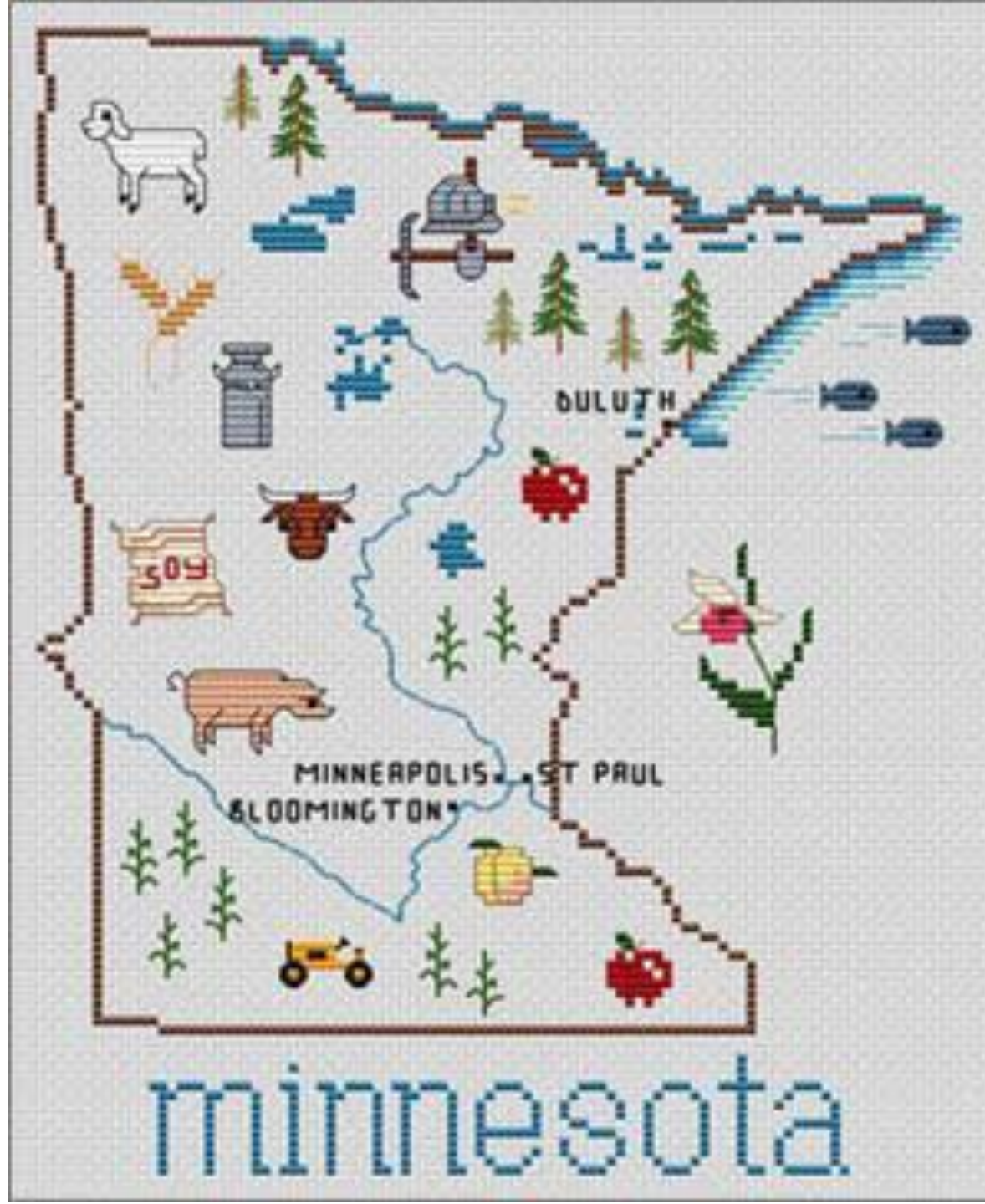
- I flew nonstop from Heathrow to an airport somewhere in the contiguous 48 states. I hired a car at the airport and spent two weeks driving around the country.
- I traveled the entire way by car, and I never put the car on a boat or a plane. I stayed within the contiguous 48 American states the entire time.
- I crossed the Ohio River exactly once, the Missouri River exactly twice, the Mississippi River exactly three times, and the Continental Divide exactly four times.
- I drove all the way to the Pacific and Atlantic Oceans, as well as to the Gulf of Mexico and the Canadian border.
- At the end of my holiday, I returned the car to the same airport where I hired it, and then I flew nonstop back to Heathrow.

What is the only U.S. state that you can say for sure Nigel visited during his recent American holiday?

Learning Outcomes for “Econ Puzzles”

The objectives for the project were to:

- Increase student-to-student interaction in an online course
- Increase instructor-to-student touch points
- Provide opportunities to apply learning to real world

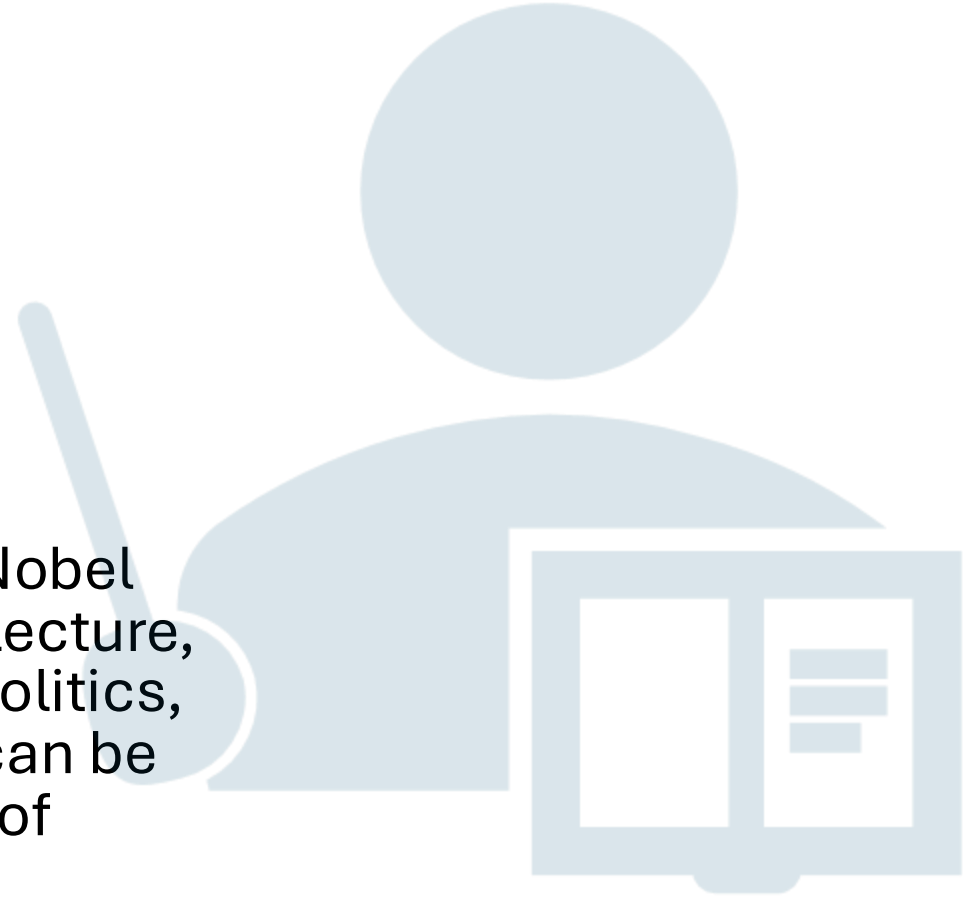


Roeder, 2018, p. 12
Image: Sue Hillis Designs, 2019



Clue #1

The mystery economist won the Nobel Prize in Economics. In their prize lecture, they shared how sociology, law, politics, business, and many other fields can be studied using the methodologies of economics.



Puzzle 2: Apocalypse Now (Or Later)

This puzzle has a 90-second time limit. Please work alone.

Imagine you are the mayor of a besieged medieval town with a finite stock of food. There is no probability that the besieging army will quit or be driven off. The probability that your citizens revolt depends entirely on the rate at which food is consumed.

Suppose that the probability of revolt is a linearly decreasing function of the rate of food consumption.

- The probability of a revolt during a given week is 1.0 if no food is consumed that week
- The probability declines linearly with the level of food consumption during the week
- There is a point where the probability of a revolt is 0.0 (and remains so if more food is consumed)

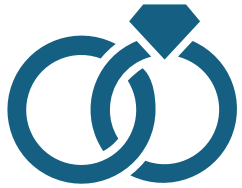
Given an initial stock of food, what is the time path of weekly food consumption that maximizes the expected longevity of the regime before the revolt? Is it better to consume a lot now and avoid the chance of a near-term revolt? Or is it better to consume less now to stretch supplies and postpone the day of zero food?

Extra Credit: Will food consumption rise, fall, or stay constant as the siege prolongs?

Answer #2

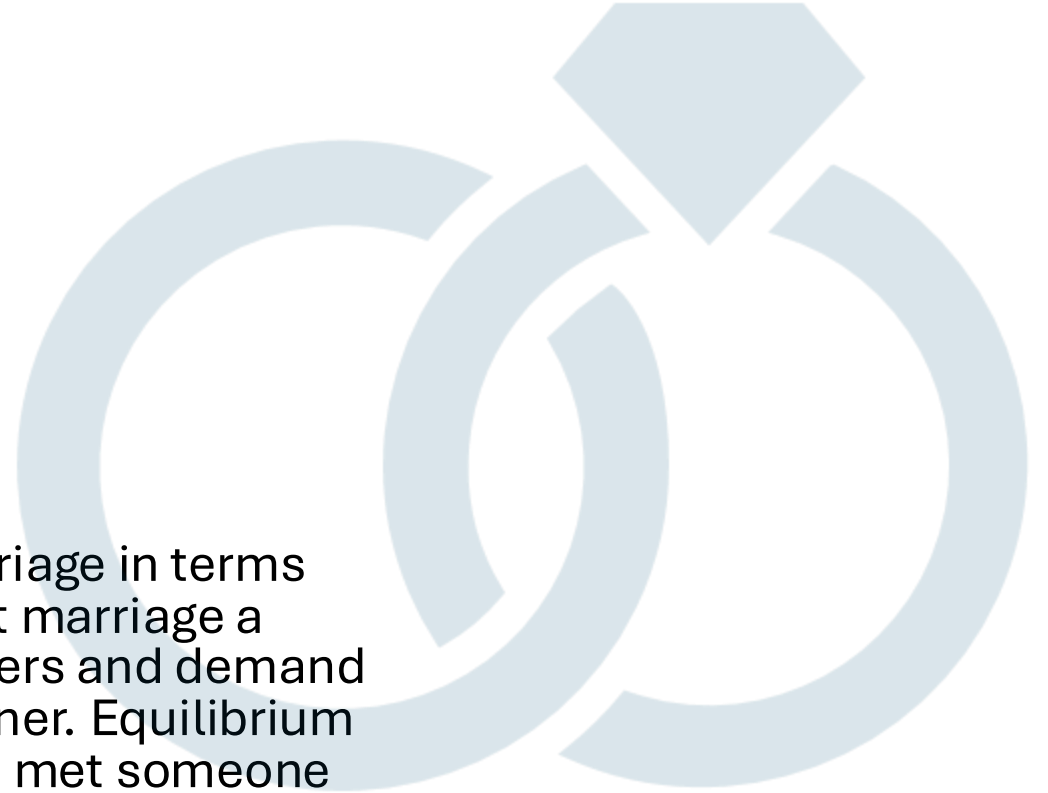
- “The optimal consumption strategy is to consume a constant amount of food per week, just enough to keep the revolt probability at zero, and continue doing so until the supply runs out.” (Nalebuff, 1989, p. 181)
- Application: the “resource curse” or “paradox of plenty”





Clue #2

- The mystery economist discussed marriage in terms unlike Hallmark or Zales. They said that marriage a market with a supply of potential partners and demand from other suitors for each type of partner. Equilibrium occurs when someone decides they've met someone that is a “good deal” according to what they bring to the marriage market.
- Note that this is a matching market - the partner must also feel the same way about the suitor relative to their other prospects!



Assignment Design: Econ Puzzles

- Discussion in each unit with one puzzle or riddle to solve
 - Whole week to respond (student-to-student interaction)
- Post-first
 - I keep the discussion moving but otherwise stay out
- Response -> Clue (instructor-to-student interaction)
 - Compile weekly awards to determine the Mystery Economist
- Quest -> Marginal grade improvement (the ultimate gamification)

Puzzle #3: Superfluous Buns



Father of the Bride. Directed by Charles Shyer, Touchstone Pictures, 1991.



Answer #3

- Hot dog buns are made by bakers who supply other products - hamburger buns, bread rolls, sliced bread, cakes, etc. The standard size for a baking pan holds four hot dog buns
- It would be expensive to buy and store customized pans for one type of good, so hot dog buns come in multiples of four (including 12, Mr. Banks)
- Source: National Hot Dog and Sausage Council, 2016

Clue #3



Arguing that a ban on the market for human organs constitutes a price ceiling at \$0, the mystery economist said that a free market in organs would reduce overall harm.



They said that binding price ceilings create shortages, which are relieved by inefficiency, illegality, or reduced safety, which could be reduced through a freer, regulated market.

“Puzzle” 4: Why do discussion boards suck?

Discuss the following puzzle with the folks around you.

Consider these points:

- Online courses with more opportunities for student-to-student and low-stakes instructor-to-student interactions are rated as more engaging
- Engagement is associated with positive outcomes such as course completion, learning outcomes, and program retention
- Discussion boards are a way to have more student-to-student and low-stakes instructor-to-student interactions

And yet, students don't want to complete discussion boards.



Clue #4

- The mystery economist analyzed the decisions of criminals using cost-benefit analysis:
 - The benefits of a crime are the likely gains multiplied by the likelihood of a successful crime, while the costs are the likely punishment multiplied by the likelihood of getting caught.
- They argued that this is a reason for increasing the costs of crime (increasing the likelihood of catching the criminal, making punishments worse, etc.)



Puzzle 5: Manhattan vs. Manhattan

Why are round-trip
airfares from Manhattan,
Kansas to Manhattan,
New York generally
cheaper* than round-trip
tickets in reverse?

**In July, Google Flights gave me \$254
compared to \$368 to travel round-trip
leaving today for one week*



Factor of PED Perspective	Time Horizon	Available Substitutes	% of Budget	Income Elasticity
Kansan	Flexible, can wait for a good deal	Flexible, can go to other tourism spots or even other parts of NYC	Likely to be a significant purchase overall, will look for deals	Likely to be a “luxury” experience; ↑ Y = ↑ NYC
New Yorker	Inflexible, must be there for work or family	Inflexible, one convenient airport and fixed reason for travel	Likely to be relatively lower budget item	Likely to be an “inferior” experience; ↑ Y = ↓ KS

- Kansans going to New York are probably on vacation.
- New Yorkers going to Kansas are probably flying for business or some other nonleisure activity like visiting family.

Answer #5: Price Elasticity of Demand



Clue #5

- The mystery economist wrote about family dynamics too. They said that if one sibling is selfish and causes harm to another, the parents would compensate the one who is harmed.
- Thus, the selfish child would have an incentive to behave well – simply to maximize their inheritance!



Mystery Economist

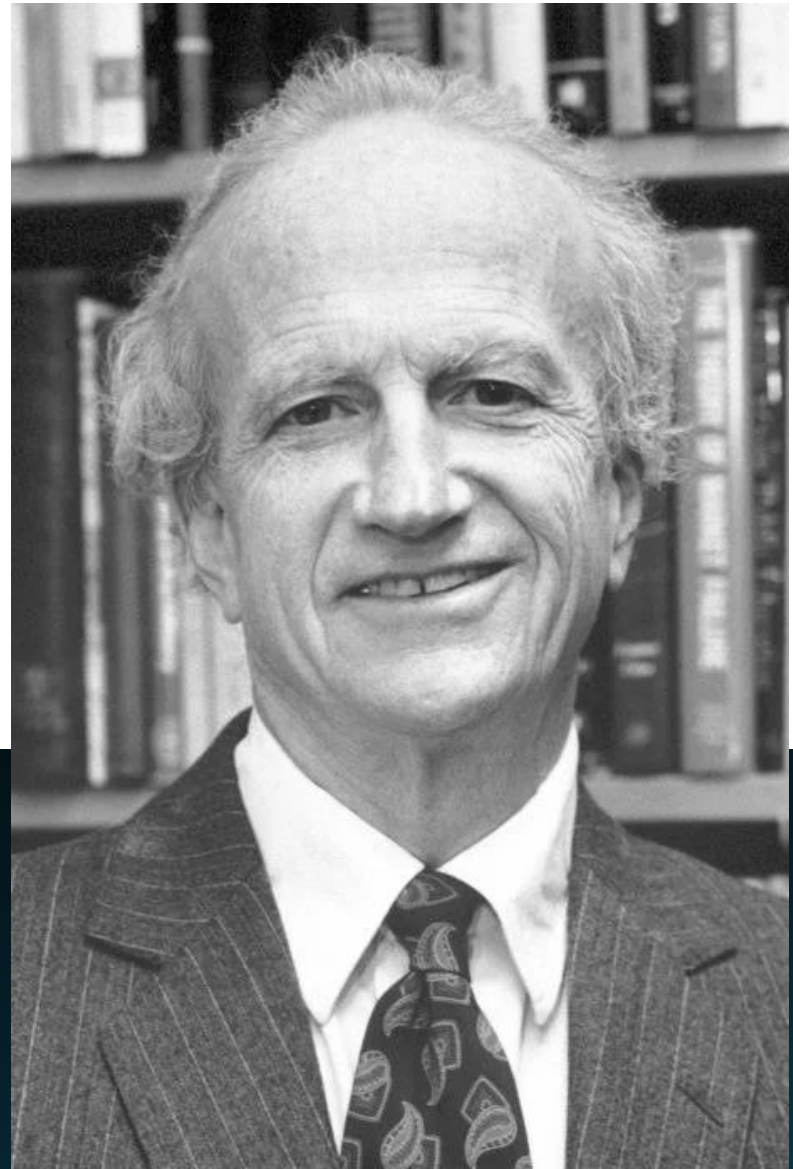


Photo from the Nobel Foundation archive