Measuring Aggregate Measures of Welfare

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The welfare of the population is the ultimate the goal of economic activity, not the quantity of output produced. GDP is an important source of welfare, but not the only source. In our earlier work on this subject, we argued that the trends in GDP and welfare may diverge, with the latter increasing more rapidly during period of significant technical innovation. Our model is based on the idea , developed by Lancaster, that there is a technology of consumption that is separate from the technology of production.

These shifts in the consumption technology are not recognized in conventional growth analysis. This omission creates a problem for understanding the impact of the revolution in information technology on the economy and on the wellbeing of society, with the Internet as an important case in point. The increased availability of timely information permits consumers to use a given amount of income more efficiently to satisfy their wants. In our recent work, we have called this increase in consumption efficiency "output-saving" innovation.

We have found that "output-saving" innovation makes a significant contribution to the growth in wellbeing. By implication, the current slowdown in real GDP growth in recent years is not inconsistent with a vibrant technological era. We have thus concluded that the extension of growth analysis into the realm of utility and welfare is unavoidable in light of the Digital Revolution, but also that the extension is fraught with pitfalls and paradoxes. This paper is an extension of our current work that explores some of these problems. They fall into three broad categories.

One: The relation between GDP growth and wellbeing.

GDP growth is generally regarded as unambiguously good in the sense that all people can, in principle, be made better off. But, it is also true that when all are not, or some are made a lot better off than others, collective improvement in social welfare may be greatly limited. In other word, social welfare is not about the size of the GDP pie, but also how it is sliced. In formal economic theory, this is a matter of the form of the social welfare function (SWF). The salient point is that the link between GDP and welfare depends on the value judgments made about the distribution of income. To what extent can aggregate measures of welfare reflect various value judgments?

The concept of utility is ambiguous. An alternative approach is to think of utility as a measure of happiness and note that many things make people happy, or give them a sense of wellbeing.

Sorting out what this means for linking GDP to utility is important when studying the link between technological innovation improvements in consumer welfare.

Two. Issues arising when using the willingness-to-pay metric as a monetary metric of utility is another area the paper with explore. How much consumers would be willing to pay in order to avoid being sent back to the original level of utility prevailing at the start of time interval under consideration is a measure of the value they attach to the change in utility relative to the end of the interval. This value can be expressed in terms of the prices prevailing at the start of the interval (the equivalent variation, or EV), or the end-of-period prices the compensating variation, or CV.

The EV and CV can in principle be estimated using statistical techniques, or by employing partial estimates based on consumer surplus. A question arises as to whether they can get at all the innovations parameters of interest, particularly the ones related to a general shift in the consumption technology.

The EV/CV framework makes some strong assumptions about the nature of goods and markets. How well-suited is the model to the situation in which there are "free" goods? This case include goods like the internet in which value is created pro bono publico through crowd-sourcing (Wikipedia, consumer product reviews), or via spillovers arising from the difficulty of the protecting property rights created as a result of innovation, particularly those involving public goods like many information-based products.

The treatment of time is an important addition to the consumption technology, since consumers must allocate their scarce time as well as their scarce income. The information revolution has had a major impact on the allocation of time, reducing the amount needed to acquire information, but also the time allocated to digital goods like social media. We propose to introduce this into the CV/EV framework of the consumption technology.

Three. The value of the products of expert services industries depends on the state of health, education, legal or financial position of the consumer-recipients. In other words, the utility of a given product depends on an initial state variable in the consumer utility function, and the value of the results depends on the change in that variable.

State dependence greatly complicates the make link between GDP and the associated utility. We propose to take a deeper look at this, which goes back at least to the work of Stigler and Becker. Vaccines that prevent a degradation of the state of health do so now and in futures years, reducing the need for medical expenditures over a period of time. Education increases the state of knowledge variable now and in the future. An innovation at one point in time can thus have impact in future years, where its effect operates through a change in the state variable. An endogenous utility function is an more extreme version of state dependence. In this case, technology determines the utility function, which is no longer seen as an independent entity whose value is to be maximized.