"Fascinating, mind-expanding, and lots of fun."
—Steven Pinker

THE ECONOMIC NATURALIST

IN SEARCH OF EXPLANATIONS FOR EVERYDAY ENIGMAS

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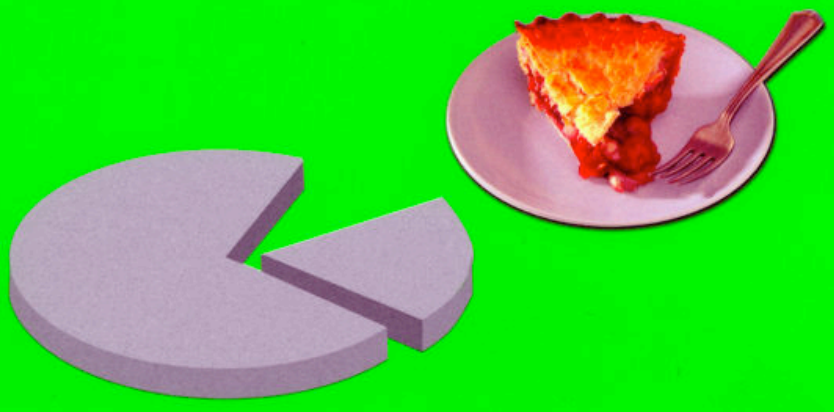
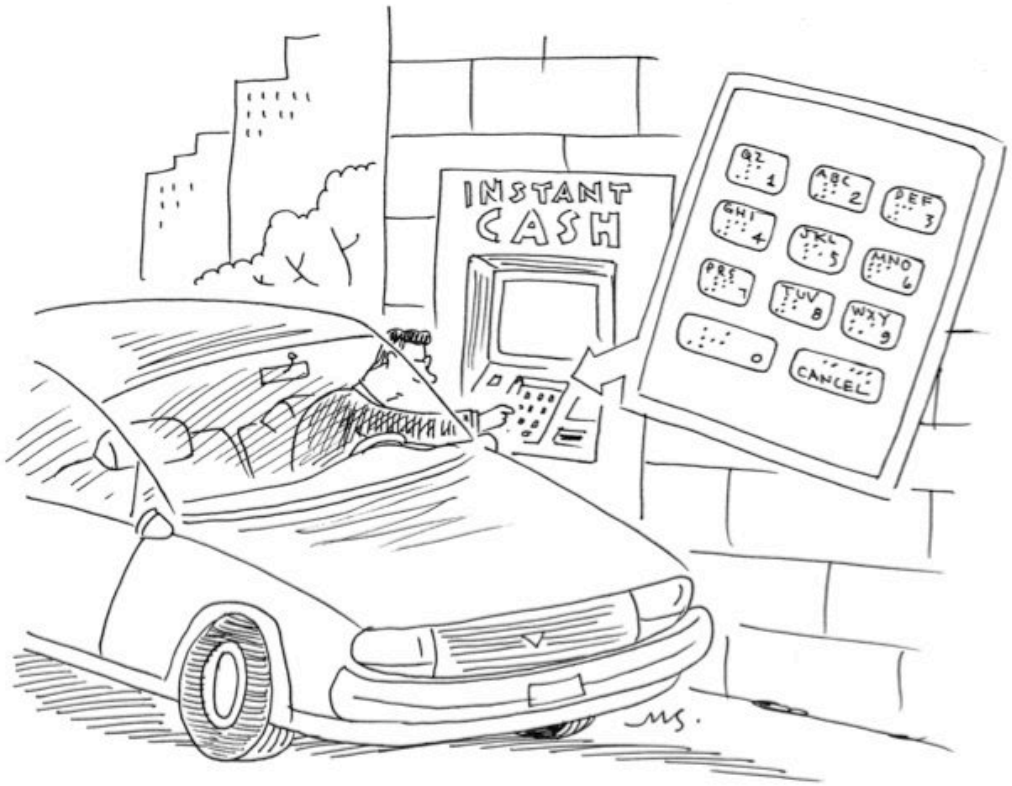


Introduction

Why do the keypad buttons on drive-up cash machines have Braille dots? It's an interesting question, since the patrons of these machines are almost always drivers, none of whom are blind. According to my former student Bill Tjoa, ATM producers have to make keypads with Braille dots for their walk-up machines anyway, so it is cheaper to make all machines the same way. The alternative would be to hold two separate inventories and make sure each machine went to the right destination. If the Braille dots caused trouble for sighted users, the extra expense might be justified. But they do not.



Braille dots on keypad buttons of drive-up cash machines: Why not?

Mr. Tjoa's question was the title of one of two short papers he submitted in response to the "economic naturalist" writing assignment in my introductory economics course. The specific assignment was "to use a principle, or principles, discussed in the course to pose and answer an interesting question about some pattern of events or behavior that you personally have observed."

"Your space limit," I wrote, "is 500 words. Many excellent papers are significantly shorter than that. Please do not lard your essay with complex terminology. Imagine yourself talking to a relative who has never had a course in economics. The best papers are ones that would be clearly intelligible to such a person, and typically these papers do not use any algebra or graphs."

Like Bill Tjoa's question about ATM keypads, the best ones entail an element of paradox. For example, my all-time favorite was submitted in 1997 by Jennifer Dulski, who asked, "Why do brides spend so much money—often many thousands of dollars—on wedding dresses they will never wear again, while grooms often rent cheap tuxedos, even though they will have many future occasions that call for one?"

Dulski argued that because most brides wish to make a fashion statement on their wedding day, a rental company would have to carry a huge stock of distinctive gowns—perhaps forty or fifty in each size. Each garment would thus be rented only infrequently, perhaps just once every four or five years. The company would have to charge a rental fee greater than the purchase price of the garment just to cover its costs. And since buying it would be cheaper, no one would rent. In contrast, because grooms are willing to settle for a standard style, a rental company can serve this market with an inventory of only two or three tuxedos in each size. So each suit gets rented several times a year, enabling a rental fee that is only a fraction of its purchase price.

This book is a collection of the most interesting economic naturalist examples I have collected over the years. It intended for

people who, like Bill Tjoa and Jennifer Dulski, take pleasure in unraveling the mysteries of everyday human behavior. Although many consider economics an arcane and incomprehensible subject, its basic principles are simple and commonsensical. Seeing these principles at work in the context of concrete examples provides an opportunity to master them without effort.

Unfortunately, that is not how economics is usually taught in college courses. Shortly after I began teaching at Cornell University, several friends living in different cities mailed me copies of this Ed Arno cartoon:

"I'd like to introduce you to Marty Thorndecker. He's an economist, but he's really very nice."

Cartoons are data. If people find them funny, that tells us something about the world. Even before Arno's cartoon appeared, I had begun to notice that when people I met at social gatherings asked me what I did for a living, they seemed disappointed when I told them I was an economist. I began asking why. On reflection, many would mention having taken an introductory economics course years before that had "all those horrible graphs."

Nineteen percent of American undergraduates take only one economics course, another 21 percent take more than one, and only 2 percent go on to major in economics. A negligible fraction pursues Ph.D. work in economics. Yet many introductory economics courses, abrim with equations and graphs, are addressed to that negligible fraction.

The result is that most students in these courses don't learn much. When students are given tests designed to probe their knowledge of basic economics six months after taking the course, they do not perform significantly better than others who never took an introductory course. This is scandalous. How can a university justify charging thousands of dollars for courses that add no value?

Even the most basic principles of economics don't seem to be getting across. If you ever took an economics course, you at least heard the term "opportunity cost." The opportunity cost of engaging in an activity is the value of everything you must give up to pursue it.

To illustrate, suppose you won a free ticket to see an Eric Clapton concert tonight. You can't resell it. Bob Dylan is performing on the same night and his concert is the only other activity you are considering. A Dylan ticket costs $40 and on any given day you would be willing to pay as much as $50 to see him perform. (In other words, if Dylan tickets sold for more than $50, you would pass on the opportunity to see him even if you had nothing else to do.) There is no other cost of seeing either performer. What is your opportunity cost of attending the Clapton concert?

The only thing of value you must sacrifice to attend the Clapton concert is seeing the Dylan concert. By not attending the Dylan concert, you miss out on a performance that would have been worth $50 to you, but you also avoid having to spend $40 for the Dylan ticket. So the value of what you give up by not seeing him is $50 – $40 = $10. If seeing Clapton is worth at least $10 to

you, you should attend his concert. Otherwise you should see Dylan.

Opportunity cost is, by consensus, one of the two or three most important ideas in introductory economics. Yet we now have persuasive evidence that most students do not master this concept in any fundamental way. The economists Paul Ferraro and Laura Taylor recently posed the Clapton/Dylan question to groups of students to see whether they could answer it. They gave their respondents only four choices:

a. $0
b. $10
c. $40
d. $50

As noted, the correct answer is $10, the value of what you sacrifice by not attending the Dylan concert. Yet when Ferraro and Taylor posed this question to 270 undergraduates who had previously taken a course in economics, only 7.4 percent of them answered it correctly. Since there were only four choices, students who picked at random would have had a correct response rate of 25 percent. A little bit of knowledge seems to be a dangerous thing here.

When Ferraro and Taylor posed the same question to eighty-eight students who had never taken an economics course, 17.2 percent answered it correctly—more than twice the correct response rate as for former economics students, but still less than chance.

Why didn't the economics students perform better? The main reason, I suspect, is that because opportunity cost is only one of several hundred concepts that professors throw at students during the typical introductory course, it simply goes by in a blur. If students don't spend enough time on it and use it repeatedly in different examples, it never really sinks in.

But Ferraro and Taylor suggest another possibility: the instructors who teach economics may not have mastered the basic opportunity cost concept themselves. When the researchers posed the same question to a sample of 199 professional economists at the annual American Economic Association meetings in 2005, only 21.6 percent chose the correct answer; 25.1 percent thought the opportunity cost of attending the Clapton concert was $0, 25.6 percent thought it was $40, and 27.6 percent thought it was $50.

When Ferraro and Taylor examined the leading introductory economics textbooks, they discovered that most did not devote sufficient attention to the opportunity cost concept to enable students to answer the Dylan/Clapton question. They also noted that the concept does not receive patient, in-depth treatment in textbooks beyond the introductory level and that the term *opportunity cost* does not even appear in the indexes of leading graduate microeconomics texts.

Yet opportunity cost helps explain a host of interesting behavior patterns. Consider, for example, the widely remarked cultural differences between large coastal cities in the United States and smaller cities in the Midwest. Why do residents of Manhattan tend to be rude and impatient, but residents of Topeka friendly and courteous?

You could argue with the premise, of course, but most people seem to find it roughly descriptive. If you ask for directions in Topeka, people stop and help you; in Manhattan, they may not even make eye contact. Because Manhattan has the highest wage rate and the richest menu of things to do of any city on the planet, the opportunity cost of people's time is very high there. So perhaps it is only to be expected that New Yorkers would be a little quicker to show impatience.

I call my students' writing assignment "the economic naturalist" because it was inspired by the kinds of questions an introductory course in biology enables students to answer. If you know a little evolutionary theory, you can see things you didn't

notice before. The theory identifies texture and pattern in the world that is stimulating to recognize and think about.

For example, here is a standard Darwinian question: Why are males much bigger than females in most vertebrate species? Bull elephant seals, for instance, can exceed 20 feet long in length and weigh six thousand pounds—as much as a Lincoln Navigator—whereas female elephant seals weigh only eight hundred to twelve hundred pounds.

Why is the bull elephant seal so much bigger than the cow?

Similar sexual dimorphism is observed in most vertebrate species. The Darwinian explanation is that most vertebrates are polygynous (meaning that males take more than one mate—if they can), and so males must compete for females. Bull elephant seals pummel one another on the beach for hours at a time, until one finally retreats, bloodied and exhausted.

The winners of these battles command nearly exclusive sexual access to harems of as many as one hundred females. This is a Darwinian prize of the first order, and it explains why males are so much bigger. A male with a mutant gene for larger size would be more likely to prevail in fights with other males, which means that this gene would appear with higher frequency in the next generation. In short, the reason males are so large is that small males seldom gain access to females.

A similar explanation accounts for the large tail displays in peacocks. Experiments have demonstrated that peahens prefer peacocks with longer tail feathers, which are thought to be a signal of robust health, since parasite-ridden males cannot maintain a bright, long tail.

For both the large bull elephant seal and the peacock with a long tail display, what is advantageous to males individually is disadvantageous to them as a group. A six-thousand-pound seal, for example, finds it harder to escape from the great white shark, its principal predator. If bulls could all cut their weight by half, each would be better off. The outcome of each fight would be the same as before, yet all would be better able to escape from predators. Similarly, if peacocks' tail displays were all reduced by half, females would still choose the same males as before, yet all peacocks would be better able to escape from predators. But bull elephant seals are stuck with their massive size and peacocks are stuck with their long tail feathers.

Of course, such evolutionary arms races do not continue indefinitely. At some point, the added vulnerability inherent in larger size or longer tail displays begins to outweigh the benefit of increased access to females. It is that balance of costs and benefits that is reflected in the characteristics of surviving males.

The biologist's narrative is interesting. It coheres. And it seems to be right. Thus if you look at monogamous species, ones in which males and females pair off for life, you don't see sexual dimorphism. This is "the exception that proves the rule" in the

old-fashioned sense of the verb "to prove": it tests the rule. Polygyny led to the prediction that males would be bigger. And in its absence, males aren't bigger. For example, because the albatross is monogamous, theory predicts that males and females will be roughly the same size, which in fact they are.

The exception that proves the rule: In the monogamous albatross, males and females are about the same size.

The biologist's narrative regarding sexual dimorphism has legs. It is easy to remember and satisfying to recount to others. If you can tell such stories and understand why they make sense, you have a far better grasp of biology than if you've simply memorized that birds belong to Class Aves. It is the same with narrative explanations based on principles of economics

Most introductory economics courses (and my own was no exception in the early days) make little use of narrative. Instead,

they inundate students with equations and graphs. Mathematical formalism has been an enormously important source of intellectual progress in economics, but it has not proved an effective vehicle for introducing newcomers to our subject. Except for engineering students and a handful of others with extensive prior training in math, most students who attempt to learn economics primarily through equations and graphs never really grasp that distinctive mind-set known as "thinking like an economist." Most of them spend so much effort trying to make sense of the mathematical details that the intuition behind economic ideas escapes them.

The human brain is a remarkably flexible organ with the capacity to absorb new information in myriad different forms. But information gets into most brains more easily in some forms than others. In most cases, students can absorb equations and graphs only with difficulty. But because our species evolved as storytellers, virtually everyone finds it easy to absorb the corresponding ideas in narrative form.

I stumbled onto this insight by chance some twenty years ago when participating in the writing across the disciplines program at Cornell, which was inspired by research showing that one of the best ways to learn about something is to write about it. As Walter Doyle and Kathy Carter, two proponents of the narrative theory of learning, have written, "At its core, the narrative perspective holds that human beings have a universal predisposition to 'story' their experience, that is, to impose a narrative interpretation on information and experience." Psychologist Jerome Bruner, another narrative learning theorist, observes that children "turn things into stories, and when they try to make sense of their life they use the storied version of their experience as the basis for further reflection. … If they don't catch something in a narrative structure, it doesn't get remembered very well, and it doesn't seem to be accessible for further kinds of mulling over."

In short, the human brain's specialty seems to be absorbing information in narrative form. My economic naturalist writing

assignment plays directly to this strength. It calls for the title of each student's paper to be a question. For three reasons, I have found it useful to insist that students pose the most interesting questions they can. First, to come up with an interesting question, they must usually consider numerous preliminary questions, and this itself is a useful exercise. Second, students who come up with interesting questions have more fun with the assignment and devote more energy to it. And third, the student who poses an interesting question is more likely to tell others about it. If you can't actually take an idea outside the classroom and use it, you don't really get it. But once you use it on your own, it is yours forever.

The Cost-Benefit Principle

The mother of all economic ideas is the cost-benefit principle. It says that should take an action if, and only if, the extra benefit from taking it is greater than the extra cost. How simple could a principle be? Still, as the following examples illustrate, not everyone finds it easy to apply.

> Example 1. You are about to buy a $20 alarm clock at the campus store next door when a friend tells you that the same clock is available for $10 at the Kmart downtown. Do you go downtown and get the clock for $10? Or do you buy it at the nearby campus store? In either case, if the clock malfunctions while under warranty, you must send it to the manufacturer for repairs.

Of course, there is no universally right or wrong answer. Each person has to weigh the relevant costs and benefits. But when we ask people what they would do in this situation, most say they would buy the clock at Kmart.

Now consider this question:

Example 2. You are about to buy a laptop for $2,510 at the campus store next door. You can get the very same laptop downtown at Kmart for $2,500 (and it comes with the same guarantee: no matter where you buy it, you have to send it to the manufacturer for repairs if it breaks). Where would you buy the laptop?

This time, most people say they would buy it at the campus store. By itself, that isn't a wrong answer. But if we ask what a rational person *should* do in these two cases, the cost-benefit principle makes clear that both answers must be the same. After all, the benefit of going downtown is $10 in each case, the dollar amount you save. The cost is whatever value you assign to the hassle of going downtown. That is also the same in the two cases. And if the cost is the same and the benefit is the same in both cases, then the answer should be the same as well.

Most people seem to think, however, that saving 50 percent by buying the clock downtown is somehow a bigger benefit than saving only $10 on the $2,510 laptop. But that is not the right way to think about it. Thinking in percentage terms works reasonably well in other contexts, but not here.

So weighing costs and benefits is obviously what you should do. Seeing how the cost-benefit principle works in the context of a surprising example gives you an interesting story to tell. Pose these questions to friends and see how they do. Having these conversations will deepen your mastery of the cost-benefit principle.

Immediately after I show students examples that illustrate a general principle, I give them an exercise that requires them to employ the principle on their own. Here's the question I pose to them after they've seen the clock and computer examples:

Example 3. You have two business trips coming up and a discount coupon you can use on only one of them. You can save either $90 on your $200 trip to Chicago or $100 on your $2,000 trip to Tokyo. For which trip should you use your coupon?

Almost everybody answers correctly that you should use it for the Tokyo trip because you will save $100, which is better than saving $90. But the fact that everyone gets it right doesn't mean that the question wasn't worth asking. Again, if your goal is for the core ideas to become part of your working knowledge, the only way that can happen is through engagement and repetition.

I chose the questions in this volume not just because I found them interesting but because they actively engage the most important principles of basic economics. My hope is that you will find this book an effortless, even entertaining, way to learn these principles. And because the questions are interesting and the answers brief, they provide good fodder for conversation.

I tell my students that their answers to the questions should be viewed as intelligent hypotheses suitable for further refinement and testing. They are not meant to be the final word. When Ben Bernanke and I described Bill Tjoa's example about drive-up ATM keypads with Braille dots in our introductory economics textbook, somebody sent me an angry e-mail saying that the real reason for the dots is that the Americans with Disabilities Act requires them. He sent me a link to a web page documenting his claim. Sure enough, there is a requirement that all ATM keypads have Braille dots, even at drive-up locations. Having Braille dots on drive-up machines might even be useful on occasion, as when a blind person visits a drive-up machine in a taxi and does not want to reveal his PIN to the driver.

I wrote back to my correspondent that I tell my students their answers don't have to be correct. But I also urged him to think

about the circumstances under which the regulation was adopted. If it had been significantly more costly to require Braille dots on the drive-up machines, would the rule have been enacted? Almost certainly not. The fact is that adding them was costless. And since the dots cause no harm and might occasionally be of use, regulators might well find it advantageous to require them—thereby enabling themselves to say, at year's end, that they had done something useful. In this case, Mr. Tjoa's explanation makes better sense than my angry correspondent's. But in other cases there are bound to be better or more complete answers out there. So read the answers to the questions with a critical eye. You may have personal knowledge that enables you to improve them. I was told by the proprietor of a wedding gown boutique, for example, that another reason brides buy their dresses rather than rent them is that wedding gowns tend to be form fitting in the torso and often require extensive alterations that could not be performed repeatedly on rental garments. It's a fair point. But it doesn't nullify the core economic insight in Jennifer Dulski's explanation.