

Article

“Friday off”: Reducing Working Hours in Europe

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Abstract: This article explores the pros and cons for reducing working hours in Europe. To arrive to an informed judgment we review critically the theoretical and empirical literature, mostly from economics, concerning the relation between working hours on the one hand, and productivity, employment, quality of life, and the environment, on the other. We adopt a binary economics distinction between capital and labor productiveness, and are concerned with how working hours may be reduced without harming the earning capacity of workers. There are reasons to believe that reducing working hours may absorb some unemployment, especially in the short-run, even if less than what is advocated by proponents of the proposal. Further, there may well be strong benefits for the quality of peoples’ lives. Environmental benefits are likely but depend crucially on complementary policies or social conditions that will ensure that the time liberated will not be directed to resource-intensive or environmentally harmful consumption. It is questionable whether reduced working hours are sustainable in the long-term given resource limits and climate change. We conclude that while the results of reducing working hours are uncertain, this may be a risk worth taking, especially as an interim measure that may relieve unemployment while other necessary structural changes are instituted.

Keywords: working hours; Europe; 4-day workweek; environmental sustainability; quality of life; productivity; productiveness; unemployment; binary economics

I would predict that the standard of life in progressive countries one hundred years hence will be between four and eight times as high as it is to-day... For many ages to come the old Adam will be so strong in us that everybody will need to do some work if he is to be contented... But beyond this, we shall endeavor to spread the bread thin on the butter-to make what work there is still to be done to be as widely shared as possible. Three-hour shifts or a fifteen-hour week may put off the problem for a great while. For three hours a day is quite enough to satisfy the old Adam in most of us!

John Maynard Keynes

When the hours, the nature of the work done, the physical conditions under which it is done, and the method by which it is remunerated, are such as to cause great wear and tear of body or mind or both ... then the labor has been extravagant from the point of view of society at large ... In such a case a moderate diminution of the hours of labor would diminish the national dividend only temporarily: for as soon as the improved standard of life had had time to exert its full effect on the efficiency of the workers, their increased energy, intelligence and force of character would enable them to do as much as before in less time.

Alfred Marshall

1. Introduction

Industrialized economies are experiencing an unprecedented period of low, zero or even negative growth. For the environment, this may be good [1]. With continuous growth, it is very unlikely that dangerous climate change can be averted [2,3]. However, negative growth is socially unstable in capitalist economies [2]. Increasing productivity by replacing labor with capital in a context of zero or negative growth increases the number of people left unemployed, unless wages are also reduced. Neither may be easily accepted by society. There is no greater source of social and political instability and desperation (social exclusion) than a widespread lack of people's earning capacity and purchasing power. Insufficient opportunities to work (unemployment) and inadequately-paying and insufficiently-skilled jobs (underemployment) are the major social issue and challenge facing both developed and developing countries [4].

This article forms part of a Special Issue on degrowth. It is common these days within circles debating the new economics of degrowth to advocate a shorter workweek as a solution to the ecological-economic crisis [2,5,6]. There are different reasons for this: (1) it would allow more people to work who would like to work, (2) it would provide people who are willing to work less with more leisure time to travel, read, learn, spend with their families and nurture human relationships, and (3) it would also allow people to spend less time in a job which is tedious and not satisfying, and at least for some decrease also their consumption of higher-end environmentally-harmful goods and services. Redistributing work would also enhance access for more people to essential goods and services.

If for new or degrowth economists reducing working hours is good, for many mainstream neo-classical economists it is anathema. The dominant view is that in the context of the crisis, labor markets should become more flexible and liberated from wage and working hour restrictions. If

anything, working hours should increase without changes in weekly wage, in order to increase productivity and pull economies out of recession.

This article offers a critical review of the economic literature on working hours in order to arrive at an informed judgment concerning whether, or more appropriately under what conditions, a reduction in working hours makes sense for a region in crisis, such as the European Union. We focus mostly on literature from mainstream and alternative (new or ecological) economics, and less so on the extensive sociological, psychological and health literature on working hours and workplace conditions. While there are a few dismissive reviews of working hours reduction policies from neo-classical economics perspectives, and some advocacy reports from new economics angles, this article attempts to give a balanced and comprehensive assessment concerning the state of our knowledge of the field, giving emphasis to economic, social and environmental considerations. Concerning the social dimension and unlike much of the new economics and degrowth literatures, our starting point is not a focus on reducing consumption, but on emphasizing that social and environmental sustainability require sustainable earning capacity for poor and middle-class people [7].

The assumption in earlier environmental writings that workers already consume too much becomes increasingly problematic under conditions of crisis when a sizeable and increasing minority does not consume enough essential goods. In general, in existing capitalist economies, earning capacity can be enhanced by some combination of two contributions: (1) wages earned through employment and (2) money earned through the ownership of productive capital [8]. The latter includes ordinary investment from wage savings that people might make through the purchasing of stocks, bonds, and property; changing ownership structures of businesses (e.g., see Marjorie Kelly's approach of *generative ownership* that focuses on generating and preserving wealth) [9], employee stock ownership plans (ESOPs) [10], and extending to poor and middle-class people effective market opportunities to acquire capital with the earnings of capital based on principles of binary economics [7,11]. These structural changes are not easy to implement in the immediate term. This article therefore considers redistributing work and leisure time through the adoption of a four-day workweek as an alternative avenue to better the lives of poor and middle-class people, at least in the near term.

The article is organized as follows. Section 2 provides a historical overview in the evolution of working hours. It finds that historically, first, economic development has brought a reduction of working hours and second, working hour reduction policies have been used during crises. However, the last worldwide standard reduction (to 40-hours) dates back to the Great Depression. Actual working hours in Europe have declined in the post-war era relative to the U.S., but in some European countries this tendency has been reversed. Section 3 examines the potential effects of working hours on productivity. The section begins with a theoretical clarification drawing from the field of binary economics. The metric of productivity is distinguished from productiveness, a confusion that is at the root of much misunderstanding in economic discussions and in attempts to address labor market concerns [4]. Section 3 finds no unequivocal link between working hours and productivity, and indeed hints to many possible ways in which less work hours may improve labor productiveness. Section 4 examines the advantages and disadvantages in terms of employment and explains the often mistaken assumption of a 'lump of labor', according to which there is a fixed quantity of work, such that if we all work fewer hours there will arise new jobs to fill the void. Still, we do find evidence that reducing working hours increases employment, especially in the short run, even if less than suggested by a lump

sum view. We also argue that shorter working hours may have positive compositional effects, making it easier for women, the elderly or disadvantaged groups to join the workforce and thereby increasing their labor force participation. Section 5 outlines the various wellbeing benefits of reduced working hours, not least in terms of more leisure. We show evidence which suggests a likely coordination problem whereby some people prefer to trade work and income for more leisure, but they currently cannot. Section 6 shows that there are potential, but not automatic environmental benefits from reduced working hours, unless complemented by environmental regulations and taxes and public investments in convivial infrastructures. Section 7 examines some of the problems with the proposal of reducing work hours in terms of wages and policy implementation. Different policy variants for reducing working hours are briefly discussed. Section 8 concludes returning to the core question motivating this paper, *i.e.*, whether, and under what conditions, may reducing working hours be a reasonable policy.

2. The Evolution of Working Hours in Historical Perspective

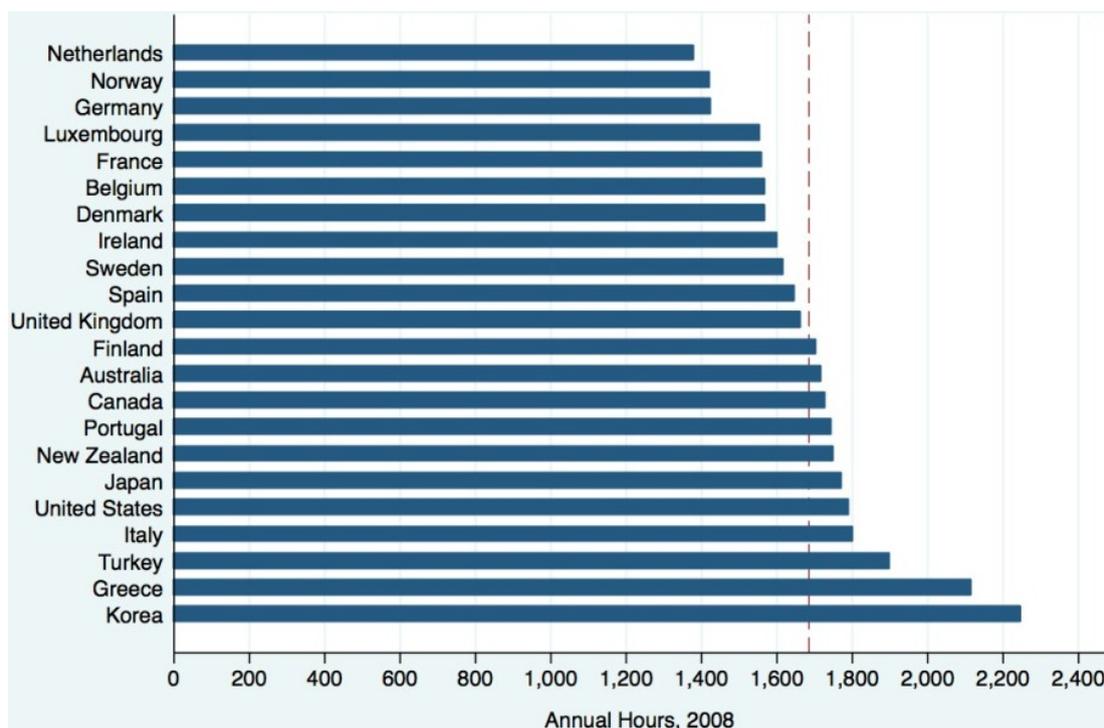
In any given period, the statutory work-hour norm may appear as an entrenched given that cannot change without major economic or social disruption. However, nations in the past did reduce the workweek, first to 48 and then to 40 hours, without apparent damages [12]. ‘Saturday-off’ or ‘August off’ was once as unthinkable as ‘Friday-off’ is today. Interestingly, it was Henry Ford who introduced the five-day workweek. In 1926 he initiated it in his factories, replacing the prevalent six-days, without reducing employees’ pay. His rationale was that workers needed more time for leisure if they were to buy the cars he was producing.

Rich countries do not become rich by working more; they actually work less as they get richer and more productive. Whereas it is true that industrialization comes with increasing working hours [13,14], subsequent economic development comes with a decrease, not an increase, of working hours [12]. If one plots GDP per capita versus weekly working hours in manufacturing for all the countries of the world, two groups appear [5]: on the left side of the graph one finds developing (industrializing) nations (*i.e.*, low GDP, lots of work), and on the right, industrialized nations (high GDP, less work). In other words industrializing nations work more than the industrialized. Overall there is a negative gradient, meaning the more developed a country is, the less it works, but the relationship is statistically significant only for the industrializing group [12].

Annual working hours per active person in the OECD reveals a similar pattern (Figure 1): the less developed countries, Korea, Portugal, Turkey or Greece are the ones that work the most. The more developed ones such as The Netherlands, Germany, or Luxembourg work the least. An exception to this pattern are the US, UK, and Commonwealth countries, which we discuss below. Certainly, this does not mean that countries become richer by working less. However, it also rejects simplistic arguments that developed economies such as those of Northern Europe will become poorer if they work less. There seems to exist a strong relation between the phase of development of a country and the hours worked: working hours probably decline as structures change from an industrializing to a more service, higher added-value economy. A counter-argument here against reducing working hours is that it might as well have been that the service sector boom allowed a reduction of actual worked hours, but further efficiency increases in many service jobs are limited, so growth requires increasing

total labor. Remember however, that here we are writing from a degrowth perspective, so we do not share the idea of growth at all costs, least of all at the cost of labor's working conditions.

Figure 1. Working hours in the OECD, 2008 (Data: OECD Stat).



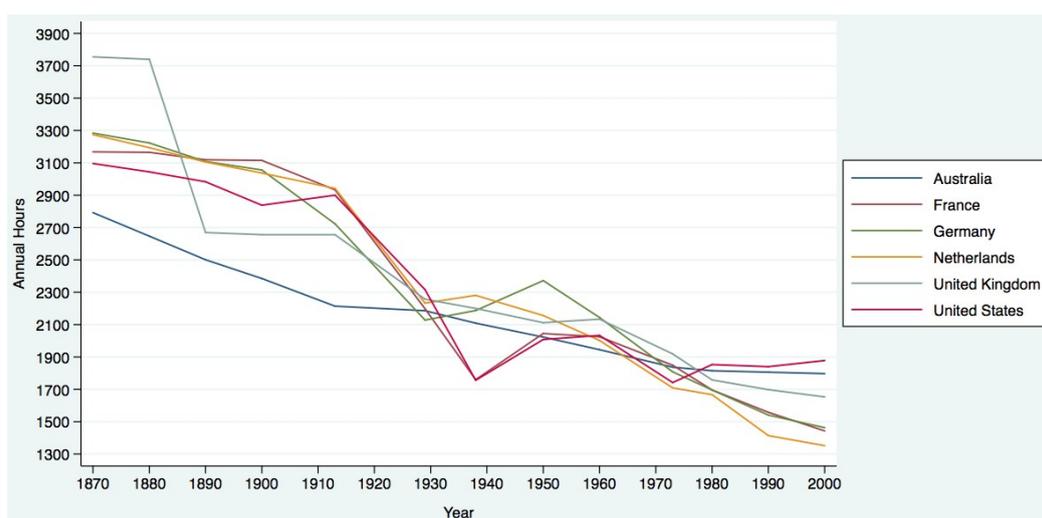
A word of caution: the labor market is complex and data must be looked in a nuanced way. The supply and demand for labor at various skill levels changes over time and differs from country to country. Different skill mixes might be demanded (and are in supply at different times) and differ from country to country. In addition, hours worked and employment rates on the one hand, and hourly wages on the other, are negatively correlated. Data that are reported need to account for the fact that weakening labor markets can respond by a combination of increasing unemployment, decreasing hours worked or decreasing hourly wages. Alternatively, large effects on hours worked and unemployment can be dampened by decreasing hourly wages. For this reason any temporal or cross-country comparisons must be carefully scrutinized, lest incorrect conclusions be reached.

Whereas a crisis may not appear as the best moment to reduce working hours, historically it is precisely during economic crises that major statutory reductions in working hours have been introduced. It was in 1933, during the Great Depression that President Roosevelt introduced a massive program of work-sharing in the US [15] and then in 1936 that he instituted the 40-hour workweek that gradually became the norm for the rest of the developed world [12]. It was also during recessions that the governments of Chile or Brazil in the 1990s introduced statutory reductions in working hours [12]. Alesina *et al.* [16] explain why this happens: whereas work-sharing does not necessarily make sense as a response to a negative economic shock at the national level (see Section 4), at the firm level firms may find it easier to reduce the total cost of salaries by reducing total hours worked rather than firing employees. Trade unions, faced with sectoral shocks, have an incentive either to cut hourly wages or to cut hours worked (but not jobs) to maintain membership. (Sometimes putting workers on “furloughs” relieves temporary crises for firms.) Whereas the employment benefits of work-sharing are under

debate [15,17] (see Section 4), there is no evidence to suggest that work-sharing delays the recovery from a recession.

Figure 2 shows that Americans work today almost as much as they worked in the 1930s [18], when they were leaders in reducing working hours (note: due to inconsistent data collection techniques across countries, these trend lines should not be compared in terms of levels). Average annual productivity gains in the US since then have been in the order of 3% but have not translated to less work, but hourly wages have declined in real terms since the 1970s. Both these factors have intensified recently. For example, the excess of US labor productivity growth over hours change rose to a nearly four-decade high of 3.1% in the period 1995–2000 [19].

Figure 2. Work time in selected countries (data from Huberman and Minns, 2007) [18].



We know that Europeans work less because they take longer vacations [16]. However, what is the cause of this difference? Prescott [20] argues that the higher marginal taxes in Europe discourage workers from working longer. Blanchard [21] attributes the divergence to cultural differences, and a stronger preference of Europeans for leisure. But Alesina *et al.* [16] reject both arguments. Americans used to work less than Europeans up until relatively recently: essential cultural attributes do not change that fact, Alesina *et al.* contend. Differences in preferences, marginal tax rates and working hours are driven by other (“omitted”) variables: unionization, labor market regulations [16] and wages. Alesina *et al.* argue that as working hours started to decline in Europe in the post-war period, perhaps due to taxation, the utility from leisure increased and a “social multiplier” effect took hold, reinforcing gained utility and shifting preferences. This “social multiplier effect” stems from the fact that the utility of not working is increasing in the number of people who aren’t working, e.g., by sharing leisure and vacations. Stronger unions in turn, coordinated the demands of individual workers for trading-off salary for leisure, achieving concessions for fewer working hours [16].

Europe may be working less than the US, but working hours in many European countries are no longer declining. Annual hours per employee increased between 1990 and 1998 in four European countries—Denmark, Italy, the Netherlands, and Sweden [22]. Reductions in working hours per employee may also reflect a greater participation of women and part-time workers in the labor force: in fact, reductions in working hours per person are much lower than per employee [18]. Note that the fact

that richer OECD countries such as the Netherlands or Germany appear to work less might have to do with higher labor force participation rates, due to part-time opportunities: whether reduced working hours have led to more work-sharing, or instead part-time work policies have increased labor force participation and pulled down average working hours is hard to say.

Furthermore, the distribution of working hours in many countries is increasingly skewed to the right: a substantial number of people work much more than the average. 25.5% of workers in Britain work more than 48 hours per week, 18.8% in Greece, 12.1% in Spain, 10.5% in France and 7% in the Netherlands [12]. This relates to a shift of employment towards the service sector and an increasing number of self-employed, who work long hours [23]. In France, for example, the average weekly working hours in manufacturing were 35.3 in 2002, compared to 38.2 in the financial sector and 41.04 in hotels and restaurants. In a country known for its 35-hour workweek, 60% of the self-employed workers are working 49 hours a week or more, and nearly 40% of them work 60 hours a week or more. The figures are similar for other European countries [12]. The self-employed are a significant proportion of Europe's labor force: in 2009 there were 32.5 million self-employed, including employers, people in the EU-27, accounting for nearly 15% of total employment [24].

In conclusion, a historical perspective alone does not suggest that working hours reduction is a good policy in times of crisis. However, it dispels the myth that working hours cannot be reduced during crises; in the past, it was precisely during such periods that hours were reduced. It also shows that the ability to reduce working hours is a quality of advanced economies and a sign of progress, not the reverse. Finally, whereas actual working hours have in general declined in Europe over time, this trend seems to have come to a halt recently, with various countries and professions experiencing an inverse trend.

3. Impacts on Productivity

3.1. Binary Economics: Distinguishing Productivity from Productiveness [25]

In addition to GDP, the metric “productivity” (really labor productivity) is used particularly perniciously in the design and evaluation of economic policies. In common usage, productivity is a ratio; it is not a measure of output. It is calculated by dividing economic output generated by both capital and labor by a factor of input, usually the number of workers, labor hours, or costs of labor. In contrast, *productiveness* (or productive capacity) is a measure of the quality of being productive or having the capacity to produce. Examples are a more productive machine that is capable of faster output (an example of capital productiveness) and a more productive worker who is capable of more creative or faster work and higher-quality outputs (labor productiveness) if his/her set of skills or motivation has been enhanced. As a statistical artifact, either kind of enhanced productiveness can increase productivity. However, productivity does no work.

Thus, productivity can be increased by the use of more productive capital (such as a faster or more flexible machine) or more productive workers, or a combination of the two. It is important to know the productiveness of labor, capital, and the labor-capital interface because this provides a more accurate measure of where a company's/nation's competitiveness lies—*i.e.*, in its capital, its labor, their interface or their mixture.

From a *productiveness* perspective, reducing the costs of production or the provision of services by the firm can be accomplished in different ways that contribute to economic growth: (1) by utilizing better tools, hardware, software, and manufacturing systems; (2) by increasing workers skills and commitment; and (3) by a better matching of labor with physical and natural capital. Theoretically, increasing labor productivity by any of these means (including using fewer worker hours per unit of output) lowers the costs of goods and services, thereby lowering prices and ultimately increasing the demand for and sale of goods and services. It can be argued that at least in some markets, more workers may be subsequently hired than displaced by following the first pathway above. It may also be the case that market demand for the outputs produced by a particular firm becomes saturated, in which case it is argued that cost savings to the consumer results in more disposable income that the consumer can then spend on other goods and services for which demand and employment is increased. The final outcome of this worker-for-worker substitution in a particular instance will vary.

Questions arise whether, in practice, (1) labor is valued and paid more or less after productivity improvements, (2) there are positive or negative effects on job tenure and security, and (3) more workers are hired than displaced. The answers depend on the sources of the increases in worker productivity and the basis of a sector's or nation's competitiveness. Giving workers better technologies to work with may increase their productivity, but not their productiveness; that is, the labor content of, and contribution to, the product or service may have actually decreased. Here, it is often capital productiveness that has increased. In contrast, skill enhancement and education increase the productiveness of labor, without capital improvements, and would increase not only productivity but also wages to workers (necessary with capital earning less of the fruits of production).

The failure to see the important distinction between labor productivity, and labor and capital productiveness, can obscure the relative advantages and disadvantages of the potential options for reducing working hours.

3.2. Working Hours and Effects on Labor and Capital Productiveness

Working-time reductions have been historically used as a means of distributing the fruits of increased productiveness [26]. The data suggest that as labor productivity rises, hours worked fall, and productivity rises again. Despite this empirical pattern however, there exists a strong theoretical argument from neo-classical economics which argues that cutting working hours will lead to a fall in productivity, by reducing labor quality or deployment efficiency (*i.e.*, the third factor of productiveness, that of "matching"). Whereas this is a possible outcome, it becomes problematic when presented as inevitable since it relies on restrictive theoretical assumptions of labor input and production technology, and has little support from historical evidence. Instead, in addition to the general historical trend (large changes in labor supply over the past four decades reveal no systematic negative effect on output per hour worked), there are many demonstrations of *increasing* labor productivity following a *reduction* in working hours (see below). But the "binary economics" distinction between productivity and productiveness is of special importance here, since this improvement may be due either to labor becoming more productive or alternatively by the less desirable effect of capital and energy substituting for labor as the cost of labor increases (more on this below). The concept of productiveness is important because it helps to distinguish between

productivity gains that flow to labor and those that flow to the owners of capital and provides insights regarding the demand for labor and capital as well as distributional and growth consequences of the distribution of capital acquisition.

The arguments of economists about the negative effects of reduced working hours follow a firm-level theoretical (model) analysis: labor costs have both fixed and variable components, so any reduction in hours per worker increases the average hourly cost of production [27]. Fixed costs may include the costs of training new workers, or social security contributions (if paid per worker, rather than per hour worked). The price of inputs climbs higher if a work-time reduction is accompanied by an increase in wage compensation per hour, which can be considered a direct tax on productivity. The conclusion is that reduced working hours reduce firm productivity, output, and hence employment, unless offset by significant reductions in wages (per hour) or counter-improvements in productivity [27]. We may distinguish here on possible improvements in labor productiveness (e.g., workers being more productive due to acquiring greater skills or due to less exhaustion) or capital productiveness (capital substituting and vastly supplementing labor, as it becomes increasingly more productive relative to labor). The model predicts that hourly wage increases, such as those that accompanied the introduction of the 40-hour workweek when Saturday was taken off without a decrease in the wage, would lead to a dramatic reduction of output and hence employment. A first empirical observation that should cause some caution with these theoretical findings is that the transition from 48 to 40 hours was not accompanied by such dramatic losses of output or employment. If anything, the opposite was the case [15], although this might have also to do with the massive increases in debt and the lack of austerity rather than working hours per se. There are, however, other possible explanations on why reduced working hours may not impact productivity negatively as predicted by over-simplified models.

First, the fixed costs of labor may decrease and hence reduce the unit cost of labor, e.g., by reducing the cost of training, or by social security systems that do not penalize part-time work (e.g., by determining contribution per hour worked).

Second, the impacts on labor productiveness—the quality of the workforce—can be positive. A concern about shorter working hours and work-sharing is that the redistribution of labor may reduce average labor productiveness by: (i) introducing less-skilled individuals in the labor force; (ii) exposing existing human capital to fewer hours in the workplace and hence reducing its capacity. However, empirical evidence of the productivity gap that opened between US and Europe through 1995–2006 fails to support these theories [28]. The average skill level grew with rising labor force participation. This may be confounded by other factors of course, but it shows no absolute link between the two. There are good reasons why this may be the case. First, there might be diminishing returns to human capital by increasing working hours (e.g., due to tiredness, boredom or decreasing returns to certain skills); the observation of Marshall in the opening quote of our article may still apply even though working hours have declined significantly since Marshall's time. Second, it might be the case that work-sharing brings into the labor force skilled people (e.g., young educated unemployed), or people who are attracted to work by part-time opportunities (e.g., skilled women or elders). In addition, there are good reasons to speculate that reduced working hours may relieve time for individuals that can be devoted to 'productive leisure' activities—formal off-the-job education and work related training activities—that *increase* human capital formation and labor productiveness. For

example, many people may devote free time to training or leisure that improves their ICT skills. The correct use of ICT is an important determinant of firm productivity differences [28,29].

In fact, recent large and small-scale work-time reductions exhibit productivity gains that exceed expectations. Productivity increases of about one-third of the percentage reduction in hours were predicted prior to the French move from 40 to 35 hours. Similarly, the Deutsche Institut für Wirtschaftsforschung (DIW) estimated a productivity gain of one to two thirds of the percentage reduction in hours during the engineering industry's incremental transition from 40 to 35 hours through the 1980s. Retrospective surveys suggest that these estimates were observed in output and employment, and that in Germany expectations were surpassed: real wages could have risen faster since there was a higher than estimated real rate of productivity growth [26,30].

Admittedly, it is not clear whether such productivity gains were the outcome of more efficient work, *i.e.*, gains in labor productiveness, as opposed to rising labor costs and substitution of capital for labor. Questioning Schor's focus on reducing working hours to reduce unemployment and encourage degrowth of the economy [31], Rezai *et al.* [32] argue that "[i] unemployment falls as working time is reduced, workers can ask for higher wages and capitalists presumably [will] search for ways in substituting labor by machines, [thereby] increasing unemployment and labor productivity" with the result that gains made to reducing unemployment are temporary and are eventually eroded. More specifically, the authors argue that more energy and less labor will be utilized. This of course depends on the relative costs of labor and energy, as well as the volatility of these two endowments [4], but if Ayres is ultimately correct in his expectation that we are at the end of cheap energy [33], the ultimate result will remain unclear.

An analysis of employment, distribution and growth premised on productivity-based suppositions will never clarify the sources of aggregate change in what counts as "labor productivity". It is crucial however to know whether improved productivity stems from rising labor costs which leads to machines for substituting workers, and therefore gained at the expense of employment or wages or instead whether it is gained by enhanced labor productiveness, which means workers can be paid more while working less. The aforementioned empirical studies do not consider such complications; this is an area that merits further research.

A major transformation in the nature of work has been the move to a largely service-based economy—now the largest sector by employment (70%) in Europe, well ahead of Industry and Construction (21% and 7%) (EU KLEMS data). However, most of the theoretical and empirical literature on working hours in Europe relies heavily on manufacturing, an increasingly unrepresentative activity [34], probably due to its importance for export revenues. Much of what is assumed to be true about production requires reconsideration in light of these recent changes [35]. Reviewing some evidence, Booth and Ravallion [36] conclude that there exists a hill-shaped relationship between productivity and hours (c.f. to the S-shaped relation assumed in the theory reviewed above that's more relevant to the manufacturing sector) [37]. This means that in many service roles there are strong productivity declines at the extremes. Strong declines imply potentially large gains if labor demand can be restructured by clipping the least productive time at the tails. Such potential gains can be amplified if combined with the patterning of time and skill-intensity of work [38,39]. It may even be that we are seeing the shoots of a shift in labor demand towards fewer hours, as firms begin to understand that "the increasingly skill-intensive nature of jobs has reduced the

number of hours for which workers can maintain high productivity” [40]. In other words, productiveness can be improved both by allowing workers work less but be less tired and more focused (labor productiveness) and by improving the patterning of time (matching labor and capital better).

In this latter front, a promising channel through which reduced working hours can increase productiveness is the decoupling of individual working time and operating hours, allowing more flexible operating hours [40]. Working time reductions provide the stimulus for new forms of organization and a more effective use of both capital and labor. During the 1990s, a number of Finnish firms adopted a 2×6 hour shift system. This extended opening and operating hours and was rewarded by considerable productivity gains and increased employment [41]. Similarly, a Danish approach to demand-targeted employment returned significant productivity increases using a more flexible, shorter hour, workforce [42]. The Dutch are European leaders in the transition to a shorter working week, having, since the 1980s, been experimenting with the “compressed working week”. Individual daily working time is generally extended, but concentrated into a four-day week (a similar approach to that was employed in Utah [6]). The firm benefits from a five-day operation with longer daily hours, and by this approach can achieve similar gains to those in Finland. There also exists the option to annualize hours, to offer firms flexibility across the year [26]. Reducing working hours therefore can improve work-time organization and reduce the total number of hours that lay idle in the workplace.

Finally, the analysis at the firm level does not aggregate by extension to the whole economy. First, if we assume that there is an exogenous drive to capital productiveness, technological progress, that is not affected negatively by reduced working hours (e.g., due to education, research, *etc.*), then the question is how to distribute these benefits between leisure and more work (Keynes’s opening quote). In other words, we may afford to incur the losses that the firm-level economic models predict, without aggregate negative effects.

Second, time liberated from paid work may be dedicated to other activities with positive effects on the welfare, even if output declines. Indeed, from a degrowth perspective, the reduction in the output of individual firms, especially polluting or resource-intensive firms, is not bad, if the labor time released from these activities becomes active in alternative, ecologically beneficial, activities. Free time from paid work may be conceivably dedicated for example to collective affairs, nurturing, and education of children or to psychologically and community beneficial unpaid work. Note that even in strict GDP terms, the quality of democracy and institutions, education, or attention to the young is known to correlate positively with economic performance [43]. There is no empirical evidence to suggest a correlation between reduced working hours and democracy, trust, or education, and there are conceivable ways in which reduced working hours may also reduce each of those. This is an important area for further research. The point, however, that we wish to make here is that there are multiple avenues through which reduced working hours may improve qualitatively national economies.

We can also speculate about the effects of reduced working hours on European or national competitiveness. Competitiveness is a misleading word in matters of trade [44]. International trade is not a zero sum game. An increase in the prices of the sectors in which Europe specializes or has a near monopoly because of reduced working hours might actually improve Europe’s terms of trade and produce welfare gains in terms of liberated personal time. Furthermore, if quality of life improves as a result of less working hours, as we suggest it does in Section 5, then Europe may get a competitive advantage as a desirable destination for international labor in the knowledge or artistic sectors.

Admittedly, the reverse might happen also, *i.e.*, workers competing at an international level may be put off by the reduced work done in Europe. It suffices, however, to note that there is no necessary causal relationship between reduced working hours and reduced economic competitiveness of Europe.

4. Impacts on Employment

The notion of reducing the number of individual hours to increase employment through work-sharing is not without precedent. As noted in Section 2 in times of crisis the proposal has been almost routine—at times implemented (e.g., the United States introduced a policy of reduced working hours in direct response to unemployment caused by the great depression). Economists have been critical of the proposed benefits of work-sharing for employment, pointing to the mistaken assumption of a fixed quantity of work, what they call “the-lump-of-labor fallacy”, *i.e.*, that there is no fixed quantity of labor to be distributed and that changes in working hours per worker might influence the total amount of work available. The demand for labor will depend on productivity, wages, and the desire for goods and services, each of which affect one another. So demand may fall if limits are put on an individual’s working hours. Support for this expectation is observed in both theoretical [27,37] and empirical work [17], and is broadly used as an argument against the effectiveness of work-sharing.

The model of labor demand by Fitzgerald [27] mentioned in Section 3, based on earlier work by Hart [37], is indicative of such views. In this model, a firm chooses the number of workers and individual hours worked in order to maximize profits (at the prevailing hourly wage rate). The model looks at the effect of a reduction of weekly hours from forty to thirty-five (on various aspects of production, one of which is employment). Fitzgerald finds that the effect varies dramatically depending on the figures used for the various production parameters in the model, such as productivity, fixed, and variable labor costs. Unless the reduction in hours is associated with a large increase in the productiveness of a fixed number of workers and/or a substantial decline in weekly wages, Fitzgerald’s model predicts that the policy will have little, if any, positive impact on employment. The parameters are exogenous in the model but similar determinants can be seen in empirical papers [17]. Hunt [17] looks at work-sharing in Germany in the 1980’s and finds that although the work-sharing initiative did produce employment gains of around 1.1%, this remained small relative to the “counterfactual” of 1.7% gains in the US during the same period without any similar policy.

Read in contrast however, these studies find that while the lump of labor fallacy holds and not every reduced hour will be converted to new employment, still *some* new employment is likely to be created, depending on changes in wages and productivity. In other words, benefits for employment may not be 1:1, but can still be positive under conceivable conditions. For example, if reduced working hours improve labor productiveness in some sectors, which Section 3 argued may be the case, then Fitzgerald’s model does predict positive employment gains. Similarly, Hunt’s work can be re-interpreted as showing that even though employment increased less than advocates promised, it did still increase, and this with hourly wage increases, which Fitzgerald’s model predicts that they should have had dramatically negative effects on output and employment. Indeed, Walker [45] argues against the critiques by economists and shows that the lump of labor fallacy is a straw-man used as catch-all rebuttal against any working hours reduction policy. Walker argues that serious proponents of working hours reduction never claimed that there is a fixed lump sum of labor or that a reduction in working

hours will lead to a 1:1 increase in employment. What they argued is that it will reduce unemployment while increasing non-monetary wellbeing, which is a much milder statement and one that empirical analysis shows that it may happen under certain conditions.

An analysis of the employment effects of work-sharing during the Great Depression shows some empirical support for Walker's thesis: there were employment gains, but smaller than anticipated by government, especially in the long-term. Taylor [15] finds that work-hour reduction during the Great Depression put 2.7 million back to work but in the long-term the potential employment gains were offset by an increase in the wage rate. His conclusion: '*Work-sharing, through mandated shorter workweeks, can be an effective short-run tool in combating major episodes of cyclical unemployment*'. Even if work-sharing has only short-term benefits, as Taylor's and some of the above studies find, these can still be important if they succeed in keeping active a part of the population that might otherwise fall permanently out of the job market during a crisis. As Krugman [46] notes, one of the greater risks with the current recession is that a considerable portion of the younger generations stays out of the labor force for such prolonged periods that it might become permanently unemployable.

Looking at the years 1980–2001, Bosch and Lehndorff [26] investigate various collective work-hour reductions in Europe. They argue that the effectiveness of the policy in generating new employment depends on a number of contextual conditions such as: (i) wage negotiations prior to implementation, in order to keep real unit wage costs down, (ii) a flexible labor market, (iii) training schemes provided by government and social partners to reduce firm level fixed labor costs and to increase average skill levels of the unemployed.

Finally, beyond absolute numbers, a question is which groups are most likely to benefit from increased employment opportunities through reduced working hours, *i.e.*, possible qualitative and compositional changes in the work-force. We can speculate that reduced working hours will benefit those who are more time-restricted due to non-enumerated work responsibilities, such as women, or care providers in general. Indeed this is the trend suggested by the move to a 35-hour workweek in France [47]. A reduction in working hours can therefore have positive distributional effects, reducing individual income and skill inequality.

One might argue that in the context of the current crisis it is more important to redistribute income from capital to labor, or from the high to the low-income in order to boost demand [46,4]. Why redistribute instead from those working 40 hours or more to those working 32? This underscores the importance of complementing working hour reductions with other redistributive policies, including taxation. While reducing working hours has historically been a policy through which labor redistributed some of the surplus in its favor (in terms of leisure) and against further capital accumulation by owners, this is not the current trend. Instituting reduced working hours, if wage parity were maintained, could provide a mechanism for redistribution from capital to labor, and in fact one that may be more acceptable by capital than direct taxation.

5. Leisure, Welfare, and Working hours

As is known from the degrowth critique and the criticism of GDP, there are many modern services that were traditionally provided within a household, but are now purchased in the market. These increase the level of GDP, but do not necessarily constitute a welfare improvement. The ability to

consume the same bundle of goods following a reduction in working hours would imply a rise in the standard of living that might not be captured by GDP. The Stiglitz *et al.* [48] report commissioned by the French Government suggests a broader look at well-being, to include material living standards (income and consumption) but also less easily quantifiable “goods”: personal health and education; personal attributes such as political voice, social connections and relationships; environmental quality (present and future conditions); and security (of an economic as well as a physical nature).

There does not exist evidence to evaluate the effects of reduced working hours on each of these components of well-being, but we can certainly speculate that, other factors equal (including income), there are important benefits to be achieved in terms of health (less over-work and work-related stress, more time for physical exercise), education (more time to devote to parenting and off-the-job personal development), personal activities (more time to devote to hobbies and other leisure activities), social connections and relationships, and possibly political voice and governance (more time to devote to political involvement and the gathering of information). There is no guarantee of course that people will devote their non-work time to such activities, but it is reasonable to argue that on aggregate, following a reduction in working hours, each of these components will stand a higher chance of receiving more personal time.

At an aggregate level, there is evidence on a generalized link between (lower) working hours and wellbeing. Empirical estimates point to an inverse relationship between working hours and life satisfaction/happiness when other individual characteristics have been controlled for, with greater importance for men [49,50]. Alesina *et al.* [16] use data on individual life-satisfaction from GSOEP, a German survey, and comparative national data for European countries from the Eurobarometer, in both cases finding that fewer hours worked are correlated with greater life satisfaction, controlling for other factors, such as income. They show that the negative relationship between hours worked across countries and life satisfaction holds for the international comparison after using collective bargaining agreements as an instrumental variable (proxy) for reduced working hours, addressing in this way reverse causality concerns, *i.e.*, the possibility that it might be happier people (or nations) that choose to work less. These empirical findings suggest that Europeans might obtain a higher level of welfare with fewer hours spent at work.

From an economics perspective, one may argue that even so there is no need for a strong policy intervention, since workers are free to express their preferences in the labor market and they are free to trade income for leisure if they wish to do so. But there is substantial evidence, which suggests that some higher wage workers in advanced countries would prefer to work less, even if this meant a reduction in income [51,52], but currently they cannot do it (of course without a reduction in wage, which was how the 40-hour week was typically introduced, most workers would prefer to work less). If individuals are unable to realize their preferences, what may be causing this? In economic terms, this might be due to a coordination failure between the individual and the firm: the firm lacks the incentive to reduce labor hours given market rigidities and first mover uncertainties; the employee is unable to negotiate an individual work-hour structure. This is a market failure, which a policy intervention can help to resolve.

In addition, a “social multiplier” (the utility of leisure rising in the quantity of leisure consumed by peers) might amplify the benefits of a broad policy proposal. An example here is Summer holidays: most people end up taking them in July or August, because there is an obvious added utility from being

on holidays while everyone else is also, than going alone [16]. This effect is strongest when we coordinate activities and has perhaps been observed in work hour reductions in Europe (be it due to tax incentives, collective bargaining strength, or other reasons), increasing the utility received from the additional units of leisure and reinforcing the reduction of working hours [16]. This may explain the creation of a “culture of leisure” in Europe, and the relatively higher preferences for less work than in the US. Trading income for work is not feasible at the individual level, but a (inter)national policy can act as a coordination mechanism, increasing welfare.

This scope for coordination and market failure correction has led even some mainstream economists, such as Alesina *et al.*, to see a limited scope for government intervention to reduce work hours. One question is how do preferences for trading-off work with leisure depend on income or class, and how they may have changed because of the financial crisis. Austerity and salary reductions are likely to have made further reductions in income less acceptable, for more people. There is no reason however to object policies such as those of the Great Depression which reduced working hours without changes in weekly wages (hence increasing hourly wages), although economists would certainly object to that, arguing that this would further suppress output and employment (Section 4) or by instigating substitution of labor by capital have short-lived effects and reduce eventually employment and wages (Section 3).

6. The Environmental Impacts of Reduced Working hours

There are good reasons why fewer working hours may reduce environmental impact. First, if productivity gains are invested in liberating time, rather than investment and capital accumulation, this should put a brake on output growth while increasing welfare, what has been called “sustainable degrowth”. Second, households scarce in time tend to use more timesaving appliances and technologies, which in general tend to be more environmentally intensive (even if more efficient per unit of product delivered) [53]. Transport and food preparation are two obvious cases where time compression is linked to more intense resource use [54]. Third, fewer hours spent at work mean reduced transport demand and reduced consumption (of energy, water, *etc.*) at the workplace. Assuming that production and service facilities will also operate fewer hours, then reduced working hours are likely to lead to less energy spent on public and office buildings and a decline of commuting, which are sources of greenhouse gas emissions. This depends crucially, however, on the ‘social multiplier effect’ and coordination between workers on common days-off; if with work-sharing there is no change in the actual hours and days that offices or shops are open, reduced working hours may lead to more employees, and hence more commuting, per hour worked. Furthermore, if the working hours per employee decline, but the working hours per person remain the same, *i.e.*, if work is shared and not reduced, then other factors equal, there will be more people commuting to work, and the offices and factories will be operating for the same amount of hours. As a result, the environmental effect of work-sharing stands to be negative through a production/transport channel.

There are also other reasons why reducing working hours may not lead to less, but to more environmental damage. Reduced working hours may lead to environmental deterioration if by tightening labor markets and increasing wages, capital and energy substitute for workers [32]. Work-sharing may also increase consumption given the increased propensity for poorer people who join the

workforce to consume [4]. Historically speaking, the reduction in worker hours the last 100 years has been accompanied by more, not less, resource use and greenhouse gas emissions. When Henry Ford introduced an extra day of leisure for his workers, his objective was that they buy and travel with his cars more, not that they consume less. It is not clear that if people got more free time and leisure, this would be directed to less resource-intensive activities. In general, leisure is consumption intensive and the leisure services offered by the market are resource intensive: if more leisure time is offered with no change in preferences, then resource consumption may potentially increase as a result. To put it metaphorically, the office lights may be off, but those of the hotel room will be on.

On the other hand, there is always the possibility that more free time may be directed to more ‘soft’ activities, such as reading and playing, spending time with the family, ‘doing nothing’, investing in personal education, *etc.* This will depend on the relative prices of different leisure and consumption goods. Regulation of environmental standards and taxation of environmental goods and externalities can shift such prices against resource-intensive goods and provide incentives for less resource-intensive forms of consumption and leisure [55]. Andre Gorz, an intellectual father of the degrowth movement, has argued that a policy of reduced time in wage labor will work only if the government steps in to provide the necessary infrastructures for “convivial”, non-wage work and play [56]. One might think of open squares, parks, theatres and arts here, subsidized by the state. The New Economics Foundation in London [6] instead responds to this problem by hinting to a reduction of hourly wages as a result of reduced working hours; the decline of income will not allow workers to direct free time to consumption. Note that this is a problematic proposal in so far as it is equivalent to proposing intentional unemployment and austerity with reduced earning capacity for workers as a proxy for environmental policy.

What does the empirical evidence show? There is tentative evidence suggesting that working hours correlate positively with ecological footprint [57] and energy consumption per capita [58] after controlling for factors such as labor productivity, labor participation rate, climate, and population. Yet it is impossible to infer from these studies whether it is a reduction (increase) in working hours that causes a reduction (increase) of environmental impact, or some third omitted variable that correlates with both working hours and environmental impact. There are several candidates for such variables including institutions, culture, technology, or economic structure (such as whether an economy is industrializing or a service economy). In the most advanced methodologically study to date with fixed effects on panel data for 29 high-income countries, Knight *et al.* find that shorter work hours tend to have lower ecological footprints, carbon footprints, and carbon dioxide emissions [59]. Panel data fixed effects control for unobserved variables that do not change over time, or that change over time but do not differ among countries. Whereas this allows definitely a more accurate estimation than the first studies mentioned above, it still does not fully account for structural changes in economies or cultures that change differentially over time and across countries. It might therefore be the case that countries that have features that let them work less, have also features that make them have a comparatively smaller environmental impact. This makes uncertain the environmental effectiveness of a policy that directly tries to influence working hours, as compared to structural changes, which bring about such reductions.

From an environmental sustainability and degrowth perspective, a more fundamental challenge to the possibility of reduced working hours is that if the future is one of less energy, due to peak-oil or

climate change restrictions, then we will need to work more, much more actually, be it in paid or unpaid work [60]. There may be a substantial contribution of more energy use per worker to higher productivity [32]. In other words, capital productiveness is not only a result of technological improvements, but also of access to cheap energy: with industrialization, “energy slaves” have increasingly replaced workers. If this is the case, then in an energy-scarce future, labor will have to replace energy or energy intensive capital. What capital will no longer do, humans will have to do. A grand part of productivity benefits in the past has built upon access to cheap oil and material resources; as these become scarcer, productivity will not increase as it has done historically. For a given level of population and GDP therefore, we will need to work more. Sorman and Giampietro [60] show this with the use of biophysical accounts that measure the amount of energy, labor, and added value of modern industrial economies at the sectoral level. Taylor also documents a relationship between energy use per worker and higher productivity [61]. For the time being, however, there is an increase of both resource prices and unemployment in the West and one could argue, that at least as a short-term response, reducing working hours may still make sense [62]. However, if in the past time was liberated because of economic development and growth, a future of degrowth may mean that we will have to work more, not less.

7. Policy Design Considerations

The first major issue with a policy of reducing working hours is whether this will take place with or without a change in wages. The 48 and 40-hour workweeks or longer vacations were typically introduced without changes in weekly wages, meaning an increase in hourly wage. More recent sectoral cuts however through collective bargaining have been followed by constant hourly wages, and therefore cuts in weekly wages (although in the United States, major industrial unions like the United Auto Workers have decreased hourly wages for new/future workers). Cutting weekly wages through reduced working hours is attractive to firms (in effect a more agreeable form of unemployment), and according to the models explained above, has less negative effects on output, profits, and total employment (in hour terms) within the firm. While labor unions might agree with such policies in the face of worse outcomes such as firings, still this is a policy of regressive redistribution from labor to capital. It is important to remember that this is not the policy advocated by Keynes or by degrowth precursors in the 1970s such as Andre Gorz. The proposal there was for a redistribution of the benefits of productivity to labor via more free time for the same level of income. This is a progressive policy much more attractive to labor, and an indirect redistributive mechanism from capital to labor. However, it stands to face more obstacles from powerful economic interests. And as noted above its environmental benefits should not be taken for granted, unless there are accompanying structural policies that will make material consumption more costly compared to convivial consumption. Reduced working hours may revive economic growth by boosting consumption (the “Ford effect”), while increasing resource use, waste, and carbon emissions. In this case, whereas still socially progressive, a policy of reduced working hours will work against degrowth and environmental sustainability.

Second, in the debate about working hours there is confusion on whether the reduction concerns working hours per person, *i.e.*, the total hours of work in a given population, or hours per worker, *i.e.*, the total hours of work by the active population, taking out pensioners, children, and the permanently

unemployed. We maintained here a clear focus on reducing the statutory hours of work (*i.e.*, per worker). However, NEF's [6] call for a 21 hours workweek seems to refer to hours per person, which is not far actually from the current average in many European nations if one takes into account the rising average age and number of pensioners and the prolonged period that youngsters remain dependant on their parents (for studies, *etc.*). A critic could as well argue that we are not far from Keynes's vision, it is just that the elder and the younger segments of the population have seen most of the gains. Retirement policy is important in this respect, since given demographic trends in Europe, it is likely that the number of retirees per active workers will increase, reducing hence the actual worked hours per person. Work-sharing would require flexibility in allowing retirees to join, or remain in, the workforce if they so wish. In other words, a conceivable policy objective may be to reduce the hours worked per worker, without reducing the hours worked per person. However, if the objective is work-sharing, rather than a total reduction of work, *i.e.*, less hours per worker but same hours per person, there are two problems: first, environmental pressures may increase (see Section 6). Second, if hourly wages do not increase then work-sharing may be an indirect form of partial unemployment. There is a thin line distinguishing part-time work as an opportunity from part-time work as a punishment, and this basically has to do with the level of wage and the degree of choice, *i.e.*, the availability of full-time jobs.

Third, reducing working hours can come in various forms: one option is the one implicit in our title, *i.e.*, 4 instead of 5 days of work. The second option is working the same amount of days but fewer hours per day. The third option is allowing more part-time work and increasing the proportion of part-time workers in the labor force (*i.e.*, fewer hours worked per worker over the year). The fourth option could be longer vacations, maternity/paternity leaves or even "sabbaticals", where every few years people can take a period of a paid break from their jobs. The economic literature reviewed here does not always distinguish between the different effects of each of these options and in our analysis, we mixed some of these, depending on the issue considered. One could argue that an integrated policy of reducing working hours may include a mix of these options. Another argument could be more in favour of options 1 and 4, since they benefit from the "social multiplier effect", whereby people can better coordinate their free time. Reorganization costs for firms or agencies may also be lower under options 1 and 4, although as noted in Section 3 for certain service industries reducing the number of hours worked in a day to match demand may be a more effective way to cut down working hours.

Organizations might have a very difficult time coordinating workers' schedules to meet the possibly unchanged demands of their customers with fewer days of work. In options 1, 2, and 4, the switch to a four day work-week could make many workers' jobs extremely rushed and unpleasant as they scramble to accomplish the same work at less time. The assumption here is that firms will respond by hiring more people (worksharing). This makes sense for scenarios 2 and 4, with workers alternating hours of work or vacation, but in an extra "day-off" scenario it won't work, since physical or other organizational limitations may constrain the number of people that can be employed. The question here is how working less may lead also to producing and consuming less (in a degrowth spirit), rather than working less but producing and consuming the same. Part-time work is an all together different question, with a huge literature, and various advantages and disadvantages and was beyond the scope of this paper, although central to the issues discussed.

Finally, any policy of reducing working hours is destined to meet implementation problems and have organizational costs. One may argue that there is no reason why a 32-hour workweek (or a longer period of vacation), will be complied by the private sector *less* than the 40-hour workweek. There is no strong reason why there may be additional non-compliance as a *result* of reducing the working hours, unless one assumes that the possible increase of labor costs may increase the incentives for companies to find indirect ways to get more unregistered work from their workers. One may assume therefore that for a four-day workweek the same legal enforcement mechanisms will operate, as those currently operating for example to ensure that Sunday is a day-off or that legal vacations are observed.

If the policy is to be effective, however, it is important that the reduction is applicable to all sectors, and not only to those where it is easily observable, such as manufacturing and the public sector. If a work hour reduction can be implemented in only highly regulated sectors, and these consist mostly of lower wage jobs, then it may exacerbate income disparity, a problematic outcome from an equity perspective [63]. In other words, manufacture workers will work less, while service workers will work more and gain more. The French 35-hour workweek was by law applicable, at least in principle, to all firms, large and small, including those providing services [47]. But the actual hours worked by service employees or self-employed intellectual laborers are difficult to monitor and enforce. With the advent of information and communication technologies, the workplace has lost its prominence as the only location in which to conduct work, especially for non-manual, intellect-based jobs in the service or research and innovation sector. Therefore beyond statutory limitations, policies might be necessary to generate the cultural conditions for a voluntary observance of the extra day-off, such as for example, regulation of shopping hours or planning of festivals and public (sport) events in the new day-off. If Alesina *et al.* [16] are correct, a ‘social multiplier effect’ may create coordination around a shared day-off, which in turn will change cultural norms and preferences beyond those directly affected by formal enforcement (for example an academic currently may not work on a Sunday, even if this could improve her performance, on the knowledge that most of her colleagues also do not work, or because this is the day that her children are off school and she wants to spend time with them). Still, this outcome is far from certain and there are important countervailing forces that might work against the observance of a four-day workweek, especially in conditions of crisis and tightening competition in the labor markets.

8. Conclusions

This article reviewed the literature on reducing working hours and considered the advantages and disadvantages of such a policy in a background of economic, social, and ecological crisis, such as that in which Europe finds itself these days. Can a reduction of working hours provide for employment, earning capacity and a healthier economy without leading to a growth of material production and consumption? This analysis has revealed how extremely complicated this question is. Perhaps it is the wrong question. Attention to the earning capacity of working and poor people is the more appropriate policy focus. Predictions of policies that focus on working hours can only be made, if we start with assumptions about how workers would use their free-time (e.g., in environmentally friendly ways), how wages/incomes would change, and how the implementation or enforcement of a work hour reduction might vary by industry, occupation, or firm size. Ultimately, the effects of a work hour

reduction would depend heavily on union bargaining power and social policies that might simultaneously be enacted to influence how workers use their additional free-time and how firms respond to the new limits on work hours. We conclude that mainstream economists and neo-liberal politicians who are eager to dismiss the reduction of working hours, or propose to increase them, are wrong. However, some in the environmental or degrowth camp who call for reductions in working hours do not take into account second or third-level effects that may make such policies ineffective and counterproductive to their own objectives.

Yet, beyond this complexity, Keynes' opening dictum remains fundamentally true. In economies that progress technologically and in which capital becomes increasingly productive, workers should work less and less. This has not happened in the past because the surplus has been reinvested in new goods and more consumption, rather than more leisure and increases in wages. However, simply mandating a reduction of working time may not be sufficient for achieving Keynes' vision. First, it is important that the reduction in working hours is not achieved at the expense of workers or the poor: reduction of working hours should come without a decline in wages. This underlies also Keynes' vision where people live well without working; the point is not to work less and be poor. Second, given that more free time with same wages may lead to more material consumption, additional policies are necessary to shift incentives in favor of convivial, environmentally-friendly consumption. The hypothesis here is that there is a window of opportunity through which reduced working hours may improve labor productiveness, allowing to liberate time, increase hourly wages, and reduce output and consumption in a way that is not welfare-decreasing, *i.e.*, a path of sustainable degrowth. Finally, given that we live in a world that is far from optimal or ideal, any policy of reducing working hours is likely to have unintended and undesired effects. For example, if the policy is not observed well for service workers, then manual workers and public employees may lose as a result. In addition, if the policy leads to capital substituting for workers, or if factories or services move elsewhere where workers are cheaper and work longer hours, then employment, wages, and environmental conditions stand to lose.

We propose therefore the reduction of working hours at least be implemented initially as an interim measure to relieve unemployment, and over time improved through trial and error as other structural changes (in taxation, increasing working and poor people's access to capital and investment of convivial infrastructures) are instituted. An interim, trial and error approach makes sense also since in a future of expensive energy, capital productiveness may decrease, not increase, and we might have to work again more, rather than less.

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Conflict of Interest

The authors declare no conflict of interest.

References and Notes

1. Friedlingstein, P.; Houghton, R.A.; Marland, G.; Hackler, J.; Boden, T.A.; Conway, T.J.; Canadell, J.G.; Raupach, M.R.; Ciais, P.; Le Quéré, C. Update on CO₂ emissions. *Nat. Geosci.* **2010**, *3*, 811–812.
2. Jackson, T. *Prosperity without Growth: Economics for a Finite Planet*; Routledge: London, UK, 2012.
3. Victor, P.A. Growth, degrowth and climate change: A scenario analysis. *Ecol. Econ.* **2012**, *84*, 206–212.
4. Ashford, N.; Hall, R.P.; Ashford, R. The crisis in unemployment and consumer demand: Reconciliation with environmental sustainability. *Environ. Innov. Soc. Trans.* **2012**, *2*, 1–22.
5. Victor, P. Questioning economic growth. *Nature* **2010**, *468*, 370–371.
6. Coote, A.; Franklin, J.; Simms, A. *21 Hours*; NEF, The New Economics Foundation: London, UK, 2011.
7. Ashford, R.; Hall, R.P.; Ashford, N.A. Broadening capital acquisition with the earnings of capital as a means of sustainable growth and environmental sustainability. *Eur. Financ. Rev.* **2012**, *October–November*, 70–74.
8. As used in this article, “capital” includes land, animals, structures, and machines – anything capable of being owned and employed in production. It does not include “financial capital,” which is a claim on, or ownership interest in, real capital.
9. Kelly, M. *Owning Our Future: The Emerging Ownership Revolution*; Barrett-Koehler: San Francisco, CA, USA, 2012.
10. Rosen, C.; Case, J.; Staubus, M. *Equity: Why Employee Ownership Is Good for America*; Harvard Business Review Press: Cambridge, MA, USA, 2005.
11. The approach that came to be known as binary economics was first advanced in the writings of Louis Kelso in a number of books and articles. The most authoritative collection of his works can be found at www.kelsoinstitute.org.
12. Lee, S.; McCann, D.; Messenger, J. *Working Time around the World*; International Labor Organisation, Routledge: London, UK, 2007.
13. Voth, H.-J. *Time and Work in England 1750-1830*; Clarendon Press: Oxford, UK, 2000.
14. Voth, H.-J. Living standards during the industrial revolution: An economist’s guide. *Am. Econ. Rev.* **2003**, *93*, 221–226.
15. Taylor, J.E. Work-sharing during the Great Depression: Did the “President’s Reemployment Agreement” promote reemployment? *Economica* **2011**, *78*, 133–158.
16. Alesina, A.; Glaeser, E.; Sacerdote, B. *Work and leisure in the US and Europe: Why so different?* NBER Macroeconomic Annual, NBER Working Paper No. 11278; National Bureau of Economic Research: Washington, DC, USA, 2005; Volume 20.
17. Hunt, J. Has work-sharing worked in germany? *Q. J. Econ.* **1999**, *114*, 117–148.
18. Huberman, M.; Minns, C. The times they are not changin’: Days and hours of work in Old and New Worlds, 1870–2000. *Explor. Econ. Hist.* **2007**, *44*, 538–567.
19. Schor, J.B. Sustainable consumption and worktime reduction. *J. Ind. Ecol.* **2005**, *9*, 37–50.
20. Prescott, E. Why do Americans work so much more than Europeans? *Fed. Reserve Bank Minneap. Q. Rev.* **2004**, *28*, 2–13.

21. Blanchard, O. The economic future of Europe. *J. Econ. Perspect.* **2004**, *18*, 3–26.
22. Maddison, A. *The World Economy: A Millennial Perspective*; OECD: Paris, France, 2001.
23. ILO. *Key Indicators of the Labor Market (KILM)*, 3rd ed.; ILO: Geneva, Switzerland, 2003.
24. European Commission. *Self-Employment in Europe*; European Employment Observatory Review: Brussels, Belgium, 2010.
25. This sub-section draws heavily from Ashford, N.; Hall, R.P.; Ashford, R. The crisis in unemployment and consumer demand: Reconciliation with environmental sustainability. *Environ. Innov. Soc. Trans.* **2012**, *2*, 1–22.
26. Bosch, G.; Lehndorff, S. Working-time reduction and employment experiences in Europe and economic policy recommendations. *Camb. J. Econ.* **2001**, *25*, 209–243.
27. Fitzgerald, T.J. Reducing Working Hours. *Economic Review* **1996**, 13–22.
28. Van Ark, B.; O’Mahony, M.; Timmer, M. The productivity gap between Europe and the United States: Trends and causes. *J. Econ. Perspect.* **2008**, *22*, 25–44.
29. Black, S.; Lynch, L. How to compete: The impact of workplace practices and information technology on productivity. *Rev. Econ. Stat.* **2001**, *83*, 434–445.
30. Crépon, B.; Kramarz, B. Employed 40 Hours or Not-Employed 39: Lessons from the 1982 Mandatory Reduction of the Workweek. *J. Polit. Econ.* **2002**, *110*, 1355–1389.
31. Schor, J.B. *Plenitude: The New Economics of True Wealth*; Penguin: New York, NY, USA, 2010.
32. Rezai, A.; Taylor, L.; Mechler, R. Ecological macroeconomics: An application to climate change. *Ecol. Econ.* **2013**, *85*, 69–76.
33. Ayres, R.; Warr, B. *The Economic Growth Engine: How Energy and Work Drive Material Prosperity*; Edward Elgar Publishing: Williston, VT, USA, 2009.
34. Coleman, M.; Pencavel, J. Changes in Work Hours of Male Employees, 1940–1988. *Ind. Labor Relat. Rev.* **1993**, *46*, 262–283.
35. Landsbergis, P. The changing organization of work and the health and safety of working people: A commentary. *J. Occup. Environ. Med.* **2003**, *45*, 61–72.
36. Booth, A.; Ravallion, M. Employment and length of the working week in a unionised economy in which hours of work influence productivity. *Econ. Record* **1993**, *69*, 428–436.
37. Hart, R. *Working Time and Employment*; Allen & Unwin: Boston, MA, USA, 1987.
38. Caruso, C.; Bushnell, T.; Eggerth, D.; Heitmann, A.; Kojola, B.; Newman, K.; Rosa, R.; Sauter, S.; Vila, B. Long working hours, safety and health. *Am. J. Ind. Med.* **2006**, *49*, 930–942.
39. Johnson, J.; Lipscomb, J. Long working hours, occupational health and the changing nature of work organization. *Am. J. Ind. Med.* **2006**, *49*, 921–929.
40. Hunt, J.; Katz, L. Hours Reductions and Work-Sharing. *Brookings Papers on Economic Activity*, 1998; pp. 339–381.
41. Peltola, P. Working time reduction in Finland. *Transf. Eur. Rev. Labor Res.* **1998**, *4*, 729–746.
42. Nelen, A.; de Grip, A.; Fouarge, D. *Is Part-Time Employment Beneficial for Firm Productivity?* IZA, Discussion Paper No. 5423, 2011.
43. Weil, D.W. *Economic Growth*; Addison-Wesley: New York, NY, USA, 2009.
44. Krugman, P. Making sense of the competitiveness debate. *Oxf. Rev. Econ. Policy* **1996**, *12*, 17–25.
45. Walker, T. Why economists dislike a lump of labor. *Rev. Soc. Econ. Taylor Francis J.* **2007**, *65*, 279–291.

46. Krugman, P. *End this Depression Now*; W.W. Norton and Company: London, UK and New York, NY, USA, 2012.
47. Estevão, M.; Sá, F. The 35-hour workweek in France: Straightjacket or welfare improvement? *Econ. Policy* **2008**, *23*, 417–463.
48. Stiglitz, J.; Sen, A.; Fitoussi, J. Mismeasuring Our Lives. *Why GDP doesn't Add up*; The Report by the Commission on the Measurement of Economic Performance and Social Progress; The New Press: New York, NY, USA, 2010.
49. Luttmer, E. Neighbors as negatives: Relative earnings and well-being. *Q. J. Econ.* **2005**, *120*, 963–1002.
50. Pouwels, B.; Siegers, J.; Vlasblom, J.D. Income, working hours, and happiness. *Econ. Lett.* **2008**, *99*, 72–74.
51. Otterbach, S. Mismatches between actual and preferred work time: Empirical evidence of hours constraints in 21 countries. *J. Consum. Policy* **2010**, *33*, 143–161.
52. Reynolds, J. Pursuing preferences: The creation and resolution of work hour mismatches. *Am. Sociol. Rev.* **2006**, *71*, 618–638.
53. Devetter, F.; Rousseau, S. Working hours and sustainable development. *Rev. Soc. Econ.* **2011**, *69*, 333–355.
54. Jalas, M. A time use perspective on the materials intensity of consumption. *Ecol. Econ.* **2002**, *41*, 109–123.
55. Van den Bergh, J. Environment versus growth—A criticism of “degrowth” and a plea for a-growth. *Ecol. Econ.* **2011**, *70*, 881–890.
56. Gorz, A. *Farewell to the Working Class. An essay on Post-Industrialism*; Pluto Press: London, UK, 1982.
57. Hayden, A.; Shandra, J. Hours of work and the ecological footprint: An exploratory analysis. *Local Environ.* **2009**, *14*, 574–600.
58. Rosnick, D.; Weisbrot, M. Are shorter hours good for the environment? A comparison of US and European energy consumption. *Int. J. Health Serv.* **2007**, *37*, 405–417.
59. Knight, K.; Rosa, E.A.; Schor, J.B. *Reducing Growth to Achieve Environmental Sustainability: The Role of Work Hours*; Political Economy Research Institute Working Paper Series, Number 304; University of Massachusetts: Amherst, MA, USA, 2012.
60. Sorman, A.H.; Giampietro, M. The energetic metabolism of societies and the degrowth paradigm: Analyzing biophysical constraints and realities. *J. Clean. Prod.* **2011**, *38*, 80–93.
61. Taylor, L. Energy Productivity, Labor Productivity and Global Warming. In *Twenty---First Century Macroeconomics: Responding to the Climate Challenge*; Harris, J.M., Goodwin, N.R., Eds.; Edward Elgar: Northampton, MA, USA, 2009.
62. Kallis, G. Societal metabolism, working hours and degrowth A comment on Sorman and Giampietro. *J. Clean. Prod.* **2012**, *38*, 94–98.
63. Costa, D. The unequal work day: A long-term view. *Am. Econ. Rev.* **1998**, *88*, 330–334.