

Accounting for humans

Eric Blair

18 May 2004

I've been using this accounting program, and have been having trouble wrapping my brain around its philosophical implications.

Your modern accounting programs are based on a system written down by Luca Pacioli in 1494. The underlying idea is that of a stock and flow model: you've got a few stocks of cash (your employer's bank account, your savings account, your PayPal a/c, your expenditures on chocolate) and cash flows from one stock to the other. The accounting books record the flow of cash from one stock to another by recording a negative entry in the book for the 'from' account and a positive entry in the 'to' account (and thus the name, double-entry bookkeeping).

Credit and debit

The names for the two entries always sounded backward to me. When you take money out of an account, that's a 'credit' and when you put it somewhere, that's a 'debit'. This makes sense at the ends of the system: when you take money out of your employer's account, that's definitely a credit to you, and when you buy chocolate, thus putting money into the chocolate account, that's definitely a debit from you. The weird part is that there's always an intermediate account in there somewhere, and that's where it seems confusing. You get a credit half-transaction from your employer, and then counter it with a debit half-transaction to your savings account. Debiting money into your a/c sounds painfully backward, unless you think about putting cash into the savings account exactly as you think about putting cash in the chocolate account, except that instead of comestibles, you're purchasing the right to future money. That is, the labels only make sense if you think of all accounts as being external and divorced from you. Money flows among accounts surrounding you, but never to you directly.

Converting things

My biologist pals point out that they do similar things with the ocean. A region can have a carbon budget, for example, wherein there's a water stock, an algae stock, a bacteria stock, a fish stock, and each of these stocks hold various levels of carbon, and when one blob eats another blob, then carbon gets transferred from

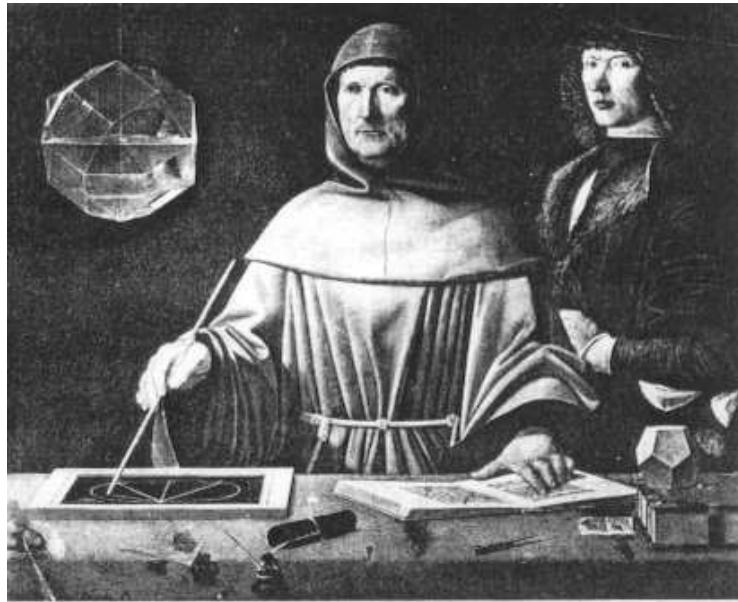


Figure 1: My name is Luca.

one stock to another. There's also a parallel nitrogen stock-and-flow model, and another oxygen model, et cetera. These elemental models are distinct, in that you don't have to worry about a bunch of oxygen suddenly turning to carbon.

Ms. JATMM of Mount Vernon, VA sent me some examples of things you can do once you've written down the budgets.

The stuff humans account for is a bit different, so if you wanted to have a cash stock-and-flow system, and a parallel system for cotton, corn, chocolate, cars, and tea, then you'll have to start converting things. When you buy chocolate, you do not alchemagically convert cash into chocolate: in the cash stock-and-flow model, you have a flow of cash from your account to 7-11's, and in the parallel chocolate accounting system chocolate flows from 7-11's account to yours (a very pleasant image, if you ask me). The price determines the relative velocity of the two parallel-but-opposing flows.

But since we're not dealing with elements, there are the actual conversions involved, which need equations in the way of $(1 \text{ unit tea leaves}) + (1 \text{ unit hot water}) + (1 \text{ unit sugar}) = (1 \text{ unit warm beverage})$. If you were organized enough, you could write down all the things we humans use, and then put together a big-ass conversion matrix representing every means of converting one thing to another. [This is a Markov-style transformation matrix, so if you start with a vector of commodities, you can repeat production until something breaks, or an equilibrium is achieved, or stuff like that.] Wassily Leontief did this for the entire U.S. economy, which won him a Nobel prize in economics (1973) for such

an astonishing feat of accounting.

The one thing missing from the model

People. You've got this whole set-up to put money into sinks such as 'cash in my wallet' or 'cash I've spent on chocolate', and could expand this to include non-money accounts like 'chocolate I have purchased'. But in disaggregating you the person into a million little accounts, it is impossible to include you the person in the model directly. The closest you get is to make a note somewhere that certain accounts are somehow tied to you the person.

Most notably, there is no place in the model for value or enjoyment or utility. The reason for this is that value is not conserved. For every dollar into one account, there's exactly one dollar out of another—but for value, exchanges happen all the time such that both people are better off. Through some sort of magic, value is created by exchange. The mind of double-entry bookkeeping has been blown, and there's nothing we can do about it.

Books have been written about this. Notably, there's Mirowski's More Heat than Light, a book that traces the history of economic theory back to Physics. 'Physics envy' is pretty palpable among neoclassicists, but Mirowski does a pleasant job of documenting its evolution, including the evolution of conservation laws in Physics. Conservation laws are the archetypal bookkeeping laws—e.g., for every action, there is an equal and opposite reaction. Mirowski then condemns all of economics to failure because it has no conservation law for value, and never will. The conclusion really doesn't follow, [and his critique of Varian is just mean,] but the trip is occasionally fun.

The resolution, which hadn't occurred to me until I wrote this, is to use the transformation matrix. After all, cars and cups of tea aren't conserved: some days there are just more of these things than other days. So you could put into the input-output matrix rules like: (1 100g chocolate bar) + (1 2-liter Slurpee) = (200 utils of fun for me). But since everybody's utility functions are different, you'd need another equation in the matrix to represent how Stevana or Joe turn Slurpees into value. You can see the model quickly becomes far too complex to write down, even for Mr. Leontief. Also, there are issues about how this value thing works: does it keep over time, and if not, where does it go? Can it be spontaneously generated? But Mr. Mirowski, once we've written down the rules of production for our imaginary commodity, the structure is consistent.

But even after we include billions of value-creating equations, people still don't appear in the model. The closest we come is to set up stocks for value, and attach one of these value stocks to each person. I think that's as close to a representation of humans as accounting will be able to do.