

First Principles

1. In each of the following situations, identify which of the twelve principles is at work.
 - a. You choose to shop at the local discount store rather than paying a higher price for the same merchandise at the local department store.
 - b. On your spring break trip, your budget is limited to \$35 a day.
 - c. The student union provides a website on which departing students can sell items such as used books, appliances, and furniture rather than giving them away to their roommates as they formerly did.
 - d. After a hurricane did extensive damage to homes on the island of St. Crispin, homeowners wanted to purchase many more building materials and hire many more workers than were available on the island. As a result, prices for goods and services rose dramatically across the board.
 - e. You buy a used textbook from your roommate. Your roommate uses the money to buy songs from iTunes.
 - f. You decide how many cups of coffee to have when studying the night before an exam by considering how much more work you can do by having another cup versus how jittery it will make you feel.
 - g. There is limited lab space available to do the project required in Chemistry 101. The lab supervisor assigns lab time to each student based on when that student is able to come.
 - h. You realize that you can graduate a semester early by forgoing a semester of study abroad.
 - i. At the student union, there is a bulletin board on which people advertise used items for sale, such as bicycles. Once you have adjusted for differences in quality, all the bikes sell for about the same price.
 - j. You are better at performing lab experiments, and your lab partner is better at writing lab reports. So the two of you agree that you will do all the experiments, and she will write up all the reports.
 - k. State governments mandate that it is illegal to drive without passing a driving exam.
 - l. Your parents' after-tax income has increased because of a tax cut passed by Congress. They therefore increase your allowance, which you spend on a spring break vacation.

Solution

1.
 - a. People usually exploit opportunities to make themselves better off. In this case, you make yourself better off by buying merchandise at a lower price.
 - b. Resources are scarce. Since you have only \$35 a day, your resources are limited (scarce).
 - c. Markets usually lead to efficiency. The market here is represented by the buyers and sellers who use the student union website to trade goods, in contrast to the “nonmarket” of simply giving items away to one’s roommate. The market is efficient because it enables people who want to sell items to find those who want to buy those items. This is in contrast to a system in which items are simply left with a roommate, who may have little or no desire to have them.

- d. Overall spending sometimes gets out of line with the economy's productive capacity. The spending by St. Crispin homeowners on building materials and workers fell short of the economy's ability to produce those goods and services. As a result, prices on the island rose across the board (inflation).
 - e. One person's spending is another person's income. Your spending on the used textbook is your roommate's income.
 - f. "How much" is a decision at the margin. Your decision is one of "how much" coffee to consume, and you evaluate the trade-off between keeping yourself awake and becoming more jittery from one more cup of coffee.
 - g. Resources should be used as efficiently as possible to achieve society's goals. Allocating scarce lab space according to when each student can use that space is efficient.
 - h. The real cost of something is what you must give up to get it. The real cost of a semester abroad is giving up the opportunity to graduate early.
 - i. Markets move toward equilibrium. Any bicycle a buyer chooses will leave him or her equally well off. That is, a buyer who chooses a particular bicycle cannot change actions and find another bicycle that makes him or her better off. Also, no seller can take a different action that makes him or her better off: no seller can charge a higher price for a bicycle of similar quality, since no one would buy that bicycle.
 - j. There are gains from trade. If each person specializes in what he or she is good at (that is, in comparison with others that person has an advantage in producing that good), then there will be gains from specialization and trade.
 - k. When markets don't achieve efficiency, government intervention can improve society's welfare. Unsafe drivers don't take into account the dangers they pose to others and often to themselves. So when unsafe drivers are allowed to drive, everyone is made worse off. Government intervention improves society's welfare by assuring a minimum level of competence in driving.
 - l. Government policies can change spending. In this case, a tax cut has increased spending.
2. Describe some of the opportunity costs when you decide to do the following.
- a. Attend college instead of taking a job
 - b. Watch a movie instead of studying for an exam
 - c. Ride the bus instead of driving your car

Solution

2. a. One of the opportunity costs of going to college is not being able to take a job. By choosing to go to college, you give up the income you would have earned on the job and the valuable on-the-job experience you would have acquired. Another opportunity cost of going to college is the cost of tuition, books, supplies, and so on. Alternatively, the benefit of going to college is being able to find a better, more highly paid job after graduation in addition to the joy of learning.
- b. Watching the movie gives you a certain benefit, but allocating your time (a scarce resource) to watching the movie also involves the opportunity cost of not being able to study for the exam. As a result, you will likely get a lower grade on the exam—and all that that implies.
- c. Riding the bus gets you where you need to go more cheaply than, but probably not as conveniently as, driving your car. That is, some of the opportunity costs of taking the bus involve waiting for the bus, having to walk from the bus stop to where you need to go rather than parking right outside the building, and probably a slower journey. If the opportunity cost of your time is high (your time is valuable), these costs may be prohibitive.

3. Liza needs to buy a textbook for the next economics class. The price at the college bookstore is \$65. One online site offers it for \$55 and another site, for \$57. All prices include sales tax. The accompanying table indicates the typical shipping and handling charges for the textbook ordered online.

Shipping method	Delivery time	Charge
Standard shipping	3–7 days	\$3.99
Second-day air	2 business days	8.98
Next-day air	1 business day	13.98

- a. What is the opportunity cost of buying online instead of at the bookstore? Note that if you buy the book online, you must wait to get it.
- b. Show the relevant choices for this student. What determines which of these options the student will choose?

Solution

3. a. The opportunity cost of buying online is whatever you must give up to get the book online. So the opportunity cost of buying online is the sum of the shipping charges plus the opportunity cost of your time spent waiting for the book to arrive (at the bookstore the book is available immediately) minus the cost saving you receive by buying online versus buying at the bookstore.

- b. Below is a list of all of Liza's options and their purely monetary costs:

Buy from bookstore	\$65
Buy from first site (price \$55), 1-day delivery	$\$55 + \$13.98 = \$68.98$
Buy from first site (price \$55), 2-day delivery	$\$55 + \$ 8.98 = \63.98
Buy from first site (price \$55), 3- to 7-day delivery	$\$55 + \$ 3.99 = \58.99
Buy from second site (price \$57), 1-day delivery	$\$57 + \$13.98 = \$70.98$
Buy from second site (price \$57), 2-day delivery	$\$57 + \$ 8.98 = \65.98
Buy from second site (price \$57), 3- to 7-day delivery	$\$57 + \$03.99 = \$60.99$

It is clear that Liza would never buy from the second site, where the book costs \$57: for each delivery time, she is better off buying the book from the first site, where the book costs \$55. It is also clear that she would never buy the book from the first site and have it delivered the next business day: it costs more that way (\$68.98) than getting it from the bookstore (assuming that it is costless to get to and from the bookstore). But it is not clear whether she will buy the book from the bookstore or the first site with delivery times of 2 or 3–7 days: this depends on her opportunity cost of time. The higher the cost of waiting, the more likely she is to buy the book from the bookstore, where she does not need to wait.

4. Use the concept of opportunity cost to explain the following.
- a. More people choose to get graduate degrees when the job market is poor.
- b. More people choose to do their own home repairs when the economy is slow and hourly wages are down.
- c. There are more parks in suburban than in urban areas.
- d. Convenience stores, which have higher prices than supermarkets, cater to busy people.
- e. Fewer students enroll in classes that meet before 10:00 A.M.

Solution

4. a. The worse the job market, the lower the opportunity cost of getting a graduate degree. One of the opportunity costs of going to graduate school is not being able to work. But if the job market is bad, the salary you can expect to earn is low or you might be unemployed—so the opportunity cost of going to school is also low.
- b. When the economy is slow, the opportunity cost of people's time is also lower: the wages they could earn by working longer hours are lower than when the economy is booming. As a result, the opportunity cost of spending time doing your own repairs is lower—so more people will decide to do their own repairs.
- c. The opportunity cost of parkland is lower in suburban areas. The price per square foot of land is much higher in urban than in suburban areas. By creating parkland, you therefore give up the opportunity to make much more money in cities than in the suburbs.
- d. The opportunity cost of time is higher for busy people. Driving long distances to supermarkets takes time that could be spent doing other things. Therefore, busy people are more likely to use a nearby convenience store.
- e. Before 10:00 A.M. the opportunity cost of time for many students is very high—it means giving up an extra hour's sleep. That extra hour is much more valuable before 10:00 A.M. than later in the day.
5. In the following examples, state how you would use the principle of marginal analysis to make a decision.
- Deciding how many days to wait before doing your laundry
 - Deciding how much library research to do before writing your term paper
 - Deciding how many bags of chips to eat
 - Deciding how many lectures of a class to skip

Solution

5. a. Each day that you wait to do your laundry imposes a cost: you have fewer clean clothes to choose from. But each day that you wait also confers a benefit: you can spend your time doing other things. You will wait another day to do your laundry if the benefit of waiting to do the laundry that day is greater than the cost.
- b. The more research you do, the better your paper will be. But there is also an opportunity cost: every additional hour you spend doing research means you cannot do other things. You will weigh the opportunity cost of doing one more hour of research against the benefit gained (in terms of an improved paper) from doing research. You will do one more hour of research if the benefit of that hour outweighs the cost.
- c. Each bag of chips you eat gives you a benefit: it satisfies your hunger. But it also has a cost: the money spent for each bag (and, if you are weight-conscious, the additional calories). You will weigh the cost against the benefit of eating one more bag. If the cost is less than the benefit, you will eat that one more bag of chips.
- d. Each lecture that you skip implies a cost: getting further behind with the material and having to teach it to yourself just before the exam. But each skipped lecture also means you can spend the time doing other things. You will continue to skip lectures if the cost of skipping is lower than the benefit of spending that time doing other things.
6. This morning you made the following individual choices: you bought a bagel and coffee at the local café, you drove to school in your car during rush hour, and you typed your roommate's term paper because you are a fast typist—in return for which she will do your laundry for a month. For each of these actions, describe how your individual choices interacted with the individual choices made by others. Were other people left better off or worse off by your choices in each case?

Solution

- 6.** When you bought the bagel and coffee, you paid a price for them. You would not have bought that breakfast if your enjoyment of it (your welfare) had not been greater than the price you paid. Similarly, the café owner would not have sold you the bagel and coffee if the price he received from you were less than the cost to him of making them. This is an example of how everybody gains from trade: both you and the café owner are better off.

When you chose to drive your car during the rush hour, you added to the congestion on the road. Your choice had a side effect for other motorists: your driving slowed everybody else down just a little bit more. Your choice made other motorists worse off.

Typing your roommate's term paper in exchange for her doing your laundry is another example of the gains that come from trade. Both of you voluntarily agreed to specialize in a task that each is comparatively better at because you expected to gain from this interaction. Your choice made both you and your roommate better off.

- 7.** The Hatfield family lives on the east side of the Hatatoochie River, and the McCoy family lives on the west side. Each family's diet consists of fried chicken and corn-on-the-cob, and each is self-sufficient, raising their own chickens and growing their own corn. Explain the conditions under which each of the following would be true.
- The two families are made better off when the Hatfields specialize in raising chickens, the McCoys specialize in growing corn, and the two families trade.
 - The two families are made better off when the McCoys specialize in raising chickens, the Hatfields specialize in growing corn, and the two families trade.

Solution

- 7.**
- Gains from trade usually arise from specialization. If the Hatfields (compared to the McCoys) are better at raising chickens and the McCoys (compared to the Hatfields) are better at growing corn, then there will be gains from specialization and trade.
 - Similar to the answer to part a, if the McCoys (compared to the Hatfields) are better at raising chickens and the Hatfields (compared to the McCoys) are better at growing corn, then there will be gains from specialization and trade.
- 8.** Which of the following situations describes an equilibrium? Which does not? If the situation does not describe an equilibrium, what would an equilibrium look like?
- Many people regularly commute from the suburbs to downtown Pleasantville. Due to traffic congestion, the trip takes 30 minutes when you travel by highway but only 15 minutes when you go by side streets.
 - At the intersection of Main and Broadway are two gas stations. One station charges \$3.00 per gallon for regular gas and the other charges \$2.85 per gallon. Customers can get service immediately at the first station but must wait in a long line at the second.
 - Every student enrolled in Economics 101 must also attend a weekly tutorial. This year there are two sections offered: section A and section B, which meet at the same time in adjoining classrooms and are taught by equally competent instructors. Section A is overcrowded, with people sitting on the floor and often unable to see the chalkboard. Section B has many empty seats.

Solution

- 8.**
- This is not an equilibrium. Assume that all people care about is the travel time to work (not, for instance, how many turns they need to make or what the scenery is like). Some people could be better off using the side streets, which would cut down their travel time. Eventually, as the situation moves to equilibrium (that is, as more people use the side streets), travel times on the highway and along the side streets will equalize.

- b. This might be an equilibrium. Those who buy gas at the first station would be worse off by buying gas at the second if the value of their time spent waiting exceeded the savings at the pump: they would save 15 cents per gallon but would incur the opportunity cost of waiting in a long line. You should expect very busy people (a high opportunity cost of time) to buy gas at the first station. Those who buy gas at the second station might be worse off by buying gas at the first: they would not have to wait in line but would pay 15 cents more per gallon. You should expect people with a lot of free time (a low opportunity cost of time) to buy gas at the second station.
 - c. This is not an equilibrium. If students from section A attended section B instead, they would be better off: they could get seats and see the chalkboard without incurring any cost (since the section meets at the same time and is taught by an equally competent instructor). Over time, you should expect students to switch from section A to section B until equilibrium is established.
9. In each of the following cases, explain whether you think the situation is efficient or not. If it is not efficient, why not? What actions would make the situation efficient?
- a. Electricity is included in the rent at your dorm. Some residents in your dorm leave lights, computers, and appliances on when they are not in their rooms.
 - b. Although they cost the same amount to prepare, the cafeteria in your dorm consistently provides too many dishes that diners don't like, such as tofu casserole, and too few dishes that diners do like, such as roast turkey with dressing.
 - c. The enrollment for a particular course exceeds the spaces available. Some students who need to take this course to complete their major are unable to get a space even though others who are taking it as an elective do get a space.

Solution

9. a. This is not efficient. If the lights were turned off, some students could be made better off without making other students worse off because the college would save money on electricity that it could spend on student programs. By leaving lights and appliances on when leaving their rooms, residents do not take into account the negative side effect they impose on their college—the higher cost of electricity. If students were forced to pay their own individual electricity costs (that is, if they fully took into account the cost of their actions), then they would turn the lights and appliances off when leaving their rooms. This situation would be efficient.
- b. This is not efficient. Instead of serving dishes that many diners do not like, the cafeteria should serve more of the equal-cost dishes that diners do like. That way, some students could be made better off without other students being made worse off.
- c. This is not efficient. In an efficient scheme, spaces would be allocated to those students who value them most. In this case, however, some spaces are allocated to students who value them less (those who take the course as an elective) than other students (those who need the course to graduate). Efficiency could be improved as follows: if a student who is not currently enrolled in the course values it more than a student who is enrolled, then the unenrolled student should be willing to pay the enrolled student to give up his or her space. At some price, this trade would make both students better off and the outcome would be efficient.
10. Discuss the efficiency and equity implications of each of the following policies. How would you go about balancing the concerns of equity and efficiency in these areas?
- a. The government pays the full tuition for every college student to study whatever subject he or she wishes.
 - b. When people lose their jobs, the government provides unemployment benefits until they find new ones.

- 10.**
- a.** Although this policy is equitable, it may not be efficient, depending on the beneficial side effects of education. It does allow everyone, regardless of ability to pay, to attend college. But it may not be efficient: subsidizing the full cost of tuition for everyone lowers the opportunity cost of going to college, and this might lead some people to go to college when they could more productively follow a career that does not require a college education. And since resources (including government money) are scarce, paying tuition for these people has an opportunity cost: some other (possibly more worthwhile) government projects cannot be undertaken. One way of getting around this problem is to award scholarships based on academic ability.
- b.** Although this policy may be equitable (it guarantees everyone a certain amount of income), it may not be efficient. People respond to incentives. If unemployment becomes more attractive because of the unemployment benefit, some unemployed people may no longer try to find a job or may not try to find one as quickly as they would without the benefit. Ways to get around this problem are to provide unemployment benefits only for a limited time or to require recipients to prove that they are actively searching for a new job.
- 11.** Governments often adopt certain policies in order to promote desired behavior among their citizens. For each of the following policies, determine what the incentive is and what behavior the government wishes to promote. In each case, why do you think that the government might wish to change people's behavior, rather than allow their actions to be solely determined by individual choice?
- a.** A tax of \$5 per pack is imposed on cigarettes.
- b.** The government pays parents \$100 when their child is vaccinated for measles.
- c.** The government pays college students to tutor children from low-income families.
- d.** The government imposes a tax on the amount of air pollution that a company discharges.

- 11.**
- a.** This policy creates an incentive to smoke less by making a pack of cigarettes more costly. This is exactly what policy makers wish to promote. Cigarettes have undesirable side effects on other people, which smokers do not (or only insufficiently) take into account. One is that other people have to breathe in second-hand smoke. Another is the cost of health care: when smokers who need treatment for lung cancer are covered by Medicare or Medicaid, the rest of society has to foot the bill. Since individuals do not take these costs (costs that arise for other people) into account in deciding whether or not (or how much) to smoke, the amount of cigarettes smoked will be inefficiently high. The tax is a way to make people take these costs into account in deciding whether or not to smoke.
- b.** This policy creates an incentive to have children vaccinated: it increases the benefit to parents from vaccination of their children. Getting vaccinated means not only that a child will not contract the measles but also that he or she cannot pass the measles on to other children. That is, there is a side effect for other people (their children get sick less often) that parents do not take into account in their decision of whether or not to have their own child vaccinated. The subsidy is a way to make individuals take into account in their decisions the benefit they can create for other people.
- c.** This policy creates incentives for low-income families to get college students to tutor their children, since getting a tutor is now cheaper or free. This results in better performance in school by these children and higher levels of educational attainment. This has positive side effects for the rest of society: the better children do in school, the more productive, happier, and healthier citizens they will be.

d. This tax creates the incentive to emit fewer air pollutants. Pollution has a negative side effect for others: it decreases air quality (for instance, it contributes to the formation of ozone smog) and results in a variety of health complications (for instance, asthma). In deciding how much pollution to discharge, a company does not take these negative side effects sufficiently into account. The tax is a way to make pollution more expensive, that is, to make the company face the cost it imposes on others.

- 12.** In each of the following situations, explain how government intervention could improve society's welfare by changing people's incentives. In what sense is the market going wrong?
- Pollution from auto emissions has reached unhealthy levels.
 - Everyone in Woodville would be better off if streetlights were installed in the town. But no individual resident is willing to pay for installation of a streetlight in front of his or her house because it is impossible to recoup the cost by charging other residents for the benefit they receive from it.

- Solution**
- 12.** a. In deciding how much to drive, each driver does not take into account the cost of auto emissions he or she imposes on others. That is, the market will lead to there being too much pollution. One way for governments to intervene would be to tax fuel or to tax cars that get low gas mileage. Or governments could subsidize new and cleaner fuels or technologies, such as hybrid cars. This would create incentives for people to switch to cars that use less polluting gas or to drive less.
- b. The market in this situation leads to too few (or no) streetlights in Woodville. Governments could improve residents' welfare by paying for streetlight installation from the taxes paid by residents.

- 13.** On August 2, 2010, Tim Geithner, the Treasury secretary, published an article defending the administration's policies. "The recession that began in late 2007 was extraordinarily severe," he declared, "but the actions we took at its height to stimulate the economy helped arrest the freefall, preventing an even deeper collapse and putting the economy on the road to recovery. Which two of the three principles of economy-wide interaction are at work in this statement?"

- Solution**
- 13.** The Obama stimulus is an example of government policy aimed at changing spending: by cutting taxes and also by directly increasing government spending, the package sought to boost overall spending in the economy. And as spending rises, firms increase production. This is an example of the principle that one person's spending is another person's income.

- 14.** In August 2007, a sharp downturn in the U.S. housing market reduced the income of many who worked in the home construction industry. A *Wall Street Journal* news article reported that Wal-Mart's wire-transfer business was likely to suffer because many construction workers are Hispanics who regularly send part of their wages back to relatives in their home countries via Wal-Mart. With this information, use one of the principles of economy-wide interaction to trace a chain of links that explains how reduced spending for U.S. home purchases is likely to affect the performance of the Mexican economy.

- 14.** The correct principle in this case is that one person's spending is another person's income. Here, a reduction in spending for U.S. home purchases leads to a fall in the income of workers in the home construction industry. This, in turn, leads to a reduction in funds sent by workers to relatives in Mexico, which leads to a reduction in spending by Mexican households. This, in turn, leads to less business for Mexican firms and job losses in Mexico. Ultimately, the Mexican economy is likely to be adversely affected by the downturn in the U.S. housing market.
- 15.** In 2005, Hurricane Katrina caused massive destruction to the U.S. Gulf Coast. Tens of thousands of people lost their homes and possessions. Even those who weren't directly affected by the destruction were hurt because businesses and jobs dried up. Using one of the principles of economy-wide interaction, explain how government intervention can help in this situation.

- 15.** The destruction caused by Hurricane Katrina caused a reduction in spending by residents in the area. This, in turn, led to reduced income as businesses failed or contracted and employment suffered. The government can help remedy the situation by spending more in the area—say, by employing people for cleanup and construction—to counterbalance the reduced spending by private residents. This is an example of the principle that government policies can change spending.
- 16.** During the Great Depression, food was left to rot in the fields or fields that had once been actively cultivated were left fallow. Use one of the principles of economy-wide interaction to explain how this could have occurred.

- 16.** During the Great Depression, spending fell far short of the country's capacity to produce. This reflects the principle that overall spending sometimes gets out of line with the economy's productive capacity. As a result of the plunge in spending during the Great Depression, farmers could not find enough buyers for food that had already been produced, so it was left to rot. Likewise, some farmers left their fields fallow.

