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TEACHING MACROECONOMIC PRINCIPLES

Telling Better Stories in Introductory Macro

By David Colander*

Teaching first-year economics involves telling stories. These stories are simplifications of far richer stories that we economists tell, test, and study. In first-year macro the stories we tell include multiplier stories, natural-rate stories, and growth stories. We embody those stories in simple models, such as the AE/AP model, the AS/AD model, and a production-function-based growth model. These models structure our story and give professors something solid to hang exam questions on. Using the growth story we teach as a case in point, this paper argues that structuring introductory macro stories around formal models makes the stories we tell unnecessarily boring to students.

I. Why Does Economics Seem Boring When It Is Not?

It is sometimes said that an economist is an accountant without a sense of humor. When introductory students hear that description, you can see them nodding in agreement; the reality is that most introductory students consider economics and the economists who teach it boring. We economists know that they are wrong; we are dynamic, exciting individuals, and the stories we have to tell are fascinating, rich with all the ingredients of a great story: exciting story lines, plot, passion, and intrigue.

When I listen to top economists discuss their research, I am infused with their passion and excitement. Unfortunately, something happens in the translation of these high-level stories down to the first-year student: the exciting becomes the boring. An important reason why is the way in which we combine the telling of the story with the teaching of simple models.

II. The Problem with Combining Introductory Stories with Formal Models

The problem with tying our stories to formal models is that a large portion of our audience does not know the language of models, mathematics. Textbook authors and intro professors know that, and to make the models somewhat understandable to these students we water down the research models into “teaching models.” Thus the stories we tell go through a multiple translation process: from a researcher’s general understanding (i) to a research model, (ii) to an easier intermediate pedagogical model, (iii) to an even easier Principles model, and finally (iv) to a student’s general understanding. At each stage of this multiple translation process some of the excitement of the economic story is lost. Our stories would be far less boring if we eliminated the multiple-translation process and went directly from a researcher’s general understanding to a student’s general understanding.

It is only for the Principles level that I am making this suggestion. I am fully aware that, while we lose something whenever we translate ideas into models, we also gain something. In research we are willing to accept the loss because of the precision and possibility of empirical testing that a formal model allows. Similarly, intermediate modeling can possibly be justified because the modeling provides students who intend to go on in economics with a needed introduction into how economists go about economic analysis.¹

¹ Discussants: Arthur Benavie, University of North Carolina; Karl Case, Wellesley College; David Romer, University of California–Berkeley; Michael K. Salemi, University of North Carolina.

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¹ I qualify this because in liberal-arts programs without business schools, most majors are not planning to go into economics; they are planning to go into business.
It is at the Principles level that the costs of the multiple translation far exceed the benefits. Ninety-nine percent of Principles students are not going on to become economists. But even at this level we require stories to follow from formal models. In making the formal models accessible to a broad range of students we have so simplified the models that they are vague shadows of the research models economists use to consider the questions. Allowable introductory models can involve nothing beyond 10th-grade algebra, geometry, and logic. This causes three problems.

First, to mathematically sophisticated students, the introductory models look naive and simplistic; these students are discouraged from going into economics because it is too simple. Second, by tying the models to stories, we limit the stories we tell. Dynamics, stochastic processes, path dependencies, and nonlinear processes (areas where much of the excitement in economics research is) are all ruled out or tend to be ignored or downplayed. Third, we generally do not succeed in teaching students the value of formal modeling, or even in teaching them remedial algebra and geometry. The problems are too deep-seated; the mathematical deficiencies built in through years of schooling are not going to be corrected in one course where the primary goal is to teach about the economy. The reality is that these students end up spending most of their time struggling with the math of the models rather than with ideas of the story.

To say that we should not teach introductory students elementary formal models is far too radical a suggestion to have any hope of being seriously considered. Thus, in this paper, I am proposing a less radical solution: that we separate the two. If we want to teach models, we do so as a type of calisthenics of the mind. We should not pursue our current practice of tying our central story line to that formal model.

Separating the teaching of models from the teaching of the ideas frees us to teach the story of economics within an historical, case-study, structure. This alternative structure will let us better relate to students the exciting conundrums with which the top researchers are struggling. It allows us to demonstrate the challenges economists have faced as they have struggled with the problems, and to present the many ideas they have developed to deal with those challenges. Separating the stories we tell from the models we teach will be enormously enabling. It allows us to tell about informal ideas that cannot be modeled formally but that excite the imagination. I will demonstrate the argument in terms of the introductory presentation of growth.

III. The Current Intro Growth Story

Currently we tell the growth story centered around the Solow growth model. In introductory macro we do not teach the Solow growth model explicitly; that would be much too hard for Principles students and, to be honest, is pushing the limits of most intermediate students. But the Solow growth model determines the structure of the way we present growth in introductory courses. It focuses the presentation on the production function, on the role of savings and investment, and on diminishing marginal returns. Technological change enters into the story as a supporting idea, which can temporarily overcome the unrelenting pressure of diminishing marginal returns.

If one were interested in telling an exciting story and, in my view, a more insightful story of growth, the order would be reversed. The dynamic aspects of growth involve technology, and thus technology is the natural center of the introductory growth story. Similarly, increasing returns, and the many other elements of the economy that can lower costs over time (e.g., path dependencies, dynamic feedbacks, and network externalities) replace diminishing marginal returns as the central guiding elements of the story. Investment and saving become supporting ideas. The story line focuses on the tendency of a market economy toward explosive growth, which somehow is held in check by political, physical, and social constraints. We do not tell that story to introductory students because the formal models that incorporate such stories are too complicated.

IV. An Historical Introduction to Growth

I propose that we replace the current model-centered story with an historical-centered story

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2 In justifying such “calisthenics models” to students I compare their minds to my body, which is not a hardbody, and suggest that just as physical calisthenics would be useful for my body, mental calisthenics would be useful for their minds.
that introduces students to growth through a consideration of the broad historical developments and facts about growth. A natural introduction to the historical approach to growth is the work of Douglass North and Robert Paul Thomas (1973), Nathan Rosenberg and L. E. Birdzell, Jr. (1986), or Angus Maddison (1995). That work shows how growth rates are correlated with the development of markets, and that those growth rates have accelerated over time. The relationship can easily be summarized in a graph relating growth rates and time (see Maddison, 1999).

That graph shows a dramatic relationship:

(i) Before markets were the main organizing structure of society, growth was minimal.
(ii) Growth rates have increased over time, with a sudden jump about 1820.

The historical approach centers the growth story around the explanations of these two empirical phenomena. It presents students with the question: why have markets and growth proceeded together? In answering this question students are directed toward stories involving the division of labor, increasing returns flowing from that division of labor, technological development, and the “extent of the market.” Markets allow specialization; specialization allows people to focus on what they have a comparative advantage in, and to develop comparative advantages through learning by doing.

V. The Role of Case Studies in the Historical Approach

Case studies in the historical approach have a different purpose than case studies in a modeling approach. In a modeling approach, case studies are examples of principles that students learned in models. In the historical approach, case studies are the raw materials from which students derive the principles. In the historical approach students build up from examples to principles, rather than build down from principles developed in models to cases. Possible cases include the development of the Swiss watch industry, the Industrial Revolution in Britain, and the recent developments in computer technology in Silicon Valley.

One can extrapolate from these cases to central issues in growth such as network externalities, technological change, and decreasing costs. One can show examples of where one technology overtakes another and emphasize the point that growth often involves new goods replacing old goods, not producing more of the same good. All these issues are hard to fit into the current production-function framework.

Building up (with guidance) from case studies is an exciting way to teach, which allows students to develop their own principles and insights. Because they have developed the principles themselves, those principles will fit into their mind-set, which is the world they are currently experiencing, better than principles developed from abstract models that have no meaning for them.

One does not have to generalize from this case study to a theory; in fact, Rosenberg (1994), whose work serves as a model of the historical approach to growth, argues specifically against doing so, since each case is particular. However, a case study can be suggestive of certain principles. At our current level of understanding of the growth process, anything other than suggestive propositions would be too much.

VI. Some Differences in Emphasis

The historical approach leads to some different emphases than does the current model-based approach. One difference in emphasis is that saving and investment play supporting roles, not the central role given to them by the Solow growth model. In the historical approach, the growth process is a cumulative process: growth creates wealth, which creates the saving and investment that will fuel the growth. An economy can end up in either a vicious circle or a virtuous circle. There is no foregone conclusion that growth will return to any predetermined growth rate.

A second difference in emphasis is that the discussion of the roles of increasing and decreasing returns are reversed: the main thrust of the historical story is increasing returns, and the self-propelling nature of growth. Diminishing returns is de-emphasized. Increasing returns, and other factors that lead to
lower costs through time, dominate the dis-
cussion because historically they have done so. In the Solow growth-model approach one
has to develop the concept of diminishing
returns, and then explain why, empirically,
diminishing returns have not led to decreased
growth rates. We thereby force students to
learn technical ideas and then modify them.
As they do they get lost in the models. In the
historical approach, we can get right to the
elements that have won out in the past.

A third difference in emphasis concerns effi-
ciency. The historical approach to growth gives
far less emphasis to the static concept of effi-
ciency and focuses instead on dynamic effi-
ciency—the role of markets in bringing about
innovation and technological change.

A fourth change in emphasis concerns the
long-run/short-run division. The model-
driven approach emphasizes the separation of
the long run and short run. In high-level re-
search, we know that separation is prob-
lematic; the two must be tied together, and many
of the interesting developments in macro-
economics involve building in the assumption
that expectations of what happens in the long
run will influence what happens in the short
run. In the historical approach, the short run
can influence the long run: an increase in
demand could stimulate the economy and in-
duce innovation that could lead to a continual
change in the growth rate. In the Solow
growth model, that could not occur.

VII. Historical Precedent for
the Historical Approach

The historical approach to growth is not new.
It was the connection between markets and
growth that led Adam Smith to write his Wealth
of Nations (Smith, 1776). Smith emphasized the
division of labor and the general advantages of
markets. Markets, by allowing trade, create an
environment of growth. In Smith’s story the
division of labor is mixed with increasing re-
turns to scale, capital accumulation, and
learning-by-doing into a story in which markets
lead individuals to create the wealth of nations.
Smith’s story is one in which the extent of the
market, increasing returns, and dynamic feed-
backs play central roles.

VIII. A Simulation Approach to Growth

History and case studies get us only so far. I
fully agree that to show complex relationships
we need to get into formal models. While I do
not believe that we can tie the growth story line
onto formal models that the introductory stu-
dents develop from scratch, I do think that we
can usefully tie growth stories to "pre-digested"
models, which is essentially what computer
simulations are. While simulation involves a lot
of math, the math is hidden; all intro students
need do is use the computer, which is a skill that
students are more likely to have than the math
skill necessary to understand a standard model.
Jonathan Roughgarden’s (1996) text on ecology
provides an example of how the growth story
could be presented with simulation models.3
Simulations allow one to demonstrate open
rather than closed models, which lets one talk
about certain periods of explosive growth.

One simulation that I use in teaching intro-
ductive growth is the Game of Life, which,
starting from some simple rules, shows a dy-
namic process multiplying and developing. It
provides a foundation for stories with increas-
ing returns and complicated dynamic processes.

The story that these computer simulations
and, in research, agent-based models, empha-
size is a different story than what the Solow
growth model emphasizes. In the Solow model,
the economy always returns to the underlying
growth rate, as if that rate were somehow a
God-given constant. In these computer models,
fundamental indeterminacy is emphasized. The
implied story line is that markets lead to growth
because markets allow individuals the possibil-
ity to experiment. Experimentation and freedom
to try out new things are the driving force of
growth. We do not know what causes growth,
but what we do know is the institutional envi-
ronment that is conducive to growth.

IX. Conclusion

There are many ways to teach a subject, and it
is natural for economists to structure their teaching

3 Roughgarden’s presentation is at a higher level than I am suggesting here, but it has some excellent, creative
approaches of tying simulations to learning about growth.
around formal models. But at the introductory level, that approach makes economics boring to students because they do not know the language of models. By presenting economic ideas in a language with which students are more comfortable, we can make introductory economics more exciting for them, and more satisfying for us to teach.

REFERENCES


