

# The Economic Naturalist Writing Assignment

Robert H. Frank

*Abstract:* Several months after having completed an introductory economics course, most students are no better able to answer simple economic questions than students who never took the course. The problem seems to be that principles courses try to teach students far too much, with the result that everything goes by in a blur. The good news is that a relatively small number of basic principles do most of the heavy lifting in economics. By focusing narrowly on these principles, it is possible to teach students to master them at a fairly high level in just a single semester. The author describes a simple pedagogical device that has proven effective in this effort. It is called the “economic naturalist writing assignment,” an essay in which students must pose an interesting question about something they have personally observed and then use basic economic principles to answer it in no more than 500 words. The author gives examples of questions and answers.

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Most students who take introductory economics seem to leave the course without really having learned even the most important basic economic principles. For example, their ability to answer simple economic questions several months after leaving the course is not measurably different from that of people who never took a principles course (Hansen, Salemi and Siegfried 2002). The problem seems to be that instructors of principles courses almost always try to teach students far too much. In the process, really important ideas get no more coverage than minor ones. Everything ends up going by in a blur.

The good news is that a relatively small number of basic principles do most of the heavy lifting in economics, so if instructors can bring themselves to focus narrowly on those, they can actually teach students to master them at a fairly high level in just a single semester. What principles should a good short list contain? If someone asked a thousand economists to provide their own versions, they would get a thousand different lists. Yet to dwell on their differences would be to

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miss their essential similarities. Indeed, almost all would contain variants of propositions like the following:

*The scarcity principle:* Having more of one good thing usually means having less of another.

*The cost-benefit principle:* Take no action unless its marginal benefit is at least as great as its marginal cost.

*The not-all-costs-matter-equally principle:* When making decisions, some costs (e.g., opportunity and marginal costs) matter much more than others (e.g., sunk and average costs).

*The principle of comparative advantage:* Everyone does best when each concentrates on the activity for which he or she is relatively most productive.

*The principle of increasing opportunity cost:* Use the resources with the lowest opportunity cost before turning to those with higher opportunity costs.

*The equilibrium principle:* A market in equilibrium leaves no unexploited opportunities for individuals, but may not exploit all gains achievable through collective action.

*The efficiency principle:* Efficiency is an important social goal because when the economic pie grows larger, everyone can have a larger slice.

Again, the important point is not whether this is the best possible short list of principles but rather that instructors will teach their introductory students more effectively if they begin with a well-articulated short list of some sort and then doggedly hammer away at it, illustrating and applying each principle in context after context.

This narrower, more focused approach has much in common with the way a good tennis pro teaches a beginner to play tennis. In addition to the basic forehand and backhand ground strokes, there are countless other strokes to master in tennis—many of them highly nuanced, such as the top-spin lob, the American twist serve, the drop volley, and so on. A good pro ignores those more complicated shots entirely, concentrating instead on getting students to master the basic forehand and backhand. Because the forehand is the easier of the two for most students, good pros generally start with it, demonstrating the shot a few times, then feeding literally hundreds of balls to students as they practice and refine the stroke. Good pros then move on to the backhand, which most students find a little more difficult to learn than the forehand. Again, they begin by demonstrating the stroke, then drilling it intensively. Next comes a rudimentary serve, with demonstration again followed by long periods of intensive, repetitive drill. The payoff is that once students have achieved working competence in just these three basic strokes—forehand, backhand, and serve—they are ready to play.

This is important because if the basic drills at the first stage were successful, students will reap actual returns from their investments. Rather than having to force themselves to go out and practice, most students find that they actually *want* to go out and play. Play itself is the way the game is really learned. If students can be led to the point at which they can hit well enough to have fun playing actual games, a lifelong learning trajectory has been successfully launched. Students will continue to play because they like to play, and the more they play, the better

they will get. Contrast that with the experience of students whose teachers try to teach them all the shots at once. Most become quickly discouraged and never go on to play the game.

In summary, then, a successful tennis learning experience consists of first achieving rudimentary competence in the basic ground strokes and serve through a process of demonstration and repetitive drills, followed by practice in the form of actual play. Those who aspire to move their games to a higher level typically continue with formal instruction. However, for them, too, an important part of the learning process is continued play.

A successful economics learning experience should mirror these same steps. A short list of basic principles should be presented to students, one at a time in the context of simple examples drawn from familiar settings. Following each, students should be asked to practice the principle by using it to solve simple problems that are closely parallel to the ones used to illustrate the principle. The student should then be given the opportunity to pose original questions and use the same basic principles to answer them.

## EXAMPLES

I will try to make this a little more concrete with some examples. In my view, the cost-benefit principle is by far the most important one instructors teach. I usually introduce it by posing a sequence of questions like the following, which are based on the work of Tversky and Kahneman (2001).<sup>1</sup>

1. You can buy a computer game for \$25 at a store next door or walk downtown to buy it from a store selling it for \$15. Where would you buy the game?

Although there is no uniquely correct answer, most students say they would shop at the downtown store to save \$10.

2. Would you walk downtown to save \$10 on a \$2020 laptop computer?

Although there is again no uniquely correct answer, this time most students say they would spend the larger amount and buy the computer from the store next door. Why walk downtown, they ask, when the percentage savings would be so small?

These questions are a good way to introduce the cost-benefit principle because most students answer them in a way that violates the principle. The principle says that the purchase should be made from the downtown store only if the amount saved exceeds the cost of the trip. The benefit in each case is the same (the \$10 saved), and the cost of the trip in each case is also the same (the amount one would pay to avoid having to make the trip). If the latter figure is less than \$10, the trip should be taken in both cases, otherwise not in both cases.

Most students quickly grasp this logic. On reflection, they seem to recognize that measuring the benefit of each trip by the absolute dollar amount saved makes more sense than measuring it by the percentage saved. The fact that they themselves chose inconsistently tends to make this point stick more firmly in memory.

The next step is to drill students in the use of the cost-benefit principle, a step that can be accomplished by posing additional questions that require its further application in similar contexts. Most students who have thought through the two questions just discussed can easily answer follow-up questions like this one.

Your employer has a travel discount voucher that can be redeemed on one of your next two business trips. You could use it to save \$100 on a \$2000 plane ticket to Tokyo, or you could save \$90 on a \$200 plane ticket to Chicago. If your goal is to do what would be best for your company, for which trip should you use the coupon?

Most students answer correctly that it is better to save \$100 on the Tokyo trip, even though the percentage savings is smaller than for the Chicago trip. It is nonetheless important for them to confront such questions right away because the simple act of responding to them helps to reinforce the relevant concepts.

So much for the preliminaries about planting a basic economic principle in the student's mind. What is the best way to then test whether students have actually acquired an in-depth understanding of it? In my own principles course, I have long relied on an assignment that not only helps students acquire an in-depth understanding of basic principles but also serves as a good vehicle for testing their mastery of them. I call it the "economic naturalist" writing assignment because it evokes the way that studying biology enables people to observe and marvel at many details of the natural environment that would otherwise have escaped notice. For the naturalist, a walk in a quiet woods becomes an adventure. In much the same way, studying economics can enable students to discover rich texture in even the most mundane details of ordinary existence.

The basic assignment is described as follows on my course syllabus:

An important part of your experience in this course will be two short writing assignments designed to foster your skills as an economic naturalist. In each of these papers, your assignment is to use a principle, or principles, discussed in the course to explain some pattern of events or behavior that you personally have observed. Numerous examples are discussed in the text and many others will be discussed in class.

Your space limit is 500 words. Many excellent papers are significantly shorter. 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. You need not include a bibliography.

This assignment is not a PhD dissertation. You are not expected to do voluminous research in support of your argument, although a relevant fact or two might help convince yourself and others that you are on the right track. It makes no difference whether your topic is "important," but try, as best you can, to choose something interesting. A really successful paper is one that begins with a really interesting question (one that makes the listener instantly curious to learn the answer) and then uses an economic principle or principles to construct a plausible answer. You'll know you have a good paper if the first thing your roommate wants to do upon reading it is to tell friends about it.

In response to this assignment, students in my principles course have tackled a host of fascinating questions. The following are some recent examples:

Why do the keypad buttons on drive-up automatic teller machines have Braille dots? (Bill Tjoa)

An interesting question! Visually impaired persons can do many remarkable things, but they cannot drive automobiles on public roadways. Keypads at drive-up machines have Braille dots, Mr. Tjoa reasoned, because once the keypad molds have been manufactured, the cost of producing buttons with dots is no higher than the cost of producing smooth ones. Making both types would require separate molds and separate batches of inventory. If the patrons of drive-up machines found buttons with Braille dots harder to use, these extra costs might be worth bearing. But because the dots pose no difficulty for sighted users, Mr. Tjoa concluded the best solution is to produce only keypads with dots.

Is this the right answer? After Ben Bernanke and I described Mr. Tjoa's example in our principles text (Frank and Bernanke 2003), we received an e-mail pointing out that the suggested explanation, although plausible, was wrong—that the Braille dots on drive-up ATM keypads were in fact a consequence of a Federal regulation requiring them. Perhaps, but so what? For the purposes of the economic naturalist writing assignment, all that matters is that the question posed be interesting and that the proposed answer to it rest on plausible economic reasoning. On both counts, Mr. Tjoa's response to the assignment clearly succeeded. Yes, it is important to remind students that the additional step of testing a hypothesis would need to be carried out before feeling confident enough to act on it. But that is a step for another time and place.

Why do brides spend so much money on wedding dresses, whereas grooms often rent cheap tuxedos, even though grooms could potentially wear their tuxedos on many other occasions and brides will never wear their dresses again? (Jennifer Dulski)

This is my all-time favorite economic naturalist question. In attempting to answer it, Ms. Dulski began with the assumption that distinctive attire matters more for women than for men on important social occasions. This might strike many as a heroic assumption, but evolutionary biologists tell us that in largely monogamous species, such as humans, distinctive appearance may indeed be more important for women than for men. Precisely the opposite pattern is observed in species in which dominant males take many mates. In those species, bright coloration and other distinctive features are more likely to be found on males than on females. Ms. Dulski reasoned that if men need not wear distinctive clothing on special occasions, a rental company could serve their fashion needs at relatively modest prices. Thus, by focusing on only a few variants of the standard men's tuxedo, a company could maintain a sufficiently large inventory to accommodate clients of a wide variety of sizes at rental prices that average roughly one-quarter of the garment's purchase price. If the goal were to appear in distinctive attire, however, it would be necessary to hold an inventory in which numerous different styles were available in all different sizes. Because this would require an inventory possibly dozens of times larger than the corresponding tuxedo inventory to serve a given volume of rentals, a rental

price that covered costs would have to be perhaps three or four times a garment's purchase price. And this, she concluded, is why women buy and men rent.

Again, I stress that whether this is the correct explanation for the observed pattern is less important than the fact that Ms. Dulski's question itself is interesting and that her proposed answer is economically plausible.

Why are child safety seats required in cars but not in airplanes? (Greg Balet)

A mother cannot legally drive her 6-month-old son to a nearby grocery store without first strapping him into a government-approved safety seat. Yet she can fly with him from Miami to Seattle with no restraining device at all. Why this difference?

In case of an accident—whether in a car or an airplane—an infant who is strapped into a safety seat is more likely to escape injury or death than one who is unrestrained. But the probability of being involved in a serious accident is hundreds of times higher when traveling by car than when traveling by air, so the benefit of having safety seats is greater for trips made by car. Using safety seats is also far more costly on plane trips than on car trips. Whereas most cars have plenty of extra room for a safety seat, parents might need to purchase an extra ticket to use one on an airplane. Most parents appear unwilling to pay \$600 more per trip for a small increment in safety, either for themselves or their children.

Why are round-trip fares from Hawaii to the mainland higher than the corresponding fares from the mainland to Hawaii? (Karen Hittle)

Most people whose trips originate on the mainland are on vacation when they fly to Hawaii, Ms. Hittle reasoned, whereas those whose trips originate in Hawaii are far more likely to be business or other nonleisure travelers. The distinction is important because although trips taken on business typically entail destinations that are dictated by external circumstances, vacation trips present travelers with an almost inexhaustible choice of destinations. As a result, the price elasticity of demand for business travelers tends to be higher for leisure than for business travelers. This, according to Ms. Hittle, is what accounts for the higher prices on flights that originate in Hawaii.

Why do airlines charge much more for tickets purchased at the last minute, yet Broadway theaters follow exactly the opposite practice? (Gerasimos Efthimiatis)

In both cases, firms face downward-sloping demand curves and thus stand to gain if they can segregate buyers with high reservation prices from those with low reservation prices. Why would last-minute purchases be associated with lower reservation prices in the case of theater tickets but with high reservation prices in the case of airline tickets? The answer, according to Mr. Efthimiatis, stems in part from how a buyer's reservation price case is linked to his or her opportunity cost of time. By waiting until the last minute to buy a theater ticket, someone whose opportunity cost of time is high would risk wasting a valuable evening if a seat turned out to be unavailable, and hence his or her willingness to pay a premium for an advance ticket. Although he or she might also be willing to pay a premium to avoid missing a flight, an offsetting factor seems even more important, which is that those travelers whose opportunity costs of time are highest—business

travelers, for the most part—tend also to be those who most often need to rearrange their travel schedules to accommodate last-minute contingencies. By making discounts available only to those who are willing to commit to a specific travel schedule well in advance, airlines are thus able to charge higher fares to those business travelers. Most remaining business travelers are made ineligible for discounts by what for them proves to be an extremely effective hurdle—namely, the Saturday night stay-over requirement. Because most vacation trips involve at least a weekend, this hurdle is easily cleared by vacation travelers. But having been away from their families during the week, few business travelers are willing to extend their stay for the weekend just to receive a discount.

Why do many people buy larger houses when they retire and their own children leave home? (Tobin Schilke)

Historically, the pattern was for couples to move to smaller houses in warmer climates when they retired. These days, however, couples are far more likely to sell the family home and then build or purchase a significantly larger one close by. Why this change?

Mr. Schilke speculated that this change has been driven in part by changes in family structure. It was once the norm for children to have at most four living grandparents. With divorce and remarriage occurring at higher rates than in the past, however, it has become common for any given child to have six, eight, or even more living grandparents and step-grandparents. With a larger number of grandparents and essentially no change in the number of grandchildren, we see excess demand on the part of grandparents for visits with their grandchildren. By building conveniently located houses with plenty of guest space, game rooms, swimming pools, and other kid-friendly amenities, grandparents are in effect paying higher prices to satisfy their demand for visits with their grandchildren.

When working with unusually capable students, I often suggest that they attempt to explain an observation that seems, on the surface at least, to be inconsistent with some of the basic economic principles discussed in the course. The following is an example:

Why does a telecommunications equipment manufacturer offer “free” BMW sedans to employees with more than one year of service?

Arcnet, Inc., a New Jersey company that designs and builds wireless telecommunications systems, provides a “free” BMW sedan to every employee with at least one year of service. The cars are not really free, of course. Each one costs the company about \$9,000 a year in leasing and insurance fees, and employees who get one must declare that amount as additional income each year to the Internal Revenue Service. So we are left with a puzzle: If the company had given not the car but an additional \$9,000 a year in salary instead, no one should have been worse off and at least some should have been better off. After all, any worker who really wanted a BMW could have spent the extra cash to lease one. Others who happen not to want a BMW would have come out ahead by having \$9,000 a year extra to spend on other things. So why give cars instead of cash?

Essentially the same question is raised by ordinary gift exchanges among family and friends. Why give someone a necktie he might never wear when you know you could trust him to spend the same money on something he really wants? Some would answer that giving cash is just too easy and is hence a less effective way of demonstrating affection than taking the time and trouble to shop for a gift. That explanation might work for small gifts but is surely a stretch for luxury cars.

A more promising tack was suggested by Thaler (1985), who observed that the best gifts are often things we do not dare buy for ourselves. Why, for example, is a man happy when his wife gives him a \$1,000 set of titanium golf clubs paid for out of their joint checking account? Perhaps he really wanted those clubs, but could not quite justify spending so much on himself.

The plausibility of this way of thinking about gift giving is affirmed by the advice it suggests for gift givers. For example, consider this thought experiment: Among each of the following pairs of items costing the same amounts, which item would be the more suitable gift for a close friend?

\$20 worth of Macadamia nuts (1 pound) or \$20 worth of peanuts (10 pounds)?

A \$75 gift certificate for one of the nicest restaurants in town (one lunch) or a \$75 gift certificate for McDonalds (15 lunches)?

\$30 worth of wild rice (3 pounds) vs. \$30 worth of Uncle Ben's converted rice (50 pounds)?

For most people, the first item in each pair is almost surely the safer choice.

Arcnet and other employers may be giving away BMWs for essentially similar reasons. An employee might find it awkward to explain to his depression-era parents why he had bought a car costing almost twice as much as a Honda Accord. Or he may worry that buying a new BMW might make his neighbors think he was putting on airs. Or perhaps he really wants to buy the new BMW, but his wife insists on remodeling the kitchen instead. A gift car from his employer erases all these concerns and more.

## HOOKING THE STUDENT

Students must complete two economic naturalist writing assignments during my course: one due at midterm and the other at term's end. Not all the assignments turned in at midterm are as interesting as the ones described above. Indeed, some students appear to struggle in their attempts to formulate a suitable question for their first paper. But by the time the second paper comes due, the far more common problem is for them to confront a difficult choice among multiple attractive topics. Students approaching the second paper deadline frequently ask whether it would be OK to do a medley—to explain not one but several different phenomena they have observed. Invariably I overhear animated conversations in which students discuss their projects with one another.

Once students realize that they can pose and answer interesting economic questions on their own, they are hooked. This is the step that is analogous to having learned the basic tennis strokes well enough to begin playing the game.

Many students have described midsemester trips home in which the economic naturalist questions discussed in class became the main topic of conversation at the family dinner table. For these students, a lifetime trajectory has begun in which their mastery of economic principles not only will not decay with each year following completion of the course but will actually grow stronger as they continue to hone their craft.

To repeat: Learning the economic way of thinking is essentially like learning a new sport. Even the best athletes seldom master a new sport unless they learn enough early on to experience pleasure in the act of playing it. The beauty of the economic naturalist assignment is that it leads students to take pleasure in actually doing economics. The writing assignments provide instructors with an excellent basis for assessing whether their students have learned anything useful.

## **GRADING**

For many professors, especially those who teach principles in large lecture classes, a daunting feature of this assignment is the prospect of having to grade so many papers. My own principles course has over 450 students, and I would not be willing to use this assignment if it meant that I personally had to read 900 student papers each semester. But there are simple alternatives that reduce the burden to manageable levels. I describe two I have used.

### **TA Grading with Supplementary Review**

Most large lecture courses employ TAs (teaching assistants). Mine does and I have experimented with several ways in which the TAs can take on most of the grading burden. In the variant that seems to have worked best, the TAs read the papers and sort them into three categories: (1) satisfactory, (2) well above average, and (3) outstanding. Base scores for the papers are the same within each category and increase across categories. I read only those papers in the outstanding category and assign additional bonus points to those I consider best in that category. I tell students that if they feel their papers have been evaluated unfairly, they can appeal to me (subject to the understanding that my review might result in an even lower grade than the one assigned by the TA). In response to this invitation, I typically receive fewer than 10 papers for review from a class of over 400.

### **Student Peer Grading**

Students submit papers electronically, identified only by their student ID numbers. The head TA then sends each student the papers of 10 classmates and asks him or her to rank them from 1 to 10. The score for each paper is then computed on the basis of the average rank assigned by the 10 peer reviewers. I then read the top-scoring 10 or 20 percent of all papers by this measure and post them on the course Web site. Each student is asked to nominate the 10 best papers from among those posted. The top-scoring papers by both my reading and peer rankings are then awarded additional bonus points.

Added attractions of the second scheme are that the first round exposes students to a random sample of work done by their classmates and that the second round exposes them to the very best papers. Reading those papers turns out to be an extremely valuable learning experience because the best papers typically have legs. Because they provide plausible answers to interesting questions, students immediately begin discussing them with friends, in the process reinforcing their understanding of the concepts involved.<sup>2</sup>

No matter which of the two schemes I use, I typically end up reading 40 to 60 papers twice each semester. They average fewer than two typed pages, and the entire evaluation process consumes less than two hours of my time per round. Even that overstates the burden of grading this assignment. Because the papers are prescreened, the ones I see are usually a delight to read.

## SUMMARY

The hurdles associated with grading the economic naturalist writing assignment can be surmounted fairly easily. I recommend this assignment to my fellow principles teachers in the strongest possible terms. It is not just an effective device for helping students to master basic economic principles; it is also an extremely effective vehicle for testing whether they have in fact acquired an in-depth understanding of those principles.

## NOTES

- 1 For a general discussion of the merits of exposing students to current thinking in economics, including concrete examples from the work of Nobel Laureates, see Becker (2003), an earlier version of which appeared as Becker (2001).
- 2 For additional discussion of the merits of peer review, see Hansen (1998).

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