Empowering Sustainable Consumption

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Environmental policy once focused only on producers: the relatively few business enterprises that needed to clean up their smokestacks and sewage outfalls. While important, emphasis on producers hasn't been enough to stem the tide of environmental degradation, because many of the worst insults come from consumption activities, not production. Consumption-related problems are large and growing, as Beijing's un-breathable air and New York's mounting garbage exports illustrate.

Current thinking — mostly outside government — identifies consumer-oriented solutions that seek to improve the quality of life per unit of expenditure rather than just making more stuff available. The newer approach seeks to change the expenditure mix to encourage a shift to immaterial goods and services, to intensify use within combined product-service systems, and to make greener products available [1]. What are the prospects for this sustainable consumption movement? Its success depends on better discernment, magnified influence, and avoiding unintended consequences.

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Can Consumers Discern which Products are More Sustainable?

Every morning I choose whether to buy coffee in a paper or plastic cup. Scientific assessments of the life-cycle environmental impacts of such choices are sometimes inconclusive. The manufacture, use, and disposal of paper cups requires more petroleum and pollutes more air and water than for plastic cups, but plastic cups do not quickly biodegrade [2]. A nice ceramic mug is only better if I keep it a long time and rarely wash it. Reasonable people may disagree on the weight to give each category of impact. Most of us will not have the capacity to sort through these tradeoffs even *after* that first cup of coffee.

Eco-labels, such the Energy Star designation for energy-efficient appliances, can help guide choices. There are now so many eco-labels competing for attention that websites such as greenerchoices.org have emerged to separate the useful labels from the "greenwash." Resources like goodguide.com assign ratings instead of labels to products, and their smartphone apps let consumers access the information while they shop. These consumer information efforts depend on a mix of governmental and third-party activities that varies across countries. They help the 15% or so of consumers who are interested in discerning which products are more sustainable.

Can Consumer Choices Drive the Economy in a More Sustainable Direction?

Studies of consumer-producer dynamics are pessimistic about quickly moving economies in a more sustainable direction entirely as a result of bottom-up consumer choices. The Toyota Prius story is emblematic. The efficient Prius has established a strong niche market position but the only way hybrid vehicles are entering the mainstream is through cost reductions that allow the technology to outcompete existing systems on their own terms. It appears that the key elements in the emergence of a green niche product

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include: 1) mechanisms, whether public or private, that allow consumers and producers to discern the relative environmental performance of alternative products; 2) proactive producers that are willing to take the risk of developing new products that are environmentally distinctive; and 3) consumers who are willing to pay a premium for such products. These three conditions are still not enough to allow the greener product to go mainstream, because that requires a fourth condition of cost parity relative to conventional products [3]. Eventually society can change its preferences by means of environmental education.

What are the System-Wide Effects of Sustainable Consumption?

Consumption is just one part of a larger system of economic relationships that includes producers, governments, and financiers all operating within the boundaries set by the natural environment. Unintended consequences may emerge from efforts to change any part of this complex system. Let's consider two.

U.S. President Obama's science advisor, John Holdren, made his most important contribution to public policy in 1971, when he and Paul Ehrlich introduced the $I = PAT$ identity, reminding us that environmental impacts (I) grow with human population (P) and affluence (A), moderated by technological improvements (T) [4]. Clean growth therefore depends on improving the efficiency of resource use ($\%\Delta T$) more rapidly than we increase the scale of production ($\%\Delta(P\times A)$). Unfortunately, efficiency improvements are losing the race with only a few exceptions. For example, production completely swamps efficiency for pig iron, aluminum, electricity, fertilizer, and motor vehicle travel; it is a tie for freight rail travel, and refrigeration is one of the very few for which efficiency is winning [5].

> Sometimes efficiency improvements save us money that we might then spend on greater consumption.

A related problem occurs when our responses to efficiency improvements lead to higher levels of production. There is an income effect, whereby the efficiency improvement saves us money that we can then spend on greater consumption, such as driving farther in our energy efficient car. There is a substitution effect, in which the money saved due to the improved efficiency of, say, a refrigerator, can be spent on alternatives, such as a jet-fueled travel vacation. These behavioral responses lead to the take-back of 10% or more of the typical efficiency improvement. The outcome is more dramatic when efficiency allows the mode of production to change, as when improving steam engine efficiencies led historically to increases in coal production by orders of magnitude [6].

Unintended consequences are no reason to give up on sustainable consumption, although they should encourage thoughtfulness. Which efficiency improvements yield systemic reductions in environmental impacts? Let's invest public funds in them. Does the demand for some products and services saturate with increased income? Let's ensure that average incomes increase to the point that everyone meets their basic needs. Are there less harmful ways to spend freed-up funds? Let's focus on improving quality of life and not only on acquiring more stuff.

Recent work provides some guidance on which products and services to focus on first. Mobility, food, and home building account for about three quarters of the life cycle impacts of consumption in advanced industrialized countries, and if we improve them we will reduce overall environmental burdens [7]. That is where public policy should focus.

Consumer behavior has significant environmental impacts, and consumers need help from third parties to recognize better choices. Consumers can only improve overall outcomes in concert with proactive producers and an encouraging and informative government. Unintended consequences diminish, but do not extinguish, the effects of sustainable consumption. Ask your neighbors this normative question: What is sufficient?

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