GOOD-BYE OLD, HELLO NEW IN TEACHING ECONOMICS

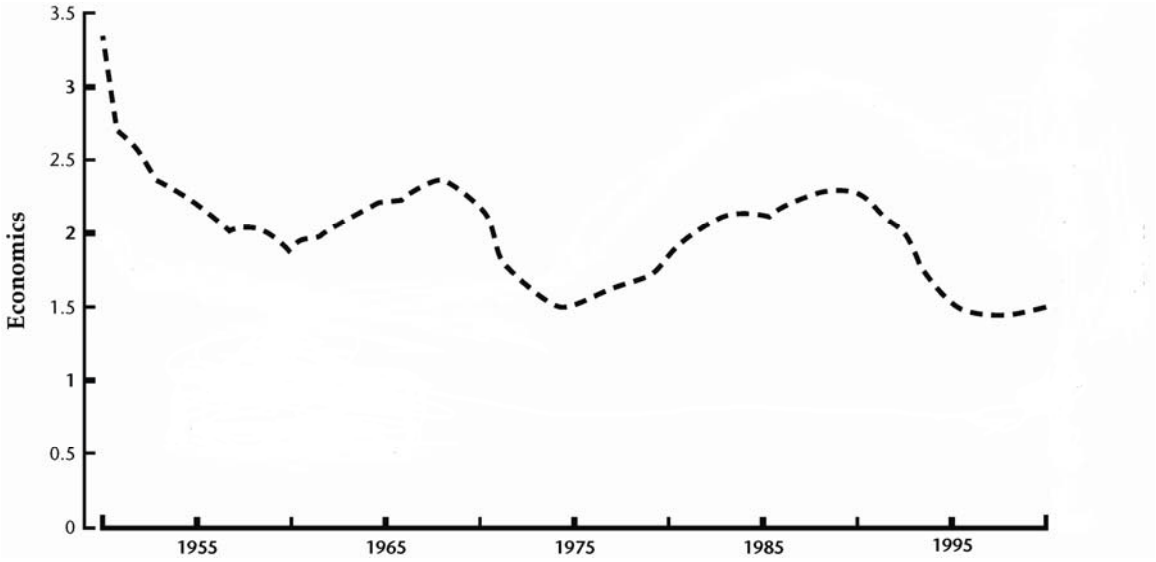
William E. Becker[1]
Indiana University

1. INTRODUCTION

Throughout the world, economists have observed student lack of interest in pursuing the study of economics. Characteristically, the trend in the proportion of U.S. bachelor's degrees awarded in economics has been negative since the 1950s, with a steep decline following a relative cyclical high in 1988, Figure 1.

FIGURE 1

PERCENTAGE OF U.S. BACHELOR'S DEGREES AWARDED IN ECONOMICS



Most recently, however, there is evidence of a turn-around in the number of degrees awarded in economics. Intriguingly, along with this recent increase in U.S. degrees awarded in economics, there has been an increase in academic economists' interest in their teaching, Becker (2003, forthcoming). For instance, when the receipt of economics degrees were at

[1] William E. Becker is Professor of Economics, Indiana University Bloomington, and Adjunst Professor of International Business, University of South Australia.

a relative high of 2.3 percent of all U.S. bachelor's degrees awarded in 1988, only a couple of sessions at the annual meeting of the American Economic Association and Allied Social Science Associations were devoted to the teaching of economics (Table 1).

TABLE 1

SESSIONS AT THE ANNUAL AMERICAN ECONOMIC ASSOCIATION AND ALLIED SOCIAL SCIENCE ASSOCIATION MEETINGS

	Sessions at Annual AEA/ASSA Meetings		
Year	Devoted to Teaching Economics	Total Number	Percentage on Teaching Economics
1987*	3	357	0.84
1988*	2	408	0.49
1989*	2	455	0.44
1990*	5	428	1.17
1991*	5	488	1.02
1992	5	518	0.97
1993	5	514	0.97
1994	4	535	0.75
1995	6	521	1.15
1996	6	541	1.11
1997	9	538	1.67
1998	14	549	2.55
1999	12	474	2.53
2000	11	465	2.37
2001	12	475	2.53
2002	16	465	3.44
2003	12	468	2.56
2004	12	457	2.63

* The annual AEA/ASSA meetings moved from late December to early January in 1992; thus, the meeting listed here in 1991 was actually held in December 1990.

At the low point for economics degrees in 1996, when only 1.4 percent of U.S. bachelor's degrees were granted in economics, there were six AEA/ASSA sessions devoted to teaching economics. By 2000, U.S. bachelor's degrees in economics had risen slightly to some 1.5 percent of all U.S. degrees granted. Although more current official U.S. Department of Education numbers are not available, John Siegfried's (2004) American Economic Association survey data indicates that this increase in economics degrees is continuing. The bottoming out of economics degrees in 1996 corresponds to the beginning of an explosion to double-digit numbers for

sessions devoted to the teaching of economics at the annual meetings in the new millennium, where attendance in these sessions on teaching economics were also among the highest of all sessions regardless of area of specialization.

The often-heard arguments that there are no incentives for teaching and that the quality of teaching does not matter in a student's choice of a course of study appear to be refuted by the revealed preferences of academic economists at the annual AEA/ASSA meetings. Economists apparently have finally learned that their teaching is one of the few policy levers they control, but that does not necessarily imply that they know what is required for good teaching (Becker and Watts, 1996; 2001), or what should be taught. In this article, I again address what is versus what should be taught, and the way economics is taught versus how it should be taught at the tertiary level.

2. TEACHING YESTERDAY'S IDEAS

I recently asked a newly minted Ph.D. candidate for an entry-level professorship to explain how she would relate the ideas of equilibria in economics science to what students see in the popular press. She paused and said, "Well, supply and demand **. . .**" I asked how she would respond to satirist P. J. O'Rourke's assertion (in *Eat the Rich: A Treatise on Economics*) that textbook supply and demand graphs do not help much in analyzing situations that are found in newspaper headlines? I do not recall getting much of an answer.

The fact is that many of the things of interest to students and things that they see and hear in the popular media do not lend themselves to simple textbook supply and demand analysis. For example, when imperfect information leads to the use of price as a measure of quality -- as in used-car markets, insurance, and labor markets -- then an equilibrium may be characterized by inequality between quantities demanded and supplied, and a neat separation of demand and supply curves may not be appropriate. Scarcity of concert tickets may actually increase their attractiveness making static demand curve analysis meaningless. Similarly, supply and demand curves are arguably unidentifiable in the case of medical and legal services.

Using the textbook supply and demand graphs, an instructor will have problems correctly handling a student who comes in with a quote such as this from Michael Collins, a retail partner at Bain&Co. in Chicago:

> "Making the 1,000th DVD player is a lot more efficient and less expensive than making the first, and that's reflected in the lower price. The difference between the manufacturing cost of the 1

> millionth and the 2 millionth is miniscule." (El Boghdady and Musgrove, 2003, E2)

Traditional discussions of supply curves are problematic when marginal costs are approximately zero, as is the case for many information-based goods with which students are familiar. The identification of supply and demand shifts are further complicated when demand for a product depends in part on its widespread usage.

Students do need to learn about supply and demand, but they also need confirmation that textbook-style competitive markets with demand and supply curves that might work for agricultural commodities, at least in an idealized world, do not work for all items of interest to them. They need to know about the principle of comparative advantage, but they also need to learn the difference between static and dynamic analyses[2] and how risk is defined and reduced through diversification, not specialization[3].

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[2] David Ricardo advanced the idea of comparative advantage two hundred years ago. It requires that the production technologies and resources of the trading partners remain in place – for example, one parcel of land is fixed and owned by one country while another piece of land is fixed and owned by another country. Unlike climate and geography, in today's world both capital and technology are not fixed; they can quickly be moved from one country to another. As a result, even if the US has an advantage in the electronic processing of insurance forms today, that technology (as well as related technologies as we have seen) can quickly be moved to India for even greater cost savings. To say that the US has a comparative advantage in processing forms requires the assumption that this technology is fixed to the US, which through TV and Web surfing students see to be nonsense. The assumed static world of Ricardo versus the dynamics of technological change cannot be ignored.

[3] Students see articles such as that in *Business Week* "The Nitty-Gritty: How To Do the Math" (January 17, 2000, p. 110), which stated "Happily, about 96% of any one company's risk can be eliminated simply by owning a diversified portfolio ..." Such headlines can be used to ask students why employees of a company would be wise not to own stock in that company, or why career specialization is risky? Using hypothetical data the importance of diversification can be driven home in a computer lab using Microsoft Excel. For example, assuming net returns to $100 invested in A, B or C are normally distributed, we see that the probability of losing principal in the diversified portfolio C is less than the other two (0.0000134 versus 0.000429 or 0.00298). This lower risk is also reflected in the smaller coefficient of variation for C.

	A	B	C = .5A+.5B
E(Net Return)	$10.00	$11.00	$10.50
St. Dev.	$3.00	$4.00	$2.50
Coef. of Var.	0.3	0.363636	0.238095
P(N.R.<0)=	0.000429	0.00298	1.34E-05

I argued in Becker, Greene and Rosen (1990) that some basic skills may have a high value at one point in time and little value at another; for example, the ability to manipulate a slide rule fell in value with the availability of the inexpensive hand calculator; the ability to manipulate the hand held calculator fell in value with the advancement of computer spreadsheets and statistical packages. Since writing with Greene and Rosen, the development of online search engines has made library card catalog skills obsolete. So, too, in economics: skills become dated. The advent of the modern-day computer, for instance, has turned economics into a more empirical subject, as seen in the work of recent recipients of the Nobel Memorial Prize in Economic Science. Yet, the typical undergraduate curriculum gives little attention to the importance of empirical research and empirical findings.

Innovations in the science of economics are not making their way into the teaching of economics at the undergraduate level. For example, although Nobel prizes are typically awarded for work completed years earlier, and Zahka (1999) describes how the Nobel Laureates' acceptance speeches can be used in teaching the principles of economics, the work of Nobel Laureates is not presented regularly in principles textbooks prior to announcement of the award and even seldom afterward. At my request, James Murray checked the indexes of macroeconomics editions of Ekelund and Tollison (2000), Mankiw (2001), Samuelson and Nordhaus (2003), Case and Fair (2002), Schiller (2003), and microeconomics editions of Bade and Parkin (2001), Mankiw (2001), Samuelson and Nordhaus (2001), Baumol and Blinder (2003), Schiller (2003) and Gwartney, Stroup, Sobel, and Macpherson (2003) for prior reference to these recent Nobel Laureates:

> Daniel Kahneman, for having integrated insights from psychological research into economic science, especially concerning human judgment and decision-making under uncertainty.
>
> Vernon Smith, for having established laboratory experiments as a tool in empirical economic analysis, especially in the study of alternative market mechanisms.
>
> George Akerlof, Michael Spence and Joseph Stiglitz, for their analyses of markets with asymmetric information.
>
> James Heckman, for his development of theory and methods for analyzing selective samples.
>
> Daniel McFadden, for his development of theory and methods for analyzing discrete choice.

He reported finding only a reference to Smith in Gwartney, et al. (2003). My cursory check of more recent editions of principles textbooks likewise

found no reference to the 2003 recipients of the Nobel Memorial Prize in Economic Science:

> Robert F. Engle**,** for methods of analyzing economic time series with time-varying volatility.
>
> Clive W. J. Granger, for methods of analyzing economic time series with common trends.

With the exception of theoretical work on screening and signaling and the role of asymmetric information in markets, the recognized work of these Noble Laureates was empirical research, with specific data issues driving theory.

A learned professor with well-refined classroom notes might argue that the works of Nobel Laureates, and certainly the dynamic process of time-series analysis, are beyond the grasp of the typical 18- to 20-year old, and their parents to be sure. However, students are aware of the idea of the complex dynamics of chaos theory from movies such as the schizophrenic thriller "π", where Max says, "If you graph the numbers of any system, patterns emerge; therefore, there are patterns everywhere in nature . . . So what about the stock market? A universe of numbers that represents the global economy . . ." A similar theme appears in Tom Stoppard's play, *Arcadia*, and an anthology by Watts (2003) provides nearly a hundred passages from both classic and contemporary literature and drama dealing with a wide range of economic concepts and issues, including a reading from *Arcadia*. Contemporary movies like "π" and plays like *Arcadia* can engage the general movie and theater-going population with current economic ideas.

For example, following the showing of Max's clip from "π," macroeconomics students who have had some exposure to probability theory can be challenged by Mathews' (2000, pp. 242-246) "urn activities" to show the "Polya process" in which multiple equilibria result from a stochastic time process involving the sequential drawing and replacing of balls based on a stochastic decision rule. Mathews (2001) places the importance of this classroom experiment in an economic context through examples drawn from history.

Learned professors accustomed to only chalk and talk teaching methods might also ague that the idea of a Pareto equilibrium is a theoretical concept not to be observed in the real world. But, again, turning to the movies, consider the blonde-in-the-bar clip from "A Beautiful Mind." I have used this clip as a motivational tool to establish the connection between Adam Smith's invisible hand and John Nash's recognition of the role of cooperation with heterogeneous student bodies consisting of both entry-level university students and advanced graduate

students.[4] I sandwich this clip between Charles Holt's (1996) trading-pit simulation (in which a Smithian equilibrium results from students pursuing their individual self-interest as demanders and suppliers) and Pickhardt's extension of Holt and Laury's (1997) classroom simulation in which a less than optimum noncooperative equilibrium tends to dominate a Nash cooperative equilibrium, which is the Pareto optimum.

3. TEACHING BEYOND THE TEXTBOOK

Colander (2004) tells how he entered into textbook writing with an ambition to change the way economics is taught, with among other things an emphasis on complexity and dynamic processes. To market books he describes how he was led by reviewers and editors to follow the standard static framework of market clearing prices and AS/AD. He states that instructors must recognize that textbooks do not represent what the author knows or believes:

> "a text(book) is not a direct expression of what the author believes, but instead a combination of a much more complicated set of considerations in which inertia and processes, not intellectual or even pedagogical validity, play the central roles . . . users of the books should be aware that that's what principles of economics textbooks are, and structure their teaching accordingly, adding context to the discussion whenever possible."

It is the instructor's job to bring his or her class up-to-date on current thinking and debate going on in the science of economics.

For example, even many intermediate and advanced economics textbook authors present without question the tenets of expected utility theory, even though the work of Nobel Laureate Daniel Kahneman and Amos Tversky demonstrates that decision-makers have trouble with the concept of probability and the valuation of expected gains and losses. The Allais paradox (which is named after Maurice Allais**,** the 1988 Nobel Prize in economics recipient) can be used to demonstrate the trouble folks have ordering uncertain prospects in a way that is independent of irrelevant alternatives – a critical postulate for von Neumann-Morgenstern expected utility theory.

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[4] Anderson and Engers (2002) correctly point out that the Nash equilibrium portrayed in the movie (all the men including Nash ignore the blonde) is not a sustainable equilibrium because given the strategies of the others Nash himself could score by going for the blonde – as pointed out by one of his male friends in the bar. Given sufficient desirability of the blond, no heterosexual male will be willing to let her walk, unescorted, so any one of them could expect to score given the strategy of the other males.

In the 1970s, Tversky and Kahneman set out to construct a theory to explain the Allais paradox. The Allais paradox (Allais, 1953) involves behavior that contradicts the independence axiom and linear probability calculations in expected utility theory. It can be demonstrated in the first week of an introductory economics class by asking each student to consider two situations (A and B), each involving a choice between two gambles:

Situation A: Which do you choose - Gamble *A1* or *A2*?

Gamble A*1* promises a sure win of $30;

Gamble A*2* is a 80% chance to win $45 and 20% chance of $0.

Situation B: Which do you choose – Gamble B1 or B2?

Gamble B*1* promises a 25% chance of winning $30,

Gamble B*2* is a 20% chance to win $45.

Situation B differs from situation A only in that one-quarter of the original probability of winning a positive amount can be realized. Yet, the majority of students typically will prefer *A1* to *A2* and prefer *B2* to *B1*. Thus, the paradox is demonstrated by actually engaging the students in the choice process.

A von Neumann-Morgenstern utility function and the implied preference reversal of the Allais paradox can be demonstrated by asking each student who said that *A1* is preferred to *A2* and *B2* is preferred to *B1* to assign utility values to the two basic outcome of wining $45 or nothing and then to state the implied utility limits for $30. For example, a student who says $u(0) = 0$ and $u(45) = 1.00$ is implying that $u(30) = v$, for $0 < v < 1$. Expected utility can now be introduced as the sum of utility outcomes weighted by their respective probabilities:

Gamble *A1* promises a sure win of $30, so $EU = 1.0(v) + 0(0) = v$

Gamble *A2* is a 80% chance to win $45, so $EU = 0.8(1) + .2(0) = 0.8$

If A1 is preferred to *A2*, then $v > 0.8$

Lottery *B1* promises a 25% chance of winning $30, so $EU=0.25(v)+.75(0)=0.25v$

Lottery *B2* is a 20% chance to win $45, so $EU=0.2(1)+.8(0)=0.20$

If *B2* is preferred to *B1*, then $v<0.8$

Kahneman states that the apparent contradiction in this implied utility is not a demonstration of stupidity but a much more interesting issue: the susceptibility to erroneous intuitions about uncertainty and probability. Allais's problem is a demonstration that the subjective response to probability is not necessarily linear. The difference between probabilities of 0.25 and 0.35 in decision-making is not as relevant as the difference between 0 and 0.10, or between .90 and 1.00. Furthermore, via questioning of students in the classroom, what Kahneman and Tversky (1979) call “reflection” and “loss aversion” can be demonstrated: changing the signs of

all outcomes in a pair of gambles almost always caused the preference to change from risk averse to risk seeking, or vice versa. For example, the majority of students in a class typically preferred a sure gain of $900 to a .9 probability of gaining $1,000 (or nothing), but they preferred a gamble with a .9 probability of losing $1,000 over a sure loss of $900.

One of the insights that Kahneman and Tversky had was that choice problems are usually described in terms of gains and losses, but the utility functions that were supposed to explain the choices were defined in terms of absolute levels. Similar to Harry Markowitz, who won the Nobel Prize in economics in 1990, they decided to adopt changes and/or differences as the sources of utility, which provided the foundation for their "prospect theory," as used in "behavioral economics" today. Prospect theory replaces the notion of "utility" with "value," which is defined in terms of gains and losses as deviations from a reference point. The value function for losses is convex and relatively steep, but for gains, it is concave and not quite so steep. In addition, Kahneman and Tversky replaced the probability factor for each preference with a subjective "decision weight" that tends to overweight small probabilities and underweight moderate and high probabilities.[5]

I hear those instructors employing traditional textbook economics saying: "students will not understand these calculations!" To those instructors, I ask: what do you think they are teaching in psychology?

4. ENOUGH! CONCLUDING OBSERVATIONS

I could go on with additional ways in which the contributions of the Nobel Laureates in economics can be used to bring more current thinking into the classroom. An instructor does not have to endorse dynamic analysis, complexity, prospect theory, the more general theories of bounded rationality, or dwell into the intricacies of probability theory in decision-making, but those teaching economics today can no longer ignore this work even if the textbooks do with their dated list of economic ideas and concepts.

Surfing the Web, students will find less than favorable critiques of such simplicity – for example, Yoram Bauman puts the boot into Mankiw's ten principles of economics at

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[5] For a review of alternative decision theories see Starmer (2000). "Can people learn to be as rational as economic theory supposes", *The Economist* (Aug 30 – Sept 5, 2003, p. 56), provides an excellent discussion of some of the research supporting behaviouralists' views versus the newer research (by John List, 2003) supporting neoclassical theory, that even introductory students can understand.

<http://www.improb.com/airchives/paperair/volume9/v9i2/mankiw.html>. They will find Avinash Dixit's proposal and demonstration of how game theory can be taught before or as an alternative to the traditional introductory economics course, at

<http://www.princeton.edu/~dixitak/home/AdelaideConf.doc>.

They will find entire journals devoted to showing the fragility of simplistic textbook economics – e.g., the online *Post-Autistic Economics Review* started by the French students' protest against neoclassical economics

<http://www.paecon.net>. A trip to the library will uncover Steve Keen's (2002) controversial book *Debunking Economics: The Naked Emperor of the Social Sciences*, which could have been more accurately titled *Debunking Textbook Economics*.

Keen also maintains an extensive Website at http://www.debunking-economics.com, as do other controversial liberal and conservative academic economists, such as Brad DeLong, at University of California Berkeley, http://www.j-bradford-delong.net/movable_type/ or Tyler Cowen and Alex Taborrok, at George Mason University, http://www.marginalrevolution.com. The Internet has become the easiest way for students to get up-to-date data, headlines, commentary and academics' views on the economy and current events. They are no longer constrained to what is in textbooks.

An economist might rightfully ask why academic economists are not already bringing this work into their classrooms if it is desired? In the case of probability and decision-making, Christopher Sims (2001, p. 53) states that few economists have been taught - and thus they have not given thought to - the differences and similarities among different definitions of probability, chance and risk and how people behave when confronted with ambiguity and uncertainty. In the case of teaching techniques, it may be that academic economists do not know what activities are available to teach these new ideas since they have never seen them in practice in the teaching of economics. As Gail Hoyt (2003) states, possibly academic economists have not embraced these new ideas and teaching methods because they are experience goods: anticipated high start-up costs keep risk-adverse economists from trying them.

Regardless of the reason for lack of innovation in teaching, ideas in the science of economics no matter how engrained in tradition must be questioned and tested. As a social science, economics is issue oriented and thus ridden with conflict. The dumbing down of economics to the dogmatic preaching of a few simple concepts, principles, and axioms of old misses the excitement of modern day economics. The power of economics

can be shown at the tertiary level by instructors updating their lists of concepts, abandoning their reliance on chalk and talk type teaching methods, and changing their examples to reflect current social and political issues.

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