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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]

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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.[2] 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.

[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.

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

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 discussion 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 efficiency. The historical approach to growth gives far less emphasis to the static concept of efficiency and focuses instead on dynamic efficiency—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 research, we know that separation is problematic; the two must be tied together, and many of the interesting developments in macroeconomics 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 induce 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 returns 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 feedbacks 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 students 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 introductory growth is the Game of Life, which, starting from some simple rules, shows a dynamic process multiplying and developing. It provides a foundation for stories with increasing returns and complicated dynamic processes.

The story that these computer simulations and, in research, agent-based models, emphasize 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 possibility 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 environment 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

Maddison, Angus. *Monitoring the world economy, 1820–1992.* Washington, DC: Organization for Economic Cooperation and Development, 1995.

_____. "Poor Until 1820." *Wall Street Journal*, 11 January 1999, p. R-54.

North, Douglass and Thomas, Robert Paul. *The rise of the Western World.* Cambridge: Cambridge University Press, 1973.

Rosenberg, Nathan. *Exploring the black box: Technology, economics, and history.* Cambridge: Cambridge University Press, 1994.

Rosenberg, Nathan and Birdzell, Luther E., Jr. *How the West grew rich: The economic transformation of the industrial world.* New York: Basic Books, 1986.

Roughgarden, Jonathan. *Primer of Ecological Theory.* Upper Saddle River, New Jersey: Prentice Hall, 1996.

Smith, Adam. *The wealth of nations.* London: W. Strahan and T. Cadell, 1776.