Opportunity Cost and Possibility Curves

"The accurate question is: which is more important, the party or the book? Not, which is more appealing at the moment. After a thousand choices, distractions vs. goals, you will have a book or an extensive collection of party favors."

Overview

Scarcity means choices, and given our political (democracy) and economic (capitalism) systems, success will depend upon the skill with which we make those choices. Economists tend to adopt the approach that the best choices are rational choices in which individuals and businesses weigh the benefits and costs of any action and choose the actions where benefits most exceed the costs. As a result economists tend to focus a considerable amount of attention on the concept of cost that they tend to approach from a rather unique perspective. Because we accept the existence of scarcity, every choice to do something is also a choice not to do something else. Your choice to study can be looked at as your choice not to party, the choice to attend class can be viewed as a choice not to watch the soaps or catch up on your sleep. What ever you choose to do, you have chosen not to do something - so your choice had a cost. Quite simply - THERE IS NO FREE LUNCH.

And do not forget it because those who promise free lunches are everywhere. If you are interested in finance, there are the offers of the highest return and lowest risk, but one of the first rules of finance is that if you want a higher return, you will have to accept a bigger risk. The financial crisis of 2008-2009 is a perfect example of what happens when too many people ignore the rule. If you follow politics, free lunch offers are everywhere. Most people expect wars to cost money, but in president Bush's mobilization for a very expensive war in Iraq, he made no appeal to Americans to sacrifice for the war effort. What he did do was ask consumers to go to the malls and spend more, just as the government was spending more for the war. No wonder there was so little opposition to the war since the costs to Americans seemed to not exist, although we will see that Bush' free lunch is not quite the free lunch since those war costs were simply passed on to future generations - and that means you!

The good news is that economic cost is not a difficult concept. The bad news is that experience has shown it is not a natural way for many people to do the calculations. This is why we open this unit with a section on opportunity cost in which we look at some choice situation. As you start thinking about the concept of economic / opportunity cost, keep in mind the following quote. "The accurate question is: which is more important, the party or the book, not which is more appealing at the moment? After a thousand choices, distractions vs. goals, you will have a book or an extensive collection of party favors."

This will be followed by a simple graphical representation of choice situations - Possibility Curves. With this model we examine explicitly the choices open to decision makers and how the set of choices can be altered. This discussion introduces two key economic concepts, *efficiency* and *specialization* (division of labor).

Economic and Accounting Cost

Let's start by examining the choices facing Rueben and Raye who are going to pay $7.50 a ticket to see the movie *A Funny Thing Happened on the Way to School*. Rueben has a $5,000 scholarship at RIU where he is studying underwater basket weaving, while Raye is a relationship consultant who is paid $100 per hour for advice on dating. You are to calculate the cost of the movie for Rueben and Raye?

The most frequent answer to the question is $7.50. This is the out-of-pocket cost, what is called the *accounting cost*. There is no problem with this number except that this number should be irrelevant for the two as they weigh the costs and benefits of going to the movies. It is wrong because it does not really give a sense of what the two will be giving up by choosing the movies. For Raye, if she could have used the time for consulting, then she would have earned $200 for the two hours she was in the movies. This needs to be included in the

calculation of the movie's *economic cost*. If Raye does not go to the movie she earns $200, and if she goes to the movie she spends $7.50. The decision to go to the movie would cost $207.50 - what we would call the economic cost of the movie for Raye.

And then there is Rueben who expected to enjoy a night away from his studies. Unfortunately for Rueben, a classmate at the candy counter meets him just after he paid his $7.50 for the movie. The classmate informs Rueben he just received an e-mail stating there will be a test the next day. Rueben realizes he should study because a bad grade will cause him to lose his $5,000 scholarship. At this time we would look at the $7.50 as a *sunk cost* (a past, non recoverable cost that has little to do with the current choice). For Rueben, once he has paid for the movie and finds out about the exam, the economic cost of the movie becomes $5,000. If he goes home to study he keeps his $5,000 scholarship, but if he stays at the movie he will lose his $5,000 scholarship.

For an example that should hit close to home, let's look at U. B. Forte who is considering the option of continuing her education. She recently graduated from high school and has been accepted to RIU. She has also received a good job offer. You are to determine for her the cost of her first year at RIU. The facts you have are outlined below.

1. starting salary for her job if she starts working after high school and does not attend RIU is $20,000 per year.
2. annual costs for rent, food, and recreation, if she takes the job and gets an apartment, are $8,400, $3,600, and $2,400.
3. tuition, room and board, fees, and book expenses are $8,400 per year and recreation costs will be $3,600 per year if she goes to RIU.
4. U. B. will earn $6,000 a year in a part-time job at RIU.

Your task is to determine the first-year cost of her decision to enroll at RIU. Take a few minutes and write down your number on a piece of paper, and once you have the number you should read on to see the framework economists would use to calculate the economic cost of a year at RIU.

The framework an economist would use for estimating the economic cost appears below. The table contains rows for earnings, major components of expenses, and net income - the difference between earnings and expenses. There are also two columns. In the first column are the figures corresponding to the decision to enroll at RIU, in the second column are the figures corresponding to the decision work and not enroll at RIU. Now use the framework to fill in the blanks and compute the economic cost of a year at RIU. Do the calculations before you turn the page.

Cost of College

	RIU	WORK
EARNINGS		
LIVING COSTS		
R&R		
TUITION		
NET INCOME		

Hope you didn’t cheat and look first. If U B had gone to school, she would have earned $6,000 at the part-time job that would not have covered her $12,000 in costs - $3,600 in R&R costs and a $8,400 tuition bill. By going to school she ended up with a debt of $6,000 for the year.

If she had gone to work, meanwhile, she would have earned $20,000, which would have more than covered her $14,400 costs - $12,000 living costs and $2,400 R&R costs. At the end of a year U B would have accumulated $5,600 in a savings account.

Cost of College

	RIU	WORK
EARNINGS	$6,000	$20,000
LIVING COSTS		$12,000
R&R	$3,600	$2,400
TUITION	$8,400	
NET INCOME	-$6,000	$5,600

We can now compare the two situations. By going to school U B ends the years with a debt of $6,000, while going to work will leave her with a savings balance of $5,600. The difference between the two is $11,600. This is the economic cost of a year at RIU. By going to school, U B's net earnings are lowered by $11,600 - so this is what it really costs to attend RIU for the year.

Before we leave this example, try to recalculate the costs of a year at RIU based on the two following modifications. What happens to the economic cost of a year at RIU if:

1. The student does not have to pay tuition
2. The student could earn $30,000 working full-time

If the student does not pay tuition then the cost of a year at school drops by that amount, which may help explain why older students, who tend to pay their own tuition, seem on average to take their work more seriously. The cost of a course is much higher for them.

If the earnings of a student not attending college increased by $10,000, then this would raise the cost of attending school by this amount, which should reduce the number who choose college. On the other hand, in the past 15 years the earnings of those with a high school education has fallen, which has reduced the economic cost of college and certainly contributed to the increased enrollment in college despite rapidly rising tuition.

Opportunity cost also explains why in 2008 *The Economist* reported an increase in applications for MBAs. A slower economy meant lower salaries and higher unemployment, both making enrollment in MBA programs more attractive. It also helps explain the trend toward shorter professional degrees and the explosive growth of weekend executive MBA programs. A person earning $100,000 a year who was considering enrolling in a two-year MBA program, which is what they used to be, would need to add $200,000 to any tuition and fees in a calculation of the cost of the degree. By lowering the degree program to one year, the cost of the program would be reduced by $100,000 - the salary that the student would not have to give up in year two. The program could be made even cheaper if someone never had to give up their job, which is the model for weekend programs where the economic cost of a two-year degree program would drop by $200,000. This helps explain why schools use shorter programs and weekend hours to increase their competitive position. It also explains how a school could charge more for a weekend program than a traditional on-campus weekly program, but potential students would see this as cheaper than the weekday program. A true win-win situation.

The concept of opportunity cost was also at the center of the argument put forward by James Fallows in his article "Bush's Lost Year" that appeared in *The Atlantic Monthly* (October 2004). According to Fallows, the decision by the Bush administration to focus its attention on the war in Iraq had a serious cost.

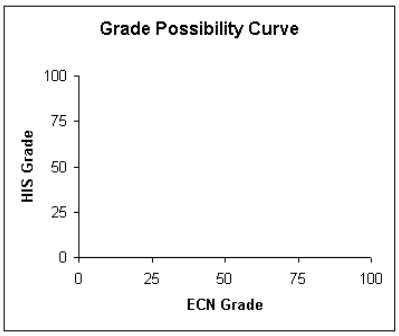
> The first front in the war on terror, Afghanistan, was left to fester, as attention and money were drained toward Iraq. ... Because it lost time and squandered resources, the United States now has no good options for dealing with either country [Iran and Korea]. It has fewer deployable soldiers and weapons; it has less international leverage through 'soft power' of its alliances and treaties. ...Worst of all, the government-wide effort to wage war in Iraq crowded out efforts to design a broader strategy against Islamic extremists and terrorists.... There is no evidence that the President and those closest to him ever talked systematically about the 'opportunity costs' and tradeoffs in their decision to invade Iraq.

Linda Blimes & George Stiglitz expand on the differences between accounting and economic cost in "The Economic Costs of the Iraq War: An Appraisal Three Years After the Beginning." You could also check out the web site Cost of War that has a counter and some estimates of what the "cost" is in terms of foregone opportunities.

Possibility Curves

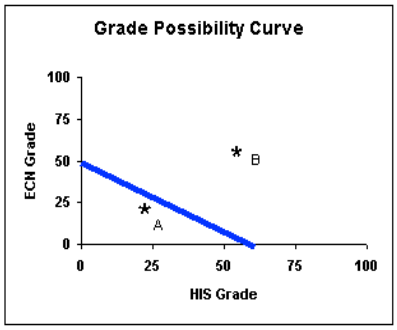
The visual representation of opportunity cost is the *possibility curve.* It describes graphically the options open to a decision maker that must decide how to allocate one resource that can be used to produce two outputs. It could be used to describe choice situations facing an individual, a firm, or an entire society. We could look at how we allocate our time between work and play, how a firm allocates its advertising budget between Internet and print ads, or how a government allocates its budgets between guns and butter. As a warm-up exercise, let's return to RIU where we can examine the situation faced by Fred who is taking this ECN course and a HIS course. Fred must decide how to allocate his time, which is the scarce input, to produce grades, which are the outputs.

To demonstrate the choices graphically, we construct a 'grade' possibility curve for Fred. On the two axes we measure the outputs - in this case the grades in the two courses. On the vertical axis we measure the grade Fred gets in economics and on the horizontal axis we measure the grade he gets in history.



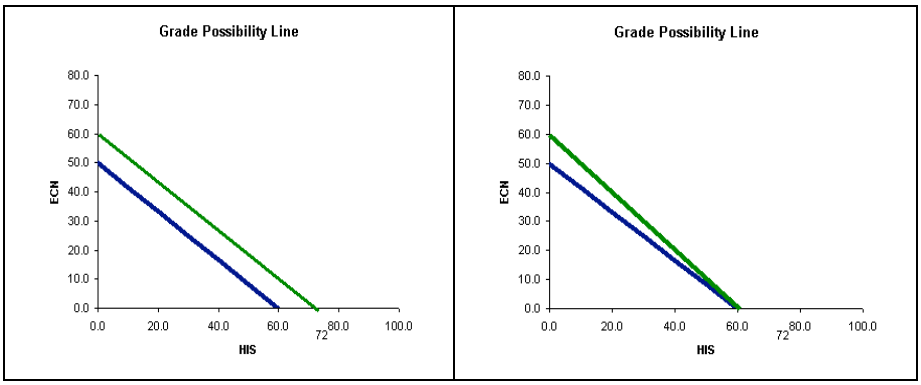
As for the available resources, Fred has 10 hours he can allocate to ECN and HIS because he has three other courses and a part time job. We also know each hour spent studying HIS improves the HIS grade by 6 points, and each hour spent on ECN improves the ECN grade by 5 points. Given these resources and productivities, we can create the blue *grade possibility line* that gives the possibilities open to Fred. Any point inside the line is achievable, but all of the resources would not be used. Fred would not be using the 10 hours for studying if we found Fred getting a grade of 25 in both courses (pt A) since the 25 points in ECN would require 5 hours (5 = 25/5) while the 25 points in history would require 4.16 hours (4.16 =25/6). The total time needed for those grades would be only 9.16 hours.

Any point outside of the line, meanwhile, would be impossible to attain given the existing resources and efficiencies. For example, Fred could not get a grade of 50 in both courses (pt. B) since the 50 points in ECN would require 10 hours (10 = 50/5) while the 50 points in history would require 8.33 hours (8.33 =50/6). The total time needed for those grades would be 18.33 hours so it would be unattainable.



The points on the line thus represent all of the possibilities open to Fred. By choosing a specific allocation of the ten hours between HIS and ECN Fred would be on one of the points on the possibility curve. For example, Fred could use all 10 hours studying ECN and get a 0 in HIS and a 50 in ECN (vertical intercept), or he could use all of the time studying HIS and get a 0 in ECN and a 60 in HIS (horizontal intercept). If Fred split the ten hours evenly between the two, the HIS grade would be 30 and the ECN grade would be 25. [You should note that the easiest way to draw the curves would be to calculate the two intercepts and then just connect the points]

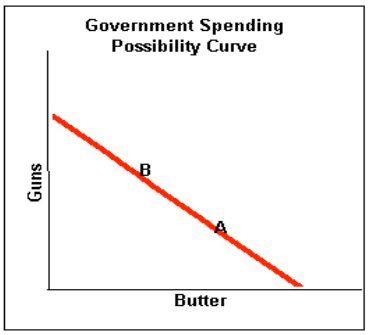
So what advice do we give Fred who wants to get better grades? How can he improve his grades? Fred can increase the resources (time) devoted to study. If Fred spends all 12 hours studying ECN then he can get a grade of 60, while 12 hours spent studying HIS would give him a grade of 72. As you can see from the outward shift in the grade possibility diagram below, Fred can now attain what was unattainable before.

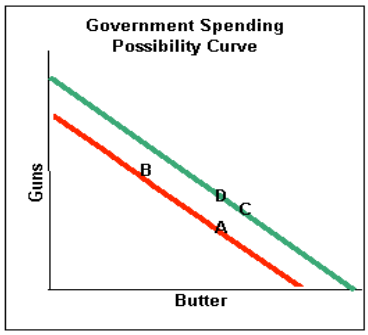


Fred could also increase the productivity of his study time by improving his study habits, maybe no TV or cell phones while studying, or maybe forming a study group to work with someone from the class. Let's look at the situation where Fred increases his productivity in ECN so each hour in ECN now translates into 6 points. There would be no change in the maximum grade Fred could receive in History if he spent all of his time studying history, but if he spent all 10 hours of his time studying ECN then he would receive a 60 in ECN. The new grade possibility curve is outside of the original so Fred would now be able to increase his GPA.
The take-away from this is that when confronted with a choice situation, you can expand the possibilities by throwing more resources at the problem or by using those resources more efficiently.

The War on Terrorism initiated by George Bush has brought back a one-time favorite example of possibility curves - the guns vs. butter example. We begin with the situation facing a government spending money on domestic programs (Butter) and military programs (Guns). Initially, point A in the left-side diagram represented the government's allocation of its spending between guns and butter. To fight the War on Terrorism George Bush had two options. The first was to maintain the same level of spending, which means the possibility curve does not move, and reallocate spending toward the military. We can see this graphically with the middle graph with the movement from point A to point B.

The second option would be to increase government spending to accommodate the increased military spending. The increased spending levels (increased resources) would mean the curve shifted outward. If the decision were made to increase spending on guns and butter, the choice would be represented by a movement from point A to point C. If Bush decided to increase defense spending while holding other spending at its initial level, then the movement would have been from point A to D.





With these examples it is clear how the possibility curve diagram can help us visualize choice situations and focus our attention on the keys in the decision.

Now it is time to move on to supply and demand curves that economists use to understand prices.