ARTICLE

Sustainable consumption and the problem of resilience

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The twenty-first century is likely to witness increased levels of weather-related disasters, droughts, epidemics, food shortages, habitat destruction, and resource conflicts. Those environmental and systemic problems will be mediated and exacerbated by potential economic dislocations, including job losses, financial crises, and commodity-price increases. As a result, the problem of resilience will increasingly permeate the politics and policies of sustainability transitions. Using a comparative analysis of two American households located at opposite ends of the income pyramid, this article explores the issue of how to think about the relationship between sustainable consumption and resilience. Although the two goals can be configured as a tradeoff, the discussion suggests how policies might address them in a synergistic way.

KEYWORDS: households, socioeconomics, income, environmental impact

Introduction

The study of sustainable consumption can be explored at a range of scales, from the global to the continental to the household. Although a full analysis of the research problem would require attention to all scales, this study focuses on the most basic level of human social organization, the household. One of the challenges of encouraging more sustainable consumption patterns at this level is that acute environmental, political, and economic instability encourages households to worry less about reducing their ecological footprint and more about having the resilience to withstand potential socioeconomic and ecological shocks. To date, scholars of sustainable consumption have not thought carefully about the problem of resilience. Doing so may make it possible to design more effective policies.

Because the topic of resilience and sustainable consumption is not yet well studied, a theoretical and qualitative approach is appropriate. The first two sections of this article are theoretical, and the third section provides a qualitative analysis of two cases at different ends of the income pyramid as a basis for further conceptualization. The purpose is to establish a framework for thinking about the relationship between resilience and sustainable household consumption and for generating hypotheses for future research and possible new policy interventions.

Sustainable Consumption and Resilience

In policy documents at both the international and European Union level, sustainable consumption is frequently defined as

[T]he use of services and related products which respond to basic needs and bring a better quality of life while minimizing the use of natural resources and toxic materials as well as the emissions of waste and pollutants over the life cycle of the service or product so as not to jeopardize the needs of future generations (EEA, 2005; for a review of the literature, see Cohen & Murphy, 2001; Jackson, 2006).

The definition echoes the Brundtland Commission’s general approach to sustainable development, which also emphasized intergenerational distributional issues (WCED, 1987). Although the definition is helpful as far as it goes, there are ways that the study of resilience may improve some of the thinking behind it.

One general line of criticism of the intergenerational emphasis of the European and United Nations studies is that the work implicitly downplays intragenerational equity. Although the Brundtland Report itself is in the European social democratic tradition and does raise some issues of intragenerational equity, the definition of sustainable consumption above does not (although it does not preclude consideration of those issues). Because the general resilience of a
household with respect to external shocks is related to household income, debt, and wealth, the study of resilience can help advance thinking about the relationships between equity and sustainable consumption.

A second aspect of the definition is that the term “minimizing” leaves open the distinction between increases in efficiency and reductions in overall consumption. The greening of a household’s consumption through energy-efficient appliances, buildings, and vehicles can coincide with an overall increase in the household’s consumption as measured by a carbon footprint or some other metric. For example, if a household purchase of an energy-efficient product results in a net savings of household expenditures, it is possible for a rebound effect to occur by which the household actually increases its ecological footprint by spending the savings on a more energy-intensive product or activity (Herring, 2009). As a result, studies of sustainable consumption should also pay attention to differences between increased efficiency in consumption and reduction of consumption. Strategies for accomplishing the latter can include shifting household consumption from energy-consuming objects to leisure activities with a low ecological footprint (such as bicycling, meditation, and gardening) or by reducing household incomes, such as by changing the terms of globalization to increase prices that have been kept artificially low or by decreasing the number of hours worked in the average household (Schor, 1998; 2005a; 2005b). However, the study of resilience may be helpful because it draws attention to new ideas for reducing consumption other than through lower income and increased leisure. For example, one might also channel disposable income into savings, provided that the investments that result from the accumulation do not generate their own rebound effects (see also Cohen, 2007).

Before developing a framework for studying the relationship between resilient and sustainable consumption, it is helpful to review the notion of resilience in general and resilient consumption in particular. The concept of resilience is widely used across a range of disciplines, including engineering (Hollnagel et al. 2006), security policy (Peters, 2008; Cascio, 2009), corporate strategy (Sheffi, 2005), and socioecological systems (Berkes et al. 2002; Walker et al. 2004; Fiksel, 2006). A common ground among most definitions of resilience is the capacity of a system to maintain essential functions when faced with perturbations, threats, or disasters. Concepts associated with resilience that are derived from formal approaches include nonlinearity, adaptive cycles, multiple scales (panarchy), adaptability, and transformability (Resilience Alliance, 2009). For human systems, the discussion of resilience and sustainabil-

ity has focused on the problem of resource dependency (Adger, 2000) and the management of place-based ecosystems (e.g., Berkes et al. 2002). There is also some work on the relationships among sustainability, urban design, and resilience (Newman et al. 2009).

For present purposes, household resilience implies the creation of reserves to protect against socioeconomic and ecological shocks. The definition is intended to build on the general work on resilience and also to retain some flexibility for the integration of socioeconomic and environmental issues. Within this broad definition, at least two major types of household resilience can be identified: economic and material. In areas of the world where household provisioning is agrarian and subsistence-based, the problem of resilience is visceral in the form of threats posed by material environmental risks such as drought and flooding. For the world’s urbanized populations, the problem of environmental risk is less direct, but even those households face environmental risks due to extreme weather events such as hurricanes, blizzards, ice storms, tornados, and floods. More generally, environmental degradation and climate change are mediated through markets and the economic system, and households are also concerned with other forms of economic risk such as job loss, inflation on basic commodities, energy-supply disruptions, and health-care expenses. The environmental and economic risks, and the more general ignorance or lack of knowledge about other possible unknown dangers, create the conditions for a household’s concern with consumption that enhances resilience. Resilience-oriented consumption (or what will be termed here “resilient consumption”) may potentially undermine sustainable consumption, but it may also be configured to enhance it as well.

To understand the relationship between resilient consumption and sustainable consumption, two main types of resilient consumption must first be distinguished. The economic type can be enhanced through two mechanisms: diversifying revenue streams and increasing household levels of economic storage (e.g., savings, insurance, and education). With respect to the first mechanism, since the 1960s an increasing number of households in the United States has shifted from a single-income stream to two or more incomes. Commonly, both spouses have entered the workforce, but sometimes a breadwinner takes more than one job. One motivation for developing multiple income streams is to increase the economic resilience of a household, and in some ways resilience is increased. For example, if one breadwinner loses a job, the household may be able to tide itself over by using the ongoing income from the other revenue streams. Having two or more incomes
therefore functions as a kind of economic reserve, provided that the household retains the flexibility to cut expenses in the event of a job loss.

The proviso is at the heart of an alternative view of multiple income streams and resilience. Warren & Warren Tyagi (2003) suggest that having two workers in a family can create other problems, because expenses can be ratcheted up and locked in. Although income is increased, so are household expenditures for items such as food preparation, an additional car, home repairs, and child care. Although Warren & Warren Tyagi do not use the concept of resilience explicitly, they suggest that two incomes may reduce flexibility in at least two ways. First, as many of us have experienced, there is often a problem of scrambling for “coverage” when a child or elderly member of the family is sick and both parents are working. Second, they assume that an adult in the household who is not in the labor force may be able to find a job if there is a crisis, and the potential constitutes a kind of resilience. As a result, an argument can be made that having a two-income household reduces resilience, although the argument applies best to two working spouses and less to the general strategy of multiple income streams.

Cohen’s (2010) macroeconomic perspective on sustainable consumption suggests a way of resolving the crosscurrents of multiple income streams with respect to resilience. When there is high job insecurity (such as during an economic recession), an adult who is not in the labor force may not be able to find a job quickly, especially one that pays well. Hence, under conditions that have become increasingly prevalent in the United States, the preferred form of resilience may be to have at least two income streams at all times. The preference may be stronger if the breadwinners are able to find full-time jobs with benefits; these prize jobs are worth hanging on to. I would add that having more than two income streams (such as from investments or from one person who works two jobs) would also increase resilience. Thus, whereas there may be a tendency for a two-income trap for two breadwinners, the tendency is much reduced for two incomes for one breadwinner or three or more incomes for two breadwinners. However, the use of multiple income streams to increase resilience works best if the marginal income can be channeled into debt reduction and increased savings, or at least into expenditures that can be reduced quickly in the event of the loss of one of the income streams. Thus, the liquidity of income potential (the capacity to find another job) and of expenditures (the capacity to cut expenditures rapidly because they are not locked in), rather than the number of working spouses, is the underlying condition that determines the relationship between multiple income streams and household resilience. Economic resilience is enhanced when both forms of liquidity are high.

A second mechanism within economic resilience is to increase economic storage, that is, by increasing savings, reducing debt, purchasing more insurance, or investing in education. Education and training are included as forms of economic storage because increases in human capital tend to increase income liquidity. Of course, the capacity to increase storage depends on the relationship between household income and expenses; thus, this mechanism is closely tied to economic resilience. There is ample evidence that during the Great Recession that followed the financial crisis of 2007–2008 households have increased savings and decreased some consumer expenditures in order to enhance their economic resilience. In other words, economic insecurity leads to heightened concerns about economic resilience, which in turn leads to more economic storage.

A second type of household resilience is to develop physical back-up systems. One might think of this form of resilience as the material-storage counterpart of economic storage. The list here is potentially quite long: generators, a battery back-up on sump pumps, water-filtration devices, a fireplace or wood-burning stove for additional heating, household wind and solar energy, space heaters for an interruption in oil or natural gas heating, additional vehicles, bicycles, car-sharing memberships, food storage, gardens, and a second home (and, for survivalists, a “refuge”). This strategy of resilience may involve some very moderate precautions, as indicated in the second case discussed below. However, the “back-up” systems strategy can also involve unconventional approaches associated with countercultural movements. The latter includes modest guides to increasing household self-reliance and home power (e.g., Szykita, 2009), dystopian science fiction about post-carbon collapse (Kunstler, 2009), and the world of survivalist groups (Rawles, 2010).

Having reviewed the concepts of sustainable consumption and household resilience, I can now suggest how the two might be articulated. As a preliminary hypothesis, the effects of concern with economic resilience on sustainable consumption will be mixed. The economic security of multiple income streams may result in higher levels of household consumption of “greener” or more efficient products, but the overall level of the household’s consumption may rise due to the increased income. For example, the higher-income household may be able to afford costly green premium products (such as organic food), but it may increase overall consumption by purchasing more prepared foods, going to restaurants, using a second car, and contracting for child care and other services. However, if the marginal revenue
from the multiple income streams is channeled into savings and other forms of economic storage, then the effects will be the opposite: the preference to increase savings will decrease the demand for green products (at least more expensive ones such as organic food), but it will also decrease overall levels of consumption. In contrast, a household with one adult who stays at home and accepts a lower income may be able to engage in gardening, cooking, and home repair, and those activities may reduce the overall ecological footprint by substituting in-home labor for outside services, such as by avoiding the use of a day-care service and by purchasing less overall.

The relationship between material resilience and sustainable consumption is also not straightforward. On the one hand, some of the back-up systems may involve activities associated with household greening and the diversion of leisure time into low-carbon activities, such as adding rooftop solar and insulation. On the other hand, some activities may entail adding energy sources that generate greenhouse-gas emissions, such as gasoline-powered generators, wood-fired stoves, and additional vehicles. However, the additions have complicated ecological implications in comparison with foregone household expenditures. Because storage systems such as a generator may be used infrequently, the overall ecological footprint of purchasing such equipment might be lower than if the household were to spend the same funds on consumer electronic devices or carbon-intensive vacations.

To summarize the argument to this point, the household goal of resilient consumption is likely to interact with the goal of sustainable consumption, sometimes in positive and sometimes in negative ways. Resilience may appear to conflict with sustainable consumption, but there are also ways in which the two can be brought into alignment.

### Household Inequality and Consumption

A second benefit from adopting the perspective of resilience for the study of sustainable household consumption is that it enables one to theorize better the changing environmental and social context in which sustainable consumption policies are being designed. To the extent that environmental, economic, and other dangers increase, or perceptions of them increase, it is likely that resilient consumption will become increasingly salient. Thus, in addition to the first proposition (that resilient and sustainable consumption have a complicated interaction that is sometimes positive and sometimes negative), a second proposition should also be considered: there is a general historical trend of increasing economic and environmental instability that will make those interactions stronger over time. The second proposition has implications for how one conceptualizes sustainability policies.

In European policy documents on sustainable consumption, such as “Household Consumption and the Environment,” the general approach is to articulate policies that could increase levels of sustainable household consumption (EEA, 2005; see also EEA, 2008; OECD, 2008). The policies generally include changing the signals for pricing, such as for the household consumption of water and electricity; providing attractive alternatives, such as improved public transportation; and making available educational and voluntary approaches, such as product labeling. The policies are all quite valuable as far as they go, but they are formulated without great attention to the problem of inequality and household debt. Because financial pressures on households (at least in the United States, but in many other countries as well) are increasing, the problem of resilience tends to push the issue of inequality more toward the center of sustainable consumption studies.

As many households have discovered during the Great Recession, a high level of debt creates low economic resilience that can lead to bankruptcy and other adverse financial outcomes. Yet, the trend for American households over the past four decades, at least until the Great Recession, has been an increase in the level of debt (Warren & Warren Tyagi, 2003; Cohen, 2010). In the United States, total household debt in 1970 was US$500 billion, or 50% of gross domestic product (GDP), whereas in 2007 it was US$13.8 trillion, or 100% of GDP (Foster & Magdoff, 2009; Federal Reserve Statistical Release, 2010). There are various explanations of the rising level (including conspicuous consumption and predatory lending), but this section will focus on two long-term macroeconomic trends in the United States that are particularly relevant to household-level resilience.

One factor behind the long-term rise in household debt is wage stagnation. In the United States, the average hourly wage for a nonsupervisory, private-sector employee has been unchanged for decades. In 1964, the first year tracked in this set of government statistics, the wage was the equivalent of US$17.57 per hour in 2008 dollars, whereas in 2008 the wage had only increased to US$18.08 (United States Bureau of Labor Statistics, 2009). For households that earned the much lower minimum wage, the real minimum wage peaked in 1968 (Kalwarski, 2009). In short, at the lower end of the income pyramid, there has been either stagnation or decline in real wages, despite the fact that real GDP increased significantly (Working Life, 2004; United States Census Bureau, 2007; Foster & Magdoff, 2009). There are also signs that even households with significant education and
professional status are facing similar challenges. As Nan Mooney (2008) has argued, using case studies, even many professional, middle-class families with advanced education have not been able to achieve the standard of living of their working-class parents. Many people who would like to have a permanent, full-time job with benefits have been forced into the “permanent temporary workforce” (Coy et al. 2010). To some degree, the decision of a household to develop multiple income streams has represented a temporary reprieve from the problem, but as Warren & Warren Tyagi (2003) suggest, that strategy is also associated with higher household expenditures (such as an additional car, day care, and home services) that can wash out the gains from the additional income stream.

Even as wages have stagnated (or, depending on which lower-income quintile is used as a point of reference, increased modestly), households have been squeezed by a second long-term trend: the decline in purchasing power for crucial items (Warren & Warren Tyagi 2003). For example, whereas the price of gasoline in 1964 was about US$0.30 per gallon (about US$2.08 in 2008 dollars), the price of gasoline in some places in the United States peaked at US$4.00 per gallon in 2008 before declining, after the Great Recession reduced demand, to about US$3.00 in 2010. The price of an average home in 1964 was about US$19,600, or about US$137,000 in 2008 dollars, whereas the price of an average home in 2008 had climbed to US$290,000 (Economagic, 2009). Furthermore, health-care benefits have increasingly been cut or subjected to limitations, larger deductions from pay checks, and patient copayments. Moreover, the economic basket of what constitutes an essential household item has increased due to technological change. In short, the prices of some basic commodities and crucial large-ticket items have outpaced the increase in wages, at least for households in the lower-income brackets and located in areas of the country where real estate prices have exceeded inflation.

One might argue that the focus on increasing wage-price pressure is overstated because households today have more material possessions than those of the 1960s. The counterargument may be valid in terms of some measures of material objects or even average home size, but one needs to take into account several mitigating factors. First, the higher levels of household possessions (such as a second car) may be essential for maintaining a second income stream, and they may be counteracted by higher expenditures on services needed to back up the second income stream (such as child care). Second, because the higher levels of material possession are accompanied by increased debt, a gross measure of physical pos-

| Households | Number (Thousands) | Income: Lower Limit (US$) | Income: Upper Limit (US$) |
|------------|--------------------|---------------------------|---------------------------|
| Top 5%     | 5,839              | 177,000                   | --                        |
| Highest Fifth | 23,357            | 100,000                   | --                        |
| Fourth Fifth | 23,357            | 62,000                    | 100,000                   |
| Middle Fifth | 23,357           | 39,100                    | 62,000                    |
| Second Fifth | 23,357           | 20,300                    | 39,100                    |
| Lowest Fifth | 23,357          | 0                         | 20,300                    |

Source: United States Census Bureau, 2008

sessions is not a good way to measure a household’s economic resilience, especially when the measure does not disaggregate across income levels. Finally, because household goods depreciate over time and are not very liquid, the accumulation of most household items does not increase resilience.

Although households in the upper two quintiles of income may escape some of the worst effects of the wage-price squeeze, the stagnation of wages and increase of real prices for some essential household items create severe pressure on households in the lower three income quintiles. The statistics on household income in the United States in 2007 indicate that 60% earned less than US$62,000, and 40% earned less than US$40,000 (Table 1). The “forty-under-forty” statistic includes many single-person households, but even for those individuals after-tax income is necessarily focused on basic expenses such as housing, utilities, food, and transportation. Given the pinched financial circumstances of those households, it is not surprising that debt has grown.

Other than the work of Cohen (2007; 2010), most research on sustainable consumption has not taken into account the relationship between household-level sustainable consumption and macro-economic changes in the global financial system, including increased debt. Rising levels of consumer debt probably have mixed effects on sustainable consumption. Increased debt may decrease a household’s ability to invest in new, more efficient or greener forms of household consumption, but it may result in lower overall household consumption. As with households that downshift by reducing the number of hours worked for increased leisure, there is simply less money available for purchasing items. In other words, there is an ecological silver lining to the clouds of economic decline. But the general point is that a perspective on resilience enables a more complete approach to the problem of how to make consumption more sustainable.
Case Studies

To explore the complicated interactions of household inequality, resilient consumption, and sustainable consumption, two case studies are presented. The use of qualitative methods is appropriate because the primary goal is to uncover possible patterns that have not yet been made visible in the literature and subsequently to generate hypotheses for future research. Although one might use two hypothetical cases, the ones presented below are based on actual households. They were selected to accomplish two goals. First, the two households provide a picture of household-level decision making at two extremes of the income pyramid in the United States. Household A is located in the lower quintile of the pyramid and Household B is located at the lower end of the upper quintile. Second, the two cases provide a picture of the interaction of resilience concerns with sustainability concerns in households already working toward sustainable consumption.

The extent to which the households are typical of the income quintile is analyzed, but the selection of the households is not intended to be representative. The goal rather is to explore how resilient and sustainable consumption interact at income extremes. The point of the comparative analysis is not to test hypotheses as much as to generate them with a qualitative and exploratory method that is essentially ethnographic. In an ethnographic approach, one uses a detailed exploration of a case, within the constraints of an article’s length, to provide insights into a general issue. As a result, the representativeness of the case is not as important as the capacity of the detailed analysis to reveal new patterns and generate hypotheses. To test hypotheses, a different study design with quantitative methods would be necessary.

Household A

Household A is a single person who lives on a limited graduate-student fellowship in a one-bedroom apartment located near a university in upstate New York. There is a minor second income stream from occasional part-time work. The household is typical in some ways, because many lower-quintile households are either young or elderly people living on their own, but atypical because the person has potential for mobility into higher income quintiles over the life course. The estimated carbon footprint for the household is 18 tons per year, compared with a national average of 27 tons for a one-person household. Carbon is calculated based on a questionnaire that measures energy-related household consumption, including building efficiency and transportation (Nature Conservancy, 2010). The household does not use air conditioning due to the cool climate, and the person does not own a car or travel much. Here, there is already an insight into how resilient and sustainable consumption may interact. The person has made an investment in resilience (increased education), and the investment has corresponded with a decline in overall consumption (including for comforts such as air conditioning and automobiles), at least in the short term.

Expenditures were reviewed based on a record of purchases for one year, and then broken down into broad categories. The figures were compared with those of Paulin (2008), who studied expenditure patterns of young single households between 1984-85 and 2004-2005. (His figures include a substantial “other” category that is not included in the table.) Paulin’s data show that households in the later time period spent more money on education and housing and less on food, clothing, and travel than households during the 1984-85 period. The increased education expenditures could be interpreted as an increased concern with resilience due to employment insecurity. The households in the 2004-2005 period also spent more on food consumed at home and less on food eaten away from home. The categories for Household A do not match up exactly with those of Paulin for either time period, but they are roughly comparable (Table 2).

The significant difference between Household A’s expenses and those of the comparison households is the relatively high amount of money spent on rent, which reflects the cost of living in a neighborhood.

Table 2 Household expenditures of one lower-quintile, single household.

| Area of Expenditure         | Household A | Population Average 1984-1985 | Population Average 2004-2005 |
|-----------------------------|-------------|-------------------------------|-----------------------------|
| Rent and utilities          | 50%         | 23.5%                         | 31.9%                       |
| Food (at home and away from home) | 21%       | 15.5%                         | 13.3%                       |
| Travel and transportation   | 10%         | 22.5%                         | 18.3%                       |
| Telephone and cable         | 8%          | 5.4% (entertainment)          | 5.0%                        |
| Clothing                    | 7% (and durables) | 6.2% (and services)          | 3.3% (and services)        |
| Insurance                   | 3%          | Other                         | Other                       |
| Health                      | 1%          | 2.0%                          | 2.1%                        |
| Education                   | 0%          | 4.2%                          | 7.7%                        |

Source: Columns 3 and 4 (Paulin, 2008)
move into a house with a cooperative living arrangement could potentially decrease carbon emissions would be to change that might increase economic resilience and reduce expenditures (e.g., Nature Conservancy, 2010). One view of the carbon-footprint calculators for the Northeast indicates that building-related energy expenditures are the greatest contributor to carbon emissions. The following hypotheses for the interaction of low-income renters with high concerns for economic resilience are:

A household may trade off housing and transportation costs by paying for more expensive housing located closer to work, thereby increasing resilience (by not relying on mechanical transportation) and increasing sustainability (by walking or biking to work).

A household may increase resilience by investing in education, which leads to overall levels of reduced consumption (in the short term) due to expenditures, time constraints, and foregone income (although the effects of higher income could lead to long-term increases in consumption).
A low-income household has a correspondingly low “affordability barrier” for sustainable consumption that is heavily governed by economic resilience. In other words, only a small subcategory of green or energy-efficient products is attractive, mostly ones that provide immediate cost reductions.

Household B

Household B is a relatively affluent family household consisting of a husband, wife, and two children who live in a single-family, three-bedroom home, also in upstate New York. Unlike Household A, Household B is not concerned with resilience in the form of debt reduction. The household has a small balance remaining on its mortgage with no other debts. Instead, its focus is on building savings in retirement and other accounts. Household B has some concerns with the quality of its multiple income streams. One parent has a full-time position with benefits, and the other left such a job when the children were small and currently has two part-time positions, which provide high levels of flexibility for juggling schedules. However, there is concern with another kind of “two-income trap,” that this parent may not be able to find a full-time job with benefits when the children approach college age.

Again, statistics were gathered for one year of expenditures for Household B, and then broken into broad categories. In Table 4, the household is compared with national average figures from the United States Bureau of Labor Statistics (2007). The categories are not exactly comparable, because Household B used a budget category of “children.” However, the categories of “children” and “adult apparel” (about 13% when added together) are roughly equivalent to the government categories of “education,” “entertainment,” and “apparel and services” (also about 13% for the upper quintile home). The most obvious differences between Household B’s expenditures and those of the comparison group are the lower automobile budgets and higher food budget. Household B has small, fuel-efficient vehicles that are paid off, and its relatively high food budget reflects a purchasing strategy focused on organic foods, occasional grass-fed meat, and premium dietary supplements that are viewed both as an environmental choice and as an investment in future health. Here, “future health” emerges as a category of resilience. Home equipment, furnishings, and repair were sometimes channeled into energy-efficient improvements when deferred maintenance issues did not take precedence.

To get a better sense of what sustainable consumption means in the case of this lower-upper quintile household, a breakdown of some examples is given (Table 5). Notice that some aspects of sustainable consumption that appear in the lower-quintile household (purchases in the reuse sector, walking and public transportation, and bus travel for vacations) have disappeared or been greatly reduced, whereas some aspects that were too expensive for the lower-income household (such as organic food) have been integrated into the household expenditures.

Although wealthy in comparison with the lower-quintile household discussed above, Household B nevertheless hits another affordability barrier with respect to greening. To understand the barrier, consider the category of food and home supplies. The household has made a transition to organic food (and local organic when it is in season), and some of the cleaning products that are most associated with toxicity risk have been replaced with natural brands. However, the non-food consumable items represent a breaking point in the transition, largely because of the relationship between health benefit and the price premium. For example, a 32-load container of laundry detergent (natural, nontoxic brand) was priced at US$11.50 at the natural foods retail cooperative where the family shops, about double the price of a conventional brand available at discount stores. The
ous energy-efficiency measures have been introduced.

In 2009, Household B invested in a dozen electric space heaters in the event of a supply shortage for natural gas or a breakdown of the boiler, and it purchased a power-transfer system for a generator to run the boiler, refrigerator, and one additional circuit. Household B also has plans to purchase a battery-powered backup for the sump pumps and a gasoline-powered generator. The expenditures took priority over continued investments in weatherization and insulation, at least in the short term. Furthermore, whereas the household was previously enthusiastic about electric-powered vehicles as a possible future purchase, it is now weighing the trade off involved in having yet another system dependent on electricity. During the ice storm, the gasoline-powered automobile enabled the family to find food, wood, candles, and other supplies at stores located outside the disaster area.

In summary, even the upper-income household hits an affordability barrier where additional expenditures that would reduce its environmental impact are viewed as imprudent because they would exceed the annual budget. Funds for investment in new household technologies would have to be taken from savings, which would reduce economic resilience. The trade off is of particular interest because it is a household with a high awareness of sustainable consumption and of the various options available. However, the categories in the right column of Table 5 are largely considered to be in financial reach only if the household income were to move more deeply into the upper quintile. Although the table identifies an affordability barrier for Household B, it was (like a production possibility frontier) shifted outward in comparison with respect to Household A.

Regarding economic resilience, the family has multiple income streams, very low debt, and substantial savings and insurance. However, in 2008 the household became much more aware of the need to enhance material resilience. A freakish ice storm left the home and surrounding neighborhoods without power for five days. As a result, the household shifted investment in the house itself away from sustainability considerations to material resilience goals. In 2009, Household B invested in a dozen electric space heaters in the event of a supply shortage for natural gas or a breakdown of the boiler, and it purchased a power-transfer system for a generator to run the boiler, refrigerator, and one additional circuit. Household B also has plans to purchase a battery-powered backup for the sump pumps and a gasoline-powered generator. The expenditures took priority over continued investments in weatherization and insulation, at least in the short term. Furthermore, whereas the household was previously enthusiastic about electric-powered vehicles as a possible future purchase, it is now weighing the trade off involved in having yet another system dependent on electricity. During the ice storm, the gasoline-powered automobile enabled the family to find food, wood, candles, and other supplies at stores located outside the disaster area.

In comparison with Household A, overall consumption has increased. There are more material possessions in the household (even on a per capita basis), and Household B also owns and uses automobiles. Nevertheless, the house is small and generally does not require air conditioning in the summer, and the family generally does not fly for vacations. Because of those choices, the household only generates 57 tons of carbon dioxide per year, compared with 110 tons for the United States average for this type of household. As a result, the per capita carbon footprint is slightly lower than that of Household A, even though Household B uses automobiles.

### Table 5 Upper-quintile household incomplete transition.

| Category                                   | Affordable expense                        | Luxury expense                                      |
|--------------------------------------------|-------------------------------------------|----------------------------------------------------|
| Food and home supplies                     | Mostly organic food, some fair trade food | Organic or green home products (detergents, napkins) |
| Household goods (appliances, clothing, furniture) | Energy-efficient appliances                | Organic clothing and natural furniture              |
| Housing, energy                            | Green electricity, weatherization, lower temperature, zone heating | Geothermal, rooftop solar, new windows, new siding |
| Transportation                             | Fuel-efficient new cars                   | Hybrid or electric vehicles                         |
| Travel                                     | Short trips, staycations                  | Green tourism                                       |

Hess: Consumption and Resilience
The following hypotheses emerge about the interaction of resilient and sustainable consumption for an upper-income household:

- Household resilience includes investments in health via food, supplements, organic food, exercise clubs, and health services. Those investments may be more energy efficient than alternative forms of household consumption. Reframing some forms of green consumption as “health resilience” issues may make them more attractive.

- As incomes increase, economic resilience involves substantial concern with savings and insurance. Although diverting resources may reduce immediate household consumption, the broader environmental impacts depend on how that money is invested. As a result, sustainable consumption research and policies need to include household-investment patterns as well.

- Even an upper-income household faces an affordability barrier with respect to voluntary options for increased sustainable consumption, but it is more likely than a low-income household to invest in energy-efficient options with a medium- or long-term return on investment. Policies that reduce that affordability barrier, but lead to middle-term gains, such as property-assessed clean-energy bonds or on-bill financing of building retrofits, may be very attractive to moderate and upper-income households.

- Due to higher levels of home ownership associated with the higher income, upper-income households will have an increased concern with material resilience (such as generators and other back-up systems). Those expenditures may compete with more direct forms of sustainable consumption that involve energy conservation, such as weatherization or energy-efficient appliances.

Conclusion

The primary conclusion of this study is that the issue of resilience is important enough that the analysis of sustainable consumption should take it into account, at least at the household level examined here. To do so productively, one must conceptualize the relationship between resilient and sustainable consumption as a complex interaction in which any single area of household consumption may involve tradeoffs or synergies between resilience and sustainability. Furthermore, because concern with resilience is very sensitive to differences among households by income, wealth, and debt, those issues need to be brought to the forefront of sustainable consumption theory. Recognition of the complexity of the relationships will be central for the design of policies that are intended to increase sustainable consumption but are also acceptable to consumers who face growing levels of concern with resilience.

The analysis of two households with a high concern for sustainability but very different economic positions has resulted in some hypotheses about how resilient and sustainable consumption might interact, and how those two types of consumption also may interact with inequality. By shifting the boundaries of the conceptualization of sustainable consumption theory, it may be possible to design more effective policies. To some degree the issue may be one of framing, that is, of positioning voluntary sustainable consumption shifts as also affording increased resilience, which in turn is differentially configured by household income and wealth. The potential policy implications are as follows: at the lower levels of the income pyramid, public policies for voluntary forms of increased sustainable consumption could become more effective if they were to provide educational programs that point to opportunities where households can be green and immediately reduce expenditures. The opportunities come primarily in the area of reuse (e.g., purchasing second-hand materials for clothing and home supplies), energy-reduction interventions with low cost and short-term returns (temporary winter weatherization and lowering the household temperature), local food (which may be cheaper than supermarket food when one compares organic-to-organic or conventional-to-conventional), and various ways to save on transportation (such as moving closer to work or investing in car-sharing programs and other forms of alternative automobility) (Cohen, 2006). For upper-income households, the challenge may be more to think of ways that link consumption of green products with health (a long-term resilience concern), middle-term economic returns (energy-efficiency investments), household savings and insurance, and concerns with material resilience.

Assuming that policies can be designed that motivate increases in sustainable consumption and also address household concerns with resilience, one runs the risk of a household-level rebound effect. One very interesting solution to the problem that sustainable consumption researchers have considered is to establish policies that encourage environmentally ameliorative or low-impact leisure activities. Those are very interesting possibilities, but analysis of resilience suggests additional options. A resilient household can withstand both economic and environmental disturbances without undergoing financial collapse or evacuation. Savings, insurance, and additional education are the most obvious economic vehicles for household-level resilience, and as one can see from

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Table 4, there is evidence that households shift to investment, insurance, and related forms of “consumption” when there is more disposable income. Thus, policies that encourage economic storage may help households to avoid the rebound effect. They may also directly reduce overall expenditures and contribute to sustainable consumption.

However, a second-order problem emerges from the “savings and insurance” solution to the household-rebound effect. Even if savings and insurance can be utilized as a mechanism for avoiding a household-rebound effect, there could be negative implications for aggregate levels of sustainable consumption depending on how the savings and other economic reserves are ultimately reinvested. If the revenue is invested globally in companies that increase fossil-fuel consumption or even spur the culture of consumerism, then there may be a second-order rebound effect (an investment-rebound effect). In other words, the positive effects on household consumption due to diversion of expenditures into savings and insurance may be overwhelmed by the negative effects of secondary investment of those funds. The perhaps counterintuitive conclusion is that sustainable consumption policies need to be broadened to include household investment. To avoid the second-order rebound effect, it is important that the financial vehicles available to the household savings include options that channel the investment into financial products that do not have negative implications for overall levels of sustainability. Examples include green funds for retirement-investment vehicles as well as a variety of new financial instruments being offered from banks and credit unions (e.g., targeted deposits that the financial institution invests in solar energy or from which it donates some profits to local environmental organizations).

The concept of resilience as including not only economic but also material reserves also suggests the potential for additional tax incentives for investments in material reserves. The policies would be most attractive for upper-income households. Examples include incentives for households that have invested in a power-transfer switch, generator, electric battery-powered sump pumps, wood-stove back-up systems, distributed renewable energy, and energy storage for solar panels. Some of the incentives exist already, but the analysis of household-level resilience suggests a broader incentive spectrum than those currently available for weatherization, energy-efficient appliances, and distributed renewable energy. Even a fossil-fuel generating investment such as a generator or back-up wood-fired stove may be broadly beneficial, provided that it is used rarely, saves resources for households and governments in the event of a disaster, and channels rebound-effect savings away from other consumer expenditures and investments that reduce sustainability.

At a higher level of scale than the household, there are some other, perhaps counterintuitive implications of thinking about sustainability and resilience together. For example, having distributed energy systems (such as rooftop solar) that use the smart grid as a bank for energy savings and withdrawals is less resilient than a system that stores excess electricity via hydrogen or batteries located on site, because a grid failure would affect many buildings. Combining both systems would be even more resilient, but there would be additional economic and environmental costs. Likewise, a bus-based public transportation system with multiple fuel sources (diesel, biodiesel, natural gas, and electricity for downtown circulators) is more resilient than a system that is heavily reliant on rail and powered by electricity, but it might be less sustainable in terms of conventional metrics such as greenhouse-gas emissions. Having a food production and delivery system that includes access to distant food sources as well as a vibrant local system of farms, community gardens, private gardens, and farmers’ markets is more resilient than one based solely on either local or global supply chains. (This issue gets into the food-miles controversy, but it does so from the perspective of resilience rather than just carbon footprints.) Likewise, a financial system based on banks that are too small to affect the system when they fail rather than too big to fail is also likely to be more resilient. Here, concepts such as “global localism” may provide a source of inspiration for the design of systems and policies that avoid survivalist retreatism but increase the resilience of cities and regions (Hess, 2009).

As the environmental crises deepen, it is possible that governments will react in increasingly proactive ways to avert the worst catastrophes by developing comprehensive sustainability policies. However, to date the pace of intervention on global warming, resource depletion, toxic exposure, and habitat destruction has not been rapid enough to stave off further degradation. As a result, it seems increasingly likely that the twenty-first and twenty-second centuries will have increasing incidences of drought, flooding, epidemics, food shortages, homelessness, contamination, weather-related disasters, warfare, and crime. The problems will only magnify economic crises that have emerged from the financialization of the global economic system, which may be a long-term phenomenon. Although the escalating environmental and economic problems will rest most severely on the shoulders of poor people living in coastal regions of developing countries, the effects are likely to spill over into all countries. As a result, even for households in wealthy countries, issues of resilience will
increasingly become interwoven with those of sustainability, and the policies for sustainable consumption as well as for the sustainable design of buildings and large technical systems, will increasingly need to take resilience into account.

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