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- **Chapter 1 – Thinking Like an Economist**
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CHAPTER

1

THINKING LIKE AN ECONOMIST

Much of microeconomics entails the study of how people choose under conditions of scarcity. Many people react to this description by saying that the subject is of little real relevance in developed countries, where material scarcity is largely a thing of the past.

This reaction, however, takes too narrow a view of scarcity, for there are *always* important resources in short supply. At his death, the Greek shipping magnate Aristotle Onassis was one of the richest men alive. He had more money than he could possibly spend and used it for such things as finely crafted whale ivory footrests for the barstools on his yacht. And yet he confronted the problem of scarcity much more than most of us will ever have to. Onassis was the victim of *myasthenia gravis,* a debilitating and progressive neurological disease. For him, the scarcity that mattered was not money but time, energy and the physical skill needed to carry out ordinary activities.

Time is a scarce resource for everyone, not just the terminally ill. In deciding which films to see, for example, it is time, not the price of admission, that constrains most of us. With only a few free nights available each month, seeing one film means not being able to see another, or not being able to have dinner with friends.

Time and money are not the only important scarce resources. Consider the economic choice you confront when a friend invites you to a buffet lunch. You must decide how to fill your plate. Even if you are not rich, money would be no object, since you can eat as much as you want for free. Nor is time an obstacle, since you have all afternoon and would enjoy spending it in the company of your friend. The important scarce resource here is the capacity of your stomach. A smorgasbord of your favourite foods lies before you, and you must decide which to eat and in what quantities. Eating another slice of pizza necessarily

means having less room for more pasta. The fact that no money changes hands here does not make your choice any less an economic one.

Every choice involves important elements of scarcity. Sometimes the most relevant scarcity will involve money, but not always. Coping with scarcity is the essence of the human condition. Indeed, were it not for the problem of scarcity, life would be stripped of much of its intensity. For someone with an infinite lifetime and limitless material resources, hardly a single decision would ever matter.

In this chapter we examine some basic principles of microeconomic theory and see how an economist might apply them to a wide variety of choices involving scarcity. Later chapters more formally develop the theory. For now, our only goal is to get an intuitive feel for that distinctive mind-set known as 'thinking like an economist'. And the best way to do that is to work through a series of problems familiar from actual experience.

THE COST–BENEFIT APPROACH TO DECISIONS

Many of the choices economists study can be posed as the following question:

Should I do activity x?

For the choice confronting a filmgoer, '. . . do activity x?' might be, for example, '. . . see *Casablanca* tonight?' For the person attending the buffet lunch, it might be '. . . eat another slice of pizza?' Economists answer such questions by comparing the costs and benefits of doing the activity in question. The decision rule we use is disarmingly simple. If $C(x)$ denotes the costs of doing x and $B(x)$ denotes the benefits, it is:

If $B(x) > C(x)$, do x; otherwise don't.

To apply this rule, we must define and measure costs and benefits. Monetary values are a useful common denominator for this purpose, even when the activity has nothing directly to do with money. We define $B(x)$ as the maximum monetary amount you would be willing to pay to do x. Often $B(x)$ will be a hypothetical magnitude, the amount you would be willing to pay if you had to, even though no money will change hands. $C(x)$, in turn, is the value of all the resources you must give up in order to do x. Here, too, $C(x)$ need not involve an explicit transfer of money.

For most decisions, at least some of the benefits or costs will not be readily available in monetary terms. To see how we proceed in such cases, consider the following simple decision.

EXAMPLE 1.1 Should I turn down my stereo?

You have settled into a comfortable chair and are listening to your stereo when you realize that the next two tracks will be ones you dislike. Ideally, you would have programmed your player to not play them. But, you didn't, and so you must decide whether to get up and turn the music down or to stay put and wait it out.

The benefit of turning it down is not having the songs you don't like blare away at you. The cost, in turn, is the inconvenience of getting out of your chair. If you are extremely comfortable and the music is only mildly annoying, you will probably stay put. But if you haven't been settled for long or if the music is really bothersome, you are more likely to get up.

Even for simple decisions like this one, it is possible to translate the relevant costs and benefits into a monetary framework. Consider first the cost of getting out of your chair. If someone offered you 1 cent to get up out of a comfortable chair and there were no reason other than the cent to do it, would you take the offer? Most people would not. But if someone offered you €1,000, you would be on your feet in an instant. Somewhere between 1 cent and €1,000 lies your **reservation price**, the minimum amount it would take to get you out of the chair.

reservation price of activity x is the price at which a person would be indifferent between doing x and not doing x.

To see where the threshold lies, imagine a mental auction with yourself in which you keep boosting the offer by small increments from 1 cent until you reach the point at which it is barely worthwhile to get up. Where this point occurs will obviously depend on circumstance. If you are rich, it will tend to be higher than if you are poor, because a given amount of money will seem less important;

if you feel energetic, it will be lower than if you feel tired; and so on. For the sake of discussion, suppose your reservation price for getting out of the chair turns out to be €1. You can conduct a similar mental auction to determine the maximum sum you would be willing to pay someone to turn the music down. This reservation price measures the benefits of turning the music down; let us suppose it turns out to be 75 cents.

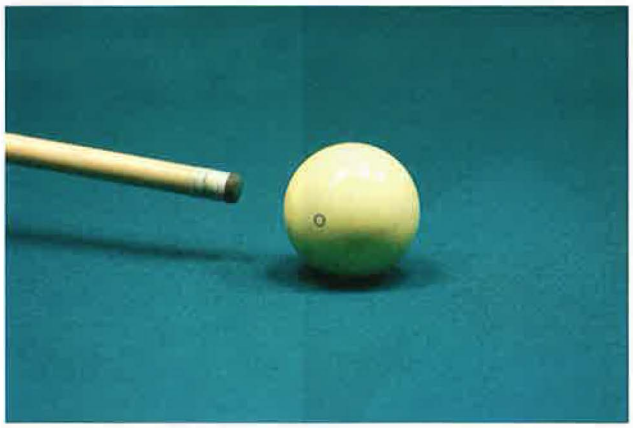
In terms of our formal decision rule, we then have x = 'turn my stereo down', with $B(x) = €0.75 < C(x) = €1$, which means that you should remain in your chair. Listening to the next two songs will be unpleasant, but less so than getting up would be. A reversal of these cost and benefit figures would imply a decision to get up and turn the music down. If $B(x)$ and $C(x)$ happened to be equal, you would be indifferent between the two alternatives. ◆

THE ROLE OF ECONOMIC THEORY

The idea that anyone might actually calculate the costs and benefits of turning down a stereo may sound absurd. Economists have been criticized for making unrealistic assumptions about how people behave, and outsiders are quick to wonder what purpose is served by the image of a person trying to decide how much he would pay to avoid getting up from his chair.

There are two responses to this criticism. The first is that economists don't assume that people make such calculations explicitly. Rather, many economists argue, we can make useful predictions by assuming people act *as if* they made such calculations. This view was forcefully expressed by Nobel laureate Milton Friedman, who illustrated his point by looking at the techniques expert pool players use.[1] He argued that the shots they choose, and the specific ways they attempt to make them, can be predicted extremely well by assuming that players take careful account of all the relevant laws of Newtonian physics. Of course, few expert pool players have had formal training in physics, and hardly any can recite such laws as 'the angle of incidence equals the angle of reflection'. Nor are they likely to know the definitions of 'elastic collisions' and 'angular momentum'. Even so, Friedman argued, they would never have become expert players in the first place *unless* they played as dictated by the laws of physics. Our theory of pool player behaviour assumes, unrealistically, that players know the laws of physics. Friedman urged us to judge this theory not by how accurate its central assumption is but by how well it predicts behaviour. And on this score, it performs very well indeed.

[1]Milton Friedman, 'The Methodology of Positive Economics', *Essays in Positive Economics*, Chicago: University of Chicago Press, 1953.



Professional pool players may not know all the formal laws of Newtonian physics, but the quality of their play suggests that they have a deep understanding of them.

Like pool players, we must also develop skills for coping with our environments. Many economists, Friedman among them, believe that useful insights into our behaviour can be gained by assuming that we act as if governed by the rules of rational decision making. By trial and error we eventually absorb these rules, just as pool players absorb the laws of physics.

A second response to the charge that economists make unrealistic assumptions is to concede that behaviour does often differ from the predictions of economic models. Thus, as economist Richard Thaler puts it, we often behave more like novice than expert pool players—ignoring bank shots and having no idea about putting the proper spin on the cue ball to position it for the next shot. Considerable evidence supports this second view.

But even where economic models fail on descriptive grounds, they often provide useful guidance for decisions. That is, even if they don't always predict how we *do* behave, they may often give useful insights into how to achieve our goals more efficiently. If novice pool players have not yet internalized the relevant physical laws, they may nonetheless consult those laws for guidance about how to improve. Economic models often play an analogous role with respect to ordinary consumer and business decisions. Indeed, this role alone provides a compelling reason for learning economics.

COMMON PITFALLS IN DECISION MAKING

Some economists are embarrassed if an outsider points out that much of what they do boils down to an application of the principle that we should perform an action if and only if its benefits exceed its costs. That just doesn't sound like enough to keep a person with a PhD busy all day! There is more to it, however, than meets the eye. People who study economics quickly discover that measuring costs and benefits is as much an art as a science. Some costs seem almost deliberately hidden from view. Others may seem relevant but, on a closer look, turn out not to be.

Economics teaches us how to identify the costs and benefits that really matter. An important goal of this book is to teach you to become a better decision maker. A good starting point is to examine some common pitfalls in decision making. The relevant economic principles are simple and commonsensical, but many people ignore them.

Pitfall 1. Ignoring Implicit Costs

One pitfall is to overlook costs that are not explicit. If doing activity x means not being able to do activity y, then the value to you of doing y (had you done it) is an **opportunity cost** of doing x. Many people make bad decisions because they tend to ignore the value of such forgone opportunities. This insight suggests that it will almost always be instructive to translate questions such as 'Should I do x?' into ones such as 'Should I do x or y?' In the latter question, y is simply the most highly valued alternative to doing x. The following example helps drive this important point home.

opportunity cost of an activity is the value of all that must be sacrificed in order to do the activity.

EXAMPLE 1.2 Should I go skiing today or work as a research assistant?

There is a ski area near your campus. From experience you know that a day on the slopes is worth €60 to you. The charge for the day is €40 (which includes bus fare, lift ticket and

equipment). However, this is not the only cost of going skiing. You must also take into account the value of the most attractive alternative you will forgo by heading for the slopes. Suppose the best alternative is your new job as a professor's research assistant. The job pays €45/day, and you like it just well enough to be willing to do it for free. The question you face is, 'Should I go skiing or work as a research assistant?'

Here, the cost of skiing is not just the explicit cost of the ski package (€40) but also the opportunity cost of the lost earnings (€45). The total costs are therefore €85, which exceeds the benefits of €60. Since $C(x) > B(x)$, you should stay on campus and work for your professor. Someone who ignored the opportunity cost of the forgone earnings would decide incorrectly to go skiing. ◆

The fact that you liked the research job just well enough to have been willing to do it for free is another way of saying there were no psychic costs associated with doing it. This is important because it means that by not doing the job you would not have been escaping something unpleasant. Of course, not all jobs fall into this category. Suppose instead that your job is to wash dishes in the dining hall for the same pay, €45/day, and that the job is so unpleasant that you would be unwilling to do it for less than €30/day. Assuming your manager at the dining hall permits you to take a day off whenever you want, let us now reconsider your decision about whether to go skiing.

EXAMPLE 1.3 Should I go skiing today or wash dishes?

There are two equivalent ways of looking at this decision. One is to say that one benefit of going skiing is not having to wash dishes. Since you would never be willing to wash dishes for less than €30/day, avoiding that task is worth that amount to you. Going skiing thus carries the indirect benefit of not washing dishes. When we add that indirect benefit to the €60 direct benefit of the skiing, we get $B(x) = €90$. In this view of the problem, $C(x)$ is the same as before, namely, the €40 ski charge plus the €45 opportunity cost of the lost earnings, or €85. So now $B(x) > C(x)$, which means you should go skiing.

Alternatively, we could have viewed the unpleasantness of the dish-washing job as an offset against its salary. By this approach, we would subtract €30/day from your €45/day earnings and say that the opportunity cost of not working is only €15/day. Then $C(x) = €40 + €15 = €55 < B(x) = €60$, and again the conclusion is that you should go skiing.

It makes no difference in which of these two ways you handle the valuation of the unpleasantness of washing dishes. Costs and benefits are reciprocal. It is critically important, however, that you do it either one way or the other. Don't count it twice! ◆

As simple as the opportunity cost concept is, it is one of the most important in microeconomics. The art in applying the concept correctly lies in being able to recognize the most valuable alternative that is sacrificed by the pursuit of a given activity.

It is no exaggeration to say that an understanding of opportunity cost allows you to see the world in a very different light. One of our basic objectives in this book is to enable you to become an 'economic naturalist'. Studying biology enables people to observe and marvel at many details of life that would otherwise escape them. For the naturalist, a walk in a quiet wood becomes an adventure. In much the same way, studying microeconomics enables you to see the mundane details of ordinary existence in a sharp new light. Each feature of the man-made landscape is no longer an amorphous mass but the result of an implicit cost–benefit calculation. This book will contain many examples of economic naturalism. Hopefully, we will inspire you to come up with many examples of your own.

Why are most university students under 30?

ECONOMIC NATURALIST 1.1

University costs are not limited to tuition fees, housing, food, books, supplies, and the like. They also include the opportunity cost of earnings forgone while studying. Earnings increase with experience. Thus the more experience you have, the more you must forgo to attend university. This opportunity cost is therefore lowest when you are right out of school.

On the benefit side, one big gain of a university education is sharply higher earnings. The sooner you graduate, the longer you will reap this benefit. Another benefit is the pleasantness of going to university as opposed to working. In general, the kinds of jobs people hold tend to be less unpleasant (or more pleasant) the more education they have. By going to university right away, you thus avoid having to work at the least pleasant jobs.

For most people, then, it makes sense to go to university first and work afterward. Certainly it makes more sense to attend university at age 20 than at age 50. ■

The reasoning in the preceding Economic Naturalist could be criticized on the grounds that school leavers typically do not decide when to attend university on the basis of sophisticated calculations involving opportunity costs. This, though, is to miss the point of our previous discussion on the role of economic theory. True, most students start right out of school simply because that is what most of their peers do. It is the thing to do. But this begs the question of how it got to *be* the thing to do. Customs do not originate out of thin air. A host of different societies have had centuries to experiment with this decision. If there were a significantly better way of arranging the learning and working periods of life, some society should have long since discovered it. Our current custom has survived because it is efficient. People may not make explicit calculations about the opportunity cost of forgone earnings, but they often behave *as if* they do.[2]

ECONOMIC NATURALIST 1.2

Why can it be costly to use a free, money-off voucher?

Many retailers offer loyalty schemes for regular customers providing air miles, money-off vouchers, and much, much more. It is tempting to think that spending loyalty points has no cost. Things, though, can be more complicated than they seem.

To illustrate the point, suppose your local supermarket rewards you for your custom with a voucher worth €10. This means you could get €10 off your next shop. But that is not all you can do. At your local pizzeria you can turn the €10 voucher into €40 off the meal. What should you do if the day you received the voucher you were planning to shop at the supermarket and then go and eat in town?

You could get €10 off your shopping or €40 off your restaurant bill. Spending the voucher on shopping is clearly a bad deal. It is a bad deal because of opportunity cost. While it might feel as though it costs nothing to use the voucher for shopping, the opportunity cost of using it is actually €30. It may sound bizarre that it costs you €30 to use a €10 money-off voucher! But that is the economic reality. The moral is to be very careful when something feels as though it is for free. It may well have a significant opportunity cost. ■

Pitfall 2. Failing to Ignore Sunk Costs

An opportunity cost may not seem to be a relevant cost when in reality it is. On the other hand, sometimes an expenditure may seem relevant when in reality it is not. Such is often the case with **sunk costs,** costs that are beyond recovery at the moment a decision is made. Unlike opportunity costs, these costs *should be* ignored. Not ignoring them is a second pitfall in decision making. The principle of ignoring sunk costs emerges clearly in the following example.

sunk cost a cost that is beyond recovery at the time a decision is made and so should be ignored.

EXAMPLE 1.4 Should I drive to Berlin or take the train?

You are planning a 250 km trip to Berlin. Except for the cost, you are completely indifferent between driving and taking the train. The train fare is €100. You don't know how much it would cost to drive your car, so you call the car hire firm Hertz for an estimate. Hertz tells you that for

[2]This does not mean that all customs necessarily promote efficiency. For example, circumstances may have changed in such a way that a custom that promoted efficiency in the past no longer does so. In time, such a custom might change. Yet many habits and customs, once firmly entrenched, are very slow to change.

your make of car the costs of a typical 10,000 km driving year are as follows:

Insurance	€1,000
Interest	2,000
Fuel and oil	1,000
Maintenance	1,000
Total	**€5,000**

Suppose you calculate that these costs come to €0.50/km and use this figure to compute that the 250 km trip will cost you €125 by car. And since this is more than the €100 train fare, you decide to take the train.

If you decide in this fashion, you fall victim to the sunk cost pitfall. Insurance and interest payments do not vary with the number of kilometres you drive each year. Both are sunk costs and will be the same whether or not you drive to Berlin. Of the costs listed, fuel and oil and maintenance are the only ones that vary with kilometres driven. These come to €2,000 for each 10,000 kilometres you drive, or €0.20/km. At €0.20/km, it costs you only €50 to drive to Berlin, and since this is less than the train fare, you should drive. ◆

In Example 1.4, note the role of the assumption that, costs aside, you are indifferent between the two modes of transport. If you had preferred one mode to the other, we would also have had to weigh that preference. For example, if you were willing to pay €60 to avoid the hassle of driving, the real cost of driving would be €110, not €50, and you should take the train.

Exercises such as the one below are sprinkled throughout the text to help you make sure that you understand important analytical concepts. You will master microeconomics more effectively if you do these exercises as you go along.

EXERCISE 1.1 How, if at all, would your answer to the question in Example 1.4 be different if the worth of avoiding the hassle of driving is €20 and you average one €28 traffic fine for every 200 kilometres you drive?

As a check, the answers to the in-chapter exercises are at the end of each chapter. Naturally, the exercises will be much more useful if you work through them before consulting the answers.

EXAMPLE 1.5 The pizza experiment

Your local pizzeria offers an all-you-can-eat lunch for €10. You pay at the door, then the waiter brings you as many slices of pizza as you like. One day you decide to run an experiment.[3] You select half the tables at random and give everyone at those tables a €10 refund before taking orders. Diners at the remaining tables get no refund. What difference, if any, do you predict in the amount of pizza eaten by these two groups?

Diners in each group confront the question, 'Should I eat another slice of pizza?' Here, the activity x consists of eating one more slice. For both groups, $C(x)$ is exactly zero: even members of the group that did not get a refund can get as many additional slices as they want at no extra charge. Because the refund group was chosen at random, there is no reason to suppose that its members like pizza any more or less than the others. For everyone, the decision rule says keep eating until there is no longer any extra pleasure in eating another slice. Thus, $B(x)$ should be the same for each group, and people from both groups should keep eating until $B(x)$ falls to zero.

By this reasoning, the two groups should eat the same amount of pizza, on average. The €10 admission fee is a sunk cost and should have no influence on the amount of pizza one eats. But is that what would happen? When this experiment was done for real *the group that did not get the refund consumed substantially more pizza.* ◆

[3]See Richard Thaler, 'Toward a Positive Theory of Consumer Choice', *Journal of Economic Behavior and Organization* 1, 1980 for the actual experiment.

Although our cost–benefit decision rule fails the test of prediction in this experiment, its message for the rational decision maker stands unchallenged. The two groups logically *should* have behaved the same. The only difference between them, after all, is that customers in the refund group have lifetime incomes that are €10 higher than the others'. Such a trivial difference should have no effect on pizza consumption. Members of the no-refund group seemed to want to make sure they 'got their money's worth'. In all likelihood, however, this motive merely led them to overeat.

What is wrong with being motivated to 'get your money's worth'? Absolutely nothing, as long as the force of this motive operates *before* you enter into transactions. Thus it makes perfectly good sense to be led by this motive to choose one restaurant over an otherwise identical competitor that happens to cost more. Once the price of your lunch has been determined, however, the get-your-money's-worth motive should be abandoned. The satisfaction you get from eating another slice of pizza should then depend only on how hungry you are and on how much you like pizza, not on how much you paid. Yet people often seem not to behave in this fashion. The difficulty may be that we are not creatures of complete flexibility. Perhaps motives that make sense in one context are not easily abandoned in another.

EXERCISE 1.2 **Jim wins a ticket from a radio station to see a jazz band perform at an outdoor concert. Mike has paid €18 for a ticket to the same concert. On the evening of the concert there is a tremendous thunderstorm. If Jim and Mike have the same tastes, which of them will be more likely to attend the concert, assuming that each decides on the basis of a standard cost–benefit comparison?**

ECONOMIC NATURALIST 1.3

Why do hotels charge a deposit?

For most delayed purchases, where there is a gap between reserving the good and paying for it, some form of non-refundable deposit is required. The purpose of the deposit seems obvious in that it 'commits' the buyer to purchasing the good. This, in turn, provides some certainty to the seller. Much of the real power of deposits stems, however, from a failure to take account of sunk costs.

Suppose, by way of example, you are booking a summer holiday in Greece for your family. You searched around for good hotels and found two you liked—the Bay Hotel and the Coast Hotel. Both cost €1,000 for the week. You rate the benefit of staying at the Bay Hotel at €1,400 and the benefit of staying at the Coast Hotel at €1,100. The Bay Hotel is the clear winner. But when you ring up you find out it is fully booked for the time you want. So, you book in at the Coast Hotel and pay a €200 non-refundable deposit.

What would you do if the Bay Hotel subsequently emails you with the news that there is a cancellation and you can now stay there? Most people would think 'too late'. The €200 deposit given to the Coast Hotel is, however, a sunk cost. That means you should ignore it. If you go to the Coast Hotel it will cost you a further €800 for a €1,100 benefit. If you go to the Bay Hotel it will cost you €1,000 for a €1,400 benefit. The Bay Hotel is still the clear winner.

It likely would be annoying that you have ended up paying €1,200 for a holiday that should have only cost €1,000. In hindsight you could have done things differently. But the deposit once paid is a sunk cost and should not affect your decision. ■

Pitfall 3. Measuring Costs and Benefits as Proportions Rather Than Absolute Monetary Amounts

When a boy asks his mother 'Are we almost there yet?' how will she answer if they are 10 kilometres from their destination? Without some knowledge of the context of their journey, we cannot say. If they are near the end of a 300 km journey, her answer will almost surely be yes. But if they have just embarked on a 12 km journey, she will say no.

Contextual clues are important for a variety of ordinary judgements. Thinking about distance as a percentage of the total amount to be travelled is natural and informative. Many also find it natural to think in percentage terms when comparing costs and benefits. But as the following example illustrates, this tendency often causes trouble.

EXAMPLE 1.6 Are you willing to walk 15 minutes in order to save €10?

You are about to buy a clock radio at the nearby campus store for €20 when a friend tells you that the very same radio is on sale at the local superstore for only €10. If the superstore is a 15-minute walk away, where would you buy the radio? (If it fails under warranty, you must send it to the manufacturer for repairs, no matter where you bought it.)

A week later you are about to buy a new television set at the nearby campus store for €1,010 when a friend tells you that the very same set is on sale at the local superstore for only €1,000. The superstore is still a 15-minute walk away. Where would you buy the television? (Again, repairs under warranty would entail sending the set to the manufacturer in each case.)

There is no uniquely correct answer to either of these questions, both of which ask whether the benefit of walking to the supermarket is worth the cost. Most people say the trip would be worth making for the clock radio, but not worth making for the television. When pressed to explain, they say the walk yields a 50 per cent saving on the radio but less than a 1 per cent saving on the television.

These percentages, however, are irrelevant. In each case the benefit of walking to the superstore is exactly the €10 saving from the lower purchase price. What is the cost of walking to the superstore? Some might be willing to do it for as little as €5, while others might not be willing to do it for less than €50. But whatever the number, it should be the same in both cases. So your answers to the questions just posed should be the same. If you would be willing to walk for, say, €8, then you should buy both the clock radio and the television at the superstore. But if your reservation price for the walk is, say, €12, then you should buy both appliances at the nearby campus store. ◆

When using the cost–benefit test, you should express costs and benefits in absolute euro terms. Comparing percentages is not a fruitful way to think about decisions like these.

EXERCISE 1.3 **You are holding a discount coupon that will entitle you to a fare reduction on only one of the two trips you are scheduled to take during the coming month. You can get €100 off the normal €200 airfare to Barcelona, or you can get €120 off the normal €2,400 airfare to New Delhi. On which trip should you use your coupon?**

Pitfall 4. Failure to Understand the Average–Marginal Distinction

So far we have looked at decisions about whether to perform a given action. Often, however, the choice is not whether to perform the action but the extent to which it should be performed. In this more complex case, we can apply the cost–benefit principle by reformulating the question. Instead of asking 'Should I do activity x?', we repeatedly pose the question, 'Should I increase the level by which I am currently engaging in activity x?'

To answer this question, we must compare the benefit and cost of an *additional* unit of activity. The cost of an additional unit of activity is called the **marginal cost** of the activity, and the benefit of an additional unit is called its **marginal benefit.**

marginal cost the increase in total cost that results from carrying out one additional unit of an activity.

marginal benefit the increase in total benefit that results from carrying out one additional unit of an activity.

The cost–benefit rule tells us to keep increasing the level of an activity as long as its marginal benefit exceeds its marginal cost. But as the following example illustrates, people often fail to apply this rule correctly.

EXAMPLE 1.7 Should Tom launch another boat?

Tom manages a small fishing fleet of three boats. His current daily cost of operations, including boat rentals and fishermen's wages, is €300, or an average of €100 per boat launched. His daily total revenue, or benefit, from the sale of fish is currently €600, or an average of €200 per boat launched. Tom decides that since his cost per boat is less than his revenue per boat, he should launch another boat. Is this a sound decision?

average cost the average cost of undertaking *n* units of an activity is the total cost of the activity divided by *n*.

average benefit the average benefit of undertaking *n* units of an activity is the total benefit of the activity divided by *n*.

To answer this question, we must compare the marginal cost of launching a boat with its marginal benefit. The information given, however, tells us only the **average cost** and **average benefit** of launching a boat—which are, respectively, one-third of the total cost of three boats and one-third of the total revenue from three boats. Knowing the average benefit and average cost per boat launched does not enable us to decide whether launching another boat makes economic sense. For although the average benefit of the three boats launched thus far *might* be the same as the marginal benefit of launching another boat, it might also be either higher or lower. The same statement holds true regarding average and marginal costs.

To illustrate, suppose the marginal cost of launching a boat and crew is constant at €100 per boat per day. Then Tom should launch a fourth boat only if doing so will add at least €100 in daily revenue from his total fish catch. The mere fact that the current average revenue is €200 per boat simply doesn't tell us what the marginal benefit of launching the fourth boat will be.

Suppose, for example, that the relationship between the number of boats launched and the daily total revenue is as described in Table 1.1. With three boats per day, the average benefit per boat would then be €200, just as indicated above. If Tom launched a fourth boat, the *average* daily revenue would fall to €160 per boat, which is still more than the assumed marginal cost of €100. Note, however, that in the second column the total revenue from four boats is only €40 per day more than the total revenue from three boats. That means that the marginal revenue from launching the fourth boat is only €40. And since that is less than its marginal cost (€100), launching the fourth boat makes no sense. ◆

TABLE 1.1
How Total Benefit Varies with the Number of Boats Launched

Number of boats	Daily total benefit (€)	Daily average benefit (€/boat)
0	0	0
1	300	300
2	480	240
3	600	200
4	640	160

The following example illustrates how to apply the cost–benefit principle correctly in this case.

EXAMPLE 1.8 How many boats should Tom launch?

The marginal cost of launching a boat and crew is again constant at €100 per day. If total daily revenue from the catch again varies with the number of boats launched as shown in Table 1.1, how many boats should Tom launch?

Tom should keep launching boats as long as the marginal benefit of doing so is at least as great as the marginal cost. With marginal cost constant at €100 per launch, Tom should thus keep launching boats as long as the marginal benefit is at least €100.

Applying the definition of marginal benefit to the total benefit entries in the second column of Table 1.1 yields the marginal benefit values in the third column of Table 1.2. (Because marginal benefit is the change in total benefit that results when we change the number of boats by one, we place each marginal benefit entry midway between the rows showing the corresponding total benefit entries.) For example, the marginal benefit of increasing the number of boats from one to two is €180, the difference between the €480 total revenue with two boats and the €300 with one.

TABLE 1.2
How Marginal Benefit Varies with the Number of Boats Launched

Number of boats	Daily total benefit (€)	Daily marginal benefit (€/boat)
0	0	
		300
1	300	
		180
2	480	
		120
3	600	
		40
4	640	

Comparing the €100 marginal cost per boat with the marginal benefit entries in the third column of Table 1.2, we see that the first three launches satisfy the cost–benefit test, but the fourth does not. Tom should thus launch three boats. ◆

EXERCISE 1.4 **If the marginal cost of launching each boat had not been €100 but €150, how many boats should Tom have launched?**

The cost–benefit principle tells us that *marginal* costs and benefits—measures that correspond to the *increment* of an activity under consideration—are the relevant ones for choosing the level at which to pursue the activity. Yet many people compare the *average* cost and benefit of the activity when making such decisions. As Example 1.7 should have made clear, however, increasing the level of an activity may not be justified, even though its average benefit at the current level is significantly greater than its average cost.

USING MARGINAL BENEFIT AND MARGINAL COST

The examples just discussed entail decisions about an activity that could take place only on specific levels—no boats, one boat, two boats, and so on. The levels of many other activities, however, can vary continuously. One can buy petrol, for example, in any quantity one wishes. For activities that are continuously variable, it is usually convenient to display the comparison of marginal benefit and marginal cost graphically.

Space and the city

Poor land use in the world's greatest cities carries a huge cost

BUY land, advised Mark Twain; they're not making it any more. In fact, land is not really scarce: the entire population of America could fit into Texas with more than an acre for each household to enjoy. What drives prices skyward is a collision between rampant demand and limited supply in the great metropolises like London, Mumbai and New York. In the past ten years real prices in Hong Kong have risen by 150%. Residential property in Mayfair, in central London, can go for as much as £55,000 ($82,000) per square metre. A square mile of Manhattan residential property costs $16.5 billion.

Even in these great cities the scarcity is artificial. Regulatory limits on the height and density of buildings constrain supply and inflate prices. A recent analysis by academics at the London School of Economics estimates that land-use regulations in the West End of London inflate the price of office space by about 800%; in Milan and Paris the rules push up prices by around 300%. Most of the enormous value captured by landowners exists because it is well-nigh impossible to build new offices to compete those profits away.

The costs of this misfiring property market are huge, mainly because of their effects on individuals. High housing prices force workers towards cheaper but less productive places. According to one study, employment in the Bay Area around San Francisco would be about five times larger than it is but for tight limits on construction. Tot up these costs in lost earnings and unrealised human potential, and the figures become dizzying. Lifting all the barriers to urban growth in America could raise the country's GDP by between 6.5% and 13.5%, or by about $1 trillion-2 trillion. It is difficult to think of many other policies that would yield anything like that.

Metro stops

Two long-run trends have led to this fractured market. One is the revival of the city as the central cog in the global economic machine (see pages 18-20). In the 20th century, tumbling transport costs weakened the gravitational pull of the city; in the 21st, the digital revolution has restored it. Knowledge-intensive industries such as technology and finance thrive on the clustering of workers who share ideas and expertise. The economies and populations of metropolises like London, New York and San Francisco have rebounded as a result.

What those cities have not regained is their historical ability to stretch in order to accommodate all those who want to come. There is a good reason for that: unconstrained urban growth in the late 19th century fostered crime and disease. Hence the second trend, the proliferation of green belts and rules on zoning. Over the course of the past century land-use rules have piled up so plentifully that getting planning permission is harder than hailing a cab on a wet afternoon. London has strict rules preventing new structures blocking certain views of St Paul's Cathedral. Google's plans to build housing on its Mountain View campus in Silicon Valley are being resisted on the ground that residents might keep pets, which could harm the local owl population. Nimbyish residents of low-density districts can exploit planning rules on everything from light levels to parking spaces to block plans for construction.

A good thing, too, say many. The roads and rails criss-crossing big cities already creak under the pressure of growing populations. Dampening property prices hurts one of the few routes to wealth-accumulation still available to the middle classes. A cautious approach to development is the surest way to preserve public spaces and a city's heritage: give economists their way, and they would quickly pave over Central Park.

However well these arguments go down in local planning meetings, they wilt on closer scrutiny. Home ownership is not especially egalitarian. Many households are priced out of more vibrant places. It is no coincidence that the home-ownership rate in the metropolitan area of downtrodden Detroit, at 71%, is well above the 55% in booming San Francisco. You do not need to build a forest of skyscrapers for a lot more people to make their home in big cities. San Francisco could squeeze in twice as many and remain half as dense as Manhattan.

Property wrongs

Zoning codes were conceived as a way to balance the social good of a growing, productive city and the private costs that growth sometimes imposes. But land-use rules have evolved into something more pernicious: a mechanism through which landowners are handed both unwarranted windfalls and the means to prevent others from exercising control over their property. Even small steps to restore a healthier balance between private and public good would yield handsome returns. Policymakers should focus on two things.

First, they should ensure that city-planning decisions are made from the top down. When decisions are taken at local level, land-use rules tend to be stricter. Individual districts receive fewer of the benefits of a larger metropolitan population (jobs and taxes) than their costs (blocked views and congested streets). Moving housing-supply decisions to city level should mean that due weight is put on the benefits of growth. Any restrictions on building won by one district should be offset by increases elsewhere, so the city as a whole keeps to its development budget.

Second, governments should impose higher taxes on the value of land. In most rich countries, land-value taxes account for a small share of total revenues. Land taxes are efficient. They are difficult to dodge; you cannot stuff land into a bank-vault in Luxembourg. Whereas a high tax on property can discourage investment, a high tax on land creates an incentive to develop unused sites. Land-value taxes can also help cater for newcomers. New infrastructure raises the value of nearby land, automatically feeding through into revenues—which helps to pay for the improvements.

Neither better zoning nor land taxes are easy to impose. There are logistical hurdles, such as assessing the value of land with the property stripped out. The politics is harder still. But politically tricky problems are ten-a-penny. Few offer the people who solve them a trillion-dollar reward. ■