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Dean Karlan

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Centre for Economic Policy Research
33 Great Sutton Street, London EC1V 0DX, UK
Tel: +44 (0)20 7183 8801
www.cepr.org

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Abstract

The reality television show Survivor has been a ratings success on CBS for over 16 years. In the show, 16 strangers are marooned in a remote location, required to compete in physical and mental challenges, and periodically vote to eliminate players from the game. The last person remaining wins one million dollars. I use this popular television show to demonstrate three important lessons from principles of microeconomics: (a) for individual decision-making, concepts like pride and honor may belong in the utility function, alongside more classical components such as consumption of goods and services, (b) thinking through how others will respond to your action is critical for good economic and strategic thinking, and (c) repeated interaction can help collusive behavior hold.

JEL Classification: A22, C70, C73, D10, D11

Keywords: Survivor, preferences, Behavioral economics, Game theory

Dean Karlan - dean.karlan@gmail.com
Yale University and CEPR

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Short title for running header: Economics in Survivor

Dean Karlan
Department of Economics, Yale University, New Haven, CT USA

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Contact: Dean Karlan; dean.karlan@yale.edu; Samuel C. Park, Jr. Professor of Economics, Yale University, P O Box 208269, New Haven, CT 06520-8269, USA.

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The television show *Survivor* provides several opportunities for teaching ideas often covered in principles of microeconomics. The American version of the reality show is highly successful. Premiered in 2000, the show is currently airing its 34th season with the contract already renewed for the next year. Its first eleven seasons were among the top ten most watched shows in the 2000s. The show has been nominated and given several Emmy Awards, including Outstanding Special Class Program and Outstanding Reality-Competition Program. Thus many students taking principles will have seen the show, and it hopefully will be an engaging application that is fun, captures their attention and imagination, and manages to distill a lesson from principles teaching.

I put forward three examples. The first example fits well in an early lecture in principles of microeconomics about preferences or utility functions. The second example fits well either in a lecture on strategic behavior or game theory. While game theory often is not included in principles courses, I believe it provides a fun and engaging topic for students, even if merely as a brief teaser of opportunities in further coursework. The third example fits well in a lecture on oligopolies or also game theory.

HOW THE *SURVIVOR* TELEVISION SHOW WORKS

Each season, around sixteen contenders are marooned to a distant tropical location where they are divided into two to four initial "tribes." Tribe members live and work with each other, providing food, water, fire, and shelter for themselves. In the first half of the season, each episode consists typically of two competitions. In the first competition, the two tribes compete against each other for a reward, typically food but also often fishing equipment, or tarp and

pillows. In the second competition, the two tribes compete for immunity. The tribe that loses the immunity competition then goes to a “tribal council,” a meeting where contestants from the losing tribe first discuss the game and then vote privately on someone from their own tribe to remove from the game. Often there are also “hidden immunity idols”, which is a physical trinket essentially that is hidden somewhere on the island. If an individual finds the hidden immunity idol, they can keep it hidden and play it at the tribal council after votes are cast, invalidating any votes cast against themselves (or they can give the idol to someone else, and it invalidates votes cast against that person). Tribes are often reshuffled after a few episodes. And then about halfway through the game, when there are about 10 to 12 players remaining, the tribes merge.

After the merge, there are no tribes, and thus no longer a concept of tribe immunity. Of course there are still “coalitions”, i.e., players who chose to collaborate and vote together, and typically coalition boundaries are the same as the prior tribe delineations. After the merge, individuals compete in individual immunity challenges, with the winner being immune from being voted off in that episode’s tribal council. The players voted out after the merge go into what is called the “jury”. Jury members watch (but do not speak at) all subsequent tribal councils. Then, once the game is down to either two or three players, there is one final tribal council. At this tribal council, the jury members (i.e., the most recent 8 to 10 players voted off) get to vote for one of the finalists to win one million dollars.

There are no rules for why and how the jury should vote, albeit there are some traditions. Jury members tend to reward people for “playing a good game.” Of course some of it is simply a popularity contest. Jury members often talk about three aspects of someone’s game: challenges (Did they compete well in challenges, earning themselves immunity along the way?), social (Were they well liked?), and strategic (Were they savvy about figuring out who to vote out when,

who to trust and not trust, when to break a coalition and when not to, etc.?).

Example 1: An Honorable Defeat

In the final episode of *Survivor: Cagayan* (Season 28), Woo Hwang showed that some players prefer an honorable defeat to a strong competitor to a wimpy victory that came about only through avoidance of the strongest competitor. The game came down to the final three survivors: Woo Hwang, who played the game with an entertaining and easy-going attitude, but also one that did not garner tremendous respect from his peers; Tony Vlachos, who was popular and seen as instrumental in coalition forming and strategic thinking throughout the game, and perceived as likely to win many jury votes out of respect for how hard he played the game; and Kass McQuillen, whose defection from a coalition and somewhat blunt personality put her at odds with several other players.

The winner of the final immunity challenge would secure a spot in the final two, and would pick which of the other two would compete in the final tribal council. Before the final immunity challenge, Woo and Kass agreed that if one of them won the challenge, their smart move was to vote out Tony. Tony was the strongest player, was well liked, and thus would likely beat either Woo or Kass in a final tribal council vote by the jury. Thus Woo and Kass agreed to take each other to the final tribal council and vote.

Woo then won the immunity challenge. Tony tried to convince Woo to vote out Kass instead. And of course Kass tried to convince Woo to stick with their plan and vote out Tony. Tony appealed to the fact that he and Woo had been in the same coalition during most of the game, and that voting him out now would contradict Woo's sense of honor. Kass argued that she had a much smaller chance in front of the jury than Tony did, and therefore Woo should pick her to

win. Woo surprised everyone when he voted Kass out and brought Tony to the final tribal council.

At the tribal council, Woo tried to explain his decision to pick Tony by saying that he was adhering to the five tenets of Tae Kwon Do – discipline, integrity, loyalty, respect, and harmony between mind and body. And that one always aims to compete against the best competitor, that there is dishonor in avoiding the good fight merely to collect some winnings. However, his loyalty was seen as passive game play by the jury, and one of the jury members even compared Woo to a dog loyal to its master. The decision cost Woo the game, who lost to Tony in a landslide 1-8 vote. At a post-show, called the "reunion" show, the show host Jeff Probst asked the jury who they would have voted for had Woo had picked Kass instead of Tony. Eight of the nine jurors, including Tony, said that they would have vote for Woo. Was that a million dollar mistake by Woo?

The fan reaction was simple: what was Woo thinking? Is he insane? Is he not rational? A lot of times in economics, particularly in principles of economics, students confuse "complex utility function" with "irrational" (or crazy or stupid). There was nothing whatsoever irrational about Woo's action. He had preferred to lose with honor than win by fighting a weaker competitor. And that sense of honor was worth a million dollars to him. Sometimes students think of "behavioral economics" as the field that helps to explain such behavior. While behavioral economics has indeed introduced new concepts and new models to our arsenal as economists, this is not one of them. Adding concepts like "honor" to a utility function lies at the heart of what economics is, and always has been, about. This story can help convey a simple point: preferences can include many things beyond money and consumables, and just because someone does something you think may be "crazy" or "irrational" does not make it so, at least by

the way an economist uses the term “irrational.”

Example 2: Winning by Losing

Richard Hatch won the first season of *Survivor* with a straightforward backwards-induction example of winning by losing[1]. The game came down to three contestants: Richard Hatch, known for his arrogance, quirky behaviors (walking around nude), and strategic gameplay (he was the one who put a coalition together, whereas other contestants seemed to be more wandering around taking it day by day); Rudy Boesch, a Navy SEAL veteran grandfather-like figure who fought in Vietnam and a favorite among the contestants and the audience alike; and Kelly Wiglesworth, a physically strong player at the challenges who defected from her alliance thus making her less popular with the coalition members, but who stayed alive by winning immunity after immunity, making it impossible for others to vote her off (and earning some respect).

As with the first example, because the game was down to three contestants, the winner of the final immunity challenge essentially got to choose unilaterally who to compete against in the final tribal council where the jury votes on the ultimate winner. The challenge was simple: each had to stand on a stump on the beach while touching a pole with one hand. Let go of the pole for any reason, and you lose. Last one holding the pole wins. A contest of mental stamina, physical perseverance (such challenges can go on for hours), and a bit of balance (not much though, for the stump was not small).

At two and half hours, all three remained. And then Richard surprised everyone when he

[1] This sequence, in *Survivor: Borneo* (Season 1), is also written up as an exercise in the textbook Dixit, Skeath and Reiley (2009).

voluntarily took his hands off the pole and disqualified him from immunity. A real puzzle is why it took him so long to drop out (the answer may be simple: dropping out too soon would have made his strategy obvious, and thus less effective). Why was it optimal for him to lose?

Start at the end. There were four possible paths in this game:

1) Richard wins and votes out Rudy, thus competing against Kelly in the final. Richard and Rudy had a strong alliance, but Richard did not think Rudy would forgive him for breaking it, even at the final stage. Thus Richard believed that if he won and voted out Rudy, he would lose Rudy's vote. He wanted to compete against Kelly, but we wanted Kelly to be the one to vote out Rudy.
2) Richard wins and votes out Kelly, thus competing against Rudy. Richard loses. Everyone knew that if Rudy made it to the end, he would win the game.
3) Kelly wins. If Kelly wins, she votes out Rudy (because, again, everyone knew that if Rudy made it to the end, he would win the million dollars). Then Richard and Kelly compete for the million dollars, but here Richard wins Rudy's vote, whereas in option #1 above Richard would lose Rudy's vote.
4) Rudy wins. Then he votes off either one. It does not really matter, because Rudy would win the game.

So basically Richard had to ask himself: if he loses on purpose, what are the odds that Rudy beats Kelly in the immunity challenge, thus wins the million dollars? And what are the odds that if Richard wins the immunity challenge and then votes off Rudy, that he still wins the game?

Richard got it right: he released voluntarily, Kelly then bested Rudy and won the immunity challenge (he lost his concentration for a moment and accidentally released after four hours).

Kelly then had only one sensible move: move out Rudy from the game, compete against Richard in the final tribal council. Richard won four votes, and Kelly three. Rudy's vote for Richard was decisive.

This sequences makes for a great lesson in backwards induction. By working backwards, and assigning probabilities to the different outcomes, one can easily conclude that Richard's best strategy was to lose the immunity challenge. An interesting further question to ask is why he did not jump off immediately? Was it that it took him 2.5 hours to figure this out? Or was there a reason to not release earlier? If he thought of the strategy earlier, for 2.5 hours he was risking a goof by Kelly putting him in a tough spot. Luckily for him, Kelly persevered. Had he released earlier, would the game have changed? It could be then that Rudy would have figured out what Richard did, and treated that as a defection nonetheless, and thus Richard would have lost his vote. That is speculation of course, but it may have motivated Richard to at least feign effort for a bit. Or it could be that starvation and heat for 39 days made it take a bit longer to realize the right strategy.

Example 3: Repeated Games Help Hold Coalitions

In Survivor, often coalitions hold even though there is clearly someone on the bottom. Why does the person on the bottom stay with the coalition? If really on the bottom, as soon as the coalition finishes voting off the members outside the coalition, the person on the bottom of the coalition will be the first to go. Of course the person on the bottom often does not know. Others lie: They say someone else is on the bottom. Or, the person on the bottom knows but holds out hope that something will change (maybe win a crucial immunity challenge, thus avoiding being voted off; maybe social dynamics will change). Often things do change. But often they do not.

Why does the person on the bottom stay with the coalition? The non-coalition members (often merely a smaller coalition, but a coalition nonetheless) try hard to win over a swing voter, by grabbing the person on the bottom of the other tribe to their side.

In Season 13, in the Cook Islands, this did happen: There were nine left, and they had already formed into two coalitions, one with five and the other with four. Jonathan Penner was on the bottom of the bigger coalition yet he was aware that he was on the bottom. Yul Kwon, more or less the leader of the smaller coalition, convinced Penner that if he were to switch to their coalition, he would not be the first to be voted out once they finished annihilating the other coalition. To convince him to come over, Yul also showed him a hidden immunity idol, threatening to use it and vote him out; alas that is a weak threat, because using a hidden immunity idol is difficult to do well, you have to guess who the other side is voting on. In this situation, Yul would have had a 1 out of 4 chance of guessing correctly who to protect with the immunity idol. Penner went for the argument nevertheless, believing it gave him some hope whereas he did not think his current situation had much hope. He defected on his coalition, switching to Yul's, therefore making Yul's coalition the stronger of the two.

So what happened? Yul kept his word for a little bit, but ultimately the coalition of four was quite strong and loyal. Penner got voted off fairly early nonetheless (he lasted two more votes; once Yul's coalition had the numbers without Penner, they voted him off). And Yul won the game and the million dollars. Yul earned everyone's respect for convincing Penner to switch (it was a tough argument to make, and was crucial for Yul getting to the end of the game). He also played a solid social and physical game.

What makes coalitions hold? Simple: the threat of punishment, inherent when games are

repeated.

If two firms dominate a market, why do we often see government wanting to regulate pricing? Because two firms that have to compete against each other over and over again in the same market, would love to come together and agree to keep prices high. One of them may get tempted, in a rash moment desperate for cash and short-term profits perhaps, to lower prices for a month just to "win" that month. But then the other firm will be forced to lower its price too. And then in the next month, they may both have to keep their prices low. And now in the long run they are making less money (but consumers are happy!). So neither one deviates from the coalition, even though it may be immediately profitable to do so, because it is not profitable in the long run.

That is the same in coalitions in *Survivor*. When they hold, even when there are some weak links, some individuals who feel less connected to the others, because those individuals fear punishment in the future rounds.

This makes a simple point relevant throughout economics, and a narrow point relevant for game theory and industrial organization. The broad point: Think strategically! What will others do in response to your action? If you are a company, you offer a price. How will consumers respond? The more narrow point: repeated interaction can yield quite different results than one-shot interactions.

CONCLUSION

Economic educators often struggle with abstract supply and demand graphs, and abstract or simplified tradeoffs like music versus movies or movies versus pizza. When teaching economic principles, we should aim to include not merely "real" examples throughout, but engaging ones

that relate to students' everyday life or desire to improve the world around them, locally and globally.[2] After all, economics is not merely a tool to make money, but a tool to improve society. These three stories from *Survivor* may have no "do-gooder" appeal to them, but I hope they are engaging and fun for students, and show how economic thinking is all around them, whether they like it or not.

Dixit, Avinash K., Susan Skeath, and David Reiley. 2009. *Games of Strategy*. 3rd ed. New York: W. W. Norton & Co.

Karlan, Dean S., and Jonathan Morduch. 2017. *Economics*. Second Edition. Dubuque: McGraw-Hill Education.

[2] For additional "real world" examples that we attempt to make relevant and engaging for students, as well as show how economics can help make the world a better place, see Karlan and Morduch (2017).