

A FAREWELL TALK FOR THE GRADUATE STUDENTS

First, I am grateful to David Widmar and the others for the invitation to talk with you now. An invitation like this is one of the nicest things that students can ever offer a professor. For me it could be nicer only in the future, when you invite me to *your* talks, and tell me about what you have learned.

When people ask why I became a college professor, a cliché answer would be because I love teaching. Ideas often become clichés because they're true, but for me that's not the case. I don't love teaching so much as I love learning, and I've been lucky to be able to learn with you in AGEC 640, and also in AGEC 340 and other classes and research projects, and I hope also today.

One of the great results in economics is the folk theorem, that some desirable social norms can be sustained just by the prospect of repeat interactions. People may choose to control their selfish impulses simply so as to maintain a valuable relationship in the future. Of course that begs the question of what those selfish impulses actually are, so the end-stage of a repeated game offers a kind of truth serum. You know where this is going. I'm no longer bound by the usual rules. I apologize in advance.

I took today's invitation as an opportunity to over-share a bit, to give a more personal and broader talk than you would otherwise hear. And David gave me plenty of advance warning, so I've had some time to think about what I most wanted to say. So here it is. The talk has a very simple plot. It begins with a joke, then I'll tell you two things, then I'll end with another joke. The two things are about agricultural economics, first about economics, then about food & agriculture. Then the closing joke.

The first joke

The opening joke is one that my father told me, and I was bitterly disappointed to discover that he didn't make it up. I thought he created everything, but then it turned out he was just repeating what he'd learned, which pretty much sums up this entire talk. The joke he told is very old so you may have heard it already. I'll update a bit: a famous physicist comes to give a big public lecture on string theory, CERN experiments, dark matter, mirror matter, the big bang, origin of the universe etc., all tied together brilliantly and then a woman at the back says she doesn't believe a word of it, actually the world is resting on a turtle. The physicist says really, and what's the turtle resting on? "It's turtles, all the way down."

So what is this joke about? At first we laugh at the woman and her ridiculous turtles. But eventually we can laugh at the physicist too. It turns out that all science can do, as it digs deeper from Galileo to Newton, Einstein, quantum mechanics, all the way down to string theory, is to find stronger and more useful turtles to stand on. Each platform is a set of axioms from which to generate hypotheses. If those hypotheses aren't rejected too often, then their underlying first principles are useful and worth keeping as a base of operations. But the axioms are themselves untestable, a bit less ridiculous than a turtle but still limited and arbitrary in some ways.

In the social sciences there are several different turtles one could stand on, and I think an important goal of intellectual life is to choose among them appropriately and to remain aware of the other possibilities. If you stop at the first turtle you encounter in life, you may find that it's not very useful. Better to keep going down a few levels to some other, deeper and more robust set of first principles. Then, as you remain aware of and perhaps even use the other available turtles to stand on, you have at your disposal an entire unified fields theory of the sciences – an even deeper meta-turtle.

So, the first idea I want to talk about is why I like some turtles more than others, and what the whole set of available turtles looks like to me. The second idea is how these first principles have played out for me in agricultural economics, where there are pretty difficult choices to be made. I will tell you about how I see those choices, and perhaps that will help you to navigate your own careers.

A first idea: toward unified fields in the social sciences

As a practical matter, the first principles generally favored by economists are **optimization by individuals** with **equilibrium between them**. These are the features of the models that make up modern economics: if your theory has optimizing, forward-looking decision-makers, who come to an equilibrium between them that is not itself necessarily an optimum, then you can be pretty sure that your theory won't seem ridiculous to an audience of economists. This is supposed to be a personal talk about me, so the question is why do I like that style of social science? I can see three features of this particular turtle that are attractive to me. Perhaps you like them too.

First, **economics is highly respectful of other people**. The economist's job is to fit an optimization-equilibrium model to peoples' actual choices, on the presumption that each person is already doing the best they can. It's not the best of all possible worlds, however, because the observed result of interaction between people is an equilibrium, not necessarily an optimum. We then use our models to compute what the available (Pareto) optima might be, and if reality falls short it's because of market failure, not people failure. This view is the opposite of, for example, psychologists, for whom it's the people themselves who might be sick. The psychologist's job involves choosing who is sick and who is healthy, and then trying to influence the sick to become like the healthy. I appreciate their work but if I had to judge people that way it would drive me crazy. I'm not that kind of Dr.! In economics the remedies involve changing incentives or institutions, not changing people.

Second, **economics generates a growing community of mutually-respectful economists**. The optimization-equilibrium approach generates an infinite number of testable hypotheses that are independent of each other, not necessarily mutually exclusive. We make many narrowly focused, stylized models. Some of these formulations can be rejected, for logical or empirical reasons, but the toolkit of models in active use just keeps growing. Each model is reductionist – the goal is simplicity, not realism – with the power of the discipline being in the whole of toolkit of models, each of which captures some aspect of a specific situation. There is no effort at one true model. This is the opposite of researchers who try to make their own work “holistic” or somehow a complete representation of the thing they study, as a result of which their work quickly becomes incompatible with other attempts at

similarly holistic representations. The narrow focus of each model helps economists remain collegial and open-minded, which are traits that I value very highly.

Third, ***economics is surprisingly successful***. On the surface, the optimization-equilibrium paradigm may seem like an utterly ridiculous turtle to stand on. Then it turns out to work pretty well, you can use it to predict and evaluate a lot of important decisions. Enough said about that, because the really interesting thing is that the optimization-and-equilibrium approach cannot explain *everything*, and is not intended to, which is a source of strength because that helps us to think respectfully about other scholarly disciplines and ask what their first principles might be.

As I think about other turtles to stand on, perhaps go deeper and explain where the ability to optimize came from, or to go further than optimization & equilibrium to explain other things in social science, as far as I can tell the deepest other set of first principles is ***generation & selection***. If you don't like optimization and equilibrium, but still want to think about society in a scientific manner, evolutionary theories offer another broad turtle you can stand on.

In evolutionary explanations, one process generates stuff, while another process selects which things persist. These generation-and-selection theories are directly analogous to the optimization-and-equilibrium models used in economics, except that economic models are by definition forward looking (we explain the present in terms of expectations about the future), whereas evolutionary models are by definition backward looking (they explain the present in terms of the past).

Thinking about evolutionary models offers a useful contrast to our own economic models. The fundamental insight is to distinguish the underlying generation process (e.g. random mutations in DNA) from the selection process (e.g. "survival of the fittest"). Like optimization-and-equilibrium, this generation-and-selection approach is surprisingly powerful and subtle. For example, Darwin's original idea of *sexual selection*, in which successful individuals must survive and reproduce to pass on their genes, gave way in the 1960s and 1970s to *kin selection*, by which other individuals can also pass on successful genes. That in turn is now being challenged by E.O. Wilson and others, who argue for theories that allow for *group selection*, in which individuals and their kin may have a lot of wimpy traits that survive only through the success of a larger community. I like that idea, perhaps because I come from a fairly small kinship group but my larger social groups do pretty well. Here I'm referring to almost any of the groups with which I am affiliated. Even Boilermakers wouldn't last long in the wilderness, but when the group is together it's hard to beat. I expect that group selection models will be enormously useful in the social sciences, and could become the main alternative to optimization-equilibrium models.

As it happens, generation-and-selection models have been present in economics for some time alongside the optimization-and-equilibrium approach, and we can imagine many hybrids that stand on both turtles. For example, I think a huge unexplored puzzle for academics is the expansion of university administration. Why are a larger and larger fraction of university staff full-time administrators? My favorite theory is a ratchet model, which is a kind of evolution in which new administrative positions arise to solve problems, but then the position remains even after the problem is resolved. In that view,

the answer to why we have so many administrators is that they solve problems we *used* to have. Enough said about that.

So far I have described two kinds of models for the social sciences. The combination of the two is my personal unified fields theory for social science. I believe that to predict and evaluate we need economics (optimization & equilibrium), but to explain where that came from we need evolution (generation & selection). All of empirical, testable social science might eventually stand on one or the other of those turtles -- but I also believe that there are still many phenomena left over, and that we should think and talk about those remaining puzzles carefully although perhaps not scientifically. These are matters of faith, untestable first principles that are independent of either a historical process of generation and selection, or a forward-looking process of optimization and equilibrium. Moral principles and articles of faith may be timeless and perhaps beyond scientific enquiry, but they remain powerful influences on scientists as people. You understand moral principles at least as well as I do so I won't say anything more about them for now. Better to see them in action – for example, in how ethics and economics interact for me regarding agricultural and food policy.

A second idea: towards an ethical economics of agriculture and food policy

For me, applying economics to food and agriculture has offered some wrenching contradictions and difficult choices. This whole talk is very personal – no slides of data, just me talking – but the first idea about economics in general was a bit abstract. When we narrow down to *agricultural* economics it gets more concrete, and personal in a different way.

What should agricultural economists do about farm policies?

In agricultural economics, at Purdue and elsewhere, it seems to me that our central challenge is how to be both mission-driven, responsive to our clientele in agriculture – and also true to our first principles as economists and as individuals. When the Purdue ag econ department was founded in the 1920s and especially as the department grew in the 1930s, farmers were much poorer than the average American. This relative poverty persisted through the 1950s and 1960s, and at that time there was the added challenge of huge disruptions due to rapid outflow of labor and consolidation of farmland. But for a variety of reasons, since the 1990s American farmers have been much richer than the average American, and there has been no further net outflow of labor or consolidation of farmland in America as a whole. So, from its hardscrabble roots, the agricultural economics discipline now finds itself serving a relatively wealthy and stable sector. Agriculture is a high-risk enterprise, but it's not going away or even shrinking. This puts our discipline in an enviable if sometimes awkward position.

In my experience, the college of agriculture can be seen, in many ways, as a school of rural studies. We replicate all the disciplines of the larger university, but focused on agriculture. This is basically similar to Asian Studies, African Studies, Women's Studies etc. – but for students and research questions that are agricultural or rural as opposed to urban in nature. It can be a really good idea to have these Area Studies programs, if only because it gives students and researchers from those backgrounds a more comfortable home within the university. The university can be very hostile to rural issues since it is

otherwise pretty much an urban environment. The rural industry that supports us is agriculture –we are a college of agriculture, not of rural studies – but our mission is clearly to serve a subset of America rather than the country as a whole.

So here we are, serving the agriculture community, using economics to try to improve our institutions and policies. Now after decades of study, it turns out that government interventions such as crop insurance, renewable fuel mandates, the conservation reserve program, land conversion restrictions and many others are not necessarily what they seem. Modern economics can explain them pretty well, but only as rent-seeking devices. These interventions are ways for farmers and landowners to obtain income transfers from the public in a way that is obscured from public view, hidden partly by their sheer complexity and partly by the claim that they exist to solve market failures such as credit constraints or environmental problems.

When agricultural economists discover this kind of truth, we may find ourselves in a very awkward position. Do we act as self-appointed referees, and blow the whistle on agricultural policies when they serve mainly to enrich already-wealthy landowners at others' expense? Does our knowledge of how those programs work impose on us an obligation to speak out against them? The choice of where to stand, given where we sit, is very difficult and offers no easy solutions– the distinctive Purdue tradition of “alternatives and consequences” is certainly useful, using economics for simulation while keeping silent on its welfare implications, but that approach does not sit easily with many people.

What should we do about food policies?

A comparable dilemma applies on the consumption side. In all wealthy countries there is huge momentum towards organic, traditional, local and artisanal foods. Richer people, who don't need to eat cheapest kinds of food, seek out products with more valued qualities. Increasingly, the cheapest foods are processed, branded, industrial products shipped from afar – so richer people turn to higher-value natural products from local artisans.

The dilemma for social scientists lies in the stories people tell about these preferences. People say they want to organic methods and traditional genetics to avoid health risks and environmental threats posed by industrial agriculture. People say they want to buy local and artisanal food so as to promote the local economy, or to avoid environmental damage from long-distance transport. But when scholars investigate these claims, they may turn out to be very fragile. What if organic, local, traditional and artisanal products don't actually deliver a healthier, more secure and sustainable food system? This is not a hypothetical question. Right now, the preponderance of evidence is pointing in that direction. It seems likely that improved health, security and sustainability will actually come from other kinds of intervention, such as more rigorous control of *e. coli* or *salmonella*, limiting fertilizer runoff from conventional agriculture, and building more efficient supply chains from tropical to temperate countries. These more effective measures don't preclude but also don't support the pursuit of organic, traditional, local and artisanal qualities that food consumers are demanding.

So, are consumers crazy? We're economists, not psychologists, so for us the customer is always right. I believe that the problem is in the stories, not the products themselves. In my view, the problem is in what's written about food. Food journalists are in the business of selling articles and books, often by stoking readers' fears and offering their own guide to safety. Food marketing materials do the same thing, to position their brands as the safe choice. Eventually I hope to do some writing for popular rather than academic audiences, to help replace what I see as misleading stories about health and the environment with a more accurate narrative about what's actually desirable in higher quality foods. My working title is *Food without Fear*, aiming to help readers enjoy various qualities without a misplaced sense of fear or guilt that shopping for conventional carrots at Wal-Mart will harm themselves or others, or a misplaced sense of foolishness about paying five times as much for a more delicious organic carrot on a sunny day at a farmers' market. Plenty of smart people do both those things, and they should not feel fearful, guilty or foolish about it. I think agricultural economics offers a lot of useful lessons to help food consumers make better choices with less anxiety, while also guiding public policy towards more effective measures about health and the environment.

So far I have told one joke, about turtles. And then I described two aspects of how I see my academic life, first in terms of economics, and then in agricultural and food policy. As promised, I am speaking personally without much regard for convention. If I have bored you by packing too much into a single talk, perhaps I can redeem myself with another joke.

The second joke

This is another one my father told me, but a more personal one intended to help explain what kind of people our family had come from. In the mountains around our valley there was an unusually big snowfall one winter, and then a sudden warm spell in spring, rockslides and a flood into upstream valleys which would soon overflow so that, in 24 hrs, our whole valley would be deep under water. The end is near so everyone rushes to their churches. For Catholics, the priest has arranged for non-stop confession. Among the protestants, one church fills the valley with song, while another holds Pentecostals in rapture. One group has brought all their jewelry and money into church, to escape this world all the faster. At this point I ask my Dad, but what do WE do? At the synagogue, the rabbi is standing on the dais with a teenage boy named Moishe. "I have canvassed the elders... and found Moishe." The congregation murmurs "Him? A dim bulb... and not even good looking. He can't help us." The rabbi says: "Listen up. Moishe will save us. Moishe will teach us. Moishe knows... how to swim."

So that's the point of this talk, which brings us full circle. It is very hard to predict what kinds of knowledge will be most useful, who will discover it or how it's best used. The fun part is to keep learning. To use the deepest, strongest first principles that you can. To use that knowledge to help others do what *they* want to do. To stay on the lookout for unexpected new skills – to learn from people like Moishe, and, every so often, if you're very lucky, you might actually get to be Moishe.