Go Back

Teaching Economics & Economic Policy

An Interactive Workshop

By

David Wheat

President, Wheat Resources Inc.

Adjunct Professor, Virginia Western Community College

P.O. Box 19234

Roanoke, Virginia 24109

http://www.wheatresources.com

888-667-8850 (toll-free)

540-966-5167 (fax)

dwheat@wheatresources.com

Teaching Economics & Economic Policy

An Interactive Workshop

David Wheat
President, Wheat Resources Inc
Adjunct Professor, Virginia Western Community College

ABSTRACT.[1]

Using system dynamics (SD) to teach economics permits explicit use of time in explanations of changing economic behavior and performance. It also emphasizes the essential stock/flow nature of the economic system, and enables supply/demand graphs to "come alive" and interact. The workshop will demonstrate the use of system dynamics in teaching economic concepts in K-12, plus SD applications that are helpful when exploring macroeconomic policy issues with advanced secondary students and college undergraduates. Time permitting, workshop participants will also examine a work-in-progress model that integrates an economy's markets for goods & services, labor, money, and foreign exchange. Participants in the workshop will receive handouts that can be adapted to their own use. The workshop will provide opportunities for interaction, and will not be a lecture. STELLA models will be demonstrated on an overhead screen. Participants will distinguish between economic stocks & flows and sketch causal loops and stock/flow diagrams.

Rationale. Traditional economic instruction at the secondary level and in undergraduate college courses relies heavily on graphs displaying supply and demand market relationships. While adding an illustrative visual component to mere verbal descriptions and explanations (the mode still typical in K-8), supply/demand graphs omit or obscure some key elements that are essential to understanding the performance of an economic system.

These omissions and misunderstandings include (1) a sense of *time* (without which, there is confusion about cause-and-effect sequences), (2) the *interaction* with other markets (e.g., interest rates in money markets), and (3) the origin of real world *events*

that trigger departures from some presumed equilibrium (e.g., "Suppose there's an increase in demand...")

Even though, in search of new equilibrium points, curves can shift up or down and arrows may trace movement along the curves, precious little insight is communicated to students concerning the real-world dynamics associated with the movements on the graphs *over and above the verbal descriptions* that accompany the diagrams. In other words, the value-added to verbal explanations by graphical illustrations is often small. In the worst-case scenario, naïve students observe the graphical manipulations and accept the outcome as "proof" of the verbal explanation.

In upper-level college courses or in graduate school, change and time issues are formally addressed with calculus. However, even many students who grasp the abstract math of dynamics will still wonder if price causes demand to change or whether it's the other way around.[2]

Moreover, both the graphical and the mathematical methods rely incessantly on *ceteris paribus* (i.e., "other things being equal"). Economic students are expected to appreciate the significance of verbal disclaimers (e.g., "interest rates remain constant") while interpreting the intersection of supply and demand curves.[3] Of course, in system dynamics, each causal link also makes a *ceteris paribus* assumption. However, in contrast with a supply/demand graph, the goal in constructing an extensive causal loop diagram is to include the relevant causal links, so that the "other things' deemed critical are permitted to change during the simulation, more or less as they would in the real world.[4]

Finally, the textbook over-reliance on out-of-the-blue exogenous forces to initiate change in economic variables begs some fundamental questions about the performance of an economy. What is meant by equilibrium? How can business cycles originate and/or persist in the absence of external shocks to the system? If governments respond to market conditions and markets anticipate governmental response, shouldn't policy variables be endogenous? When dealing with the issues raised by these questions,

system dynamics provides better tools than graphical analysis and calculus.

I should emphasize that, far from abandoning supply/demand graphs, the system dynamics approach makes those graphs more useful and meaningful. The data implicit in the graphs are used to generate simulated dynamic behavior, and graph-associated data in different parts of the system can actually interact. The supply/demand graphs "come alive" for students, and dynamic interaction between different markets permits real-time interpretation of the performance of an economic system. All of this is accomplished by drawing on the essential stock/flow nature of an economic system.

Workshop Format. Participants in the workshop will receive handouts that can be adapted to their own use. The workshop will provide opportunities for interaction; it will not be a lecture. STELLA models will be demonstrated on an overhead screen. Participants will distinguish stocks and flows in the economy, and sketch causal loops and stock/flow diagrams.

Sample Topics. For K-12 topics, I will select a few specific learning standards (such as the samples below) that have been mandated by the state of Virginia for all public school students, and demonstrate how SD can facilitate the learning process.[5]

Elementary School:

The student will explain the interdependence of producers and consumers in a market economy.

The student will compare different ways that money can increase in value through savings and investment.

The student will describe the relationship between taxation and government services.

The student will explain the role of money, banking, and credit in [an economy].

Middle School:

The student will explain the Great Depression and its effects, with emphasis on weaknesses in the economy and the collapse of the financial markets.

The student will explain the structure and operation of the U.S. economy, [including emphasis on] concepts such as supply & demand, markets, competition, financial institutions, consumption, saving, and investment.

High School:

The student will analyze the U.S. economy [including an analysis of]: the interaction of supply and demand in markets, and the relationships of households, firms, and government.

In addition to the K-12 topics listed above, the workshop will include a demonstration of the application of system dynamics to an understanding of government fiscal and monetary policies that would be appropriate for advanced secondary students and college undergraduates (e.g., the open market operations of the Federal Reserve System, aimed at adjusting the money supply and interest rates).

Finally, if workshop time permits, I will provide an overview of a work-in-progress model that integrates an economy's markets for goods & services, labor, money, and foreign exchange.

---

[1] Copies of handouts, slides, and supporting materials will be available to workshop participants. In addition, copies can be obtained by contacting the author by email (dwheat@wheatresources.com), toll-free telephone (888-667-8850), or fax (540-966-5167).

[2] Official economics resolves the issue by reminding students to be careful about their terminology—that "demand" is not the same as "quantity demanded." System dynamics prefers to take time into account.

[3] The ultimate obfuscation results from multi-staged graphs that purport to capture multiple background interactive effects in a simple display of two lines crossing on a graph (e.g., the infamous IS-LM curve).

[4] While regression-based econometric models aim to include interactive effects, the way such models deal with non-linear relationships and feedback is usually problematic, always obscure, and never helpful to anyone seeking to learn how the system works. That's in addition to the models being virtually powerless in the short run when decision makers in business and government are facing recession and need reliable forecasts.

[5] In 1994-95, the author was actively engaged in the development of the history and social science Standards of Learning for Virginia's public school students.