

NBER WORKING PAPER SERIES

THE PAST AND FUTURE OF ECON 101:
THE JOHN R. COMMONS AWARD LECTURE

N. Gregory Mankiw

Working Paper 26702
<http://www.nber.org/papers/w26702>

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
January 2020

The views expressed herein are those of the author and do not necessarily reflect the views of the National Bureau of Economic Research.

NBER working papers are circulated for discussion and comment purposes. They have not been peer-reviewed or been subject to the review by the NBER Board of Directors that accompanies official NBER publications.

© 2020 by N. Gregory Mankiw. All rights reserved. Short sections of text, not to exceed two paragraphs, may be quoted without explicit permission provided that full credit, including © notice, is given to the source.

The Past and Future of Econ 101: The John R. Commons Award Lecture
N. Gregory Mankiw
NBER Working Paper No. 26702
January 2020
JEL No. A2

ABSTRACT

The introductory economics course, often called Econ 101, is where most economists get their start and where many students receive their only exposure to the field. This essay discusses the course's evolution. It first looks back at how economics was taught at Harvard in the 19th century, based on a textbook by Professor Francis Bowen. It then looks ahead at how the introductory course may change as pedagogical tools improve, as society confronts new challenges, and as the field accumulates new knowledge.

N. Gregory Mankiw
Department of Economics
Littauer 223
Harvard University
Cambridge, MA 02138
and NBER
ngmankiw@fas.harvard.edu

The introductory course in economics, often called Econ 101, has played a large role in my life. When I arrived as a freshman at Princeton in 1976, I had little idea what economics was and had no intention of majoring in it or making a career of it. But during that year, I took an introductory micro course from Harvey Rosen and an introductory macro course from Burt Malkiel, both superb teachers. By the end of my first year of college, my career aspirations had changed profoundly. My focus shifted from the mathematical and natural sciences to the social sciences.

When I joined the Harvard faculty in 1985, one of my first teaching assignments was a section of the introductory economics course, called Ec 10 at Harvard. It is a yearlong course, devoted to micro in the fall and macro in the spring. Marty Feldstein was the course head. Ec 10 was, and often still is, the largest course on campus. At the time, much of the material was taught in small sections of about 20 to 25 students. I ran one of those sections.

A few years later, I entered the textbook business, publishing my intermediate macro book in 1992 and my principles text in 1997. When my principles book came out, Marty was one of the first adopters. It is no coincidence that my book fit well with Ec 10. Given that I had taught a section of Ec 10 under Marty's leadership, my book in many ways reflected his vision of economics.

In 2005, Marty was ready to pass the baton of Ec 10 course head. As the author of the course's textbook, I was his natural successor. When the department chair asked me to take on the assignment, I happily accepted. I ran Ec 10 for the next 14 years, overseeing an ever-changing army of section leaders and introducing economics to about 10,000 students.

I begin with this personal history to explain my fascination with the topic I address in this essay: the introductory economics course. The introductory course is critical to a student's development. For people like me, it is their first glimpse of the field and can spark a lifetime of study. For many more people, it is their only exposure to the field. The course shapes their worldview, both as participants in the economy and as citizens in society.

As an instructor and textbook author, I am naturally interested in how the introductory course should evolve going forward. But as we look toward the future, we should be mindful of the past. So before speculating about the future of introductory economics, let me begin with some history of economic pedagogy.

Econ 101 Circa 1856

During my three decades on the Harvard faculty, economics has typically been the most popular undergraduate major. But of course, given the youth of economics as a field and the age of the university, economics did not always play such a central role on campus.

Harvard was founded in 1636, about a century before Adam Smith was born. The American Economic Association (AEA) was founded in 1885. A year later, the first scholarly journal in economics written in English published its first issue. That journal was Harvard's *Quarterly Journal of Economics* (QJE).

The first course in economics offered to Harvard students, however, predates the founding of the AEA and the publication of the QJE. As early as 1825, Harvard seniors had the

opportunity to take a course in what was then called Political Economy. During the middle decades of the 19th century, the course was taught most often by a professor named Francis Bowen.

Bowen was not a member of the economics department, for there was no economics department at the time. Instead, he was in the philosophy department. He held the title of Alford Professor of Natural Religion, Moral Philosophy, and Civil Polity.

It would be wonderful if we had a time machine that could take us back to the 1850s and let us see what introductory economics looked like under Bowen's instruction. Fortunately, we do have one: a book.

In 1856, Bowen published a textbook, called *The Principles of Political Economy, Applied to the Condition, the Resources, and the Institutions of the American People*. I spent much of last summer reading it. My goal was to get a sense of the origins of economics pedagogy at one of the nation's oldest universities.

The first thing that one notices when reading this book is how different it is in style from modern textbooks. There is almost no use of even the simplest mathematics. The 546-page book includes only one diagram (on pages 254 and 256), and an economist today would not recognize it. (In case you are curious, it is used to explain Ricardo's theory of rents. Specifically, Bowen explains how, as the population increases and less fertile land starts being used for agriculture, the more fertile land, which is already in use, enjoys increasing rents. The idea is correct, but Bowen's diagram does not really help the reader understand it.)

There is also only one equation in Bowen's book (on page 308). The equation looks slightly unfamiliar at first, but it becomes clear in context that it is a version of the quantity theory of money, an idea highlighted in most modern textbooks on macroeconomics.

An introductory economics student today might hear about the almost complete lack of mathematics in Bowen's text and be tempted to conclude that learning economics must have been much less demanding back then. But nothing could be further from the truth.

Bowen's book is not an easy read. Partly, that statement reflects my subjective judgment as a reader. But there is also a more objective way to reach the same conclusion.

A common measure of reading difficulty is the Flesch-Kincaid Grade Level, which Microsoft Word can compute. It is based on the lengths of words and sentences used. To help you get a sense of the scale, let me point out that academic papers are typically written at about the 12th-grade level, which only about 1 in 8 U.S. adults is prepared to handle. Malcolm Gladwell writes at the 9th-grade level, F. Scott Fitzgerald at the 8th-grade level, Stephen King at the 6th-grade level, and Ernest Hemingway at the 4th-grade level. When I put the first few paragraphs of my own introductory textbook into the calculator, they scored a grade level of 8.9.

By contrast, when I put the first few paragraphs of Bowen's book into the calculator, I found that they achieved a grade level of 14.6. Bowen's text reached this high grade level not because Bowen uses big words—word length is about the same in Bowen's book and mine—but because he writes in very long sentences. Whereas the average sentence in my text is 15.4 words, the average sentence in Bowen's text is 42.3 words, almost three times as long.

Let me quote one sentence from Bowen's book to give you a sense of his writing style.

On page 3, he offers a foundation for the study to come, writing:

Political Economy begins with the supposition, that man is disposed to accumulate wealth beyond what is necessary for the immediate gratification of his wants, and that this disposition, in the great majority of cases, is in fact unbounded; that man's inclination to labor is mainly controlled by this desire; that he is constantly competing with his fellows in this attempt to gain wealth; and that he is sagacious enough to see what branches of industry are most profitable, and eager enough to engage in them, so that competition regularly tends to bring wages, profits, and prices to a level.

This 99-word sentence is a mouthful. You would never read anything like it in a modern textbook. The broad ideas here—scarcity, capital accumulation, self-interest, optimization, entry, and competition—are all familiar. Yet the sentence is hard to unpack precisely because it introduces so many fundamental ideas at once.

Indeed, throughout Bowen's text, there are numerous ideas familiar to modern economists, even if the ways in which they are presented are not so. For example, Bowen asks,

What is it that constitutes value in exchange, and why do various articles possess it in such unequal proportions? The answer is, that exchangeable value consists of two elements,—*utility*, and *difficulty of attainment*. The article valued must in some measure be useful... Yet if there be no difficulty in the way of its attainment, if, like the air, the water, and the sunlight, the supply of it be inexhaustible and open to all the world, then it has no exchangeable value (p. 32, emphasis in original).

A modern student would recognize this logic. Prices result from an equilibrium based on consumers' willingness to pay and producers' costs. Bowen doesn't convey this reasoning using supply and demand curves, which today are the bread and butter of most introductory economics courses, but the concepts underlying those curves are certainly present.

Bowen's understanding of long-run economic growth similarly anticipates many modern themes. For example, some recent theories of endogenous growth, promoted most famously by Paul Romer, emphasize that technological knowledge is a public good. Bowen quotes the Scottish economist John Ramsay McCulloch as follows:

“The moment that the invention of logarithms, the mode of spinning by rollers, and the discovery of cow-pox had been published, they were rendered imperishable, and every one was in a condition to profit by them. It was no longer necessary to resort to their authors. The results of their researches had become public property, had conferred new powers on every individual, and might be applied by anyone” (p. 37).

This statement describes well the role of knowledge as a public good.

Some modern economists who study economic growth, most notably Daron Acemoglu, stress the role of institutions in explaining varying levels of economic development around the world. This lesson was not lost on Bowen, who even included the word “institutions” in his book's title. He writes, “I am no great believer in the natural excellences of Anglo-Saxon blood, but I have great faith in the acquired excellences of Anglo-Saxon institutions.” He explains that these institutions foster “a disposition to toil, to dare, and to save” (p. 77). Bowen cites Mexico

and most of South America as places where poor governmental institutions impede economic development, saying these nations are “wasted by anarchy and misrule” (p. 79).

Another modern issue that features prominently in Bowen’s text is concern about economic inequality. His title page includes an epigram from the Victorian politician and writer Samuel Laing: “It is not that a Duke has 50,000£ a year, but that a thousand fathers of families have 50£ a year, that is true national wealth and well-being.” Toward this end of widespread prosperity, Bowen regularly emphasizes the role of human capital. Though he does not use that term, he recognizes “education, study, or apprenticeship” as a type of capital akin to a machine (p. 72). He says the main cause of poverty is an overabundance of unskilled workers, which he calls “rude labor” (p. 84).

At the same time, Bowen says that we must accept some degree of inequality as an inevitable fact of economic life, lest we thwart the forces that lead to national prosperity:

As men are differently endowed by nature with faculties of mind and body, with indolence or energy, with improvidence or thrift, so their situations in life must differ. And it is the true policy of society to encourage the more valuable qualities;—not to dishearten frugality by depriving it of its savings, nor to foster idleness by feeding it with the fruits obtained by the persevering toil of others (p. 127).

From this passage, it is a good guess that Bowen would be surprised by the degree of redistribution we observe in economies today.

Of course, many topics are omitted from Bowen’s treatment simply because some knowledge had not yet developed. The word “marginal” is nowhere to be found. (By contrast,

the word appears 27 times in the first chapter of my principles text.) Also absent from Bowen's text is any semblance of the idea, most often attributed to John Maynard Keynes, that aggregate demand is a key driver of the business cycle. The reader also gets little sense of the importance of strategic interactions, as emphasized today by game theorists, or of how asymmetric information can create problems for market economies. Without doubt, we economists have made progress since 1856.

Perhaps the issue that Bowen discusses in a way that would seem least compelling to modern economists is international trade. He is skeptical that free trade is the right policy for the United States, instead advocating tariffs to promote industrialization. Free trade may have been fine for developed nations such as the United Kingdom, but nascent American industries needed protection, at least temporarily, to reach their potential (p. 209). He feared that, but for protectionism, the United States would depend excessively on agriculture. Bowen was similarly worried that the American government was selling land to settlers at too low a price, promoting Western expansion at the expense of urbanization (p. 100).

My colleague Ben Friedman has recently completed a new book on some aspects of the history of economic thought, called *Religion and the Rise of Capitalism*. According to Ben, international trade was one of the main issues that motivated Bowen to write his book. At the time, a leading economics textbook in the United States was *The Elements of Political Economy* by Francis Wayland, a professor and eventual president of Brown University. It was first published in 1837, about two decades before Bowen's book. Compared with Bowen, Wayland followed much more in the footsteps of Adam Smith, lauding the benefits of unfettered trade.

Bowen aimed to provide an alternative view more supportive of the interests of New England industrialists who preferred not to compete with cheap imports.

Let me finish my discussion of Bowen with what I found to be the most surprising aspect of his book: the absence of any serious discussion of slavery in the United States. Bowen was writing just a few years before the Civil War, so the issue must have been on his mind. But his book contains only passing references to it. Those references, however, give some sense of Bowen's views. On the one hand, by modern standards, Bowen was probably a racist. At one point, for example, he refers to "barbarous races" (p. 141), and he unabashedly notes that African slaves are widely considered "vile" (p. 117). On the other hand, Bowen saw slavery and caste systems more generally as impeding economic development because they prevented labor from moving to where it was most valuable. In a discussion of ancient Greece and Rome, he writes, "Both these nations might have made far greater progress in opulence, if the institution of slavery, itself a caste, had not existed among them" (p. 116). Perhaps Bowen avoided the topic of American slavery precisely because it was so politically fraught at the time.

Back to the Future

That concludes my time travel back to the Econ 101 of 1856. I now want to take you on a trip in the opposite direction and consider what introductory economics will be like in the future. Here I must admit that my time machine is less reliable. Amazon was happy to sell me a copy of Bowen's book, but it still does not stock textbooks from the future (though I would not put it past

Jeff Bezos to do so at some point). Armed with a knowledge of history and a good imagination, however, I can offer some conjectures about how Econ 101 will evolve in the decades to come.

Let me start with form rather than content. When we compare Bowen's text with modern textbooks, we see that the style of writing has become simpler and more accessible over time. That trend toward readability will likely continue. Future generations of students will have grown up in a world of iPhone texts, tweets, and emojis. They will never put up with books whose average sentence is 42 words long. Textbook writers will need to keep their prose succinct. They will have to write less like Francis Bowen and more like Ernest Hemingway.

The other major change in the form of presentation we have seen since Bowen's day is the increased use of mathematical explanations. The modern Econ 101 classroom is filled with graphs and equations. The math is not hard. Most students learn all the math they need for introductory economics early in high school. The incorporation of mathematics is not to make economics more intimidating, as some students may suspect, but rather to make it easier. Over the years, we economics instructors have learned how to communicate economic ideas more simply and precisely using basic mathematics. The most famous example is the model of supply and demand, which explains the theory of competitive markets more clearly than any purely verbal explanation ever could.

This trend toward greater use of mathematics may well continue. How it evolves will depend on the kind of mathematical preparation students have entering college. My guess and my hope are that, as the impact of cheap computing and big data grows, basic statistical methods will be introduced earlier and more fully to high-school students. If so, the Econ 101 class can take greater advantage of statistical tools.

For example, in U.S. decadal data since 1870, the correlation between inflation and the rate of money growth is 0.79. I point out this fact when I teach intermediate macroeconomics as evidence consistent with the quantity theory of money. I feel comfortable doing so because most students in intermediate-level courses are economics majors and have taken a basic course in statistics. This statement about correlation, however, would make less sense in an introductory classroom where many students do not know what a correlation is. That could well change as high-school curricula evolve.

The most salient change in form over the coming decades may be the substitution of pixels for paper. In recent years, digital textbooks have become increasingly popular, but they have mainly existed alongside traditional paper books. Most likely, it is only a matter of time before paper textbooks completely disappear.

Digital books offer several advantages. One is that they come at better prices. While introductory textbooks typically list for about \$250 in hardback, they can be accessed in digital format for about half that price. A student gets an online subscription for the duration of the course. The book is always available if the student has some electronic device and an internet connection, which is usually the case now and will become ever more common as time passes. And the digital book is arguably more convenient because the student does not have to lug a heavy book around campus.

Digital textbooks also include online homework systems. An instructor can assign problem sets, which students answer online. The problem sets are automatically graded, with the scores recorded. The system provides feedback to the students faster than a traditional human

teaching assistant can. And an instructor in a large course can assign regular homework without the college having to incur the cost of hiring many teaching assistants to grade the work.

Digital books offer instructors greater flexibility. Instructors can easily pick and choose what material to make available to their students. Aware of this possibility, textbook authors can provide a library of optional material. It takes only a few clicks of the instructor's mouse to add the additional material to the students' digital books. In addition, instructors can easily add material of their own creation or from other sources.

Most important, digital books offer a greater range of pedagogical possibilities than traditional books. For example, graphs can be animated. Students can see them built up, step by step, much as an instructor would do in a classroom. In addition, videos can be embedded to introduce topics, explain difficult concepts, or show problems worked out. For students who are more auditory learners (such as the 20 percent of the population with a language-based learning disability like dyslexia), these videos provide a quicker route to understanding. And with text-to-speech capabilities, the computer can read the book out loud, which may also be useful for these students.

As an aside, let me note that some years ago, I wrote and filmed a series of 36 short videos for my principles text, one for each chapter. The videos are brief introductions to the chapters, offering another way to motivate students. When producing these videos, the publisher insisted that I appear in them, and I reluctantly agreed. But I thought it would be better if I wrote the scripts and the publisher hired an actor to perform them. After all, screenwriters usually don't act in the movies they write. This division of labor is just an application of the principle of comparative advantage. We need economics professors to write the screenplays for our digital

textbooks, but I predict that students in the future will have the benefit of watching more photogenic performers.

We are only at the beginning of the digital textbook revolution, and we are still learning what works best in this new environment. It seems like an area of research where randomized controlled trials could produce some fascinating results. Moreover, advances in technology will likely enable more pedagogical innovations. At some point, we may have digital textbooks that include perfectly honed lectures on every conceivable topic prepared by top economists and writers and performed exquisitely by three-dimensional holograms of Emma Stone and Idris Elba. Artificial intelligence might even give virtual Emma and Idris the ability to answer student questions.

Some instructors may hear this prediction and worry that the role of live human teachers will diminish over time, putting their livelihood at risk. I don't think that will occur. I expect it will be a long time before a machine can replace the human interpersonal connection inherent in the best student-teacher relationships.

But those of us who teach introductory economics might have to rethink our roles. Rather than being conveyors of information, we may be more like coaches, guiding students along the optimal path of learning. Instead of giving traditional chalk-and-talk lectures, we may increasingly flip the classroom. Students will learn the core material from Emma and Idris at home and come to class to work through problems with classmates under an instructor's oversight.

Instructors may also spend more time facilitating classroom discussion and debate. In recent years, I have taught a freshman seminar of 12 students. For each weekly class, the students read a book, such as Robert Heilbroner's *The Worldly Philosophers*, Milton Friedman's *Capitalism and Freedom*, and Mihir Desai's *The Wisdom of Finance*. The students then get together to discuss the work with their peers. The seminar is, essentially, a book club. My role is to pose some questions for discussion and to act as a traffic cop to ensure everyone gets a chance to participate.

For me, it is a great experience. I love hearing what the students have to say. At the end of the semester, students remark about how much they have learned in the seminar. But they have learned almost nothing from me. Rather, the lively interactions with their peers reinforce what they are learning from the readings they do before class. If the digital textbooks of the future make the core knowledge of economics more readily accessible, this kind of discussion-based class could replace the chalk-and-talk lecture as the norm.

Let me now move from form to content. How do I expect the ideas that we teach in introductory economics to evolve over time?

My first answer is, not as much as you might think. I say that because, having recently read Bowen's text, I recognize how timeless many of the key lessons of economics are. Bowen did not have supply and demand curves, but he understood that the forces of supply and demand determine market prices and the allocation of resources. Bowen did not have access to the recent literature on economic growth, but he appreciated the nonrivalry of knowledge and the importance of institutions and human capital. Bowen did not have a modern model of the macroeconomy, but he knew that inflation is a monetary phenomenon. These and many other

ideas that are in both Bowen's book and modern textbooks will continue to find their place in introductory classes even a century from now.

Yet the content of our courses will change over time. One reason is that as history unfolds, society faces new challenges, and introductory courses should reflect them. Bowen was concerned with the pricing of government land and the pace of Western expansion. That made sense when he was writing. In our time, the financial crisis of 2008 has changed how many of us teach. In my introductory class, I increased discussion of bank capital and leverage. I previously thought these topics were best left for more advanced courses in financial institutions and money and banking, but the events of 2008 upended that judgment.

Looking ahead, other issues loom large. For example, healthcare spending is increasing as a share of the economy, rising from 5 percent of GDP in 1960 to 18 percent today. If that trend continues, health economics will need to play an increasing role in the introductory economics classroom. The topic of health economics is, not surprisingly, absent from Bowen's book and even today often omitted from introductory economics courses.

The other reason that introductory courses will change is that the field of economics evolves. That is, our courses should reflect the current state of the economics profession. For example, economic research is far more empirical today than it was in the past. Our introductory courses reflect that change by discussing the results of empirical studies as they become relevant for the topic at hand. Recently, I have begun to think that we should also start introducing our students to some of the empirical methods used in those studies. Nothing like that appears in Bowen's book or in most introductory courses today.

Economics will also evolve as economists explore synergies with other disciplines. One of the most important developments during my professional life has been the growth of behavioral economics, as economists have come to recognize what we can learn from psychologists. Today, many introductory courses include some of the lessons from this subfield. In the future, I expect we economists will start learning more from biologists. There are already nascent areas of literature trying to better understand economic decision-making with insights from brain science and genomics. So far, advances in knowledge have been scant. But that could change, and if it does, eventually these advances will find their way into Econ 101.

As we contemplate what we might add to introductory courses of the future, we should remember that the capacity of our students to absorb information does not expand just because economic knowledge does. Increasing coverage of some topics must come at the cost of reducing coverage of others. If we decide to add more material on health economics, empirical methods, or bio-economics, perhaps we will need to leave budget constraints, indifference curves, and income and substitution effects to more advanced courses.

These decisions are hard. But they are also inevitable. “People face tradeoffs” is the first principle of economics. As Econ 101 adapts to changing times, we should remember that this principle applies to our role as instructors as well.

Economics as a Worldly Philosophy

In closing, I would like to return to a fact I mentioned earlier: When Francis Bowen taught economics, he was not in an economics department. He was in a philosophy department.

We should remember our roots. Economics did not emerge as an outgrowth of applied mathematics (though today we apply a lot of mathematics, often to good use). Nor did it arise as a subfield of statistics (though applying statistical methods has made the discipline richer and more credible). Instead, economics evolved from a type of applied philosophy, promulgated by people such as Francis Bowen and, most famously, Adam Smith.

For good reason, Robert Heilbroner called economists “the worldly philosophers.” When we step into the Econ 101 classroom, we should embrace that image. Our focus should be on the big questions that motivated the field at its founding and that still attract students today. When students leave our classes, they should read the news, follow political debate, and evaluate alternative perspectives with greater understanding and more finely tuned critical skills. They should take with them not a set of conclusions or even a set of techniques but rather the beginnings of a worldview, a way to make sense of what occurs around them.

A worldview is what Francis Bowen offered his students of introductory economics in the 1850s. It is what I try to offer my students today. And I am confident that it is what the best instructors of Econ 101 will offer their students a century from now.