Sustainable Consumption and Worktime Reduction

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Summary

This article argues that in the global North a successful path to sustainability will entail a stabilization of consumption through reductions in hours of work, a solution that neither ecologists nor economists have addressed seriously. The article presents data on the slowdown of hours reductions in many countries and discusses the need for policy intervention to counter firm-level disincentives to reducing hours of work. It then discusses the potential popularity of work-hour reductions with consumers. It ends with an argument that technological changes will be insufficient to achieve sustainable consumption patterns and that averting continued increases in the scale of consumption through trading income for time is imperative.

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Introduction

An accumulation of evidence suggests that current and projected patterns of production and consumption are destroying the planetary ecology. This was the conclusion of a majority of the world's scientific Nobel laureates in 1993, when they issued the World Scientists' Warning to Humanity (UCS 1993). Since then, measured ecological decline has accelerated and the world's scientists continue to warn us. Renowned Harvard biologist Edward O. Wilson has argued that if projected trends in consumption growth and population are not altered, within decades "the world will surely have become a hellish place to exist" (Wilson 2002, 27, 34).

Strikingly, economists have mostly ignored these warnings.[1] In some cases, they have engaged in active opposition, arguing either that the ecologists are unduly pessimistic, that they overstate the costs and understate the benefits of the changes being discussed, or that technological change and market processes are sufficient to manage ecological resources. I believe that this stance is founded on unwarranted assumptions and rooted in over-reliance on longstanding, but untenable orthodoxies, such as the ideas that the path of consumption reflects workers' preferences, that continued increases in GDP per capita in the rich countries will yield gains in well-being that outweigh ecological costs, and that the market can solve ecological problems. The need is urgent for economists to discard their shortsightedness and seriously address issues of unsustainable resource use and ecological degradation. On the other hand, the sustainability literature, although attentive to the degradation of planetary resources, has focused almost exclusively on resource-efficient technological change and changes in the product mix. I believe such approaches will be insufficient. I argue instead that in the global North a successful path to sustainability must confront our commitment to growth and will ultimately entail a stabilization of consumption through reductions in hours of work. Indeed, it is difficult to imagine a globally ethical, timely, and politically feasible resolution to the global ecological crisis in which populations in the North do not reduce the number of hours worked per capita.

My argument is arranged as follows. I begin by summarizing the views of ecologists and economists and present a critique of some of the standard economic reasoning with respect to ecological limits. I then discuss the contemporary context for hours reductions by examining recent trends in hours in the Organisation for Economic Cooperation and Development (OECD), and in particular the reversal of historic trends toward shorter hours of work. Next I discuss the structural factors that lie behind the determination of hours. Finally, I turn to a consideration of the common view that stabilization of consumption growth, and by implication reductions in working time, are unnecessary because technological advance will be sufficient to achieve sustainable resource use.

Ecology and Economics

In recent decades, the empirical literature on sustainability has been dominated by ecologists. Their conclusion is that humans are using the planet in unsustainable ways. For example, an update of the pioneering model of Meadows' and Meadows' W3 model, under reasonable assumptions for economic output, population and consumption, consistently produces the worst outcome of overshoot and collapse (Meadows et al. 1992). Another approach has been employed by Stanford ecologists, who have calculated human use of net primary production (NPP) (Vitousek et al. 1986). By the mid-1980s, humans were already appropriating 40% of the NPP that was produced on land (and 25% of the total land and sea NPP). Current trends in population and consumption suggest significant growth in human appropriation, with adverse, if not catastrophic results (Meadows et al. 1992). A related approach measures nitrogen fixing and finds that human activities are now responsible for a level of nitrogen fixing equivalent to all natural sources combined. Nitrogen fixing has a variety of adverse effects including increased concentration of nitrous oxide (a greenhouse gas), increased acid rain and smog, water pollution and algal blooms, and reductions in biological diversity (Vitousek et al. 1997).

Another model is the ecological footprint—an accounting tool that calculates the land and shallow sea area necessary to support a nation's

level of consumption (Wackernagel et al. 1999, 2002). Ecological footprint analysis has been useful in pointing out both gross patterns of unsustainable resource use and global disparities. According to footprint accounting, the planet's biological capacity of 1.91 global hectares per capita was reached in 1978, and by 1999 sustainability was exceeded by 20%.[2] The United States has a 9.57-hectare footprint, now the world's largest. Western European countries are in the 4- to 8-hectare range. All industrialized countries are operating in deficit with respect to ecological footprint, in contrast to poorer countries such as India, China, and Brazil (Venetoulis et al. 2004, 12).

In contrast, economists have been dismissive of ecological models and the idea of natural limits to growth.[3] (For a prominent economist's scornful attitude toward ecological models and natural limits, see work by Nordhaus [1992]). It is common for economists to sidestep the scientific evidence in their critique of the limits-to-growth view, founding their opposition largely on predictions from abstract economic models and extraordinary faith in the ability of technological advance to raise resource productivity. They point to rising crop yields, falling oil prices, the growth of tree plantations, and cultivated fish production as prima facie evidence against the limits-to-growth perspective. This evidence is unconvincing, even according to standard economic reasoning. Perhaps most importantly, the argument that market prices are an accurate reflection of ecological scarcity is specious. First, market participants must not only have access to accurate information, but also be willing to believe it. In the case of ecological decline, the consequences are so far-reaching, uncertainty is so large, and the necessary human adaptation is so immense that humans have a hard time assimilating and accepting the situation. We have seen this in the case with climate change. Such "psychological denial" is consistent with new views of human rationality and decision making emanating from experimental economists, such as framing theory (see below). My own advocacy work in this area, which has included focus group research on consumers' attitudes toward ecological information, supports the idea that there is strong resistance to accepting bad ecological news (see Taylor 2002). Ecosystem decline, furthermore, is typically a complex and nonlinear process whose path may be difficult for market participants to comprehend and predict.

The view that prices accurately reflect scarcity also founders on the fact that property rights determine prices. On the one hand, many of the world's ecological resources are not owned, so their destruction is not reflected in prices. For example, the current price of oil does not account for the costs of climate change to which oil consumption will contribute. Second, the costs of ecological decline are not borne equally and fall disproportionately on the poor. The tens of millions of Bangladeshi citizens whose homes will be flooded by rising oceans are not able to exert pressure in markets to raise the costs of climate-altering activity. Those who are responsible for the majority of carbon emissions (wealthy Americans, for example) will be far less affected than the average global citizen. The failure of the world's wealthy to take ecological decline seriously is as much an equity issue as it is a sustainability one.

Similarly, the argument that rising agricultural productivity will allow us to escape natural limits is also flawed. One reason is that the high-tech agriculture that is the basis of increased agricultural productivity has carried significant ecological and human costs that have not yet been reckoned with. Furthermore, new technologies (such as genetically modified organisms), on which proponents of this view rely for future productivity increases carry unknown and potentially serious risks.

Finally, economists have almost totally failed to reckon with one of the most damaging critiques of their position—the growing survey evidence that casts doubt on the positive relation between expenditures and welfare (or happiness), especially among the affluent. (For a review of the now substantial literature on happiness, see work by Frey and Stutzer [2002]. See also work by Schor [1998].) Once the fallacies in the standard reasoning on welfare are exposed, the case for growth in rich countries becomes significantly weaker.

The foregoing evidence, as well as more that I do not have the space to detail, points strongly in the direction that humans must drastically transform and reduce their utilization of the planet's

ecological resources. Having already achieved high levels of income through intensive exploitation of natural resources, the populations of the North should now open up "ecological space" for the billions of consumption-deprived people in the South with whom we share the planet. (On ecological space, see work by Sachs and colleagues [1998].) The typical economic approach may have been sensible in the eighteenth and nineteenth centuries when modern economic ideas took shape, but it is increasingly hard to defend in the face of contemporary realities.

Happily, a few prominent economists have begun to take sustainability seriously. An important collaboration between Stanford ecologists and economists, including Nobel laureate Kenneth Arrow, Partha Dasgupta, Geoffrey Heal, and Lawrence Goulder, has resulted in a paper entitled "Are we consuming too much?" that is forthcoming in the *Journal of Economic Perspectives* (Arrow et al. in press). The study defined a "sustainable development" path as maintaining the productive base of the economy, so that consumption does not fall in the future, that is, as maintaining intergenerational welfare. Significantly, the authors of the paper conclude that the answer to their title question may well be yes. If they are right, then we are faced with the urgent task of reducing the impact of consumption on the planetary ecology. I turn now to one strategy for doing this—a stabilization of Northern output and consumption growth through the use of productivity growth to reduce working hours, rather than to raise consumption. (For earlier arguments along these lines, see work by Schor [1991, 1995a].)

Trends in Working Hours

For the purpose of my subsequent arguments it may be useful to put contemporary worktime trends in a longer term perspective, and to consider, for a moment, the larger question of the relationship between capitalism and hours of work. The conventional wisdom is that capitalism has been associated with declining hours of work and that it possesses an inner logic that drives down hours of work. This modernist bias is evident in nearly all accounts of the future of worktime, beginning in the 1960s and 1970s, with books such as Daniel Bell's *The Coming of Post-industrial Society* (1973), as well as the more recent and influential work of Jonathan Gershuny (2000), Angus Maddison (1987, 2001), John Robinson (1986), Robinson and Godbey (1999), and others. (For a critique of the modernist perspective, see work by Schor [in press]. On the debate about trends in hours, see other work by Schor [2000].)

The modernist accounts typically begin in the last quarter of the nineteenth century, at which point hours began a sharp downward turn throughout Western Europe and North America, as a consequence of vigorous trade union demands for hours reductions, as well as hours legislation by the state. A longer historical perspective shows the myopia of this view and the errors of interpretation that have resulted from assuming that "capitalism" began in the late nineteenth century. If we look at the earlier phase of capitalist development in Britain (e.g., the seventeenth and eighteenth centuries) we see that that the growth of the market was associated with a sharp upward trend in annual hours, mainly through an expansion of days worked per year but also through longer daily hours (Schor 1992, Rule 1981) As the factory system spread, this upward trend continued, and annual hours in both Britain and the United States reached a peak in the mid-nineteenth century. Because most discussions of the relationship between capitalism and working hours begin at just this point, they conclude that capitalism has yielded both more income and more leisure time. But this is erroneous. Indeed, one can see the error of this perspective by considering the public discourse that developed concerning hours of work by mid-century in both Britain and the United States. Long hours were opposed not only by trade unionists, but also by employers who had begun to realize that the powerful upward pressures on hours that emanated from an unregulated capitalist market were leading to the exhaustion of the labor force and jeopardizing its reproduction. State intervention had become socially rational. Indeed, the fact that business opposition to hours legislation was sufficiently blunted in the late nineteenth century for such laws to pass is prima facie evidence for the view that excessive hours constituted a collective action failure endemic to the system.

After mid-century, the combination of hours legislation and growing trade union power led to declines in hours. Angus Maddison's widely used estimates of annual hours confirm the rapid declines in hours during the period 1870–1938. For example, in France, annual hours worked per capita fell by nearly 1,100, from 2,945 to 1,848. From a common base of about 2,950, hours fell by 625, 296, 720, 717, and 902, respectively in Germany, Japan, the Netherlands, the United Kingdom, and the United States (Maddison 1987). During this same 1870–1938 span, the United States, the United Kingdom, France, and Japan witnessed more extensive hours reductions than in any other period over the last 125 years. Only Germany and the Netherlands experienced greater declines after 1938 than from 1870 to 1938, and the differences between the periods for these two countries are not great (Schor 1997).

Let us now turn to the post-World War II (WWII) period. Table 1 presents estimates of hours for both employed persons and the working age population within the OECD from 1950 to 2000. These data were compiled by Baxandall and Burgoon (in press), using a cross-national database from the University of Groningen that provides more comparative international estimates than earlier data. One clear finding is that reductions in hours of work in the early post-WWII decades were substantial, in what looks very much like a continuation of the pre-war trends. For example, between 1950 and 1980, the average decline in hours per employee across the OECD was 18%. The annual average decline was 0.57% between 1950 and 1973 and 0.7% from 1973–1980. Despite some variation among countries, hours fell by at least a total of 10% in all cases. For example, reductions reached or exceeded 25% in Sweden, Norway, Belgium, Germany, and the Netherlands. The more "liberal" market-oriented countries (Australia, Canada, Ireland, the United Kingdom, and the United States) had the least reduction during those decades. Both the Nordic and continental European groupings witnessed significant declines—22% and 20%, respectively.

After 1980, we see the beginnings of a shift away from a century of declining hours to a potentially general reversal of that trend. Between 1980 and 2000, hours fell much less, by an average of only 0.3% per year, for a total reduction of 7%. In the United States and Sweden, hours have actually increased. In some other countries, such as Australia and Canada, reductions have been less than 0.1% per year. In contrast, the countries of continental Europe did continue to reduce hours. In Austria, Belgium, the Netherlands, and Switzerland, reductions were between 13% and 14% overall, or nearly 0.7% annually. Reductions were also significant in France (9%), Germany (11%), and Ireland (16%). The rate of decline slowed considerably between 1980–1990 and 1990–2000. Among the Nordic countries, where the change was most dramatic, the total reduction fell from 3.2% in the first period to 0.45% in the second. In the continental group the decline was from 6.7% to 5.0%. In the third group, the fall was from 2.5% in the first period to 2.2% in the second. In the period 1980–1990 hours rose only in one country, namely Sweden. From 1990 to 2000, Denmark, Sweden, and the United States had rising hours, and New Zealand showed no change.

Other data suggest that these figures may be understating the increase in hours in some countries. Estimates from the household-based Current Population Survey calculated by the Economic Policy Institute (EPI) show a significantly higher increase in annual hours per working person in the United States than the OECD figures, because the OECD estimates for earlier years are considerably higher than the EPI figures (table 2) (Mishel et al. 2002). (The 2000 estimates are identical.) The EPI estimates show that after 1967, annual hours have increased in every subperiod and are now about 200 hours higher than in 1973 (versus a mere 3-hour [hr] difference in the OECD data). The excess of productivity growth over hours change, that is, the sum of productivity growth and hours change, rose to a nearly four-decade high of 3.1% in the period 1995–2000 (table 3). Similarly, Maddison (2001) also finds evidence of greater increasing hours than in the Groningen data. By his calculations, annual hours per employee increased between 1990 and 1998 in four European countries—Denmark, Italy, the Netherlands, and Sweden.

Table 1 Annual hours worked per employee and per working-age person

	Annual hours per employee						*Change*		*Annual hours per working-age person*				*Change*
	1950	*1960*	*1973*	*1980*	*1990*	*2000*	*1950–1980*	*1980–2000*	*1973*	*1980*	*1990*	*2000*	*1980–2000*
Nordic													
Denmark	2,071	1,929	1,580	1,582	1,492	1,541	−24%	−3%	1,188	1,178	1,137	1,166	−1%
Finland	2,035	2,041	1,707	1,756	1,677	1,637	−14%	−7%	1,195	1,258	1,228	1,098	−13%
Sweden	2,038	1,905	1,641	1,503	1,546	1,623	−26%	8%	1,207	1,192	1,269	1,197	0%
Norway	2,040	1,939	1,671	1,512	1,432	1,376	−26%	−9%	1,130	1,100	1,039	1,062	−4%
Average	2,046	1,953	1,650	1,588	1,537	1,544	−22%	−3%	1,180	1,182	1,168	1,131	−4%
Continental European													
Austria	2,100	2,073	1,889	1,755	1,683	1,519	−16%	−13%	1,277	1,112	1,103	1,035	−7%
Belgium	2,404	2,289	1,971	1,805	1,699	1,554	−25%	−14%	1,197	1,022	949	919	−10%
France	2,045	2,025	1,849	1,696	1,558	1,540	−17%	−9%	1,186	1,060	923	939	−11%
Germany	2,372	2,152	1,848	1,723	1,616	1,532	−27%	−11%	1,271	1,143	1,029	1,010	−12%
Italy	1,957	2,018	1,815	1,724	1,674	1,634	−12%	−5%	1,155	1,103	1,069	1,034	−6%
Netherlands	2,156	2,002	1,709	1,569	1,414	1,347	−27%	−14%	926	833	860	981	18%
Switzerland	2,092	2,015	1,883	1,821	1,641	1,589	−13%	−13%	1,463	1,352	1,365	1,284	−5%
Average	2,161	2,082	1,852	1,728	1,612	1,531	−20%	−11%	1,211	1,089	1,042	1,029	−6%
Liberal													
Australia	2,023	1,945	1,880	1,815	1,806	1,797	−10%	−1%	1,283	1,192	1,241	1,262	6%
Canada	2,090	1,994	1,899	1,806	1,799	1,789	−14%	−1%	1,186	1,179	1,237	1,261	7%
Ireland	2,437	2,320	2,177	2,025	1,922	1,700	−17%	−16%	1,305	1,154	1,030	1,114	−3%
New Zealand	—	—	—	—	1,759	1,756	n.a.	n.a.	—	—	1,179	1,248	n.a.
United Kingdom	2,112	2,134	1,919	1,758	1,698	1,653	−17%	−6%	1,345	1,202	1,208	1,170	−3%
United States	2,166	1,967	1,882	1,831	1,819	1,879	−15%	3%	1,217	1,207	1,313	1,396	16%
Average	2,166	2,072	1,951	1,847	1,801	1,762	−15%	−5%	1,267	1,187	1,201	1,242	5%
Japan	1,958	2,095	2,042	2,000	1,956	1,799	2%	−10%	1,427	1,403	1,419	1,346	−4%
All-OECD average	**2,123**	**2,050**	**1,845**	**1,746**	**1,677**	**1,626**	**−18%**	**−7%**	**1,233**	**1,165**	**1,144**	**1,140**	**−2%**

Source: From Burgoon and Baxandall (2004); from Groningen University (2002); from OECD (various years). Note: —means data is unavailable; n.a. means not applicable.

Table 2 Annual hours per working person in the United States, 1967–2000, per the Economic Policy Institute

Year	*Annual hours*
1967	1,716
1973	1,679
1979	1,703
1989	1,783
1995	1,827
2000	1,878

Source: Mishel and colleagues (2002, 115, table 2.1).

Annual hours per working-age person reveal an even greater shift toward higher levels of work effort in the recent period, driven in part by a general increase in married women's labor force participation in much of the OECD. Whereas average hours per employee declined by a total of 7% between 1980 and 2000, hours per working-age person declined by only 2%. Between 1990 and 2000, the change in annual hours per working-age person was only a 4-hr total decline, or 0.3%. In the Nordic countries, the differences between the two measures are small (only 1% on average), but in the continental group, these differences are substantial (11% versus 6%, on average). Among the third group, the differences are even sharper. Although hours per employee fell on average 5%, hours per working age person rose by an equivalent amount (about 5%).

The combination of rising hours in the United States plus a subset of Western European countries means that for the last decade, for a large fraction (perhaps a majority) of the population in the most affluent parts of the world, annual hours of work have been *increasing* rather than *decreasing*. It is plausible that without deliberate policy interventions, the long century of hours reductions has come to an end, with some countries following the United States onto a trajectory of rising hours, and a larger subset already in a trend of stable hours. Across the OECD, we may be replicating the type of market failure that characterized the mid-nineteenth century and that led to collective interventions to reduce hours. In the current period, however, the adverse consequences are not merely overworked employees (although stress and burnout have become important problems), but also ecological degradation. In this sense, my call for hours reductions as part of the solution to unsustainable consumption is analogous to the calls for hours legislation 150 yr ago.[4]

The Structural Bias toward Long Hours: Employer Incentives

Achieving hours reductions will require structural changes in the operation of labor markets. Indeed, even the proximate causes of rising hours are complex. In the United States, factors include the movement of women into full-time career jobs, an upward shift in work norms made possible by the growing power of employers relative to employees, and the collapse of hourly wages at the bottom of the wage distribution (which necessitates longer hours to avoid costly declines in household income). Some have also argued that higher levels of income inequality have led workers to prefer longer hours, an explanation which could also help explain developments in some of the other OECD countries (Bell and Freeman 1998). This argument has been tested by Bowles and Park (2001), who found that in countries with higher levels of income inequality, hours of work in the manufacturing sector are higher.

Table 3 Growth in annual hours and productivity in the United States, 1967–2000 (average annual change)

Period	*Change in hours (1)*	*Change in productivity (2)*	*Excess productivity growth over hours change (2) + (1)*
1967–1973	−0.04%	2.5%	2.46%
1973–1979	0.2%	1.2%	1.4%
1979–1989	0.5%	1.4%	1.9%
1989–1995	0.4%	1.5%	1.9%
1995–2000	0.6%	2.5%	3.1%

Source: Based on data from Mishel and colleagues (2002).

More generally, the recent trends in hours must be seen in the larger context of the operation of labor markets in capitalist economies. The conventional perspective, which is based both on neoclassical economic theory and on more general frameworks of modernism and progress, argues that the demand for leisure is a normal good, which workers will want more of as income rises. The alternative perspective takes the view that for long periods of time Western capitalist economies have displayed a structural bias toward the translation of productivity growth into increased levels of output and income, rather than reductions in working hours. Far from being a permanent feature of the market economy, as the conventional view argues, the century of hours reductions from 1870 was the result of extra-market forces—strong trade union pressures combined with state policies to reduce hours, which served as powerful counterweights to the structural bias. This alternative perspective explains why technological change has not delivered the leisure dividend that is routinely predicted by social analysts. And it provides a stark counterweight to the claims of analysts such as Ulrich Beck and Jeremy Rifkin, who ironically predicted "the end of work" at a time when average hours were increasing in a number of countries (Beck 2002, Rifkin 1995).

Although Marxists and heterodox economists have long believed in a structural bias toward long hours, they have typically attributed its existence to the need for firms to maintain consumer demand (Galbraith 1958; Cohen 1978). Such an explanation is functionalist and fails to specify the mechanisms by which what firms need is guaranteed. In contrast, I have argued that four factors related to labor costs create strong incentives at the firm level for maintaining stable (or rising) hours. Where these factors are quantitatively important, as in the United States, they have resulted in strong employer opposition to allowing workers to trade productivity growth for shorter worktime. Similar opposition may also be surfacing in some European countries.

The first factor is related to the theory of efficiency wages. To elicit optimal levels of labor effort from workers, firms raise wages above the market clearing level and thereby maintain a certain positive "cost of job loss," defined as the difference between what a worker earns on the job and his or her next best alternative. (See Bowles 1985; Schor and Bowles 1987; Schor 1990.) The firm cares about the length of working hours, because as long as income-replacing social welfare payments are not fully proportionate to hours of work, longer hours of work raise the cost of job loss. This is also the case if the workers' job alternatives upon re-employment have a higher likelihood of being part-time positions than jobs that are already filled. The intuition here can perhaps be most easily seen by considering how the firm would view the differences between employing one worker for 40 hr/week [wk] and two for 20 hr/wk each. The 40-hr/wk worker is more dependent on the firm, because his or her cost of job loss is higher. Thus, *ceteris paribus*, firms will prefer to structure jobs with relatively long hours and will be resistant to schemes that allow workers to take productivity growth in the form of shorter hours of work, either weekly or annually.

The second incentive arises whenever employment-related costs, such as medical insurance, disability and pension payments, and hiring and training costs, are structured on a per-person rather than a per-hour basis. (Even when these costs do vary with hours, they tend to be capped at a certain level, thereby introducing a per-person, rather than a per-hour component.) These costs impart an employer bias against allowing workers to opt for short hours.

Third, when employees are paid on the basis of an annual salary, rather than by the hour, firms may be able to induce workers to work long hours. Under certain conditions surrounding the nature of job decisions and negotiations, these hours can be understood as gratis, or free to the firm. In unpublished research I have conducted with Hilary Seo using the U.S. Panel Survey of Income Dynamics, we found that the change from payment by the hour to a monthly salary raised annual work between 100 and 150 hr, depending on the model specification.

Finally, whenever the firm faces an upward-sloping labor supply function, it will prefer long-hours workers, because allowing hours reductions means the firm will be forced to go deeper into the labor pool, thereby facing either reduced worker

quality or higher wages. I have argued that this effect is particularly strong where production is heavily capital-intensive, because the firm has an incentive to use that capital as continuously as possible, and prefers to hire as few shifts of workers as it can.

The net effect of these micro, or firm-level incentives is that in the absence of trade union pressure or state regulation, firms have typically structured jobs as long-hour positions. Those jobs that do allow short hours (such as many women's jobs) typically exact significant penalties for the privilege of working less, such as the failure to carry benefits such as medical insurance or pensions, the absence of upward-sloping wage or career trajectories, and low levels of capital equipment. Furthermore, the firm-level bias toward long hours has led to what we might call a "missing market," namely the market for shorter hours. Individual employees usually do not have the right or opportunity to negotiate for shorter hours, to reduce hours within jobs once they occupy them, or to trade wage increases for time off (Altonji and Paxson 1988). The absence of this market in hours is important, because it vitiates the standard neoclassical claim that hours of work are set by workers' preferences, that stable or rising hours reflect workers' choices for income over time, and that the path of the economy with respect to output and employment growth is optimal. In such a case, the typical outcome will be that output exceeds what would have been chosen were such a market operating. This in turn implies an excessively consumption-intensive and natural-resource-intensive path. Thus, a structural flaw in the operation of labor markets lies at the heart of unsustainable patterns of production and consumption.

The foregoing analysis suggests that declines in hours occur only when there are strong counterpressures to firms' preferences. Furthermore, the level of cost associated with fringe benefits affects hours, as does labor supply. Finally, this approach suggests that in countries such as the United States, with its weak trade union movement, substantial business opposition to labor market legislation, and heavy firm-level costs, hours reductions will be especially difficult to achieve.

Consumers' Preferences and Worktime Reductions

The foregoing analysis is purely production-centered, arguing that firms are the key actors in the determination of working hours, rather than workers. How do workers' preferences for income and consumer goods affect the determination of hours? In this approach, workers' preferences are mainly endogenous, and adjust to the level of hours, income, and consumption that the market delivers, rather than exogenous preferences driving the market. Survey and experimental evidence suggests that the phenomenon of preference endogeneity, that is, preferences that adapt to market outcomes, rather than being fixed, may be more important than has heretofore been recognized.[5] If this is correct, it suggests that ecologists should champion policies that avert income increases rather than attempting to reduce current consumption.

Preference endogeneity reveals itself in the marked asymmetry between preferences for current and future income and consumption. Although surveys of workers in OECD countries have frequently shown significant desires to trade off future income in order to gain more free time, workers are far less willing to reduce current income. I have identified this asymmetry for the case of the United States, arguing that there is a dynamic inconsistency in preferences over time (see Schor 1992, chapter 5). At the beginning of the period I looked at (roughly 1980), surveys revealed that in the main workers expressed satisfaction with their current mix of income and free time, preferring the same income, same hours option to either less income, fewer hours, or more income, more hours. Attitudes to future income, though, were very different—a majority indicated that they would prefer to forego future income in order to achieve more free time. As I have noted, average hours increased over this period, and few workers actually gained free time instead of increases in pay. When asked again in later years, most continued to express satisfaction with their current hours and income, despite the fact that their previous preferences had not been "satisfied." I interpreted this as evidence that preferences adapt to current levels of income, and

workers are reluctant to reduce their current consumption. But once again, they would be willing to forego future pay increases. Over time, workers end up, in this model, "wanting what they get" rather than "getting what they want" (as in the neoclassical story). Only after the large increases in hours that U.S. workers had experienced by the 1990s did substantial numbers begin reporting that they would prefer fewer hours and less income.

The view that consumers are resistant to reductions in current consumption is supported by a now-substantial literature on endowment effects (Thaler 1980), status quo bias (Samuelson and Zeckhauser 1988), and loss aversion (Kahnemann and Tversky 1984). (See Thaler 1992, chapter 6, for a survey of these effects.) This literature relies on laboratory experiments that show that people are far less willing to give up or risk income that they already have than they are to risk losing income they have not yet gained. In a variety of experiments—subjects were given small items to trade or keep, they were given hypothetical choices between lottery tickets and money, or they were given various investment opportunities—the results revealed that people are averse to relinquishing things, money, or opportunities that they currently have. Similarly, potential future gains are not as highly valued.

The endogenous preference view is the reverse of the conventional wisdom, which is that workers' exogenous preferences determine the level of hours. It is also quite different from historical accounts such as the work of Cross (1993) that emphasize consumer desires and union strategy as the leading variable in determining hours, and hence the level of output and growth. It is beyond the scope of this article to provide a full discussion of this debate, but my view is that in the post-WWII period workers have mainly adjusted their desires to the level of output and income that has been generated, rather than caused longer hours. In the United States, I believe that the failure of trade unions to achieve hours reductions was originally due at least as much to their inability to get employers to agree as it was to members' preferences for income. That having been said, the truth lies somewhere in between the extremes of pure employer determination and pure worker determination.

But whatever one's interpretation of the past, the combination of data on preferences, experimental evidence, and the extent to which current income is encumbered suggest that a politically feasible approach to sustainability should not rely on asking people to reduce their current levels of income and consumption. In contrast, future income is much less highly valued. Therefore, approaches that structurally stem the flow of increased income into consumers' hands are more promising.

On the other hand, the discussion above implies that there will be considerable resistance from employers to shorter hours, at least unless the disincentives they face are reduced. I have discussed this issue elsewhere (Schor 1992, 1995b), so I will be brief here. In general, policy reforms that uncap the firm's payments to social welfare funds will reduce the disincentive to allow shorter hours. So too will any changes that shift responsibility for social welfare from the enterprise to outside bodies, such as unions, municipal bodies, or the state. In economies where unionization is pervasive, the creation of a "market" in hours is easier, because unions can bargain for workers as a whole. (This difference is a major one between the United States and Western Europe.) Furthermore, firms are more likely to accept cost-neutral hours reductions, which can be achieved either through state subsidies or through the structure of the deals that are struck with workers. In sum, although there are complex issues to work through on the firm side, they are not insurmountable.

Hours Reductions and Ecological Degradation

If reductions in hours were to be achieved, what would be the impact on the planetary ecology? To my knowledge, there are no detailed empirical studies linking environmental degradation and hours of work, so this discussion is largely speculative. In the simplest models, in which hours are correlated with income and hence consumption, a *ceteris paribus* reduction in hours would reduce impact. In the formulation known as IPAT, hours are correlated with consumption. The I = PAT formulation is that

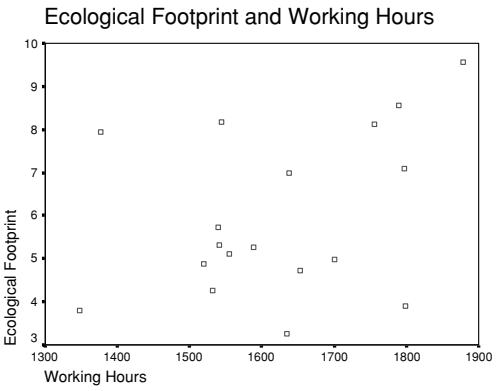

Figure 1 Ecological footprint and number of annual working hours (per employee).

Environmental Impact, or I, is determined by the per capita level of consumption (denoted by A, for affluence) multiplied by the environmental impact per unit of consumption (denoted by T for technology) times total population (denoted by P).[6] Of course, *ceteris* is not always *paribus*, and there are scenarios one might imagine in which reducing worktime caused some channels of higher environmental impact. An obvious one is that more free time results in greater travel, which is highly damaging. More generally, policies that channel productivity growth into free time rather than income are likely to have impacts on the product mix, and hence to alter the average T of the economy. It is important, though, to remember that there are effects that will be imposed by the stabilization of income in this scenario, such as the fact that the average consumption intensity of a unit of time will decline. It seems likely that on average, as the economy shifts to a situation of "time surplus," there will be a decline in the demand for speed and convenience, both of which are highly damaging. But even if these effects are small or nonexistent, there will be a large positive impact on I through the stabilization of A.

To address this question, I conducted a linear multiple regression of the national ecological footprint for the 18 OECD countries against hours per employee. I found a significant positive correlation, thereby supporting the idea that hours reductions will reduce I (see figure 1). The regression equation is Footprint = −1.65 + 0.37 (Annual Hours per Employee) with a *t*-statistic of 1.6 for the hours variable. Hours per working-age person are also a significant predictor of ecological footprint, but with a slightly lower coefficient. Of course, this is a very simplistic test, and a full accounting would include many other variables, such as energy use, population structure, and consumption levels. Nevertheless, it may be considered suggestive.

Hours reductions can come in a variety of forms—reduced average hours per job, average annual hours per person, lower total hours per working life, and so on. These are important issues that loom large in policy debates about worktime reduction. Another key issue is whether hours reductions are concentrated heavily in a subset of the population, either as outright unemployment or as underemployment. In Western Europe there has been widespread discussion of a "third sector" of informal employment, in which people receive a basic income and work a small number of hours, alongside a formal sector in which jobs carry long hours (see Beck 2002, van Parijs 1985). The politics, welfare effects, and economic impacts of different types of hours reductions are varied, and I do not have the space to consider them here. As a general principle, however, egalitarian distributions of hours are more likely to be politically feasible over the long run. I think it is unlikely that a minority of highly compensated employees will be willing to support low-hour workers in the third sector indefinitely. From the point of view of ecological degradation, though, the key variable is likely to be the total number of hours worked per capita, a measure that includes both average hours per job and per person and the employment-to-population ratio.

Conclusion

Worktime reduction has not played a central role in the literature on sustainability over the last decade. Population and technology have been more likely to take center stage. But as is now widely recognized, population trends have been radically altered in recent decades. That leaves technological improvements. Will they be sufficient to move us back to sustainability, without attempts to control the level of affluence?

This is a very widespread view, perhaps the dominant one. Most economic writing suggests that scientific advance plus market competition will be sufficient to stem the tide of ecological degradation. And there is a strong current among environmentalists that focuses almost exclusively on green technologies and their potential for dramatic reductions in the use of natural resources. (I refer here to movements such as Factor 10 and "biomimicry," as well as the work of designers and architects such as Amory and Hunter Lovins, Michael Braungart and William McDonough, and Paul Hawken. See, for example, Hawken and colleagues [1999] McDonough and Braungaurt [2002] and Benyus [2002].) A related, although less purely technological view is that of "ecological modernization" (Mol and Spaargaren 2000).[7]

Undoubtedly, increased use of resource-efficient technology is both necessary and likely. But will it be sufficient, if productivity growth continues to be channeled into income? I think not. First, shifting to environmentally benign technologies will require rates of innovation that are far in excess of recent experience. Rates of diffusion of green technologies have been disappointingly slow. And the prospects in poor countries, whose consumption is rising most rapidly, are even more problematic, given the high cost of cutting-edge innovations. Second, even with major improvements in ecological efficiency, it is difficult to imagine continued consumption growth that does not draw on hitherto untapped natural resources. Even clean production and consumption require the extraction and transformation of some natural resources. Finally, growth in affluence can undermine improvements in technology. In the United States, for example, cleaner vehicles and more efficient use of residential energy have been outweighed by rising vehicle ownership and miles driven, larger homes, and a growth in appliances (Taylor and Tilford 2000, 472).

Finally, the argument that continued consumption growth in the global North can be sustainable is especially difficult to make in a global context. It is by now well recognized that one of the most dynamic aspects of the consumer system is the drive to globalize and replicate Western consumerist lifestyles. The increased presence of Western media and advertising, the expansion of transnational corporations into domestic markets in the global South, and the development in the South of large middle classes with disposable income are part of a process of rapid growth in branded consumer goods worldwide. In addition to cultural products these include apparel, vehicles, consumer electronics, fast food, travel and tourism, and a range of household durables. In general, this shift is associated with much higher levels of environmental impact. (For a general argument along these lines, see work by Durning [1992].) A strong global equity principle requires a commitment to allowing all people to consume natural resources at a common rate. In practice, this will involve the elaboration and implementation of an egalitarian distribution of ecological space. Achieving a sustainable and equitable global solution is clearly incompatible with a worldwide replication of U.S. lifestyles or even the somewhat less damaging ecological impacts of the lifestyles of other industrialized countries. In such a situation, inhabitants of the global North can and should opt for a new economic and social vision based on quality of life, rather than quantity of stuff, with reduced worktime and ecological sustainability at its core.[8] Such a vision has the potential to create broad-based pressure for an alternative to the current system of ecologically destructive, inequitable consumer-driven growth. Indeed, the future of the planet increasingly depends on it.

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Notes

1. In Wilson's words, leading economists "have mostly ignored the numbers that count" (Wilson 2002, 23).

2. One hectare (ha) = 10^4 square meters (m^2, SI) ≈ 2.47 acres.
3. For an interesting discussion of differences between ecologists and economists, see work by Wilson (2002).
4. I am grateful to anonymous referee 3 for this point.
5. Preference endogeneity has been one of the topics of the MacArthur Research Network on norms and preferences. See <www.umass.edu/preferen>.
6. *Editor's note:* For a history of the IPAT formulation and environmental impacts, see the article by Chertow (2000).
7. Industrial ecology shares an optimistic view of technological change (Chertow 2000), but agreement as to the degree to which this kind of innovation will be sufficient to achieve sustainability remains a matter of lively debate (Ausubel 1996; Graedel 2000; Huesemann 2003).
8. For an example of one organization's attempt to effect such a change, see <www.newdream.org>.

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