

About Closed Systems

This discussion will be brief. I hope to expand on it later.

My father was an aeronautical engineer. I had a good overview of things like English, French, History, Geography, Mathematics, in my English High School. My earlier advanced education (A-levels) was in Mathematics, Physics, Chemistry, and my undergraduate degree was in Classical Arabic Studies. I came to graduate-level Economics at the age of 23, having already formed a worldview in terms of those other studies.

One day, Dad asked me how “economic growth” could occur. I explained to him that, if we organize people in better ways, we can get more output. It looks like getting something for nothing. (Wouldn’t that be nice?) He responded that, in his world, systems are always closed. That is to say, if you put a barrier around a “system” (say, a fire burning), and you measure the energy in the system – what the fire loses and what the air gains, for example – you find that energy is conserved. I hope to think of other examples, to give a better picture, but that will do for right now.

Fast forward to ECON 603, Graduate Microeconomics. And doctoral work on the national economy of Algeria, with particular reference to internal (within-country) migration. I ran into, almost immediately, the difference between the migration result for the “open economy” (open to trade) versus the “closed economy” (not open to trade). I will not bore the reader with the technicalities. Economists are aware; general readers are unlikely to understand.

Suffice to say, my research supported the “closed economy” result. This was paradoxical, because Algeria was open to trade. I remembered what my father had said, and immediately realized that the issue is the “closed world economy” (more on that later). My professors didn’t seem to understand what I was getting at; reason being that, up to then, modeling the global economy was not much done. Most models were nation-state models, and these were usually open to trade. Somehow, I could not get it through to them that, even though my data were for Algeria alone, this was a global phenomenon.

Today, I think there is very little doubt that this is, indeed, a global phenomenon. The basic result is that, when productivity in farm commodities increases, their

prices decline. It's known as Engel's Law, and agricultural economists are well aware of it. Farm prices are volatile, year to year and month to month. The price series on Wheat in England (see Systemic Bias page on Anniespicsandpoems.com) was not available at that time. So, it was more of a theoretical position on my part than proven. Today I think it's proven. (And it can apply to the AI boom too.)

Intuitively, I think we can all see that trade with outer space is minimal, so that the earth's economic system is "closed." But figuring out HOW it is closed, relative to economic analysis, has proven quite challenging. Changes in prices confound all sorts of attempts to analyze economic growth and change. I decided to do what scientists do – a "thought experiment" rather than a real-world experiment – and held the money supply constant. And the rest is history, as they say! As soon as I got a sense of how this would work, it seemed to me that it had to be shared. So, that which is "closed" is the money supply. (Obviously, the money supply, or the money in circulation, DOES change in the real world, so there are challenges there.)

The way I got around that was to say, in any one moment, the money in circulation is constant. This is "real-world" now. Clearly, it's an ideal, or an approximation. But it raises a whole different set of questions from what mainstream analysis examines.

For example, IF in a moment in time, the monetary system is "closed" – money in circulation doesn't change – then any small movement of money in one direction will be done at the expense of another direction. What I have modeled is what happens when there is no compensation for this movement. In other words, the movement of money in one direction, at the expense of another, is ongoing. It's called "systemic bias," and most of us know it happens.

This little research journey is a good example of the interaction of theory and reality. Just as "equilibrium" is never reached in mainstream models that believe the economic balance is fair, so a totally constant money supply is never reached in the way that the real world operates. But if we understand the theoretical point, that there is a tendency for some to benefit at the expense of others without compensatory "trickle-down," then we can avoid the excesses of believing in mainstream theory for the short run, while not appreciating that it also leads to systemic bias over the long run.