

Lecture 3. Scarcity, Exchange, and Production Possibilities

THE ECONOMIC PROBLEM

Most of the time most of what we produce is both scarce and desired. After all, if it is not scarce why should any of us spend any of our limited work-time making more of it? And if it is not desired why would any of us spend any more of our limited work-time making more of it? Almost by definition, therefore, most of our work-time and most of our attention will be focused on commodities for which there is an “economic problem”: that some of us at least would like to have more of them, and yet there is not enough for everybody to have all that they want.

The fact of scarcity almost immediately induces another fact: the fact of necessary choices. To take resources and use them to produce more of one scarce and valued commodity is necessarily not to use them to produce some other commodity—also scarce and also valued. Thus everything has a cost: the “opportunity cost” of what the resources used for it could have been used for had they been devoted to some alternative.

You all are spending four—well, perhaps 4 1/2, given the university’s reaction to the state fiscal crisis and the difficulty in getting into what courses you want when you need to take them—years here at Berkeley. What is the “opportunity cost” of attending Cal? The \$10K a year in tuition and fees is a small part of it. The big part of it is the money you are not making at the full-time job you would be likely to have were you not at Berkeley. When there is scarcity, there are always choices to be made. And to choose one path is to forego others—maybe not for you so much as for other people, who cannot use for their own purposes the resources you consume.

SCARCITY AND CHOICE IN A MARKET ECONOMY

How does a market economy handle scarcity and choice. Let’s set up a simple, toy economy in which the factors we want to analyze are crystal clear. That is something that economists like to do.

Economics 1: Spring 2012

J. Bradford DeLong, Lanwei Yang, and a cast of thousands...

<https://bspa.berkeley.edu/portal/site/807cbf25-1161-4508-8c1e-5b71c42e5fe1>
<http://delong.typepad.com/sdj/econ-1-spring-2012/>

What Do We Care About?

- We care about choices between things we value
- “Opportunity cost”
 - What is the “opportunity cost” of attending Cal?
 - Cash cost plus foregone wages plus foregone valuable experience plus tied to Berkeley plus not a boring job...
 - What is the “opportunity cost” of drinking a cup of coffee?
 - You can’t spend the time and money taking yoga lessons



Dharma and Greg

Remember the 1990s sitcom “Dharma and Greg”?

Dharma is loose and mellow and California. Greg is uptight.

Let us say that Greg is very good at making coffee: in a shift he can make, say, 10 absolutely perfect cups of coffee—double half-caf lattes made half skinny and half with half-and-half. Greg, however, is inept at yoga. He can teach or do one lesson max in a shift, with the book at his elbow, trying to get things right.

Dharma, by contrast, burns the beans and spills the milk and forgets to fill the espresso pods. She can only make two cups of coffee a shift. But at yoga she is a champ: able to teach or do five lessons in a shift.

Autarky

If Dharma and Greg were each on their own, their respective lifestyles would not be so lavish. Greg could spend all of his time brewing coffee—making ten cups a shift—or all of his time doing yoga—completing one lesson per shift. Or he could be somewhere in the middle. Let us follow Aristotle, say that the best choice is moderation in all things, and say that Greg splits his time: he spends half his time making cups of coffee and half his time trying to do yoga, and in a shift he completes five cups of coffee (which he drinks), and about half a yoga session.

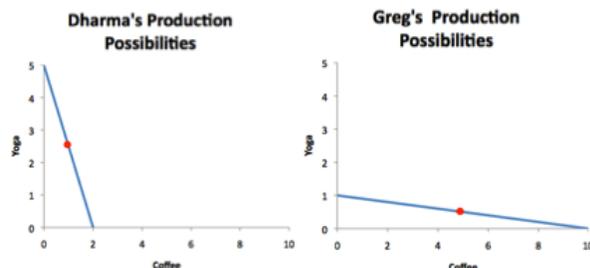
Similarly, Dharma on her own could spend all of her time brewing coffee—making two cups a shift—or all of her time doing yoga—completing five lessons per shift. Or she could be somewhere in the middle. Let us follow Aristotle, say that the best choice is moderation in

Scarcity and Choice in a Multi-Person Economy

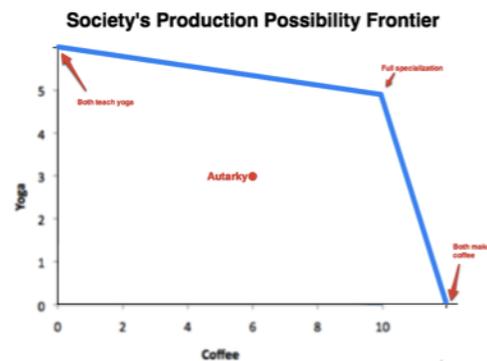
- Dharma and Greg
 - Greg is good at making coffee—can make, say, 10 cups a day
 - But inept at yoga—one lesson a day max
 - Dharma is good at doing (and teaching) yoga—can teach 5 lessons a day
 - But can only make two cups of coffee



Greg and Dharma in Autarky



There Is Something Wrong...



all things, and say that Dharma splits her time: spends half time making cups of coffee and half time doing yoga, and in a shift completes one cup of coffee (which she drinks), and about 2 1/2 yoga sessions.

Now it is pretty clear that there is something wrong here. Let's look at what each is producing and add them up—we have three yoga lessons and six cups of coffee. But if we take a step back and look at production possibilities for society as a whole, we see that this society could be producing a lot more than it is. The “autarky” allocation is well within the economy's Production Possibility Frontier. If we put both to work teaching yoga, we could get six yoga lessons taught. If we put both to work pulling lattes, we could get twelve cups of coffee brewed. If we specialized—well then we could get 5 yoga lessons taught and 10 cups of coffee brewed.

The Market Economy

Now let us set up a market system to serve as a societal calculation mechanism for planning and organizing production and distribution. A guy walks out and tells Dharma and Greg: “You own the products of your work, but if you want to and if you both agree you can each trade the products of your work to the other at a price I will write down.” And he sets up a big whiteboard on an easel and writes:

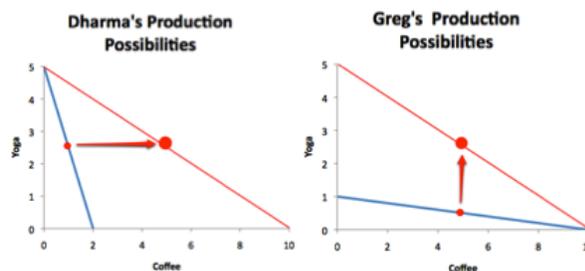
$$1 \text{ yl} = \text{cu}2$$

One yoga lesson trades for two cups of coffee.

Now what happens. Dharma thinks: “Hmmm. Suppose I spend all my shift time doing or teaching yoga. I could teach Greg yoga half time, and do yoga myself half time. That still gives me my 2 1/2 yoga sessions, and Greg will pay my five cups of coffee for teaching him yoga lessons. That makes me a lot better off—or at least a lot more caffeinated.”

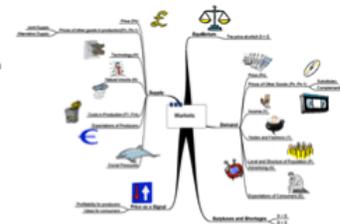
Similarly, Greg thinks: “Hmmm. Suppose I spend all my shift time making cups of coffee. I could trade half my coffee to Dharma, and consume the other half. That still gives me my 5 cups of coffee. And with Dharma teaching me I will get

A Market with cu2 Yoga Lessons!



What the Market System Gets Us

- Win-win
 - Dharma benefits as long as the price of yoga lessons > cu0.40
 - Greg benefits as long as the price of yoga lessons < cu10
- Wealth Maximization
 - Any price between cu0.40 and cu10 produces an “wealth-maximizing production outcome
 - Any price between cu0.40 and cu10 produces an efficient allocative outcome
 - Any price outside the range shuts the market—and specialization—down
- Distribution:
 - A price of cu10 gives all the surplus to Dharma
 - A price of cu0.40 gives all the surplus to Greg
 - A price of cu2 makes them equally well off
 - Or does it?



through about 2 ½ yoga lessons for each shift that I work. That makes me a lot better off—or at least a lot more likely to attain inner peace.”

Thus, they both think, the market system is a win-win arrangement. Dharma benefits as long as the price of yoga lessons $> cu0.40$. Greg benefits as long as the price of yoga lessons $< cu10$. At any price between $cu0.40$ and $cu10$ there is an incentive for each to specialize their production in what he or she does best—we will have a wealth-maximizing outcome.

There are issues of distribution.

If the guy with the whiteboard writes down a price of $cu10$ for each yoga lesson that gives all the surplus to Dharma: Greg does not benefit from the opening of the marketplace. Similarly, a price of $cu0.40$ for each yoga lesson gives all the surplus to Greg. A price of $cu2$ makes them equally well off—each multiplies the consumption of the commodity they are inept at producing by five while leaving their consumption of the commodity they are good at making unchanged. Each of their production is worth 10 cups of coffee. Or does it leave them equally well off? Maybe Dharma can teach yoga but doesn't like to, while Greg finds the highest expression of his species-being in the making of cups of coffee and winds up much happier.

Information

The thing to notice is how easy all this was. You need a guy with a whiteboard to announce that what you make is your own until you agree to trade it away. You need, somewhere in the background, a police officer who can throw Dharma in jail if she simply steals cups of coffee. You need the guy to write $1 y1 = cu2$ on the whiteboard. (Or do you?) But that was it. You did not need to program a computer to decide on the optimal allocation of labor—Dharma took a look at her latte-making skills and figured out she should specialize in teaching yoga, and Greg tried unsuccessfully to get his heels to the floor while doing the downward-facing dog and decide to specialize in making coffee, and they did this all by themselves. You did not need to send around PDC—Production and Distribution Coordination agents—to make sure that people were following the plan, for their own self-interest ensured that they would follow their respective plans. And you did not need to have a bunch of clerks in a warehouse keeping track of whether people had overfulfilled their plan allotments and figuring out which commodities should go into whose ration sacks for distribution: they figured out themselves what they wanted to trade for.

Let me say that again: in order to coordinate production and distribution in an economy with N commodities via the market, you have to:

In Order to Coordinate...

- ...in an economy with N commodities via the market, you have to...
 - 1. Find a whiteboard
 - 2. Write down N prices
 - 3. *Laissez-faire*
 - 4. Maybe you don't have to write down the prices



1. Find a whiteboard
2. Write down “the stuff you make is yours until and unless you trade it away at the market price” on the whiteboard
3. Write down N market prices—one for each commodity—on the whiteboard
4. *Laissez-faire*—let people do what they thought best
5. And maybe you don’t have to write down the prices

By contrast, if we had a centrally-planned command-bureaucratic economy, we would have to:

1. Figure out what everybody should do.
2. Tell everybody what to do
3. Figure out what everybody should consume
4. Tell everybody what they are going to consume
5. Check up on everybody to make sure that everybody is producing what they are supposed to be producing—and working hard at it
6. Check up on everybody to make sure that everybody is consuming what they are supposed to be consuming.

In Order to Coordinate...

- ...in an economy with N commodities via a bureaucratic command-and-control hierarchy, you have to...
 - 1. Tell everybody what to do
 - 2. Tell everybody what they are going to consume
 - 3. Check up to make sure everybody is doing what they are supposed to be doing



With a toy economy with only two people in it—Dharma and Greg—these information differences are trivial, unimportant. But the real U.S. economy has 140 million workers and more than 100,000 different commodities. And the real global economy has 2 billion workers outside the home and some 150,000 different commodities, even not counting the fact that commodities play different social roles in different places.

It is this economizing on information that is, I think, at the heart of the five-fold difference in efficiency between planned and market economies. A huge chunk of time and energy in planned economies is spent moving information that is already well-known at the periphery of the society to the center. And a huge chunk of information that needs to be collected in order for central planners to make good decisions is not collected—and then bad decisions are made.

The system of private property and market exchange has two enormous advantages over central planning. First, private property pushes decision-making out to the periphery of society, where the “owners” of commodities already have the best information as to what the commodities should be used for. Second, market exchange provides people with the right incentives—an incentive to work diligently, and not to consume wastefully. By contrast a command economy has to spend an enormous amount of labor trying to make sure that people are not shirking on the job or wasting on the consumption side.

But what if these advantages in information of a market economy are not, in some particular situation, larger than the advantages of centralized planned coordination. What if it is more productive to do some pieces of the division of labor via bureaucratic command-and-control? Then the market provides incentives to create such islands within itself—that is what big businesses are. Toyota needs a front axle and a back axle for each car it hopes to sell, and it plans production so that front- and back-axle production are in synch: it doesn't go out and buy front and back axles in a market. Where it is productive to create islands of command-and-control central planning, it will almost surely be profitable to create such islands. The market economy thus creates incentives for people to bypass it wherever they think it is likely to do a sub-optimal job.

And, of course, that we live in a market economy does not mean that everything has to be done via the market. We have a government. We can use it. The late Paul Samuelson used to like to say that it was much better to characterize our economy as a mixed economy rather than a market one.

EVALUATING SOCIETAL CALCULATING MECHANISMS

In general, the market economy ranks rather highly along all the dimensions one might use to evaluate societal systems for planning and organizing production and distribution.

First, a system should produce a plan, an allocation, that is attainable. China's central planning system during the Great Leap Forward produced a plan that was not attainable, and more than fifty million people died of starvation as a result. Many more would have died had not PLA Marshall Peng Dehuai stood up at the Lu Mountain plenary meeting of the Chinese Communist Party and said that this must be stopped. That was not good for his career in Maoist China—he had very strong incentives indeed not to do so. But he did nevertheless, thinking his righteous duty as a servant of the people was more important than his career, his lifestyle, his liberty, or indeed eventually his life. All honor to PLA Marshall Peng Dehuai at the Lu Mountain Plenum of the Chinese Communist Party, whose actions challenging Mao Zedong may have saved the lives of as many as 50 million people. But we cannot rely on there being a large number of brave self-sacrificing servants of the people to keep the system on the rails.

A market system does well, most of the time, in setting out an attainable plan.

Second, will the right people be making the right things? As we saw, the market does well on that: Greg and Dharma are both deployed in the labor force in places where they will be most productive.

Questions to Ask of Any Societal Calculating Mechanism

- Is it attainable?
 - i.e., China during the Great Leap Forward not attainable
- Will the right people be making the right things?
- Will anybody say "I don't want that, I want this instead"?
- Will it be *fair*?
 - The cu0.40 price allocation might be Pareto-optimal
 - Dharma teaches yoga
 - Dharma consumes 2.5 yoga and 1 cup of coffee—and at a price of cu0.4 doesn't want to teach any more or less for any more or less coffee
 - Greg consumes 2.5 yoga and 9 cups of coffee—if he doesn't like yoga that much, he might not want to take any more yoga lessons even at a price of cu0.4
 - But it doesn't seem *fair*, does it?
- That is what we will look at next time...



Third, will anybody say “I don’t want that, I want this instead”? Well, in a market economy if people wanted to trade some of what they are consuming away for something else, they could do so. The fact that they haven’t strongly suggests that they don’t. There is the question of whether some people will wind up having much more than others. And that leads us to the fourth dimension:

Fourth, will the consumption allocation be fair?

That, however, is not something the market is set up to provide. Attainability, productive efficiency, and allocative efficiency—yes. Fairness? Much more doubtful.

SUMMARY

We have an 18-fold increase in global technology since 1800—a 72-fold increase since 8000 BC. Of that, we can attribute maybe five-fold to the market economy. How are we to understand this enormous edge of market over command?

A market is superior at handling scarcity. And there will always be scarcity. We are constructed so that as technology advances necessities become things not worth mentioning, conveniences become necessities, luxuries become conveniences, and we invent new luxuries to aspire to, and to work hard to attain. Thus most of the time most of what we produce is both scarce and desired. That entails the fact of necessary choices, of “opportunity costs.” And that is something a market economy is very good at handling.

A market system partly overcomes scarcity by inducing a win-win specialization of production into an efficient pattern. And it partially overcomes scarcity by allowing people to choose the consumption goods they would most like to see. However, the main benefit of a market economy thing is that it doesn’t require much work at the center for it to run.

It is this economizing on information that is, I think, at the heart of the five-fold difference in efficiency between planned and market economies. A huge chunk of time and energy in planned economies is spent moving information that is already well-known at the periphery of the society to the center. And a huge chunk of information that needs to be collected in order for central planners to make good decisions is not collected—and then bad decisions are made.

The system of private property and market exchange has two enormous advantages: private property pushes decision-making out to the periphery where owners have the best information, and market exchange provides people with an incentive to work diligently and not to consume wastefully. What if it is more productive to do some pieces of the division of labor via bureaucratic command-and-control? Then the market provides incentives to create such islands within itself—that is what big businesses are. And, of course, that we live in a market economy does not mean that everything has to be done via the market. We have a government. We can use it.

In general, the market economy ranks rather highly along all the dimensions one might use to evaluate societal systems for planning and organizing production and distribution except for fair-

ness: that is not something the market is set up to provide. Attainability, productive efficiency, and allocative efficiency—yes. Fairness? Much more doubtful.

WHAT YOU SHOULD HAVE LEARNED...

You should now be able to:

1. Explain what the “economic problem” is.
2. Explain the notion of “opportunity cost.”
3. Determine what information we need to acquire and disseminate in order for a market economy based on private property to successfully function as a societal calculating mechanism for planning and organizing production and distribution.
4. Determine what information we need to acquire and disseminate in order for an alternative—for, say, a centrally-planned command bureaucratic economy—to successfully function as a societal calculating mechanism for planning and organizing production and distribution. to function?
5. Explain the magnitude of the extraordinary informational advantages offered by the market system as a societal calculating mechanism.
6. Link these informational advantages to the empirical success of market economics vis-a-vis alternatives.
7. Explain the questions we should ask in order to evaluate any societal social calculating mechanism for planning and organizing production and distribution.