Measuring what we treasure

Professors urge to look *Beyond GDP* in an age of resource depletion

By Lynn Bolt Rosendale ‘85

Money isn’t everything. But when it comes to measuring the success of a nation, it is pretty much the only thing. GDP (Gross Domestic Product), the monetary value of a country’s economic output, reigns supreme in terms of economic indicators. A GDP that is growing can enhance a country’s reputation and therefore its strength and power.

This powerful indicator that now influences elections, policy decisions and manufacturing strategies did not exist a century ago. Nobel Prize-winning economist Simon Kuznets is credited with developing the concept of the GDP (originally formulated as GNP or Gross National Product) in the mid-20th century as policymakers struggled to understand and respond to the Great Depression.

At the time, it was understood that the national accounts were limited in their scope: they were designed to assess prosperity while realizing that other contributing aspects were not being fully valued. Kuznets understood this and in fact warned that “the valuable capacity of the human mind to simplify a complex situation … becomes dangerous when not controlled in terms of definitely stated criteria.”

But as policymakers grabbed hold of the numbers and began using them as the benchmark of success, the complexities were obscured.

Calvin professors Matt Heun (engineering) and Becky Haney (economics) have teamed with Clemson University professor Michael Carbajales–Dale (environmental engineering and earth sceinces) to unveil at least one part of that complexity: a part that they believe is critical for the future.

“Simply measuring GDP is not a good enough measure of what makes an economy go and what brings good quality of life to people,” said Heun.

The result, their recently released book, *Beyond GDP: National Accounting in the Age of Resource Depletion* (Springer, 2014),bolsters the conversation that is currently on the fringes of economic thought in the United States.

“Once you start taking stock of our natural resources and then try to put a value on them, it becomes very obvious that we are using up resources, that we have some clear constraints, and it becomes more obvious that the decisions that we make impact future generations. That becomes crystal clear,” said Haney.

The idea of valuing natural resources is not new. “One of the first calls for the integrated and comprehensive reporting of environmental-economic data, including natural and manufactured capital, came from the Brundtland Commission (1983–1987), which recognized the need to devise rigorous methods for integrating environmental assets into national balance sheets and income statements,” the authors write.

In response the UN developed the System for Environmental and Economic Accounting (SEEA), publishing a handbook in 1993. Many European Union member states adopted this method of integrating environmental accounts with their national accounting.

In 1994, the U.S. Bureau of Economic Analysis (BEA) also began developing a system that would integrate environmental costs into national accounting, but once initial reports were released, further study was forbidden by the U.S. Congress.

Haney believes there were two main reasons for the ban on future research. “Right now, the numbers that we have to look at are all profits; they’re all on the positive side and show gains. The costs are ambiguous. Once we put a cost on what’s hidden and have a more balanced picture, the negative aspect of the economy becomes very concrete,” she said.

“Second, because the BEA was using a set of valuation techniques that require judgment calls or ‘educated guesses,’ there is a range of values on our resources, not a pinpointed number. People aren’t used to seeing that. A barrel of oil traded for a price decided on by the market feels real, solid, a number I can trust. Valuing any non-market transaction, such as resources in the ground, is the first step towards valuing pollution, and that is the greatest fear.

“We need to start owning the cost we’re putting on the environment, and no politician wants that on their watch,” she said.

So what would a biophysical approach to economics or “green GDP” include? It would account for the depreciation of natural capital in appraising wealth. This is the value of natural resources, such as minerals, fossil fuels, forests and fresh water. But it would also include the degradation of ecosystems, which provide important goods and services to the economy and well-being.

For example, a tree might be valued at a certain dollar figure, but a whole forest provides much more in value than the cumulative total of the trees’ dollar value. Forests provide recreation, habitat and carbon sequestration.

“And the story needs to include the fact that natural resources are now constrained,” said Carbajales–Dale. “The way we currently look at economics was built for the 20th century, when we were still on the upside of resource extraction.

“That used to mean that things like capital and labor is where we needed to make our investment: the number of boats and fishermen is what would constraint your catch,” he continued. “Now it’s the number of fish that are available that affects your catch.”

What also would be negatively valued and accounted for is the amount of energy required to generate the product and the output in terms of pollution.

“When I think and write and speak about this, I think there are so many advantages to having good information and making policies and judgments based on that information, especially with politically charged topics like energy and climate changes,” said Heun.

“In my opinion, information contained in the ‘green GDP’ or other international efforts are a good starting place for getting information we need to make good decision about energy and the economy,” he added.

Haney, Heun and Carbajales–Dale attempt to make that point in their book, and then go on to suggest more technical formulas that could be used to better equip scientists and policy makers to make decisions.

In simpler terms, Heun uses the metaphor of a metabolism to better understand the economy: “Living organisms take inputs from the biosphere and expel waste. You need to consider all of the ways the economy is tied to the biosphere and how the economy is really a metabolism that uses energy to process natural resources to make products, some of which provide a better life for us all.”

The book then provides a technical framework by which to do accounting that is “new and necessary,” according to Carbajales–Dale.

“Our framework takes into account flows of materials,” he said. “For instance, iron ore comes out of the environment, so that includes the mining industry, but then it goes into steel production and finally to construction. The way materials are stockpiled in certain sectors of the economy changes the picture.

“What drives our interest in this is that transforming the energy sector to things like solar, wind and hydro takes a tremendous among of investment in terms of natural resources and energy. In order to provide solar energy, we first need to build factories to produce the solar panels and likewise for the other options. All of these investments come at a cost that needs to be accounted for. It’s a mammoth investment.

“But so is every coal-fired station and gas-powered station that we build every year,” he said. “We have to realize that each time we invest in that, materials are locked into that purpose rather than building out renewables.”

As a mechanical engineering professor, Heun believes that what he says in the book is critical for students to understand. “I teach courses that deal with the design for systems that consume fossil fuels: power plants, air conditioners, heat pumps, internal combustion systems. These are the topics in my classroom, and I think it’s ok to ask the questions, ‘Where does the energy come from to run your refrigerator and air conditioning? What is the generation rate of CO2?’” Even if the textbook doesn’t ask these questions, I feel compelled to.”

Even more urgent for Heun though, is to share his view as a Christian. “The list of things that Reformed Christians think are important includes the well-being of other humans made in God’s image and it includes the well-being of the natural world, that part of creation that we hold as general revelation,” he said. “The route to sustainable energy runs straight through the economy but so does human well-being.

“Because I am a Christian, because I value human well-being and because I see the natural world as revelation, these connections matter. The challenge for me in communicating this is that those connections are terribly difficult to unravel. The story of those connections is not simple to tell, but I feel absolutely compelled to pursue this because of those important things I hold true as a Reformed Christian.”

For Haney, too, she sees her calling “to be a voice of transformation to protect the ways in which humankind impacts creation. What’s so lovely about being involved in this book is that it has exposed me to the incredible wealth of concrete data that is compelling and undeniable.

“The big, giant takeaway for me is that we are making decisions today in how we invest in capital with the idea that investment of any kind is good for the economy, when the reality is that those decisions affect our energy demands and locks us into energy paths that will have to be invested in long into the future,” she said.

“This is so central to where we’re headed, and people just don’t know about these connections and that these issues are out there,” added Heun. “I’ve committed myself to telling the story, and this book is part of that.”

Another part is Heun’s continuation of educating students on this: “ My greatest hope is that by exposing hundreds of young, fantastically intelligent minds to these issues that they will someday be in a position where they make important decision that make the world into a better place.”

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*“If you do not think about the future, you cannot have one.”*

*~John Galsworthy, Nobel Prize winning author*