The three-front war: pursuing sustainability in a world shaped by explosive growth

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This article characterizes the pursuit of sustainability as a three-front war. Success requires reductions not only in the environmental impact per unit of economic activity, but also in the economic growth to which we have become accustomed and the inequality that has accompanied it. To explain the difficulty in responding to this threefold challenge, the article reviews historical data on the evolution of the global economy. In the subsequent discussion, I argue that the explosive growth experienced since 1950 has created a world in which rapid progress toward and beyond affluence is “business as usual.” The pursuit of sustainability is difficult in large part because it takes place within this world shaped by explosive growth. An income transition is suggested as part of the effort to win the three-front war.

KEYWORDS: economic growth, world economy, resource consumption, social behavior, affluence, environmental impact

Introduction

Over the past half century, the earth’s ability to support human activity has become an increasing concern due to a long sequence of adverse impacts from the effects of pesticides (brought to the public's attention in 1962 by Rachel Carson) to the emission of greenhouse gases leading to climate change (IISD, 2006). In response to this concern the scientific community has begun to identify boundaries within which the effects of human activity should remain (Rockström et al. 2009). In the policy arena, this concern has led to demands for a shift toward sustainability in human activity. While the notion of sustainability is, in the words of a recent review article, “creatively ambiguous” (Kates et al. 2005), what its pursuit entails is generally clear: the modification of human activity to reduce the pressure it places on the environment.

This article’s framing of the pursuit of sustainability as a “war” builds on other similar usage, such as President Lyndon Johnson’s War on Poverty in the 1960s in the United States (Newman & Jacobs, 2010). As in Johnson’s case, the use of the term “war” here is meant to convey the issue’s seriousness and the pressing need to address it. The identification of “three fronts”—lessening the environmental impact per unit of economic activity, lowering the worldwide rate of economic growth, and addressing global income inequality—builds on an active discussion in current literature. Tim Jackson’s (2009) treatment of relative and absolute decoupling brings the first two fronts into focus and makes it clear that success in addressing both is essential. Reports that consider the environmental impacts of success in development make clear the importance of the third front (Commission on Growth and Development, 2008). Framing the pursuit of sustainability as a “three-front war” indicates that progress on all three is not only desirable, but necessary. The purpose of the article is to marshal evidence from recent work in economic history and other areas to support that point, to explain why fighting the three-front war will be difficult, and to begin to explore ways it might be effectively fought and won.

The article begins by presenting evidence supporting the characterization of economic growth since 1950 as “explosive” and showing how that growth has shaped our current expectations. Our world today is characterized as a global consumer society poised on the brink of affluence. To put a human face on this characterization, a group of examples explores the pervasive impact of explosive growth throughout the world. Turning to the pursuit of sustainability in that world, the need to substantially reduce both the environmental impact per unit of economic activity and the pace of growth in economic output is explained using the metaphor of running down an up escalator. Looking ahead, most of the anticipated growth in output comes from growth in income (i.e., output per capita) not population, so to lower growth in output one needs to lower growth in income. How might such a reduction come about? The article argues for an income transition in which high income nations forgo further income growth, thus allowing other nations to reduce the pace of their income expansion while still closing the gap with the
West. The article does not discuss the income transition in detail. It instead provides a computation showing that such a transition could in principle provide the basis for progress in the “three-front war.” Vision and measurement are suggested as useful points of departure for this effort.

This article is largely a work of synthesis and interpretation. There are, however, three somewhat novel aspects. The first is the development of numerical criteria for consumers and for affluent and near-affluent societies. These criteria provide a quantitative basis for the claim that the world today is a global consumer society poised on the brink of affluence. The second is the use of the spread in income between the nations of the West and the rest of the globe as a measure of global inequality. This measure has particular relevance in the pursuit of sustainability. Finally, descriptive devices—the three-front war, the escalator, and the income transition—are used to develop the argument (see also Wilk, 2010 and Princen, 2010 in this issue). While this approach rests on other scholarship, each element brings a bit of novelty and, hopefully, clarity to the twists and turns of a complex argument.

The Long View

The business press routinely provides quantitative information on the state of the economy. Those who follow economic affairs are so used to receiving this reporting that it comes as something of a shock to recall that its availability is a relatively recent development. Data on the standard measure of a nation’s economic output—gross domestic product (GDP)—only became widely available in the 1950s. However, economic historians have been able to develop estimates for earlier years. One of the most remarkable achievements of this sort is the work of Angus Maddison. Drawing on a variety of sources, Maddison (2007) developed data on GDP that cover the entire globe and span over 2,000 years. In addition to their remarkable scope, two features make Maddison’s data particularly useful:

- GDP is developed at the national level using local currencies and there are various ways to convert it to a common currency. Maddison uses purchasing power parity (PPP), a technique designed to produce comparable data on the prices paid for consumer goods and services.
- As initially developed, data on GDP reflect inflation, but Maddison’s data have the effects of inflation removed.

These features ensure that, to the extent possible, Maddison’s GDP data provide a consistent picture of output through time at the national, regional, and global levels.

Table 1 provides global-level historical information drawn from or developed using Maddison’s data. The information covers the preindustrial and industrial eras (i.e., before and after 1820). The two eras are subdivided to indicate the variation in growth within them. Following Maddison, the financial data are all in 1990 dollars. Based on the Consumer Price Index (CPI), if the data were expressed in current (i.e., 2007) dollars, they would be about 60% higher.

Table 1 begins with output. This measure is followed by population and then income, defined as usual to be the ratio of output to population (i.e., average real GDP per capita). The income data provide an indication of the volume of goods and services that could be provided to each person, adult and child, if output of the global economy was divided equally. While income is derived from output and population, it is often useful to turn things around and to think of population and income as giving the “length” and “breadth” of the economy’s output. Just as length times breadth defines the area of a rectangular field, so population times income determines output. Thus, if population increases by a factor of 2.5 and income more than triples, output increases nearly eightfold. Since 1950, that is roughly what has happened.

The spread, shown at the bottom of Table 1, is the difference in income between two groups of nations: what Maddison refers to as “the West” (Western Europe, North America, Australia, and New Zealand) and the rest of the globe (“the Rest”). In 2003, income in the West was US$23,710 while for the Rest it was only US$4,217. Thus, for 2003, the spread was US$19,493. Unlike the first three data series shown in the table, the spread is not a standard macroeconomic measure. However, its use is well supported. The divergence between the West and the Rest is a current area of interest in economic history (Pomeranz, 2000). Comparisons of incomes provide standard measures of inequality. What is new here is the use of the term “spread” and the focus on the difference, rather than the ratio of incomes generally emphasized (Berry & Serieux, 2007).

There are many measures of global inequality and each provides a different perspective on the global income distribution. Gini coefficients, the

| Table 1 Economic growth over the long term. |
|------------------------------------------|
| Output (US$ billions) | 1 | 1000 | 1820 | 1950 | 2003 |
| Population (millions) | 226 | 267 | 438 | 2,526 | 6,274 |
| Income (US$ per capita) | 116 | 126 | 214 | 6,274 | 19,493 |
| Spread (US$ per capita) | -25 | 622 | 5,171 | 19,493 | |
most common measure of inequality, show stability, particularly since 1950 (Milanovic, 2005). Analysis based on the US$1.25-per-day “poverty line” used by the World Bank suggests progress in poverty reduction (Chen & Ravallion, 2008). Consideration of the spread shows that, even if one accepts these results, and many do not (e.g., Reddy & Pogge, 2005), there is still reason for concern about worsening global inequality. The spread provides a measure of the difference in the goods and services that, on average, incomes in the West and in the rest of the world can purchase. The data in Table 1 show that over the industrial era massive income growth has been accompanied by an even greater increase in the spread. Since 1820, per capita income has increased by roughly US$6,000, but the per capita spread has grown by about US$19,000. Most of the increase in both measures has occurred since 1950.

In large part, it is our experience that shapes the future we anticipate. In particular, patterns of change in recent historical data provide the basis for “business-as-usual” scenarios. Table 2 shows such a scenario for the global economy in the year 2030. The output, population, and income data were produced by Maddison. They are well known and have been widely cited by experts in discussions of macroeconomic issues (e.g., Federal Reserve Bank of Kansas City, 2006). The spread for 2030 was computed from Maddison’s income projections.

On one hand, some analysts claim that a scenario based on “business-as-usual” is too optimistic. In the early 20th century, economic growth was below the rather wide range suggested by previous experience (World Bank, 2007). It is possible that experience in the early 21st century will be similar. However, if the rate of growth through 2030 proves to be the same as that seen from 1913 to 1950, a period with two world wars and the Great Depression, global output in 2030 would still reach US$67,485 billion, about 65% more than in 2003. On the other hand, there are those who assert that Maddison understates the likely pace of future economic growth. For instance, Nobel laureate Robert Fogel (2007), who received the prize in economics for work related to long-term growth, expects a much more rapid pace. In light of these considerations, the more than doubling of global output in 27 years shown in Table 2 is a midrange scenario.

**Explosive Growth**

The data in Table 1 make it clear how much of the growth experienced over the last two millennia is packed into the period since 1950. In the years through 1000 there was almost no change in output, population, or income. Over the next 820 years there was growth, but its pace was very modest. After 1820 things changed dramatically. Within the industrial era, the years since 1950 account for most of the increase. This “end-loading” of growth is particularly striking for output. In 1950, output stood at only 13% of its 2003 level.

There are two effects at work in Table 1, each of which contributes to the remarkable change since 1950. First, rates of growth are increasing. For output, the rate was 0.2% per year from 1000 to 1820, 1.6% per year between 1820 and 1950, and 3.9% per year since 1950. In addition, there is a “size effect.” The growth experienced between 1820 and 1950 determines the starting point for the subsequent growth. Had growth rates remained at the pre-1820 level, output in 1950 would have been US$918 billion, not US$5,337 billion as shown in Table 1. With this lower starting point, the annual growth rate of 3.9% since 1950 would have contributed US$6,056 billion to global output in 2003, rather than the US$35,576 billion that was actually added.

The combined impact of high growth rates and the size effect becomes greater as one moves closer to the current day. The period from 1990 to 2003 accounts for about one-third of the increase in output seen over the last 2,003 years. Change at the pace maintained by the global economy since 1990 is rarely seen in day-to-day life. Were ordinary life to speed up to match that pace, very strange things indeed would occur.

For instance, imagine a chance encounter with a friend’s son who you last saw three weeks ago on his tenth birthday. Suppose the child’s growth over the three weeks bore the same relationship to his previous growth as the growth in global output since 1990 has to its previous growth. If the boy was four feet tall on his birthday, he would be six feet tall three weeks later. A child growing two feet in three weeks would be shocking. For the global economy, packing one-third of the growth in output seen over 2,003 years into the last thirteen is an equivalent “growth spurt.” However, it is not shocking because, in terms of individual human experience, three weeks is “short” while thirteen years is “long.”

The years since 1950 have been a period of explosive growth. Normally, when explosions occur, the response is to take cover and wait for things to return to normal. However, if the explosion goes on

### Table 2 Projections for 2030.

|               | 2003  | 2030  |
|---------------|-------|-------|
| Output (US$ billions) | 40,913 | 96,580 |
| Population (millions)  | 6,274  | 8,175  |
| Income (US$ per capita) | 6,516  | 11,814 |
| Spread (US$ per capita) | 19,493 | 28,581 |

(Data from World Bank, 2007, and Maddison, 2001).)
for decades it becomes part of ordinary life. That is where we find ourselves today.

Consumption and Affluence

Our world today is shaped by the explosive growth experienced in the recent past and by the expectation that this growth will continue with only temporary setbacks. To begin coming to grips with that world consider a simple question: “What are we?” In responding, context matters. Here the context is global. This rules out a host of parochial responses, such as “We are Americans” or “We are Hindus.” Answers will reflect the respondents’ sensibilities and concerns. Some might say, “We are all children of God.” Others might respond that “We are part of the web of life on Earth.” One can imagine the same individual giving either of these responses if relations among different religious groups or stewardship of the natural resources that sustain us were uppermost in his or her mind when the question was asked. Here what is uppermost in mind is the impact of explosive growth. The response on which our discussion will focus is the following: We are a global consumer society poised on the brink of affluence.

The remainder of this section develops and applies criteria for a nation or a region of the globe to be considered a consumer or an affluent society using Tables 1 and 2 and the data upon which they rest. The results of this exercise are summarized in Table 3. They show quite clearly the emergence of the global consumer society at the “brink of affluence” (i.e., near affluence). The following section addresses current attitudes and behaviors relevant to consumption and affluence. Together, this quantitative and qualitative discussion provides a picture of the world shaped by explosive growth.

It is common to refer to the nations of the West as consumer societies. However, most of the rest of the world is much poorer than the West and it may seem odd to regard these people as part of a global consumer society. Nonetheless, that description is becoming increasingly appropriate. Research has shown that individuals become “consumers” when household income for a family of four reaches US$1,800 per capita (measured in 1990 dollars) (Myers & Kent, 2004). The US$1,800 figure fits well with recent work by Martin Ravallion, a World Bank economist known for his analyses of global income issues. Ravallion (2009) defines the “developing world middle class” as comprising people with incomes of US$2 to US$13 per day in 2005 dollars. Expressed in 2005 dollars, the US$1,800 standard is roughly 50% higher, placing it at about the midpoint of the US$2 to US$13 interval. In 2005, out of a population of 6.5 billion, 2.6 billion were living on $2 a day or less, another 2.6 billion on US$2 to US$13 a day, and 1.3 billion on over US$13 a day. The top group are all consumers. So are many people in the middle group. Indeed, as a recent report by The Economist (2009) makes clear, the process of becoming a consumer takes place gradually as income rises above US$2 per day. Thus, in 2005 the number of consumers in the world was between 1.3 and 3.9 billion. The West and the other high-income nations, with a population of fewer than a billion, accounted for only part of them.

At a certain point, the number of consumers becomes sufficient to change the character of a nation or region, making it a consumer society. We define consumer societies as nations or regions in which average per capita income is at least twice the US$1,800 level. This indicates that a substantial proportion of the nation’s or region’s population qualifies as consumers. Maddison’s data show that, by 2003, incomes in all the major nations and regions of the globe except India and Africa exceeded the US$3,600 threshold. In 1950, only the nations of the West had incomes that high. Looking ahead, Maddison’s projection for India’s income in 2030 is US$7,089, far above the level required to become a consumer society. Based on Maddison’s projections, only in Africa does the development of a consumer society lag significantly.

The affluent society, discussed in John Kenneth Galbraith’s (1958) well-known book of that title, provides a second point of reference for global income growth. Many things about the initial affluent society were unique to the United States, but if one examines historical data on income for the country (Maddison, 2003), a general criterion for an affluent society can be developed. During the 40 years pre-

| Type of Society | Income Threshold (US$1990) | 1950 | 2003 | 2030 |
|-----------------|---------------------------|------|------|------|
| Consumer        | 3,600                     | 19.2 | 69.7 | 82.3 |
| Affluent        | 8,900                     | 6.2  | 13.8 | 32.3 |
| Near Affluent   | 6,675                     | 6.7  | 15.5 | 82.3 |
ceeding the start of World War II, the range of income in the United States was roughly US$4,100 to US$6,900 (in 1990 dollars). During the war there was a dramatic increase, after which high levels of income persisted. Average per capita income of US$8,900 or more during this period provided the basis for the emergence of an affluent society.

An income of US$8,900 can be regarded as a threshold for the emergence of an affluent society. Using that figure, along with Maddison’s data and projections, one can follow the progress toward affluence on a worldwide basis in a fair degree of detail. In 1950, only the United States and Switzerland had an income at or above US$8,900. During the subsequent 60 years, the remainder of what Maddison calls “the Rich” (the nations of the West plus Japan) have all become affluent. Indeed, by 2003, all of them had incomes of more than twice this threshold value for affluence. Among the other nations and regions of the world, incomes rose between 1950 and 2003, but not to the level of affluence. However, if Maddison’s projections prove accurate, by 2030 roughly one-third of the world will reach this level.

As shown in Table 2, Maddison projects a global income in 2030 well above the US$8,900 threshold for affluence. In part, this reflects the incomes of the Rich, which are expected to reach four times the threshold. However, the other regions and nations are projected to have an income of US$8,504 in 2030, just shy of the threshold level. To show the progress toward affluence anticipated in Maddison’s projections, data on “Near Affluence” (i.e., income at or above 75% of the threshold for affluence) are included in Table 3. In 1950 and 2003 there was little difference in the nations and regions that qualified as affluent and near affluent, but by 2030 most nations and regions are near affluent. Based on Maddison’s projections, only Africa fails to reach near affluence.

Meet the People

As the data in Table 3 show, in 2003 about 70% of the world’s population was part of a consumer society. Continuation of the explosive economic growth we have come to regard as “business-as-usual” will bring most nations and regions to near affluence in 2030. In order to come to grips with the implications of these developments, the following discussion assembles a few anecdotes from several sources about life in various parts of today’s world.

- Vidya lives with ten members of her family in a single room on the outskirts of Mumbai, a large city in India. Her home has no running water or refrigerator, but there is electricity for three light bulbs and a couple of fans. Vidya works at a bank. Her goal is to save enough to purchase a car (Worldwatch Institute, 2008).

- Casas Bahia, Brazil’s largest retailer, has recently opened its first store in a favela (“slum”). Customers flock to the store because it offers installment purchase plans designed for those without credit cards or even bank accounts. As Maria, a resident of the favela, explains, “Everything I have comes from Casas Bahia” (Economist, 2009).

What is striking about Vidya is the gap between her current circumstances and her goal. India has had very rapid economic growth since the early 1990s. When such growth continues over a period of years it becomes “reasonable” to plan, as Vidya does, for dramatic leaps in consumption. Her goal mirrors the American experience as it became an affluent society. Rapid growth in ownership of a wide range of consumer goods, including cars, was a defining feature of the early postwar period in the United States. Maria’s words explain all too clearly how aspirations such as Vidya’s are becoming reality today. The emergence of a consumer society has been supported by the appearance of department stores and, more recently, shopping malls. Comparative studies show uniformity in these developments across the globe (Stearns, 2006).

- College students in the United States were asked to consider two different possibilities when they graduated and entered the work force. Either they would earn US$50,000 a year while their classmates averaged US$25,000 or they would earn US$100,000 while their classmates averaged twice that amount. The students were asked which possi-
bility they would prefer. Most chose the first option (Layard, 2005).

- The Birkin is a luxury handbag. Despite its high price, there has been a waiting period to purchase one. What creates such a demand? As one reviewer of the book *Bringing Home the Birkin* explains, “For a woman of a certain class anywhere in the world, carrying one is the quickest way to telegraph to other women, ‘I win.’ And so some of them will do or pay just about anything to get one” (Muhlke, 2008).

The behavior of both the college students and the “Birkin ladies” provides examples of positional concern—valuing one’s income and possessions based on their relationship to those of others. For the Birkin ladies, there is always something new—weekly sessions with the most desirable personal trainer or the most expensive vehicle to drive or be driven in—that allows the message “I win” to continue to be sent. Similarly, as the college students go through life, they can continuously shift their focus to ever-richer peer groups, driving them to seek ever-higher incomes simply to send the same signal, “I win.” In these ways, positional concern fuels insatiable demand. It goes a long way in explaining how the Rich manage, year in and year out, to absorb vast amounts of additional goods and services.

The Birkin ladies and others like them are the last link in a chain of aspiration that begins with billions like Vidya and Maria and binds together the global consumer society. In the United States, historical studies have shown that, over time, the less-well-off portion of a population develops an ever-broader set of “wants” that reflect the consumption patterns of higher income reference group (e.g., Brown, 1994). A global version of this process is underway today. The emergence and rapid spread of mobile phones has helped to create a global reference group. Only a few decades after the technology’s introduction there are billions of subscribers worldwide (Castells et al. 2007). Contemporary phones can take and transmit pictures, access the Internet, and carry television shows and video downloads. And where are the Birkin ladies in all of this? They are characters on television programs and participants in “news” videos that increasingly define international consumer aspirations.

### Going Down the Up Escalator

Having “set the stage” we are now ready to address sustainability. A thorough discussion would touch on a wide range of issues including water use, preservation of biodiversity, and the environmental impacts of emissions of various types. Here, to keep things manageable, the discussion will focus on just one of the major concerns—climate change due in large part to the carbon released when fossil fuels are burned.

Recent historical experience leading to an expectation of continuing explosive economic growth provides the context for considering the pursuit of sustainability. Maddison (2003) describes the linkage between carbon emissions from fossil-fuel use and the increase in economic output since 1820 and expected through 2030. Intensity, that is the amount of carbon emitted per dollar of economic activity, provides the connection between output and emissions. As shown in Table 4, intensity has fallen since 1950. Maddison projects the rate of decline to be even greater in the future. However, the effects of the decline in intensity have been and are expected to be more than offset by growth in output. As a result, emissions from the use of fossil fuels are projected to continue to grow. While their rate of growth declines over time, the amount to which the rate applies increases. The combined effect is shown in the bottom line of Table 4. The amount of additional carbon emissions each year through 2030 remains substantial.

Table 4 depicts a world that was walking down an up escalator between 1950 and 2003 and, based on Maddison’s projections, will be running down through 2030. The escalator is the growth in output. The pace of the walk and run is indicated by the rate of decline in intensity. While the declines shown in Table 4 may appear modest, over time the reductions in intensity have large consequences. Since 1950, intensity has been cut roughly in half. Looking ahead,
Maddison (2003) projects a roughly similar cut over half as many years. We can, and should, respond to climate change by “running,” that is by continually striving to increase the efficiency of our fossil-fuel use. However, while it is possible to identify options for improving efficiency, getting them adopted has proved difficult even when they are very cost effective (Cowart, 2001). Furthermore, success in energy-conservation efforts is often accompanied by “re-bound” in demand resulting in additional fossil-fuel usage (Gottron, 2001). Thus, running is, by itself, a very risky response to emissions growth.

The details of the discussion above are specific to the use of fossil fuels. However, similar points can be made concerning a wide range of sustainability issues. We can, and should, be more “efficient” in our use of all nonrenewable natural resources as well as freshwater and land, particularly forested areas. However, in each case, the effects of the “economic growth escalator” will offset the effects of increased efficiency. Indeed, as Princen (2005) has argued, pursuing efficiency generally fosters additional consumption. Thus, as with fossil fuels, avoiding a risky reliance on increasing efficiency alone puts slowing the pace of growth in output on the agenda.

What are the prospects for a significant decrease in the pace of growth in economic output? To make an assessment, one needs to examine the drivers of that growth. As noted earlier, output is the product of income and population. The data in Table 1 show that over the industrial era the contribution of population to growth in output has decreased and that of income has increased. Looking ahead, the projections provided in Table 2 suggest a continuation of this trend. Population growth accounts for only 30% of the 136% increase in output through 2030. Thus, getting off the economic growth escalator means making a set of personal and political choices that reduce growth in income.

Table 5 Possible paths for emissions.

|                        | Reference Case (Maddison) | No Growth in Emissions |
|------------------------|---------------------------|------------------------|
| Growth–2003 to 2030 (% per year) |                          |                        |
| Population             | 1.0                       | 1.0                    |
| Income                 | 2.2                       | 1.1                    |
| Output                 | 3.2                       | 2.1                    |
| Intensity of emissions | -2.1                      | -2.1                   |
| Carbon from fossil-fuel use | 1.0                    | 0.0                    |

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The scenarios presented in Table 5 illustrate the linkage between growth in income and emissions. Both scenarios assume population growth and declines in the intensity of emissions as in Maddison’s projections. However, the second scenario departs from Maddison, showing the change in income required to keep global emissions in 2030 at the same level as in 2003. This is a very modest goal in light of the current climate-change literature (Worldwatch Institute, 2009). As the results in the table show, to achieve that goal the rate of growth in income needs to be cut to half of what Maddison projects. A drop in population growth would be a welcome addition to the no-growth scenario. However, rather than reducing the need for cuts in income growth, it would simply make a more appropriate bottom line—a decline in emissions through 2030—possible.

Table 5 shows that the historically unprecedented pace of reductions in the intensity of emissions assumed by Maddison is ultimately insufficient to address climate concerns. In addition, anticipated growth in income needs to be cut substantially simply to hold emissions at their current levels. Unfortunately, that is not where we are headed. While acknowledging the modest degree of downshifting that has occurred in the United States and elsewhere since 2008, virtually all evidence suggests that among the Rich, ever greater income and consumption remain foremost objectives. Affluence is increasingly the goal throughout the developing world. As income growth moves new billions into the consumer society, the local and global media provide ever more distant points of reference, creating a treadmill of raising aspirations. Achieving affluence, or vastly exceeding it, rather than addressing climate change and other environmental concerns, is becoming the primary concern of an ever larger proportion of the global population.

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Table 5 shows that the historically unprecedented pace of reductions in the intensity of emissions assumed by Maddison is ultimately insufficient to address climate concerns. In addition, anticipated growth in income needs to be cut substantially simply to hold emissions at their current levels. Unfortunately, that is not where we are headed. While acknowledging the modest degree of downshifting that has occurred in the United States and elsewhere since 2008, virtually all evidence suggests that among the Rich, ever greater income and consumption remain foremost objectives. Affluence is increasingly the goal throughout the developing world. As income growth moves new billions into the consumer society, the local and global media provide ever more distant points of reference, creating a treadmill of raising aspirations. Achieving affluence, or vastly exceeding it, rather than addressing climate change and other environmental concerns, is becoming the primary concern of an ever larger proportion of the global population.
An Income Transition

Change in population depends on the difference between the birth and death rates. Over the industrial era, two major developments involving these rates have occurred. First the death rate fell. Then, with a lag, the birth rate followed. This two-stage movement is referred to as the demographic transition. It is the second stage of the transition—the lagged decline in birth rates—that is of particular interest at present. As with the changes required to reduce the death rate (Riley, 2001) and then to feed the added billions (Evans, 1998), the details of the second stage of the demographic transition are complex. However, looking beyond the details, a key point emerges. Birth rates have always been far below biological potential. In the past, the rates chosen were appropriate for rural, agricultural societies with high infant and early childhood mortality (Clark, 2007). The recent drop reflects a number of factors including the shift from agriculture to industry and commerce, the expansion in education and work opportunities for women, and growing urbanization. In this new environment, having fewer children “makes sense.”

The industrial revolution ushered in an era of rapid income growth as well as population growth. It is possible that, as with population, there could be a lagged choice to reduce the rate of income growth, creating an income transition. Were it to occur, such a reduction would be a complex phenomenon. Its timing would differ among nations, as would the specific developments fostering it and the changes accompanying it. However, to take place, the reduction would need to be generally recognized as part of a strategy for the pursuit of well-being. The importance of this motivation rests on recent findings at the border between psychology and economics that show that people have a general propensity to reject change even when it would be individually advantageous to accept it (Thaler, 1992). Thus, for change to take place a powerful force, such as the pursuit of well-being, must be behind it.

How might low or even no-income growth fit into a strategy for the pursuit of well-being in today’s world? To begin to answer this question, a brief comparison of the United States with France is useful. Labor productivity (i.e., GDP per hour worked) is about equal in these two nations. However, work time in France is significantly less, reflecting a 35- rather than 40-hour week, a 40- rather than 46-week working year, and other differences. As a result, France has a significantly lower level of per capita income than the United States (Alesina et al. 2005). These differences reflect choices by the French to limit the work week and to mandate specific minimum levels of annual vacation. Similar choices have been made in the past in various nations of western Europe (Eichengreen, 2007) and they could, at least in principle, be made in the United States as well. Other choices could also be made. For example, a “sabbatical policy” could provide time off at reduced pay during the course of a worker’s life, funded using a mechanism similar to Social Security. There is a variety of evidence that choices such as these would enhance the well-being of workers in the United States:

- Survey data show that American workers’ ideal hours of paid work are much less than actual (Jacobs & Gerson, 2004).
- Analyses of European vacation/leave policies have identified positive impacts on well-being (Alesina et al. 2005).
- Recent examples show that Sabbaticals, even at a small fraction of full salary, are attractive (Dominus, 2009).

While the evidence just presented is specific to the United States, the argument for a shift to the pursuit of well-being via time rather than material affluence is broadly applicable to all the rich nations. A reduction in paid work would provide additional time for other parts of workers’ lives, such as family, friends, and civic activities, which could contribute to enhancements in well-being. Studies have shown that work, and the commute associated with it, is, in general, the least satisfying part of an individual’s day (Frey & Stutzer, 2002; Kahneman et al. 2004). Fewer work hours would also help people to reduce the stress that often accompanies the increasing intensity of work in all the rich nations (Green, 2007). This, in turn, would improve physical well-being by reducing stress-related disorders (Helman, 2007). When considering these arguments, it is useful to note that while workers in most rich nations have shorter hours than their counterparts in the United States, there is evidence that reductions in working hours would still be broadly attractive (Victor, 2008).

For the nations of the West, the argument for a shift away from income growth as part of the pursuit of well-being and sustainability has been discussed by Juliet Schor (2005) and others. However, the developments that might lead the rest of the world to make a similar shift have received less attention. As in the West, there is recognition of the environmental impacts associated with economic growth, reflected, for example, in China’s rapid recent development of...
wind as a source of electricity generation (Bradsher, 2009). However, concern about the environment alone is not likely to provide a sufficient impetus for developing nations to reduce the pace of their income growth. The West provides the model for the pursuit of well-being. So, if a focus on time rather than material affluence takes hold in the West, it will likely spread, first to other rich nations and then more broadly. However, to effectively foster lower income growth in the rest of the globe, the pressure to catch up with the West also needs to be reduced. The spread shown in Tables 1 and 2 provides a measure of the difference in the goods and services which, on average, incomes in the West and the rest of the world can purchase. In the current global consumer society, the magnitude of this difference is well known in the developing nations. To increase the likelihood that they will limit the pace of their income growth, the spread needs to be reduced.

Table 6 shows Maddison’s projections for income in 2030 and an alternative that illustrates an income transition. As in the “no-growth” scenario presented in Table 5, the transition scenario assumes that growth in global average income is held to 1.1% per year. This is roughly half the pace achieved from 1950 to 2003 and projected by Maddison for the future. In the transition, income in the West remains constant, reflecting a very strong shift in focus to time affluence. Zero income growth in the West allows the developing nations to grow a bit more slowly and sustainably while still narrowing the income spread. Income growth elsewhere around the world is less than in Maddison’s projections, but still sufficient to move the Rest to near affluence. Rather than rising by over US$9,000, the spread falls by nearly US$3,000. Growth of 1.1% per year in income rather than Maddison’s 2.1% provides a lower output in 2030. As in Table 5, the reduction in output, along with Maddison’s assumed decline in intensity, results in no growth in carbon emissions from fossil-fuel use. This point is highlighted in the bottom line of Table 6.

The income-transition scenario presented in Table 6 shows progress, reducing carbon emissions in 2030 below what was expected based on Maddison’s business-as-usual assumptions. The progress is modest, holding emissions to 2003 levels rather than reducing them. However, the changes required to produce this progress are substantial and the possibilities for failure numerous:

- Income in the West in 2030 is held to the 2003 level, a reduction of more than one-third from Maddison’s business-as-usual figure.

One can imagine many ways in which each of these three interlocking parts could fail to come together to produce what is assumed. Consider the West. There is a spread in income among the nations in this group. Those at the “low end” might demand convergence, requiring the incomes for those at the top to fall if there is to be no change over all. Those at the “top end” may resist such “degrowth.” The challenge for those committed to the pursuit of sustainability is to find ways to successfully address all the key parts.

Conclusion: Fighting the Three-Front War

The need to reduce the intensity of environmental impact per unit of economic activity and the pace of growth in output makes the pursuit of sustainability a “two-front war” (see Wilk, 2010 and Princen, 2010 in this issue). The second front raises the issue of an income transition. When one considers the requirement for such a transition to extend beyond the West to the entire globe, the need to address income differences as well as intensity and output turns the pursuit of sustainability into a three-front war. The world in which we live, where exploitive economic growth has become “business-as-usual,” makes fighting that war difficult.

How might the struggle for victory begin? The answer offered here is with a vision for the future and a way of measuring our progress toward it. Donella Meadows (1994) explained the role of vision quite clearly: “Vision is the most vital step in the policy process. If we don’t know where we want to go, it makes little difference that we make great progress.” Meadows went on to explain how a vision should be

### Table 6 An income transition scenario.

|                      | 2003 | 2030 Maddison’s Projections | An Income Transition |
|----------------------|------|-------------------------------|---------------------|
| Income (US$1990):    |      |                               |                     |
| Global               | 6,516| 11,814                        | 8,755               |
| The West             | 23,710| 37,376                        | 23,710              |
| Rest of the Globe    | 4,217| 8,795                         | 7,157               |
| Spread (US$1990):    |      |                               |                     |
| 19,493               |      | 28,581                        | 16,553              |
| Annual carbon emissions (millions of metric tons) | 6,705 | 8,794 | 6,705

- There is a roughly 25% reduction in income growth in the rest of the world compared to Maddison’s projections.
- The cuts in income growth are accompanied by substantial decline in the intensity of emissions assumed by Maddison.
developed: “The process of building a responsible vision of a sustainable world is not a rational one. It comes from values, not logic.”

The discussion leading to our framing of the pursuit of sustainability as a three-front war suggests the values to guide the visioning: quality of life rather than greater income, global solidarity rather than global competition, and environmental stewardship rather than unlimited use of limited resources. As Barry Hughes & Evan Hillebrand (2006) explain, these are the values that increasingly inform global initiatives today. The notion of plenitude developed by Juliet Schor (2010) is an example of a vision driven by these values. Schor focuses primarily on the West. However, her introduction clearly acknowledges the need to situate change in the West in the global context. For the West, the key aspects of plenitude are increased well-being and “cutting-edge green technology,” features that resonate clearly with our discussion of what is required for a successful income transition. Plenitude is a serious and important effort to provide the type of vision needed to help guide the fight in the three-front war.

Measurement follows vision. Once we know where we want to go, we need to be able to tell if we are moving in the right direction. The choice of a good indicator is crucial. We need a simple, clear replacement for our current indicator—real GDP—one that increases with gains in quality of life, global solidarity, and environmental stewardship. The Quality of Development Index (QDI) formulated recently by the Tellus Institute (Rosen et al. 2010) provides an example of the type of indicator required.

Why put so much emphasis on measurement? The answer is in a well-known aphorism, generally attributed to management consultant Peter Drucker, “What gets measured gets done.”

A global consumer society poised on the brink of affluence is the context for the pursuit of sustainability today. As the results in Table 6 show, it is easy to describe a pattern of change that makes progress. The difficulty lies in overcoming the effects of explosive economic growth on our behavior and expectations. We have come to see such growth as both necessary and desirable. In fact, it is neither. Our ability to recognize that fact and to act on it in a coordinated global fashion will determine whether, in the end, we win the three-front war.

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