

Recently, Brad DeLong, professor of Economics at UC Berkeley and former deputy secretary for the U.S. Treasury Department during the Clinton Administration, joined Manu Saadia, the author of Trekonomics and Inkshares co-founder Adam Gomolin to discuss the economics of Star Trek.

Trekonomics is available for pre-order at [inkshares](http://inkshares.com).

Prof. Brad DeLong blogs at: <http://delong.typepad.com/> and you can follow him on twitter @delong

The following transcript has been edited for length and clarity.

On post-scarcity:

Adam (to Brad): Off the top of your head, if you were teaching a course on Trekonomics what would you be covering on Week One of the Economics of Star Trek or Trekonomics?

Brad: Week One of Star Trek economics has to be we're in a post-scarcity society.

Adam: What does that mean?

Brad: It means that we have as much of the material necessities of life that we need or that in some sense we want. That we don't have to earn money so that we can then spend it to get what is necessary or even convenient or even luxurious for us, as far as material goods are concerned. The society has enough resources for us go off and see, say, the double stars of Beta Leri with their gas streamers pulled off of each other by the gravitational pull of the double star system...if that's what we want. That we don't have to scrimp and save and earn up money so we can afford to spend time at the Four Seasons Capa Lillavay [sp]. We want to actually go to the Four Seasons and spend. That we do what we want with our time rather than being under the gun of necessity.

Adam: What color and context would you add to that?

Manu: I would also say that the very notion of luxury and the positional value of consumption is radically altered. It reminds me of something Keynes had said...

Brad: ...That the economic problem wasn't the permanent problem of the human race. That within three generations, Keynes was writing in 1930....at least in Britain, we can hand over people who act like the Ferengi with a disgusting shudder, to the specialists of mental disease.

Manu: He said it's a mental disease.

Adam: Can one conspicuously consume in the 23rd Century.

Manu: What would be the point?

Brad: What would be the point?

On technological progress, satiation and wine

Adam: Well, in world of unlimited scarcity, can there be such a thing as conspicuous consumption?

Brad: for example, my brother, who is an investment banker, gave us, last Christmas, a 1982 Bordeaux Chateau Lafite which we drank and which indeed lived up to its reputation. Now, we can wonder about to what extent its reputation is real given that the Chateau was located exactly where ships sailed into Bordeaux from London where they stopped to rebalance their loads...and pick up extra ballast... was it really the best region to grow red wine or was it due to the fact that it was located in the best spot to export it?

Manu: There is a very good argument about this: Burgundy or Champagne are horrible places to grow wine. They were just very close to Paris.

Brad: They were also close to the Burgundian Court

Manu: Yes. And the river

Brad: Yes

Adam: So, why is that? Is it over fertility of the soil? So is it a proper fertility of the soil?

Brad: No...the climate's not great for grapes.

Manu: not good for grapes

Adam: Sure, but I mean...

Brad: you had six, eight centuries of people figuring out, selectively breeding grapes...

Adam: Right, so they breed grapes, So it is not the case that the Burgundian fog and the cool mornings allow for acidity in a pinot noir grape but rather that the grape had adapted....

Brad: The grape has been adapted.

Manu: To circle back to Star Trek from there ...

Brad: It was one of the Rothschilds who said that he found he could only drink his best products about once a month or he lost appreciation for them. And so, his best wine was not the wine he drank most of the time precisely to preserve his peak experience. And so, in the Star Trek universe the consumption of 1982 first-class Bordeaux is limited to when it's appropriate, in order to maximize the utility for the best experience.

Manu: And you cannot procure it through any sort of competitive bidding?

Brad: You replicate it...

Adam: That actually leads me to this question; does the Replicator solve the Diamond-Water paradox?
[editor's note: the diamond-water paradox states that while water is considerably more useful for survival, diamonds command a much higher price in the marketplace]

Manu: I think it really does...

Brad: I think it does. But, I would also say that in many respects here in the middle class and upper middle class in the North Atlantic....already for ourselves, as far as...

Adam: No one who has tried to buy an engagement ring would believe that though.

Manu: Yes.

Brad: Well, except that the engagement rings we have are relative: if you go to the Musée de Cluny in Paris you can look at the crowns of the Visigothic Kings, and the Burgundian Kings in the fifth, sixth and seventh century. And the gems they have set in their crowns are things you would not dare give your girlfriend. (...) Look, 1776 North America was a very rich country by 18th Century standards because of the enormous land to labor ratio, and yet still 75% of our people were farmers engaged in growing your 2,500 calories per day plus essential nutrients plus other things. Now, in the United States we're down to 3% of the labor force who are growing our food, going from 75% to 3% means as far as basic calories and nutrients are concerned we have gone 95% of the way to the Replicator, right? Roman legions conquered Europe and much of Asia on basically a big loaf of garlic/barley bread plus some salt, plus whatever squirrels they could catch and whatever greens they could gather where the legions were marching. And they were happy to

Adam: Happy?

Brad: Happy to have this diet as long as they had sufficient salt attached to it. And that 2,500 calories plus essential nutrients plus enough protein was the destiny for most of the human...the occupation of most of the human race since the invention of agriculture. And this average diet, even with 75 to 80% of your labor force growing it, produced adult males whose average height was maybe 5'2" or 5'3". Such a diet, that if you try to give it to your children today Alameda County Child Protective Services would come and take your children away and you would never see them again...if you gave them that diet. We have solved scarcity with respect to food, we've solved scarcity with respect to clothing, when we consider that the average Prussian noble family in the 18th Century had one gown suitable for court appearances to be shared among all of the females and these are people who are nobles, these are people with a Von in their surname. Last time I was in Britain, in Norfolk and we went to Oliver Cromwell's house, the house he lived in when he was parliamentary representative. (...)

Adam: Was it glorious?

Brad: No, ceilings are seven feet tall.

Adam: It was a glorious revolution joke (...)

Brad: As far as that, when I was 5, my house in Welford Massachusetts was more comfortable and had many more square feet per person than Oliver Cromwell's house, plus we had appliances. And we had central air...

Adam: You used to make this point, when I was your grad instructor that you would be better off today in the bottom 10% of American society than you would have been in top 1% of European society even a hundred years ago.

Brad: Yep, yep

Adam: They didn't have a microwave...

Brad: Nathan Rothschild, the richest man of the world in the 19th Century, died when he was younger than I am of an infected abscess in his back. We don't die of infected abscesses.

Manu: And on the topic of progress Robert Fogel actually has data tables going back to before the industrial revolution, all the way up to the 20th century. [editor's note: the economic historian and Nobel Prize laureate Robert Fogel invented the term 'techno-physio evolution' to describe the physiological impact of the industrial revolution on European and North American populations: his book [The Escape from Hunger and Premature Death](#) is a must-read for any Star Trek fan] These tables listed what people in Europe died of, what their weight at birth was and what was their height. He uses height as a sort of index of the overall health of the population, within a statistical distribution... obviously there were people like George Costanza and there were people like..

Adam: People like Cosmo Kramer

Manu: Yes.

Adam: None of whom are present right now.

Manu: And you can see a physiological improvement since the 18th century. So now the great question is "Are we going to continue to grow, both physiologically and economically?" The improvement in overall health and nutrition at least in the developed world is indeed something that is tangible and documented.

Brad: Yes

Adam: Week 2. What will you be covering on Week 2 in your course on Treconomics?

Manu: We would have to talk about the role of technology and the role of technological progress. Because one of the questions of Star Trek is: "Is it technology that changes society?" This is the dominant narrative today. We are disrupting everything, I think that there is a valid point to what Kurzweil and Peter Diamand are saying: exponential technologies have a way to transform society and it's very unique and maybe uncontrolled.

Brad: It's a question of what human psychology determines is the limit. Whenever you reach satiation in some particular range... We have gone from 80% of the labor force producing 2,500 calories plus essential nutrients plus protein down to 3%, and yet still a fifth of what we spend is either on food (...) We're still focusing on what is a psychologically-derived expression of the need for fuel for the human body. It's still a major focus of our concerns. If you look at it by its bio-mechanical root, which is the

amount of fuel and the nutrients necessary to sustain life, that concern is satisfied by a rather small part of the attention we pay to it. Plus, the attention we pay to it is considerably flawed. Right? All you have to do is look at me and check my blood pressure, and realize that the evolutionary system that designed me to hunt for food has gone clearly awry. Right? That the sugar and the salt addiction, and knots in my brain that are not serving me well. And in fact a considerable amount of medical care in the United States now and over the next two generations is dealing with the fact not that we don't have enough devoted to calories, but that we have far too much of our economy devoted to creating the calories, especially the $C_6H_{12}O_6$ (glucose) part of the calories and especially $NaCl$ (salt) part of the nutrients.

Manu: Which are essential

Brad: Which are essential and which are necessary. There's an absolute reason that in the environment of evolutionary adaptation we created a brain which if you find something salty, you lick it. If you find something sweet, you gobble it and keep gobbling it. (...) We've been unable to figure out how to modify and control ourselves, create appropriate social systems... So, that the fact that we actively are 95% of the way to the Replicator still does not allow us to properly manage ourselves, so that we consume only what's good for us. And in the process we also consume an enormous amount of what's enjoyable to us. You know. That anyone who lives in greater San Francisco or has gone to even some place as cheap and as easy to access as the Ferry Building...that you can simply go back and forth from the Slanted Door to the Hog Island Oyster Company...and you know, have quite a good life. For not what are extraordinary exceptional prices, given Americans' incomes.

(...)

ON POST-SCARCITY AND HUMAN NATURE

Brad: I think people like Ricardo and Marshall would say that it's no more a problem for economics that material goods are scarce in the Star Trek universe. That it's a problem for Ricardo that air is not scarce. That, after all, in the world of *The Martian* (best-selling novel written by Andy Weir) which we were referring to earlier, air is very scarce indeed.

Manu: Yes.

Brad: Air is so scarce that this guy, poor Astronaut, who...The book you should read now, the movie I'm sure they'll do a good job but it comes out next year. This poor astronaut, trapped on Mars has this enormous amount of technological scarcity problems.

Adam: Well, actually air isn't scarce.

Brad: Really?

Adam: Well, it's not, well, it's not...

Brad: He starts growing plants not just for calories, but for air...

Adam: Right. But air is only scarce if the technology needed and the input resources are scarce. Which is

kind of very much the point of the Star Trek and the foundation of the post-scarcity economy is that you can create what you need...

Brad: The things that aren't scarce we don't care about because we're satiated. We have enough. And, maybe there is, in this world today, for middle class and upper middle class dwellers in the North Atlantic at least,...calories aren't scarce, what are scarce are the services of personal trainers to yell at you. And some personal trainers charge high prices... *that* matters but, you know, we don't focus on the dollars-per-calorie measures of nutrition in SafeWay, we do focus on the cost of personal trainers.

Manu: There are some people who would say that Energy is scarce, but...it's not.

Brad: But there will be some things that are still scarce even if they are only the attention of people whom you trust to serve as your interior design consultants. So, you don't have to become a total moron when you arrange the Replicator-produced furniture in your apartment. And as long as there are some of those things that are scarce, even if they're ultimately the services of personal trainers or the taste and eye of people who would advise you on your furniture decisions, or the time logged by your personal shopper, or the directional and compositional abilities of my first cousin, Philip Lord, director of the Lego Movie, who is going to be doing the Hans Solo origins story, which you should also all go and watch...as long as those things are scarce, as long as those pieces of the collective social game are scarce, there will still be an economy and it will still run. It may not be for money. Everything might be done via bitcoin. There still will be people who are trying to gain control of whatever the scarce resources are somehow.

Adam: So, are you saying that human nature has changed? That in the 23rd century, people are no longer obsessed with the accumulation of wealth...

Manu: But, they're obsessed with the accumulation of rank!

Brad: yes, yes.

Adam: So, has human nature changed?

Brad: People regard Riker as a weirdo because he would rather be second-in-command to Picard than to control his own spaceship. And it's pretty clear that that's a feature of society rather than errors by screenwriters who haven't gotten the way...

Manu: Yes, it's very deliberate that that is what the screenwriters intended. I would also say that personally I don't believe that there's such a thing as human nature.

Brad: No?

Manu: Think about anthropologists like Boas and Levi-Strauss. I mean, when we say human nature, maybe it's a shortcut to talk about market-competitive behavior. I'm not so sure that this is something that has existed at all time and places in every society all over the world. Or that it's something that's innate. Maximizing utility, maybe that is something that's innate? Because it has a base in physiology?

Brad: I would say that we're in some sense designed by the environment of evolutionary adaptation to be animals that like to enter into gift-exchange relationships.

Manu: Collaborators.

Brad: If you actually want us to behave like Ferengi, always driving the hardest bargain with our counterparty, you need to be very specially trained to do that, and in fact most people aren't. You know, most people who when the cashier at SafeWay hands them an extra dollar by mistake, will actually return it, for which Quark would look at us and say, "Why are you such an idiot"?

Manu: Yes.

Brad: And the answer will be, "well I'm not a utility-rationalizing-economic agent, instead, I'm an east-African-plains-ape-cooperator engaged in reinforcing social ties through a gift-exchange relationship.

(laughter)

Manu: He's right.

Brad: I don't want to be taken advantage of but also I don't want to be the kind of person who takes advantage of others.

Adam: It's an incentive structure that has worked to form us into specific creatures in much the same way the fog in Burgundy made a thin-skinned grape, well-suited to the terrain.

Manu: And to jump in on that, what's so funny is, very often people criticize The Next Generation and Deep Space Nine because "all the characters, they're not relatable. They're too perfect, they're too nice, they're too goody two shoes? They're intergalactic boy scouts." But in fact, those traits are very consistent within a society where gift-exchange--that type of cooperative behavior--is probably **more** rewarded than being a Ferengi.

Brad: Was it Montesquieu who said that there are different people, who are molded in different ways and have different ruling passions? The ruling passion of tyranny is fear, the ruling passion of a monarchy is honor, the ruling passion of a republic is virtue, and over all of this you have the ruling passion of a commercial society is profit, and you have mixtures of all of these.

ON THE BORG & ON THE PRIME DIRECTIVE

Adam: Well, you appeared to open the door, the two of you, outside of the borders of economics into political theory. That door being open, I will walk through it. Big three, of course, Locke, Hobbes, and Rousseau. Which of these--

Manu: Rousseau, the Borg, the Borg! It's the collective will--

ADAM: Hobbes, Locke, and Rousseau; which of these theorists, number one, best characterizes humanity in the 23rd century? And do you have any further commentary on how they apply to Star Trek.

MANU: Personally I think that it is Rousseau. If only because the main villain, the Borg, is the mirror image of the Federation. It's the Federation made literal, and the Borg has the perfect allocation of resources. As in the Borg, the cybernetic collective organism, everybody is a drone and every drone hears

the collective will in its brain and acts upon it in the most rational way and it's a type of cyber governance, it's highly networked, computerized, and efficient, and it's Rousseau...

BRAD: What is the collective will of the Borg for? They never really find out.

MANU: The pesky Q once says they're the ultimate users, they assimilate. They're constantly expanding.

BRAD: And then what do they do when they assimilate things?

MANU: They assimilate more, they use...

ADAM: Isn't that more Hobbes than Rousseau even? In a certain sense.

BRAD: I'm kind of even thinking of this as the market economy gone absolutely mad. They use everything for its best and most efficient use, and if your best and most efficient use is that you are supposed to spend 18 hours inside the sewer of San Francisco directing sewage, one way or another the Borg collective will assign you as a drone to do that. You won't even especially mind, because you were appropriately compared and networked to everyone else, and you agree that this is your best use.

MANU: There's an element of the Federation in there, because the Federation is also perfect about allocating resources, except they're not imperialists.

BRAD: Yeah, except they have too many resources to actually think that they need to expand fast enough to make proper allocation of resources a necessary thing. Although there is proper allocation of rank, proper allocation of honor, in the Montesquieu-ian sense. Inter-species cooperation, which is reversing the insult done to the family of Mogh or possibly being willing to tolerate the insult done to the family of Mogh. Does the interest of the many outweigh the interest of the few?

MANU: There's this amazing thing called the Prime Directive. I find it ties into political theory because it says that you are no longer exploring or observing for goals that are... [editor's note: the Prime Directive is the first law of Star Trek's United Federation of Planets. It states that the Federation is absolutely prevented from ever intervening in or interfering with another civilization's internal affairs and natural development.]

BRAD: Is the prime directive serious or is it a plot device to create interesting stories? Is it a piece of the background -- Is it a reaction against the misadventure in Vietnam? It's kind of those three things.

MANU: It creates good stories but I think it's also the the organic law of the Federation. It is the most important principle for them... It is the number one thing. You have many episodes that deal with it and I think the writers bought into this notion...

BRAD: Of cultural hegemony and cultural sovereignty...

Manu: Yes

Brad:... that in some sense we are not interested in maximizing the utility of individuals so much as in allowing cultures to develop their Utopian civilization in their own way, in their own process.

MANU: Picard states at one point that the Prime Directive is meant to protect us all, the prime directive is to protect the Federation.

BRAD: Against the Federation itself from becoming the Borg.

ADAM: But the concept that the needs of the many outweigh the needs of the few, isn't that really a complete subjugation of the concept of natural rights? Wouldn't the founders just be absolutely abhorred by that--

Manu: what founders?

Adam: Our founders. United States.

BRAD: Probably not. Probably not, they were believers in Republican virtues. You know, George Washington always wanted to pose as someone who would have simply preferred to be a gentleman farmer in Virginia, enjoying his leisure and hanging out with his wife...and his slaves...and his stepchildren. But he was forced by the needs of the many to first become a general and boss lots of people around and have an exciting life. And then become a president and boss people around and have an exciting life. But at each stage, the thing he claims to want most desperately is to simply retire to the plantation of Mount Vernon and hang out in a large pool of sweat in Central Virginia. That's absolutely awful climate.

MANU: I prefer Hamilton, I think in the commercial Republic, people...

BRAD: Hamilton was much more into being a powerful guy.

ADAM: There was this great line at the end of chapter 3 of the Hamilton book (Ron Chernow's biography of Alexander Hamilton), 'he was the messenger from the future'. In the 23rd century future... I mean, is Star Trek really just about, in the scarcity discussion, a world where no longer is there geometric population growth and arithmetic resource growth? You know, when we were your grad assistants, we used to create exams at Berkeley, we would ask ourselves, or at least you would ask all of us to ask ourselves a question: What are the core concepts that, if your students leave this course without knowing, then, we have failed them? One of those concepts was always--

BRAD: Potential limits to growth.

ADAM: Potential limits to growth.

ON THE FERENGIS

ADAM: Starfleet Academy, week 3 of the course, Treconomics; what is the week's title on the syllabus?

MANU: The economics of the other races. Because economics is not that important in the Federation, but it is very important to deal with other people in the galaxy. And not just the Ferengis, but also those who live under different locales and economic conditions.

BRAD: Those that have been conquered and imperialized.

MANU: I think there's a reason why most of the Vulcans are diplomats. Because it is more important to be a diplomat than a starship captain, so as to understand intimately how other cultures function and species function. How to deal with them in a way where the military is not necessarily involved. And one the best ways to understand other societies is probably to understand their political economy -- who's in charge? how do they allocate resources? Incidentally, this is something I always wondered about Star

Trek: I think, logically speaking, the Federation should have already bought out the galaxy and all its enemies. Because they are so opulent and wealthy, they can probably buy their way out of any problem, even with the Klingons, and that way you do not have to kill people who have a different sets of ethics. That's a paradox, and that is something that's not resolved in the show.

(...)

Adam: Ok, this is good. We're talking about week 3, what are the three texts that you've assigned (...) we are now talking about the comparative economics of the galaxy in the 23rd century.

Manu: Well the Ferengis are the traders and the shopkeepers and they're kind of the, what, (to Brad) the Venetians, maybe? That's what I always wanted to ask you, the Ferengis come across as sort of a satire of the Ayn Rand, manly-man of economic mastery.

Brad: They come across as a great many things. It's very unclear what acid dream or what strange Google pattern recognition algorithm applied to what pieces of human history they come out of...

Manu: There's this famous monologue where Sisko tells Quark "Once we were like you" and Quark is like, "We are *nothing* like you. We didn't have slavery, we didn't have concentration camps". So, he's presenting a sort of dream history of capitalism. The ideal of capitalism.

Brad: Everything is trade and only trade. It's a matter of honor among the Ferengis not to steal stuff. You know, that you have to trick people by making them voluntarily buy what they shouldn't. You're not allowed to enslave, you're not allowed to steal, you're not allowed to-

Manu: You can water the drinks as much as you want, but

Adam: Fraud is fine, coercion: uncool.

Brad: Coercion very uncool. And so this is, it does give them a very considerable advantage over most of human society.

Adam: So in the Ferengi universe...mail fraud, not a crime, larceny and assault still...

Manu: Unions. If you ever consider a union, that's like the highest crime. If you join the union... there's this episode in Deep Space 9 which is very funny.... (imitating a Ferengi) We want to start... A u u u union?, they can't even bring themselves to say it. But the part about the Ferengi that's remarkable I think, it's almost through osmosis and contact with the Federation over five-ten years of Deep Space Nine, they slowly change...

Brad: Into Social Democrats.

Manu: Yes! And you know, *Keynesian* Social Democrats. And you know, women are actually suddenly allowed to hold jobs and actually go out into public, not naked, which is--

Adam: Right, it's a dialogue of cultural diffusion.

Brad: Yes.

Manu: Yes. By the way, that's something that I also find very strange: that the Ferengi, if they are such good businessmen, they should have actually recognized much earlier that there is real value in including women.

Adam: They should have figured out that 50% of the human capital base is lying dormant...

Brad: Yes. As I say, it's some kind of insane acid dream, [] pieces of human history.

BRAD DELONG'S FAVORITE STAR TREK SHOW

Adam: Favorite Star Trek franchise?

Manu: The Next Generation.

B: I thought I would pick the Next Generation, but when I looked up what my favorite episodes were, they were mostly from the Original Series. But I should probably step back and quote the science fiction author Lois McMaster Bujold who attempted to explain why it was that she and her peers love Star Trek so much, given the absolute idiocy of what was on the screen so much of the time. She said her parents could never understand it. And it was at that moment that she realized one experiences art and entertainment primarily in your head. That is, that just as in a book, reading is not something that's out there, it's something inside. That even with a TV show, where the video and audio are there and the pair of them are going directly to the brain, it's still not what you see and hear that's the show you experience, it's what you had manufactured inside your brain. (...) And the Next Generation is clearly superior as a show. But by the time that entered my brain The Original Series was already the 'definitive' Star Trek.