

On the ideal uses of physical vs. monetary valuations

Personal discussion thread from the expert group on sustainability brought together at the Library of Alexandria

First, relative to the seeming disagreement over the use of monetary measures of value, especially assets or wealth, as opposed to physical measures (e.g. Salah's "physical indicators of ecological losses") I would suggest that this seeming disagreement (along one dimension-say that of *information form*) can be resolved within the context of another, co-existent, dimension, namely that of *information use* and thus physical and monetary indicators play equally useful and complementary roles. More specifically,

When the information is being used to select some option (investment, production and/or consumption) and when the options are composed of multiple heterogeneous assets/flows there is no way to select one option over another while believing (much less being able to satisfy due diligence requirements) that the option selected is somehow better or is more likely to produce more desired results than the competing options without using some implicit or explicit method of translating the heterogeneous quantities (however imprecisely expressed, and whether performed in one step or many) into a common unit of comparison.

For example (and I apologize for stating perhaps the obvious) if one needs to select between two different production functions for investment (presumably based on some form of ROI comparison), one which dumps toxic air pollutants into the atmosphere while providing jobs for one demographic and the other which dumps toxic waste into a local stream while providing just as many jobs to another demographic, there is no way to perform the selection without creating some relative valuation scheme that allows for the two options to be compared within a single framework, no matter how imprecise. For example, quantities of air pollutants must be compared with quantities of water pollutants. Some relative valuation must be made. Some quantity of air pollutant must be selected as better or worse than some quantity of water pollutant. One could try to make only pair-wise comparisons but it would always be possible to generate a common unit of value from the pairwise comparisons.

So to the degree that some form of relative value determination needs to be made, there is no option but to use some kind of monetizing (or relative valuation) technique (whether performed by economists estimating TEV or perhaps by folks closer to sources and uses of the information, and whether done through direct pricing of physical/social phenomena or whether by indirect pricing thru pairwise real value comparisons, whether performed in advance or within the context of a just-in-time scenario analysis environment where different stakeholder-based valuation schemas can be bound to physical quantities to generate financial values in a transparent fashion during the decision making process).

Salah's first paragraph-comment: In the first paragraph of your page 2 you sneak in world 'income' with world wealth (twice in fact) as unnecessary to value in money. But wealth and income should be treated

separately. Wealth is beyond reach for valuation in money; nor for that matter is it amenable to physical stock-taking. But income (national income for *individual* nations as the nomenclature implies) is a different issue. National income is regularly being estimated round the world in money, and for better or worse has been built into contemporary culture. And I very much doubt if it can (or ought to) be dislodged. GDP and its cohorts have many limitations as you know (virtually confined to market transactions; weights used for aggregation are market prices; official GDP overlooks transactions in the 'black' or informal economy, etc.) but the flow national accounts, however imperfect, are very useful. Analysts may manipulate these numbers at will to cull from them more useful estimates suiting a variety of purposes, among which the various quantities you indicate as potentially useful for sustainability.

That said, the illuminating example given by Salah as to the uselessness of a money value for world wealth (*or income for that matter*), is not a criticism of monetization approaches per se.. Rather it highlights the need for comparisons as a precondition for meaning. Any objective description, whether physical or monetary, if made in isolation is useless. Only by comparing such a description to that same description for different times or locations do we produce useful/meaningful information. For example, knowing one's personal resource consumption as compared against peers or bio-availability is useful; while knowing one's personal resource consumption in isolation is useless. For another example, no matter how imprecisely we might be able to assign some value for global wealth *or income* if using those same standards of precision we were to see that that number had been increasing over a period of centuries, then peaked over a period of a couple of decades, and for the past couple of decades was subsequently declining, that would be useful information (it would mean something)!

In contrast, (and recalling the theme here of physical vs monetary indicators) when the information is being used to assess how long a current production/consumption pattern can continue without some significant change (for example the need for factor substitution owing to the depletion/impairment of some resource) then I believe that physical indicators can be more appropriate than monetary ones.

Consider the following kinds of sustainability questions:

If we increase production of 'X' by 50% over the next 5 years how much sooner will

1. Greenhouse gasses reach point 'Y'?, or
2. The population of keystone species 'Y' drop below its sustainable threshold?

Over what time period do we need to decrease production of 'X' by 'Y' percent or increase the productivity of 'X' production relative to the numbered item below in order to

1. Keep 'X' percent of fish stocks from dropping below sustainable thresholds
2. Keep surface water stocks above 'X'
3. Not run out of input 'X' before we will have found a substitute

Being able to answer these kinds of critical sustainability questions, does not require pricing CO₂ or ecosystems. Rather what is required is the linking of the real aspects of production/consumption functions within the human economy to "real estimates" of bio availability if a natural capital resource or "human availability" if a human capital

resource. These linkages are crucial to our understanding of how long we can continue current production/consumption patterns or how much living standards can raise before critical shortages in capital appear that will disrupt those economic functions absent significant factor substitution. They also allow us to model the returns on investing in more efficient production/consumption functions in terms of changes in known time sustainability of the current pattern (e.g. by investing 'x' dollars in some more efficient production function we can triple the known sustainable years of current consumption patterns from 25 – 75).

Thus, I believe within the context of sustainable development, physical and monetary indicators play equally useful and complementary roles

Second, relative to the seeming agreement that the needs and thus appropriate sustainability indicators for poorer countries are/should be different from those appropriate for richer countries, while I certainly agree with the sentiment expressed, I would suggest (anticipating potential tugs of war between richer and poorer countries over indicator selections) we may benefit by instead associating indicators with a ranked scale of income/lifestyle groups that exist across all countries and in terms of which differences between the aggregate incomes/lifestyles of countries is represented by differences in the relative distribution of a country's population across different income/lifestyle groups. (The same has been said about economic sectors.) More specifically,

The differences in interests of richer and poorer countries apply equally to richer and poorer individuals within countries. The question raised by many "what is the poor country trying to sustain" applies equally well to the poorest people in rich countries. The converse is also true. The concerns of the very rich in any poor-in-aggregate country more naturally align with the rich-in-aggregate nations.

From a sustainability standpoint, it would appear useful to calculate, to the degree that this has not been done elsewhere, the range of physical resources consumed by different income groups where the identification of an income group is constant across countries and time and then associating each distinct instance of each income group (say the Xth group in the U.S. or Egypt in the 1990s) with its position relative to the mean set of physical resources consumed by the aggregation of all instances of that income group.

One could then look at the resources consumed per income group at a global or national scale (or sub national if we had the data). And one could ask which resources were most threatened by the development of or continued growth in certain countries or more specifically of the movement of "A" percent of the population from income group "P" to income group "Q". Or what would need to be done to lower the resources consumed by the 'Y' instances of the 'X' income group. (e.g. what would it take to lower the energy consumption of middle class Americans and Canadians relative to their equivalent income groups in the EU?)

Analogous to the benefits of looking at resource consumption on a per sector basis rather than either a per capita or per unit of GDP (thus getting around the obvious tugs of war), considering sustainable development indicators on a per income group (and sector) basis may provide more fine-grained and policy-relevant information .