

The Heart of Teaching Economics: Lessons from Leading Minds
(Edward Elgar Publishing, 2010)

Simon W. Bowmaker, New York University

Interview with Robert H. Frank, Cornell University

April 14, 2009

Robert Frank was born in Coral Gables, Florida in 1945 and obtained his BS in mathematics from the Georgia Institute of Technology in 1966 and his MA in statistics and PhD in economics from the University of California at Berkeley in 1971 and 1972 respectively. He joined Cornell University as an Assistant Professor of Economics in 1972 and has remained there ever since, currently serving as the Henrietta Johnson Louis Professor of Management and a Professor of Economics. During this time, he has also served as Chief Economist at the Civil Aeronautics Board (1978-1980), Fellow at the Center for Advanced Studies in the Behavioral Sciences, Stanford (1992-1993) and French-American Foundation Professor of American Civilization at l'École des Hautes Etudes en Sciences Sociales in Paris (2000-2001). Professor Frank teaches *Introductory Microeconomics* to undergraduates at Cornell, and *Microeconomics for Managers* on the MBA program. In 2004, he received the Russell Distinguished Teaching Award from Cornell's Johnson School of Management's fifth-year reunion class and in the following year received the School's Apple Distinguished Teaching Award.

Professor Frank's research interests are behavioural economics and applied microeconomics, and his work has been published in numerous journals, including the *American Economic Review*, *Econometrica*, *Journal of Political Economy*, *Journal of Monetary Economics*, and *Journal of Economic Perspectives*. His books include, *Falling Behind: How Rising Inequality Harms the Middle Class* (University of California Press, 2007), *The Economic Naturalist: In Search of Explanations for Everyday Enigmas* (Basic Books, 2007), *What Price the Moral High Ground?* (Princeton University Press, 2004), *Luxury Fever: Money and Happiness in an Era of Excess* (The Free Press, 1999), *The Winner-Take-All Society* (The Free Press, 1995), co-authored with Philip Cook, *Passions within Reason: The Strategic Role of the Emotions* (W.W. Norton, 1988), *Choosing the Right Pond: Human Behavior and the Quest for Status* (Oxford University Press, 1985), and two textbooks, *Principles of Economics* (McGraw-Hill, fourth edition, 2009), co-authored with Ben Bernanke, and *Microeconomics and Behavior* (McGraw-Hill, eighth edition, 2009). Since 2005, he has been a monthly contributor to the "Economic View" column in *The New York Times*.

I interviewed Robert Frank in his office at the Stern School of Business at New York University, where he was a visitor in the academic year 2008/2009. It was mid-morning of Tuesday, April 14, 2009.

BACKGROUND INFORMATION

Bowmaker: Your bachelors and master's degrees are in mathematics and statistics respectively. Why did you decide to study for a PhD in economics?

Frank: I had been an engineer of various types as an undergraduate at Georgia Tech. Studying engineering involved three-hour labs every afternoon. Math was attractive because there weren't any of those labs, and so I switched to math in my junior year. I did take a couple of introductory economics courses and I liked them, but there wasn't an option to major in economics at Georgia Tech.

After college I spent two years in the Peace Corps, and it's very common for Peace Corps volunteers to think they want to come back and be development economists. That was what I decided I wanted to be when I spent some two years living in rural Nepal. And so, I applied to graduate school, fully intending to get a PhD in development economics, but it turned out that Berkeley didn't have anybody particularly interesting in that field. I took a

couple of courses and didn't much like them and so I just went into the straight economics fields, with econometrics and macroeconomics being my two major fields at the time.

My statistics degree was really just an accidental opportunity. Berkeley has a very good statistics department, and they reached out to students in other fields, offering to count the statistics courses that you took in the economics program, like probability and econometrics, as credit toward their master's degree. So, you really only had to take five extra courses to get a master's degree. It ended up being a good deal because in the job market an extra credential never hurts, and I think it helped me enormously, in fact. But it wasn't that I was thinking of becoming a statistician. I'm embarrassed now if anyone knows I have that degree, because I don't think I could answer too many difficult questions about statistics at this point.

Bowmaker: As a student, did any of your teachers stand out as being particularly influential or inspirational?

Frank: The teacher who had the biggest impact on me was my analysis teacher, Eric Immel, in the math program at Georgia Tech. The quiet intensity of his weddedness to the theorems he was talking about was an eye opener to me. I hadn't really thought about being a teacher until I had had a course with him. So, he would be one I'd list.

At Berkeley, Tom Rothenberg, the econometrician, was an influence and George Akerlof also. They seemed to be asking interesting questions and they had a good sense of scientific methodology that they brought to the discussion of issues. And Dan McFadden was another early influence. I thought he was just incredibly insightful about the kind of problems he studies.

Bowmaker: As a teacher, have any of your colleagues been particularly influential in developing your style and approach in the classroom?

Frank: I started teaching the big introductory course in the first semester that I arrived at Cornell in the fall of 1972. I had never had any experience of doing that and I never saw anyone else do that course in that format—I'd always had small sections for the courses I'd taken. So, it was learning by doing for me. I'm sure I did lots of damage in the early going, but I gradually developed a little bit of intuition about what worked well and what didn't, and it's been a life-long learning experience trying to figure out how to make that course work as well as I think it can work. I wish I had those early years to do over again.

Bowmaker: You taught mathematics in high school in Nepal as a Peace Corps volunteer. Did that experience help you in any way in preparation for university teaching?

Frank: Oh, I think every time you get up and teach a course, it's more experience. That was really the first teaching I'd ever done. I was at a small village high school, where the teaching method was mostly rote learning—the teachers would chant something out and students would repeat after them and try to just memorize things. The approach we take is not much like that really—we're trying to teach people how to master ideas and apply them. So, it was a surprising experience for students in that context to see a different approach, and amazingly heartening to see how much they seemed to like it.

GENERAL THOUGHTS ON TEACHING

Bowmaker: What do you like most about teaching and what do you like the least?

Frank: The joy of teaching for me is seeing students light up with a sense that now they can do something useful that they couldn't do before. Once you learn a few economics principles, suddenly you've got a way of talking about problems to other people and it's empowering. So, witnessing that transformation in students is the real payoff.

The administrative parts of teaching are always the least welcome, but you mustn't grumble. To catch a student cheating is one of the aspects of teaching I like least. I'm pretty strict about putting them on notice that I expect them to do only their own work. I have caught students cheating and I always prosecute vigorously when I do, but it's an aspect of the process that I find very painful.

Bowmaker: On balance, do you think that teaching effectiveness and research productivity are complementary or competing endeavors?

Frank: Well, there is now evidence that the people who are good researchers tend on average to be better teachers also. Some people conclude from the correlation that doing research *helps* your teaching, but that doesn't follow—some people are better at *everything* than others. For example, it's a surprise to some that good athletes are smarter on average than people who aren't good athletes. I think that relationship has gotten obscured by the fact that in college athletes are admitted preferentially, and so in any local environment the athletes are dumber than other students—they've been recruited as athletes and their low test scores have been overlooked to get them onto the team. In high school, where there aren't admissions criteria, people are just automatically in a catchment area, and the tests there reveal that the good athletes are smarter than average. So, there's just a general competence factor—if you're capable, then you're going to be good at research and good at teaching.

But how would I assess whether bringing my own research ideas into the classroom has made my courses better? Well, it's been pleasurable for me. Do happy teachers do better than unhappy ones? I don't know. I guess I really haven't any concrete evidence to offer on whether being a good researcher helps you to be a better teacher. Obviously, there's a time trade-off. Some of the teachers at schools that are very strong research environments say that if they win a teaching award that's an undesirable signal. Their senior colleagues warn them that they're spending too much time on their teaching.

THE LEARNING PROCESS

Bowmaker: How would you describe your understanding of how humans learn?

Frank: It's interesting that in economics we do not have any instruction in how to teach. For example, medical doctors have hands-on instruction, and law students go through moot court exercises. In fact, virtually every profession has a lot of formal, hands-on training before they send people out to do what they do. All the focus in our graduate instruction is on mastering the details of the discipline itself, and then we just hope that once you're put in front of a group of students you can somehow transmit relevant information to them. That seems an odd posture to strike when you think about it. There's a lot known now about how people learn, and just putting someone up there with no training or background knowledge

in how the human mind absorbs new information and masters ideas seems like a bad strategy. And we've got some pretty vivid evidence that indeed it's been a bad strategy. I'm talking about the results of tests that are now given to introductory economics students six months after they've taken our courses. They're given questions that probe their basic understanding of the important principles in economics and they don't score any better on those tests than others who have never taken the courses at all. That's a pretty dismal level of performance.

I think mainly it's because we really haven't given sufficient thought to the question of *how* to transmit what we think is important. By default, people go in trying to transmit everything they possibly can transmit—that's obviously not a good strategy—and we often transmit things in a form that's not optimal. We did not evolve as mathematicians as a species. It wasn't Man's impulse to grab a twig and do graphs and equations in the sand. When he had an idea to communicate he told a story typically. We evolved as storytellers, and that's the central message of learning theory in the last century. The brain really absorbs information much more readily in some forms than in others, and the most ready form, the form to which the brain is most receptive, is narrative—an account that has actors in it, some semblance of a plot, and if the plot's vivid and interesting, so much the better. Information that's encoded in that form gets into the brain like a key into a lock—you don't have to swim upstream, you don't have to battle resistance.

If you hear an interesting narrative that makes a point, then your first impulse is to repeat the narrative to someone else. That's your currency in conversation. If what you say to people is boring most of the time you don't have a ready supply of conversation partners—it's a marketplace out there. So, if we can put interesting narratives in front of students, they will not only absorb the ideas in the narratives, they will also repeat them to others. That's the learning-by-doing miracle that occurs. If you don't really use an idea, the learning theorists now tell us, it will eventually decay and vanish from your brain. Once you've learned to use it, though, then you have a tendency to keep exercising it and it gets more deeply cemented in the brain over time. So, I think that's the real challenge—to incorporate what's now known to learning theorists into the design of our courses. We've not done a good job of that at all.

Bowmaker: How do you assess whether the students are learning the material?

Frank: Well, they have the usual tests. It's a challenge to make a test that a strong majority of a group of economists would say, "Yeah, if they can answer those questions then I'd agree they've really mastered what I think is important." That's something I'm working on—trying to collect a set of questions that would elicit that kind of strong agreement among economists.

The one exercise in my Principles course that I've been doing now for about 20 years that's really emerged as by far the most effective teaching technique of any I've ever come across is a simple writing assignment. I call it, *'The Economic Naturalist Writing Assignment.'* That's a name I picked because of the influence a couple of biology courses had on me. I took a few in college and they quickly transformed me and how I see the world. If you learn a few details of evolutionary theory and biological theory, you start to see pattern and texture in the natural environment that you never, ever noticed before. That's a very stimulating experience. And so, what I ask students to do is to try to become the economics analogue of a field biologist—you go out in the world and you look around.

The assignment is this: Pose an interesting question, based on something you've seen or experienced personally, and then, in 500 words or less, craft an answer to it based on basic economic principles. They have to do that twice in the term. I stress *interesting* question for several reasons. It's not easy to come up with an interesting question—try it and you won't immediately have 10 or 15 questions pop into your mind. Students struggle on the first assignment. Often, they'll come and visit me in my office and say, "Is this question interesting enough?" and I'll say, "You've got another week, keep thinking about it." So, finally they do come up with a question.

Many of them on the first round are interesting, but in the process of coming up with one, they've had to think about lots of different possibilities, and that's a useful step in the learning process. If you come up with an interesting question, it also heightens your motivation to craft a plausible answer to it, and you're going to want to try it out on other people. "Why is it," one of my students asked, "that the drive-up ATM keypads have Braille dots on them?" It's supposed to be an old vaudeville joke—don't the manufacturers know that the drivers can see? He said, "Well, fair enough, the drivers can see, but the manufacturers are going to make the machines with the Braille dots on the keypads for the walk-up locations anyway, and given that they're already set up to do that, it would just be more costly to make two different kinds of machines, one with Braille dots and one without, and then worry about which ones went to which destinations. It might be worth doing that if the Braille dots caused trouble for the drivers, but clearly they don't. And so, the company just keeps its cost to a minimum by making all the machines alike."

That's a perfectly good application of the basic cost-benefit principle, which is one of the main principles that I stress in the introductory course. When students hear the ATM example, they want to repeat it, and each time they do so they get some air time and some practice thinking in cost-benefit terms, and they learn the idea a little bit better each time. As I say, they have a hard time coming up with an interesting question on the first round, but the typical experience when the second paper comes due at the end of the term is that they'll come to see me in my office and say, "Oh, Professor Frank, can I do a medley? I've got three great questions, can I do a short write up on each?" "Absolutely," I tell them, "if you keep it under 500 words." In fact, many of the very best ones I've ever gotten have been 100 words or less.

So, it's an exercise with an impact that you can just see unfold over the term. The brain somehow gets rewired between the middle of the term and the end of the term. And then in terms of the long-run impact, they just keep honing that skill forever. They come back ten years later at class reunions and knock on my door and say, "Oh, here's one I thought of." And I get e-mails from students all the time, saying, "How about this one?" Not only do they not lose their grip on the ideas after six months, they get better at them. It's a specific assignment that really takes maximum advantage of the message of the learning theorists—craft an interesting narrative, use it, repeat it and ideas just get to be yours pretty quickly.

Bowmaker: How do you check your own progress and evaluate your own efforts in the classroom?

Frank: It's good to have some way of evaluating the tests you give. I give multiple choice exams, primarily because I teach such large classes. It's not impossible to give essay questions, as I have TA's, but I have absolutely no confidence in my ability to consistently award partial credit.

The students don't like multiple choice tests. They think, 'Oh, I knew a lot about that question, but just because I didn't pick the right answer, I didn't get any credit at all'. Well, I remind them that they knew something about another question and had narrowed the choice to two and guessed right. So, if you look at the law of large numbers over a semester it's pretty fair—you're going to get about the right amount of credit.

The nice thing about the multiple-choice exams is that you can run them through an optical grading machine that will give you detailed feedback about how students did on each of the individual questions. And if you've got a question on your exam that nobody got right or only 2 per cent of the students got right, then you need to re-think how you presented the material that underlies that question. If you've got a question that nobody got wrong, maybe that's a question that's not really doing the job of creating the Bell curve. So, yes, the tests are good feedback. But to me the papers are really the ultimate evaluation. If the proportion of interesting papers I get at the end of the term is high, then I know that the course has really reached them.

Bowmaker: How much importance do you attach to the students' official evaluations of your teaching?

Frank: I always read them. Sometimes the comments are useful and sometimes they're not. There will always be an embittered student whose goal just seems to be to try to make you feel bad. But on average, they're useful feedback. I think it's important not to have a goal of having everyone like you. You've got to be prepared to stand up enough for the approach you think is the right one, even if it's not the most popular one at the moment. If a few people don't like the course, that's not going to interfere with my life progress in any significant way. I'm going to do it the way I think the course ought to be done.

It's a shame that course evaluations play the dominant role that they sometimes do because I think they do create an incentive for professors to pander to students. Cornell has a very nice teaching award that they offer in the business school. It's given by the five-year reunion class. They come back and poll their members and give a teaching award to the professor who had the most impact on them during the five years they've been out of school. I think that pushes you past the question of how happy are you at the moment and really asks you, 'Well, did I profit from being exposed to these ideas or not?' If more schools would adopt an award like that into whatever other teaching measures they have, I think that would be a useful thing.

TEACHING PHILOSOPHY AND TECHNIQUE

Bowmaker: What do you promise your students?

Frank: I tell my Principles students that I'm not going to bombard them with myriad details. I'm going to try to commit myself up front to a firm decision about what the handful of ideas I want them to master is and make sure that they leave the semester with a real good grip on those ideas. In general, the mistake we make as teachers is to try to teach students too much. We feel we've done a good job if we show them 100 slides with lots of stuff on each slide and can say, "Wow, I was good today, I really showed them a lot." I think the better question is, "What can we realistically hope that they'll walk away with after a session?" That's a very different question to, "How *much* can I show them?" and leads to a very different way of thinking about how to use your hour.

Bowmaker: What do you expect of your students?

Frank: I expect they'll be able to answer hard questions about a short number of ideas. A lot of people, when they originally hear about the strategy of the course, think, "Oh, that's great, that'll be easy, I'll only have to worry about a few things." Well, since you only have to worry about a few things, I feel at liberty to really demand that you know them at a deep level. And so, the tests are harder than the tests they get in their standard courses, where all they have to do is really regurgitate some information that they won't retain for long. Here, you have to demonstrate that you've penetrated the idea and can actually use it in novel contexts. That's harder, but it's quite 'do-able' in the span of a semester if you don't try to bite off too much.

Bowmaker: How do you treat your students?

Frank: They're adults by the time they get to me. They're 18 years old and formally are adults. They can be drafted into the armed services, they're required to obey adult laws and pay taxes if they earn income. So, I think it's incumbent on me to assume that they're adults. One thing I've learned over the years, however, is that there's not a magic dividing line between adolescents and adults. A lot of the foibles that plague adolescents, plague adults well into middle age, and so it's good to give them feedback and incentives to keep up. We all have a tendency to procrastinate. So, if you give people timely checks along the way to minimize procrastination, they'll benefit from that and learn more. I think they recognize that. Adults do need some prodding and nudging.

Bowmaker: How do you prepare to teach?

Frank: The big dilemma confronting any teacher is how closely to follow the book, assuming you have assigned a textbook. If you follow the book very closely, I think students get justifiably annoyed. They ask, "Why should we be paying good money to come here and listen to him regurgitate what's in the book?" If you depart radically from the book, then they're a little at sea because they don't have a good reference to go to if they can't follow a point.

So, it eventually became clear to me that the uniquely correct approach is to present examples like the ones in the book, but different in interesting structural details. If you do that, then they don't complain, and their interest level is higher than if it's something they've already seen. On the other hand, having already seen a similar example, they're better able to follow the flow of a similar one when it's presented in class. The main insight from learning theory is that if you don't see and use an idea multiple times it doesn't leave any trace in your brain. The brain seems to have evolved with a rule of thumb—ignore information you see only once. There's so much information that comes at you each day that if you tried to assimilate all of it you'd just get totally overwhelmed and overloaded. I think the brain doesn't begin to craft new circuits until after it's seen some clues that, "Hey, this might be important enough that I'd better figure out a way to deal with it more efficiently than just starting from scratch each time." Repetition is absolutely essential to long-term learning.

So, before I come into the classroom, I'm trying to figure out ways to throw ideas at them that I've already thrown at them once before. The challenge is to not bore them by giving them the same thing. I typically construct lectures with examples parallel to the ones in the book, which are richly illustrated. That's another lesson that I've picked up over the

years—the brain seems much better able to remember a point if it’s got some visual hook associated with it. That doesn’t just mean supply and demand graphs. In my books I’ve always tried to use illustrations to accompany examples, and I’ve informally done checks of comprehension with the examples that have illustrations. Students generally score better at remembering the interesting details about those than the ones that don’t have illustrations. We’re a highly visual species, and so you can tell a very efficient story with an image. It’s good to make use of that in the classroom. Now the possibilities are much greater than when I first started. There are videos that are on target for lots of the points we try to make, and if you can sprinkle some of them in from time to time, that’s a plus.

Bowmaker: What are your primary teaching methods? Is there something in particular that you do that is intended to help and encourage students to learn?

Frank: The sequence that seems to work best for me is to give numerous illustrations of an idea embedded in a familiar context and then extract the general principle from the examples. Many people try to do the sequence in reverse—state a general principle, then go look for applications of it. That can work, too, but it works better when you see the pattern in the examples and you’re almost at the point where you can extract the principle on your own. That’s how the principle first emerged, you can be sure. Somebody didn’t think up a principle and then go look for examples of it.

So, the learning process works best when it mimics the natural process that’s just wired into us. And this is something I really saw vividly for the first time in my Peace Corps language instruction program, which was results-oriented in the extreme. I’d had four years of Spanish in high school and a couple years of German. I went to Spain and Germany and nobody knew what I was trying to say—not a very effective output from all that input. But when we were trained in Nepali, we had 13 weeks to get ready to stand up in front of students who spoke no English and give them classroom lessons in Nepali. That sounded like a tall order, but they didn’t teach us about complicated grammatical tenses. I never learned the word for ‘noun’ or ‘verb’ and I never heard the pluperfect subjunctive tense explicitly mentioned. You just mimicked the process that a child uses to learn its native tongue. We would repeat words until we could say them passably, and then they would give us a sentence, and we would say the sentence until we could roll it off pretty fluently. Then they would change the noun in the sentence, and you’d have to change the article and insert the new noun, might also mean using the plural verb rather than the singular verb.

This was done all on the fly, and if you couldn’t do it on the fly, you really weren’t ready to move on. So, it was very active drill and repetition-based, but it worked—we could communicate pretty well after just 13 weeks. I got up and started teaching, without any apparent effort, in front of students who knew only Nepali. The idea that you would give them more if you mimicked that natural organic process that the brain has built in to it just seemed totally appealing to me. And that’s really what I’ve been trying to look for opportunities to apply ever since.

Bowmaker: How do you handle teaching large sections of students?

Frank: That’s one of the first examples I take up in my Principles course—how big the class should be. It’s an exactly on-target example of an application of the cost-benefit principle. The smaller the class is, at least up to a fairly low number of students, the more effective it will be in terms of actually imparting the knowledge you’re trying to get across. Maybe even

a one-on-one tutoring session is the most effective, but in a class of five or ten students there would be more peer-learning that you could take advantage of. So, some small number would be the most absolutely effective form you could teach the course in, but it's also more expensive when the class gets smaller, and the question then is: How much less effective is it when we make the class bigger? That's really an empirical question. How big it *should* be is a question of how much you're willing to pay for a slightly more effective course. I think if you put a good teacher in front of a large class and really encourage that teacher to invest heavily in the design of the course, that's a pretty efficient way to teach it. If you have good lectures that you can give, and TA's who are competent and who can meet with the students once a week in addition to that, then that's a good way to cut down on the cost of providing what's still a very effective course.

Bowmaker: How do you deal with the heterogeneity of students that typically exists in a class?

Frank: I deal with that by aiming at the people who are never going to take another course because they're the ones who are far more numerous than the others. And if you can't sell them that what you have to offer is of any interest, then you won't make any headway with any of your students. So, pitching it to the student who's looking for a *Physics for Poets* analogue is the right strategy for the Principles course. You want to make the ideas come alive in a way that students can grasp easily and see the relevance of.

Bowmaker: Apart from teaching math in Nepal as a Peace Corps Volunteer, essentially all your teaching career has been at elite institutions. Most students taking a principles course do so at community colleges or second and third rank state four-year colleges and universities, where in terms of preparation, ability, and motivation, typically the mean of any given class of students will be lower than at Cornell or similar, and simultaneously the range much, much wider. How would you adjust what you do in a principles course to deal with that situation compared to Cornell?

Frank: That's an interesting issue that isn't really perceived clearly when people think about it. In the textbook market there's a kind of perceived hierarchy of books— "This is a high-level book", "That's an intermediate-level book" or "Here's a community-college level book." In fact, the most effective design for the Principles course would work at all those levels. You can make exams that are challenging for even the best students that don't involve a lot of technical detail. You can just ask them probing questions about opportunity cost and the cost-benefit way of thinking. There's no trouble stumping the Cal Tech geniuses with simple plain English questions about those kinds of ideas. Pitch the course to the moderately intelligent general audience and then design your exams to fit the specific student body you're teaching and you'll do fine in this course.

Bowmaker: How do you strike the right balance between being objective in the classroom versus incorporating your own views?

Frank: That was a challenge during the last eight years. There were many economic policies pursued during the Bush administration that ran counter to all the training that I'd ever received as an economist. The idea that you could run up big federal budget deficits with tax cuts and it wouldn't matter—that it wouldn't somehow impoverish the country in the long

run—ran counter to everything I learned. I was ready to say that to students and I would try to preface it by saying that this may sound like a partisan remark, but as far as I'm concerned this is the position of the profession on this issue and it runs counter to what some of the political leaders were saying at the time.

The ideal situation would be that they don't know where you're coming from politically as you stand up there as a classroom teacher. If that is such a big part of you that it bleeds through, then I think it's really an obligation for you to disclose where you're coming from and give people the opportunity to push back and resist. We don't want to try to propagandize our students, obviously, but we do want to teach them to think critically, and when the logic and teachings of the profession dictate a certain way of looking at a problem, we shouldn't be shy about pointing that out.

COURSE STRUCTURE AND CONTENT

Bowmaker: Should macroeconomics principles be presented before microeconomics principles? The original position taken by Paul Samuelson was that macro should be taught first because it more powerfully develops or exploits a student's initial interest in the subject.

Frank: That used to be the standard sequence—macro first then micro. Now it's become much, much more common for micro to be first and macro to be second. I think micro being first has always made better sense, just because micro is where we have the deepest sense of agreement about what the most important ideas are, and increasingly those ideas are the foundation of thinking about macro issues. So, starting in the 1970s, if not earlier, there was a professional movement to have micro foundations for macro economic theories and that's really permeated the profession in a deep way now. I don't think there's much debate at this point about which to do first. The issue, at least statistically, has been settled in most people's minds.

Bowmaker: When you are designing your syllabus for Principles of Microeconomics, how do you strike the right balance between teaching established ideas that have stood the test of time and incorporating current research?

Frank: When I'm designing my syllabus, I think of it as a production process where there are scarce resources—the students have limited attention and time, so I have to decide what to include in a course that lasts a semester. The principle that I've adopted, which seems the most sensible one to me, after having used it for many years, is that an idea's claim to being on the syllabus is in proportion to its ability to help students recognize and think more clearly about situations that they're actually going to encounter out there. That's a good argument for leaving Jacob Viner's long-run average cost curve envelope *off* the syllabus in the Principles course. But it's also an argument for putting some elementary game theory *into* the Principles syllabus. The whole idea of collective action problems is so salient throughout much of social and economic existence that it's still astonishing to me that we let students graduate without ever having really been exposed even briefly to the concept of the 'prisoner's dilemma' or other collective action games. I think choosing what to cover, based on how much it will help them explain as they make their way in the world, is the right criterion as far as I'm concerned. It's that rule that I've used, and it's been a good one.

Bowmaker: How about the balance between formalism and reality?

Frank: Formalism has been an enormous aid to thinking about complicated economic problems. The issue of whether we should have formal models isn't really on the table. The profession has made great progress because of them. The question of whether we should have a lot of formalism in the Principles course is a separate one. You can believe that formalism has been essential to the field's ability to make progress in the last century, and at the same time believe that the less formalism there is in the Principles course, the better. That happens to be my belief. I think that if you're at a school like Cal Tech or MIT, where students are very sophisticated mathematically, or if you're teaching a classroom of engineering majors, then a formal, mathematical approach can actually simplify some of what you do and give you extra time to do other things. For the vast majority of other students, however, it's a barrier to learning. They get distracted by the formalism, they have to spend a lot of time on it, they get tangled up in it, and that time and effort is at the expense of time and effort they could be spending really developing a deeper intuitive feel for the ideas themselves.

When we put a lot of formalism into the introductory course, we say we're preparing students for the intermediate course, but the rude fact is most students don't take the intermediate course—only a tiny fraction go on to take it. I found that a much higher proportion of my introductory students *do* go on to take the intermediate course, after taking a more intuition-based introductory course, and not only do they *not* have difficulty in the intermediate course where, after all, we take all the formal ideas up from scratch as if you'd never seen them, they actually do quite well compared to the typical student. So, I think there's not much of an agonizing trade-off to worry about here. Get them interested in the subject. This is our chance to persuade them that our ideas have some purchase out there in the world—if you know economics, you'll be better at navigating your way through the environment. If we can persuade them of that, a lot more will want to take the intermediate course and that's the time for them to wrestle with indifference curves and Lagrange multipliers and the like.

Bowmaker: How does your Principles course begin and why does it begin where it does?

Frank: I begin by telling them about the economic naturalist writing assignment, and I think the best way to prepare for that assignment is just to see as many examples as possible of its good execution. So, the first lecture I give is devoted exclusively to a recounting of some of the best examples that have been submitted over the years by students. I think they're interesting questions, which is why I chose them. Maybe students' opinions about what's interesting diverge from mine in some cases, but I think there's surprisingly broad overlap from people of all backgrounds about what an interesting question is, and so that has become just the standard way to begin a course.

Bowmaker: Which are the key ideas at the heart of your course and how do you teach them?

Frank: What we really need to do is to commit ourselves to a short list of core principles and then do them over and over again. I don't want to list seven of them—that's how many I put on my list. Different people would have ten and others might have three, but I don't think there's any question that the most important one of all is the cost-benefit principle—you should do something if the benefit exceeds the cost and if the benefit doesn't exceed the

cost then don't do it (if it's a tie, then it doesn't matter whether you do it or not). That simple idea will take you far in thinking about myriad questions that you will encounter in the world. If you could just master that one principle you would have such a huge advantage going forward. And I think the best way to master that principle, or any other principle, is to see examples of how it applies. Here, one of the most effective strategies is to make use of some of the research in behavioural economics that describes cases where people don't seem to follow basic principles of rational behaviour.

In the case of the cost-benefit principle, Kahneman and Tversky have some nice examples where you can give people a cost-benefit question and they'll answer it one way if you frame it in one manner and a completely different way if you frame it in a different manner, and yet it's essentially the same question. For example, will you go downtown to save \$10 on a \$20 clock radio? Students say, "Yeah, sure that would be worth it." Would you go downtown to save \$10 on a laptop computer? "What, are you kidding? It wouldn't be worth going downtown to save so little on a computer." But it's the same cost-benefit test that should apply in the two cases. The benefit of going downtown is \$10—that's how much you'll save. The cost is whatever you assign to the inconvenience of going downtown. If it's less than \$10, go downtown in both cases, and if it's more don't go downtown in either case—buy it right next door and pay the normal price.

If you can steer students into making a bad choice in an example—a choice that they can easily recognize on reflection as irrational—then I think you've hooked them. They go back and try the same questions out on their friends, and they seem delighted when their friends get them wrong. So, start simple, take a principle and figure out a good way to hook them into thinking about it seriously, and just build on that.

My wife just by osmosis has become something of an economic naturalist. In New York this fall we were going to lunch one Saturday and we passed a bunch of places selling Christmas trees on the sidewalk. Each tree we saw had a flimsy wooden stand affixed to the base of it. That was something I'd never seen before in Ithaca, where we live—you buy trees without stands attached to them. Everybody has a stand of one form or another that they own and that they affix to the tree once they get it home. There was no question that it made sense for us to do Christmas trees that way. So, I just asked her when we sat down to lunch, "Why do you suppose in New York they sell Christmas trees with these flimsy wooden stands on them?" She thought for a minute and her eyes lit up and she said, "Well, in New York if you had a stand like the one we use at home, where would you put it the rest of the year?" New Yorkers live in matchbox apartments and there's just no storage. We keep our big stand down in the basement where there's plenty of room, or out in the garage. Here it would just be a horrible nuisance to work around that clunky stand all year round. It's better to have a disposable stand and be done with it. That's the cost-benefit way of thinking. Storage space in New York is expensive, so people have less of it, and they adapt in other ways. If you can think about problems that way, you're ready to go.

Bowmaker: Which intellectual abilities or qualities will your course help students to develop?

Frank: I think the cost-benefit principle is the bedrock of critical thinking. When somebody argues for a proposition, you can almost always boil that argument down to a claim that doing something yields greater benefits than costs. And if you know how to think about what the relevant costs and benefits of an action are, then you can just react to claims in a much more deeply intelligent way from that moment forward. So, I think it's really that skill that we're trying to inculcate in students—the ability to think critically about things.

Bowmaker: Where will students have difficulty with motivation or understanding?

Frank: Well, the long-run average cost curve is a good example. Jacob Viner couldn't convince his draftsman to put the tangency points at the bottom of the U-shaped short run average cost curves, and the draftsman ended up being right. But it was a long back and forth, and students just don't get much out of that. If you're going to test them on it, they'll put in the hours to be able to get the questions right when it comes exam time on Thursday, but they're not going to carry that forward with them when the course is over. So, if it's transparently inapplicable to anything you care about, then motivation is generally a problem.

Bowmaker: Where does your course end and why does it end where it does?

Frank: I typically end up talking about externalities and collective action problems. I think those are the greatest sources of welfare loss that occur in the economy. They're also the ones that individuals usually can't do anything about by themselves, and the ones most important to recognize and to discuss intelligently in policy decisions. That's the set of issues I try to send them out with fresh in their minds.

TEXTBOOKS

Bowmaker: You use your own textbook for teaching Principles of Microeconomics. Which book did you use before that one?

Frank: I used to use one by Willis Peterson. It was a watered-down, very bare bones intermediate book, and that style appealed to me. It went out of print finally, so I was forced to revisit the decision. I came across a book by Paul Heyne called *The Economic Way of Thinking*. I thought I had needed to write a Principles textbook that was a little more focused on core ideas and didn't go into all the encyclopedic detail of others. But then I read the preface to Paul Heyne's book and thought, 'Ah, this is the book; I won't need to write one after all.' So, I assigned it in my course, and to my surprise the students hated it. And as I read through the body of the book more carefully, I got a sense that, 'Well, yeah, this doesn't really walk students through the basic principles in a repetitive way, it just throws out some doctrinaire views about price theory'. It just didn't seem like an effective teaching tool, never mind the fact that the students didn't like it. I finally decided not to use a book and started developing detailed notes of my own, based on this 'less is more' vision of the course, and after several years I had a pretty good set of notes. I would Xerox them and make them available to students, and then at that point it was a fairly easy step to extend them into a narrative form. So, I wrote a Principles text for my micro course and would make that available to students in a Xerox form again.

And then a textbook company approached me about doing a published version of it, and I said that I'd be interested. They said, "Well, we need a macro part, too—you can't sell a principles book without a macro part." I said that I really didn't want to write a macro part because I didn't feel like I had a clear enough vision for that part of the course to offer any unique value-added. And so, they went off in search of a macro co-author, and to my delight Ben Bernanke read the draft of the micro part and liked it and said he'd like to sign on as the macro co-author, and we produced a book.

Because of various market pressures, the book we first produced had more in it than I thought it should have. We are now putting out both that book and a brief edition of the book. Subsequent editions of the brief version will move toward the book that we really thought would be the one people should use in the Principles course.

Bowmaker: Has writing a textbook made you a better teacher?

Frank: It definitely forces you to think more carefully about the course. It doesn't necessarily make you a better teacher if the result of your effort is, 'Well, I've got to include this, I've got to include that. Then you end up feeling that there are a thousand ideas that you can't possibly *not* touch on when before you only did a hundred.

Bowmaker: How important is a textbook for a Principles course?

Frank: I think if you don't have a textbook, then students often get lost—if you just try to present material to them and they don't have any anchor to go back to. Detailed notes are a substitute, but not a good one. I think the best combination is detailed notes that cover examples like the ones in the book but different. I have done that and it's essentially writing a second book, which is a lot of work. I made detailed PowerPoint lecture notes for my course to accompany the text and those are available to students.

It's not a whole lot of start-up costs to do a 'less is more' version of the course now. The materials are all available to people and I think there are some other books out there that are shorter. So, our book isn't the only one for people to look at and it's something people ought to think about when they sit down and say, "Well, what's the best way to go about this course?"

When you talk about that question in the abstract with people you get almost universal agreement— "Yes, we ought to be cutting back and focusing on core principles and repeating them and drilling them". But then people will say, "But what *are* the core principles?", and, "Where's the Chamberlinian model of monopolistic competition?" There's always some reluctance to commit to a specific list. And people will say, "Yeah, I ought to be doing the course that way, but I've been using another book, I've got my notes, and so I'll do it next year". It's like the smoker who says, "I'll quit tomorrow." There's always some compelling reason not to do it. It's a big issue for people to think about, but the hurdles in your way to doing the course differently now aren't very high.

Bowmaker: In the past five years, a plethora of 'pop-economics' books have been published, including *Freakonomics*, *The Undercover Economist* and your own book, *The Economic Naturalist*. Bob Solow said your book was, "an excellent way for students to learn economics." Do you think those kinds of book should be required reading for a Principles student in addition to a textbook?

Frank: I think the availability of a whole set of good books that talk about economic examples from daily life really is a good supplement to the course. In my textbook with Ben Bernanke, we have lots of economic naturalist examples in the textbook itself, but then a couple of years ago I published my book with nothing but economic naturalist examples in it. I put the electronic page proofs of that book on my course website and I tell students if you want to see what I think is a good paper for your economic naturalist assignment, here are the ones I've liked over the years.

Many students have gotten excited about the discipline by reading *Freakonomics* [by Stephen Dubner and Steven Levitt]. *The Undercover Economist* [by Tim Harford] is a terrific book, and you could assign that with full confidence. Tyler Cowen's *Discover Your Inner Economist* is a good book. There are some really good ones and I think they're enormously helpful in bringing students in.

TEACHING ECONOMICS IN THE FUTURE

Bowmaker: How do you think the process of teaching economics will change over the next few years and to what extent will student demands and expectations shape those changes?

Frank: There's been some student protest about excessive formalism in graduate curriculums. I don't think that's had much impact. It's still true that if you're looking for a job in economics, it's clearly advantageous to be the more technically rigorous of a pair of job candidates. I do think that the level of formalism in the Principles course will at some point decline sharply. The publishers of our book thought that since there's such widespread agreement that the 'less is more' approach makes sense that it would sweep the market in a year's time, but it didn't. Our textbook has been gaining sales substantially in each edition, but it's still not the best-selling textbook in the market. It's now among the leaders finally, but it appears difficult for people to abandon their notes and switch to a new approach. I think, though, at some point the profession will tip and say, "Well, we knew it all along, we should teach in this 'less is more' way." But I'm still waiting for that day. We're closer to it, but it hasn't come yet. Once it does, I think we'll see a real revolution in the Principles course.