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The 15-hour week: Keynes's prediction revisited

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May 2022

Abstract

In 1930 Keynes opined that by 2030 people would work only 15 hours per week. As such, this prediction will not be realised. However, expected lifetime hours of leisure and home production in the UK rose by 58 per cent between 1931 and 2011, rather more than Keynes would have expected. This reflects increases in life expectancy at older ages and much longer expected periods of retirement. Leisure in retirement contributes to high life satisfaction for the elderly but building up savings to pay for it is a barrier to working only 15 hours per week.

INTRODUCTION

In 1930, Keynes published a short essay called "Economic possibilities for our grandchildren". It is famous (notorious?) for its prediction that a hundred years hence people would work for only 15 hours per week. Although this was originally conceived as an after-dinner talk for schoolboys and then as a public lecture rather than as a serious piece of scholarly research, it has a high profile. This was underlined by a collection of 14 papers commenting on the essay mostly written by distinguished economists including 4 Nobel Prize winners (Pecchi and Piga 2008).

In his own words, this is what Keynes said: "I would predict that the standard of life in progressive countries a hundred years hence will be between 4 and 8 times as high as it is today" (2008: 21). At that point, "everybody will need to do some work if he is to be contented … a 15-hour week may put off the problem for a great while. For 3 hours a day is quite enough to satisfy the old Adam in most of us!" (2008: 23). Keynes was foreseeing a future where consumption needs could be met with very little or no work but where most men would not want to give up work completely.[1] There is a back-of-the-envelope flavour to this prediction but, even so, it has been much discussed.

As well as market work, Keynes also contemplated the future of home production and envisaged that this would take up a modest amount of time. He thought that: "We shall do more things for ourselves than is usual with the rich today, only too glad to have small duties and tasks and routines." (2008: 23). This would, however, leave man "faced with his real, his permanent problem … how to occupy the leisure, which science and compound interest will have won for him" (2008: 22). In other words, work-life balance would in future become unhealthy and leisure time would be excessive.

The general reaction among economists is nicely captured by Pecchi and Piga: "How could it be that a man of Keynes's intelligence, with a deep understanding of economics and society, could be so right in predicting a future of economic growth and improving living standards and so wrong in understanding the future trends of labor and leisure, consumption and saving?" (2008: 3). The economists in their volume discuss several plausible hypotheses to explain the failure of work hours to fall as Keynes predicted. These include that for work-leisure choices substitution effects were bigger and income effects smaller than Keynes (implicitly) assumed, that new goods created new consumer wants, and that preferences have changed in response to advertising, and that consumer expenditures keep increasing to keep up with or outdo fellow citizens.[2]

The data reported in Table 1 are typical of those that have been used to compare outcomes with Keynes's predictions and to suggest that he was right about growth but wrong about leisure. The UK has experienced lower growth than most other advanced economies since 1931 but, nevertheless, real GDP per person in 2011 was a little over 5 times the 1931 level, i.e., already within the 4 to 8 times band so on that measure Keynes's prediction about economic growth was well on track. Although average hours of market work per year for men fell by more than a quarter between 1931 and 2011, in that year they were still a long way above Keynes's prediction of 780 hours and had decreased by just over 10 per cent in the previous 30 years.

Another way to express Keynes's prediction is as an expected increase in the amount of leisure (and/or home production). Allowing a conventional 8 hours per day for sleep, there are 112 waking hours available per week. The work week averaged 48.1 hours (2500/52) in 1931, so this left 63.9 hours for

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[1] The discussion in Keynes's paper is clearly about the future of men's rather than women's work.
[2] An increase in wage rates raises both income and the opportunity cost of leisure. Its effect on labour supply is ambiguous and depends on the relative size of the two effects. The last three arguments might be interpreted as reasons for the substitution and income effects being different from what Keynes imagined.

leisure and home production. A work week of 15 hours would leave 97 hours per week, so Keynes's was predicting an increase of 51.8 per cent (97-63.9)/63.9 in leisure/home production time. This is more than two and a half times the actual increase between 1931 and 2011 which was 19.9 per cent (76.6 – 63.9)/63.9 according to Table 1.

However, this only takes account of time use pre-retirement and does not include later life. This is an important omission in the context of increases in life expectancy and length of retirement since 1931 (Tables 2 and 3), as this paper shows. I calculate that over his lifetime a 20-year-old male in 2011 could expect 267959 hours of leisure and home production compared with 169152 for his 1931 counterpart, an increase of 58.4 per cent (Table 4). On reasonable assumptions, this is more than Keynes would have predicted, as the paper also demonstrates. The main reason for his 'underprediction' is that, contrary to the expectation of 1930s' experts, life expectancy at older ages has increased considerably since the 1960s.

When separate calculations are made for expected lifetime hours in home production and in leisure time the result is a 37-48 per cent increase in the latter between 1931 and 2011 which is a good deal less than Keynes might have supposed based on the information that was available in 1930. My central estimate that a 20-year-old male in 2011 could expect over his lifetime 44496 hours of home production and 223463 hours of leisure compared with 12183 and 156969 hours, respectively, for his 1931 counterpart. Here the unforeseen surprise is the large increase in married women's participation in market work and an associated rise in home production by men.

Finally, it is important to note that taking this life-cycle perspective gives an important insight as to why, although the total of lifetime hours in leisure and home production has risen by more than Keynes would have predicted, average hours of market work for those in employment have fallen by less than he suggested. Consumption during a longer expected period of retirement needs to be financed by the accumulation of assets during working life and this is likely to have been underwritten by continuing to undertake a substantial amount of market work pre-retirement.

I. ESTIMATING EXPECTED LENGTH OF RETIREMENT (ELRP)

The method used to obtain estimates of the length of retirement is basically the same as that proposed by Lee (2001). Retirement duration is estimated for male workers at age 20 by calculating a weighted average of life expectancy at each age of retirement. The weight assigned to life expectancy at age x, e_x, is the probability of retiring at age x. In turn, this is the product of the following probabilities: the probability of remaining alive to age x (S_x), the probability of remaining in the labour force until age x conditional on surviving to age x (T_x), and the probability of retiring at age x conditional on remaining in the labour force at age x (γ_x). Among the men who would retire between age x and age x + 1 ($S_x T_x \gamma_x$), the proportion of those who die is given by the mortality rate within the age interval ($_1q_x$). If the likelihood of retirement does not vary within the age interval, half of these men would die before they leave the labour force. Therefore the probability of retirement between age x and x + 1 is $S_x T_x \gamma_x [1 - (0.5 \times {}_1q_x)]$. If a man retires between age x and x + 1, his expected length of retirement is $(e_x + e_{x+1})/2$. Assuming for simplicity that the earliest age at retirement is 50, this gives the expected length of retirement at age 20 as follows:

$$\text{ELRP} = \rho^{20\text{-}50} \Sigma_{x=50\text{-}89} S_x T_x \gamma_x [1 - (0.5 \times {}_1q_x)][(e_x + e_{x+1})/2]$$

where $\rho^{20\text{-}50}$ is the probability at age 20 of surviving until age 50.

Both period and cohort estimates of ELRP are reported in Table 3. Period estimates are based on the assumption that a 20-year-old man estimates his retirement duration based on current mortality and retirement rates remaining unchanged in future. Cohort estimates are based on the mortality and retirement rates that obtained as the 20-year old passes through his life and are equivalent to an assumption of perfect foresight of future life expectancy and labour force participation probabilities. Except for those cohorts reaching the age of 20 a long time ago estimates are partly based on future projections. Since, over time, life expectancy has been increasing and, at least until recently, fewer people have been working late in life, in general, the period estimates of ELRP may be considered as a lower bound and the cohort estimates as an upper bound. The gap between the two has varied in the past and has described an inverted-U shape since 1931.

The data used to estimate ELRP were as follows. Life expectancies and survival rates prior to 1951 were taken from Case et al. (1962) who compiled the evidence of early English life tables which were constructed using information collected by the Registrar General. From 1951, life tables published by the Office for National Statistics (2018) were used. These include projections through to 2068 such that cohort estimates for a 20-year old are available up to 2011. Labour force participation rates from 1931 to 1981 are taken from Johnson (1994) who derived them from the Population Census.[3] Later years use tabulations from the Labour Force Survey and projections of future participation rates through to 2065 in Office for Budget Responsibility (2015).

Table 3 reports estimates for ELRP that reflect a large increase between 1931 and 2001. In the years since Keynes published his essay, from 1931 to 2011, the period and the cohort estimates gained 11.71 and 8.04 years, respectively. The main reason for longer expected retirement is increased longevity. The period estimates for life expectancy at age 20 were 47.1 years in 1931 and 59.4 years in 2011 and at age 65 were 11.4 and 18.3, respectively. When Keynes wrote a 20-year old had a 70.4 per cent chance of surviving to age 65, which became the conventional age at which men retired, whereas by 2011 this had risen to 87.1 per cent. ELRP is estimated as 7.58 years using 2011 participation rates and 1931 mortality. Thus, 8.79 out of the 11.71 years increases in ELRP between 1931 and 2011 resulted from improved life expectancy.

II.   ESTIMATING EXPECTED LIFETIME HOURS OF MARKET WORK AND OF HOME PRODUCTION & LEISURE

Having made estimates of ELRP and using estimates of annual hours worked (AHW) from Table 1, it is possible to divide expected lifetime hours at age 20 into expected hours of market work and of non-market work or leisure. The estimates assume that the average year comprises 8766 hours of which 2922 are allocated to sleep.[4]. Total lifetime hours are 5844 multiplied by life expectancy at age 20 (e_{20}). Then

Expected Hours of Market Work = $(e_{20} -$ ELRP) x AHW

Expected Hours of Home Production & Leisure = (5844 x e_{20}) - $(e_{20} -$ ELRP) x AHW

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[3] The census was not taken in 1941 for which year Johnson interpolated his estimates.
[4] This allows for a leap year every fourth year.

The limitation of this formula is that it does not capture phased moves into retirement where workers initially scale down their hours before retiring completely. However, since only a small proportion of lifetime expected market work hours are post-65 and there were shorter hours at these ages both in 1931 and in 2011, any bias in comparisons of expected lifetime leisure/home production between these two years is likely to be very small. The evidence available for 1931 is for workers in London and shows average weekly hours for those who worked at ages 65, 70 and 74 were 41.4, 35.0 and 31.1, respectively (Baines and Johnson 1997), and on average in England and Wales 5.1 per cent of lifetime hours were after the age of 65. For the UK in 2011 men who worked at the ages of 65-69 and 70-74 averaged 30 hours and 20 hours per week, respectively (Chandler and Tetlow 2014), and 3.4 per cent of lifetime hours were post-65.

Table 4 reports a substantial change in the expected proportions of a worker's lifetime spent in work and leisure/home production. Whereas in 1931, with then current mortality and labour force participation rates 38.5 per cent of expected waking hours would be spent in market work by 2011 that had fallen to 22.8 per cent. According to these estimates, a 20-year-old male in 2011 could expect 267959 lifetime hours of leisure or home production compared with 169152 hours for his counterpart in 1931, an increase of 58.4 per cent.

The increase in lifetime hours of expected leisure and home-production hours has some interesting features. First, a relatively large part of this increase, 68433 hours or 69.3 per cent of the total, accrues during retirement, i.e., towards the end of life when health may be deteriorating. The increase in expected leisure or home-production time pre-retirement is only 21.4 per cent compared with 58.4 per cent overall (Table 4). Second, over half of the 35414 increase in expected pre-retirement leisure/home production hours is in the form of vacation time which rose from an average of 2.2 weeks per year in 1931 to 5.8 weeks in 2011 (Ward et al. 2018) so that 16.2 per cent of these hours were on vacation in 2011 compared with 7.4 per cent in 1931. A rising share of leisure time being taken as vacations is perhaps not surprising when the very high valence rating of 'vacation' is recognised.[5]

III.   ESTIMATING LIFETIME HOURS OF MARKET WORK, HOME PRODUCTION, AND LEISURE

It is possible to make estimates of expected hours spent in home production and leisure, respectively, for pre-retirement men based on time-use diaries but only for snapshot years beginning in the 1970s. A summary of key findings for males aged 20-59 is reported in Table 5 for 1974 and 2014. It is reasonable to regard 'core domestic work' and other 'unpaid work' as home production and 'uncommitted' as leisure time.[6] A notable feature of these estimates is the rise in men's time in core domestic work between 1974 and 2014. Post retirement we might suppose that the total amount of home production time per household increases modestly and the division between men and women

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[5] In other words, 'vacation' is a word that strongly connotes 'happiness'; for details of the measurement of the valence of words on which this observation is based using the Affective Norms for English Words (ANEW) dataset, see Hills et al. (2019). In their sample of 13915 words, 'vacation' scored 8.63/9 and ranked 1st.
[6] This would be consistent with survey evidence of enjoyment of different activities reported by Ramey and Francis (2009) and with their suggestion that we regard as leisure anything enjoyed more than any type of work.

is a bit more equal. In view of the data collected by Ramey and Francis (2009) for the United States, I assume that in retirement compared with pre-retirement male hours of home production increase by 1.8 hours per week in 1931, 3.2 hours per week in 1971, and by 2.4 hours per week in 2011. The time use data for 1974 and 2014 is used to estimate time in pre-retirement home production in 1971 and 2011, respectively.

An estimate of pre-retirement home production time for men in 1931 is difficult and can be no more than an educated guess. It seems highly likely that it would be lower than in 1974. An obvious reason for this is the large increase in married women in employment from 10 per cent in 1931 to 49 per cent (many part-time) in 1971. Time-use evidence for later periods suggests that more market hours worked by women is associated with increased home production time for their male partners.

This pattern is reflected in the experience of the United States. In 1930, for the 25-54 years age group men spent 5.8 hours per week in home production and 44.7 hours in market work whereas for women the hours were 45.9 and 10.1, respectively. In 1970, men worked 12.0 hours per week in home production and 40.1 hours in paid work while for women the hours were 39.1 and 15.7, respectively. In round numbers, between 1930 and 1970 roughly six hours of market work switched from men to women and a similar number of hours of home production went the other way. With the American experience in mind, it is reasonable to assume that in the UK, on average, men pre-retirement devoted half as many hours per year to home production in 1931 as in 1971, 249.4 compared with 498.7.[7] Clearly, this is somewhat questionable, so I also report estimates based on this ratio being a quarter and three quarters, 124.7 and 374.0 hours per year, respectively.[8]

This methodology produces the results reported for all men in Table 6. Again, there is a substantial increase in the amount of expected lifetime leisure which goes up by 42.4 per cent in the central estimate (1931, 2), from 156969 hours in 1931 to 223463 hours in 2011 or by 37.2 per cent and 47.9 per cent in the alternative calculations. It is striking, however, that expected lifetime hours in home production are estimated to increase markedly – from 12183 to 44496, in the central estimate.

A further notable feature of the estimates in Table 5 is that between 1974 and 2014, the traditional relativity between the market work hours of highly educated men and those with little education was overturned. In 2011, the former performed 331.6 minutes of market work per day compared with 318.2 minutes per day for the latter. Indeed, time spent in market work in 2014 by highly educated men had increased compared with forty years earlier. As was highlighted by Gershuny and Fisher (2014), in the early 20th century the best educated men were the leisure class during their careers, but this was no longer the case a century later.

However, the life expectancy of highly educated men in 2014 greatly exceeded that for men of low educational attainment, as is reported in Table 7, with the implication that they could look forward to 5.5 more years of retirement. In turn, this meant that at age 20 they could expect about 40,000 more

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[7] This would imply that hours in home production in 1931 in the UK were 82 percent of those in the USA; in 1971 the proportion was 80 per cent.
[8] The derivation of estimates of home production is set out fully in the appendix.

years of leisure over their lifetime even though they would expect to work longer hours prior to retirement.

IV. A LIFETIME EQUIVALENT OF KEYNES'S PREDICTION

Keynes did not discuss the future of work over the whole life cycle nor did he ever predict what life expectancy or retirement behaviour might be a hundred years after he wrote. It is possible, however, to make some informed guesses at what he might have assumed and thus to make an estimate of lifetime expected hours of leisure and home production in 2030 from a 1930 Keynesian perspective.

The demographic future was a high-profile issue in the 1930s in the context of worries that the future was one of a declining population. The best-known and much-publicized predictions were made by Charles (1935). She offered 3 variants of which her estimate b) which took account of increases in future life expectancy is the most appropriate. Her views were typical of the time; she foresaw steady decreases in mortality below the age of 70 for the next 30 years, at which point a minimum level would have been reached, but she expected mortality over the age of 70 to remain at the 1935 level. In 1965 the maximum life expectancy at birth of 68.3 years would have been attained. This is very close to the 68.1 years in the life table for 1961 (Table 1). I will assume for my lifetime equivalent of Keynes's prediction that the life table for 1961 still obtains in 2030; in other words, in common with informed opinion of the 1930s, Keynes is assumed not to have foreseen the further increase in life expectancy to 79.0 years in 2011.

In his essay, Keynes seemed to think that in future home production would not take up much of men's time. This would fit with a world in which few married women worked outside the home. It is most unlikely that Keynes would have foreseen the large increase after World War II in market work by married women which became an important reason for men to spend more time in home production. The married women's labour force participation rate flatlined at about 10 per cent from 1901 to 1931 (Hatton and Bailey, 2001). Married women going out to work was widely seen as an unfortunate consequence of 'need' or a social problem (McCarthy, 2016). On this view, it would surely have withered away in Keynes's future land of plenty. I shall assume that Keynes would have projected that men's hours in home production would remain at the 1931 level.

By 1930, the concept of occupational pensions which would become widespread after World War II had arrived for the lucky few. These schemes typically had a normal retirement age and by the 1930s this was generally 65 years for men. This was also established as the state pension age in 1928 and, as Hannah put it, "The age of 65 as the pension age for men had long been considered ideal" (1986: 128). By the 1950s, it was possible for middle-class men to retire completely at 65 and enjoy a comfortable retirement which most chose to do. I will assume for my lifetime equivalent of Keynes's prediction that age-specific labour force participation rates were as in 1931 up to 65 with AHW = 780 after which age no-one works.

If a lifetime equivalent of Keynes's prediction is based on the life table of 1961 and full retirement at age 65 for those still in work, then expected lifetime hours of leisure or home production for a 20-year -old man in 2011 are 258720 and expected hours of market work are 35233. The increase in lifetime leisure and home production time compared with 1931 is 53.0 per cent. This is less than the 58.4 per

cent increase that actually accrued between 1931 and 2011. So, contrary to conventional wisdom, it seems that actual increases in the expected time available for leisure and home production taken together have exceeded anything Keynes might have predicted. Keynes was right to predict a large increase in leisure and home-production time but failed to see that much of this would be enjoyed in retirement. Keynes did not put his prediction in terms of lifetime experience but if he had done so he would surely have under- rather than over-predicted the expected increase for a 20-year old man in 2011 compared with his predecessor of 1930. The change in life expectancy since the 1930s would be a very nice surprise.

If, however, lifetime hours of home production and leisure time are estimated separately, then leisure time increased by considerably less than Keynes would have predicted between 1931 and 2011 – by 42.4 per cent compared with 56.5 per cent.[9] This reflects a big rise in hours devoted to home production which it is reasonable to suppose that Keynes would not have anticipated. Another striking difference between the historical experience and a Keynes-type prediction that shows up in Table 8 is that 36.7 per cent of expected lifetime leisure occurs post-retirement in the experience but only 11.5 per cent is post-retirement in the prediction.

A notable feature of these estimates is that the percentage of lifetime hours devoted to leisure is a good deal lower in 2011 than Keynes would have projected even though total leisure time has increased substantially. As is reported in Table 9, whereas Keynes might have expected that a 20-year-old man in 2011 would use 83.6 per cent of his waking hours on leisure, the period estimate for 2011 is 64.4 per cent. Keynes may well have thought 42.4 per cent more leisure occupying 64.4 per cent of time a better outcome than 56.5 per cent more leisure taking up 83.6 per cent of time since it might allay the fears that he had of excessive leisure and strike him as a better work-life balance.

IV.   A LIFE-CYCLE VIEW

It is helpful to analyse decisions about how much to work in the context of a life-cycle framework in which their intertemporal aspect is recognised. A stylized example taught to economics students would see a phase of borrowing when young, accumulating assets while middle-aged and dissaving during retirement. It might be expected that there is consumption smoothing over time and the central prediction is that optimization will be achieved by equating the marginal utility of consumption over time. The accumulation of assets pre-retirement, which reflects both work effort and savings behaviour, matters for living standards during retirement.

The much greater accumulation of assets by the average person at the end compared with the beginning of the 20th century underpins the notion of being able to finance an enjoyable retirement, as Hannah (1986) noted. These assets often included occupational pension and housing wealth as well as an entitlement to a state pension. A recent study found households adopting a three-pronged asset accumulation strategy based on homeownership, pensions and savings to provide financial

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[9] This conclusion is based on the central estimate (1931, 2) for home production hours in 1931. It also holds for the (1931, 1) and (1931, 3) estimates which give 37.2 versus 54.7 per cent and 47.9 versus 58.5 per cent, respectively.

security as welfare benefits have become less generous (Hillig 2019). The number of persons in receipt of payment of an occupational pension, which were typically based on defined benefit schemes, rose from 0.2 million in 1936 to 9.2 million in 2011 (Hannah 1986; ONS 2019). The percentage of dwellings which were owner-occupied rose from 23.4 in 1918 to 34.1 in 1939 and 65.0 in 2011, having peaked at 69.8 per cent in 2001 (Holmans 2005; DCLG 2013). In 2011, house ownership was normal for the 'traditional working class' as well as the middle classes and the elite (Savage et al. 2013).

A life-cycle model with consumption smoothing predicts that an expectation of a longer period of retirement implies that individuals will aim to enter retirement with a larger stock of assets. This implies that an increase in ELRP will encourage working more and/or saving a higher fraction of income pre-retirement. Increases in life expectancy in the second half of the 20th century tended to mean longer retirement for many men given the norm or even the contractual obligation to retire at 65.[10]

Life expectancy for men at 65 rose from 11.4 years in 1931 to 18.3 years in 2011. Other things equal, this implies that to maintain a given level of consumption the amount of assets required at retirement period was 1.6 times larger in 2011. If this is to be achieved by accumulation of housing wealth, there is a strong incentive to move up the housing ladder rapidly by working more (Banks et al. 2017; Bottazzi et al. 2010) For those with occupational pensions, longer life post-65 acts as a disincentive in defined contribution or career-average defined benefit schemes to reduce working hours prior to retirement.[11] For those schemes where the defined benefit is based on final salary, it raises the cost in terms of foregone earnings and pension payments of a reduction in work hours.[12]

The possibility of accumulating sufficient assets to enjoy retirement rather than endure a life of poverty seems to have paid off for many old people in recent times. Given a greater capacity to finance retirement and much better pension arrangements, Hannah argued that "Voluntary retirement is … a luxury good whose incidence would be expected to grow" (1986: 124). Costa (1998) pointed to the lower price of recreational goods and their increased variety as reasons why retirement became a lot more enjoyable in the later 20th century.

Other economic and social historians have emphasized that many elderly people at this point had the option of a fairly comfortable retirement, that living standards in old age had improved markedly compared with the mid-20th century, both in absolute terms and relative to those in employment, and that older people often described themselves as active, involved and happy (Johnson 1989; Thane 2000). This last observation is consistent with the evidence of a large volume of happiness studies which report relatively high levels of subjective well-being in later life. In 2011-15, UK responses to the survey question 'Overall, how satisfied are you with your life nowadays?' on a scale of 0-10

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[10] A survey in 1994 found that 53 per cent of men had an upper limit on their retirement age and more than three quarters of men had an expected retirement age of 65 (Meadows 2003).

[11] The damage done by reducing work hours for part of a career is illustrated by the high impact of reduced hours and career breaks for women who have children. In their early 60s women in the UK have median private pension wealth which is about one third of that of the median for men and 47 per cent of the difference is attributable to interruptions to full-time work (Jeetwa 2019).

[12] For example, for someone in a 2/3 final salary scheme whose full time-earnings are y, the total cost of going half time at age 55 is 5y + (0.33y x 11.4) = 8.76y if life expectancy at 65 is 11.4 years as in 1931 but 5y + (0.33y x 18.3) = 11.04y if life expectancy at 65 is 18.3 years as in 2011. Obviously, with no pension entitlement the cost of going half time is only 5y.

averaged 7.8 at 65, 7.85 at 70 and 7.7 at 85 – higher than at any age between 20 and 65 (Blanchflower and Oswald 2019).[13]

Overall, it seems plausible that increases in life expectancy and the associated lengthening of the retirement period have meant not only much increased time spent in non-market work and leisure in later life but also have acted to discourage dramatic reductions in market work hours in youth and middle age. This provides a further important reason, not previously stressed in the literature, why Keynes's 15-hour week prediction was incorrect.

V. CONCLUSIONS

It is generally agreed that Keynes's bold prediction of a 15-hour week by 2030 will not be realised. If this is taken to be 780 hours per year of market work, this compares with 1840 hours in 2011. Between 1931 and 2011, annual hours of work fell by a little over a quarter whereas Keynes predicted a fall of two thirds by 2030. An alternative way to frame Keynes's prediction is in terms of an increase of 52 per cent in time available for leisure or home production per week. Not surprisingly, this also seems wide of the mark since up to 2011 the actual increase was a little under 20 per cent.

It is really important to consider the implications of increasing life expectancy. Partly this is because If, however, the increase in expected leisure and non-market work time is considered on a lifetime basis, a very different picture is revealed. For a 20-year old man expected years of retirement have increased from 4.66 years in 1931 to 16.37 years in 2011 mainly as a result of improved life expectancy. The implication is that expected lifetime hours of leisure and home production taken together rose by 58.4 per cent between 1931 and 2011. However, time spent in home production rose considerably over this period with the implication that my central estimate of the increase in expected lifetime leisure rose by rather less, namely, 42.4 per cent.

It is also valuable to think about the choice of many hours of market work when young with a life cycle perspective which takes account of the need to finance the additional years of retirement that come with greater longevity. Much of the additional leisure/home production time that a 20-year-old man can now expect will accrue in retirement. This should not be considered 'low value'. The evidence suggests that on average persons aged 65 and over have a high level of life satisfaction nowadays. However, enjoying a comfortable retirement is facilitated by accumulating assets earlier in life and this has mitigated against larger reductions in annual hours of market work.

Keynes did not make a prediction on a lifetime basis but if he had it would surely have assumed that life expectancy, especially for the elderly, would have risen by much less actually was the case. Using conventional 1930s' demographers' assumptions plus a 15-hour week and universal retirement at 65, his prediction for the increase in expected lifetime leisure and home production work hours would

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[13] 'Retirement' is also quite a happy word according to its valence. It scores 6.6 and ranks in the top 11 per cent of words. This undermines the view of Skidelsky and Skidelsky that "it must surely be wrong to concentrate so much leisure in the last years of a person's life {when} capacity for enjoying it may well have diminished" (2013: 25).

have been 53.0 per cent rather than the 58.4 per cent that transpired. Viewed from this perspective, contrary to conventional wisdom, the outcome has exceeded Keynes's expectations. However, for leisure itself I think Keynes's expectation of the increase would probably have been around 56.5 per cent which comfortably exceeds the 42.4 per cent actually achieved.

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Table 1. Average Male Hours of Work, Real GDP per Person and Real Consumption Expenditure per Person

	Hours/Year	*Real GDP/Person*	*Real Consumption Expenditure/ Person*
1931	2500	100.0	100.0
1951	2333	142.6	118.7
1961	2273	187.5	150.0
1971	2157	246.5	187.1
1981	2062	292.6	226.9
1991	2044	376.5	316.6
2001	1917	475.8	429.8
2011	1840	515.0	468.1

Source: Thomas and Dimsdale (2017), Tables A12, column F, A21, columns A and V, and A54, column AW.

Notes: real GDP and real consumption expenditure are 5-year averages.

Hours per year take account of part-time work, holidays, stoppages, and sickness.

Hours per year reported by Thomas and Dimsdale (2017) have been adjusted to put them on a male-only basis using the Labour Force Survey from 1971 and Department of Employment and Productivity (1971), Table 84 for earlier years for which all part-time work is assumed to be carried out by women.

Table 2. Male Life Expectancy at Birth (years)

1931	58.7
1951	66.4
1961	68.1
1971	69.0
1981	71.0
1991	73.4
2001	76.0
2011	79.0

Source: ONS (2015).

Note: these are period estimates.

Table 3. Expected Years of Retirement for Men at Age 20 (years)

	Period Estimate	*Cohort Estimate*
1931	4.66	9.84
1951	5.88	14.68
1961	6.71	16.73
1971	8.28	17.31
1981	10.33	17.60
1991	13.10	17.61
2001	15.07	18.12
2011	16.37	17.88

Sources: Derived using mortality estimates taken from cohort and period life tables in Case et al. (1962) and in ONS (2018) together with labour force participation rates based on Johnson (1994) and OBR (2015).

Table 4. Expected Lifetime Hours of Market Work and of Home Production & Leisure for Men Aged 20.

	Market Work (%)	*Home Production & Leisure (%)*
1931	106100 (38.5)	169152 (61.5)
1951	100366 (35.1)	185406 (64.9)
1961	99080 (33.7)	194873 (66.3)
1971	92578 (30.9)	206635 (69.1)
1981	86542 (28.3)	219099 (71.7)
1991	84008 (26.5)	232437 (73.5)
2001	79421 (24.1)	250765 (75.9)
2011	79175 (22.8)	267959 (77.2)

Source: derived using data for Tables 1 and 3 and period estimates of life expectancy at age 20 from Case et al. (1962) and ONS (2018).

Note: these are period estimates. Sleep is allocated 8 hours per day.

Table 5. Time-Use: Average Minutes per 5 Activity Day (men aged 20-59)

	Sleep	Core Domestic Work	Other Unpaid Work	Market Work	Uncommitted Time
All					
1974	469.1	22.3	59.9	348.3	543.8
2014	505.8	55.3	62.5	324.0	508.4
Lower Education					
1974	465.5	21.8	57.1	356.0	541.2
2014	496.3	70.2	78.9	318.2	478.6
Higher Education					
1974	479.1	28.4	59.7	320.0	563.0
2014	504.2	54.8	59.9	331.6	514.8

Source: data based on time-use diaries provided by Jonathan Gershuny.

Note: average minutes are for a full 7-day week.

Table 6. Expected Lifetime Hours of Market Work, Home Production, and Leisure for Men at Age 20.

	Market Work	*Home Production*	*Leisure*
All			
1931 (1)	106100 (38.5%)	6310 (2.3%)	162842 (59.2%)
1931 (2)	106100 (38.5%)	12183 (4.4%)	156969 (57.1%)
1931 (3)	106100 (38.5%)	18052 (6.6%)	151100 (54.9%)
1971	92578 (30.9%)	26911 (9.0%)	179724 (60.1%)
2011	79175 (22.8%)	44496 (12.8%)	223463 (64.4%)
No Qualifications			
2011	78207 (23.5%)	53269 (16.0%)	201632 (60.5%)
Degree			
2011	84679 (22.6%)	47070 (12.5%)	243436 (64.9%)

Source: Table 4 and own calculations, see text.

Note: 1931 (1) assumes that pre-retirement home production per year is ¼ of the 1971 level; 1931 (2) assumes that pre-retirement home production is ½ of the 1971 level, and 1971 (3) assumes that pre-retirement home production is ¾ of the 1971 level.

Table 7. Life Expectancy and Years of Expected Years of Retirement for Men at Age 20 (years).

	Life Expectancy at Age 20	*Expected Years of Retirement*
All	59.4	16.37
No Qualifications	57.0	13.72
Degree	64.2	19.23

Source: e_{20} from ONS (2018) and Ingleby et al. (2021); ELRP based on own calculations.

Note: these are period estimates. ELRP is derived using the formula in the text, lifetables from ONS (2018), and labour force participation rates from Chandler and Tetlow (2014).

Table 8. Expected Lifetime Hours of Home Production and Leisure for Men Aged 20 vs. Keynes-type Predictions.

	Pre- Retirement	*Post-Retirement*	*Total*
Home Production			
1931 (2)	10585	1598	12183
2011	30753	13743	44496
Keynes 2011	11265	1760	13025
Leisure			
1931 (2)	131334	25635	156969
2011	141540	81923	223463
Keynes 2011	217475	28220	245695
Home Production & Leisure			
1931 (2)	141919	27233	169152
2011	172293	95666	267959
Keynes 2011	228740	29980	258720

Source: own calculations, see the text.

Table 9. Expected Lifetime Hours for Men Aged 20 Used for Different Activities (%)

	Market Work	*Home Production*	*Leisure*
1931 (2)	38.5	4.4	57.1
2011	22.8	12.8	64.4
Keynes 2011	12.0	4.4	83.6

Source: own calculations, see the text.

1971

Pre-retirement

Home production is based on 1974 time-use diary estimates for non-paid work = 498.7 hours per year.

Post-retirement

Add 166.4 hours per year to pre-retirement hours, so home production time = 665.1 hours per year.

2011

Pre-retirement

Home production is based on 2014 time-use diary estimates for non-paid work:

All men = 714.7 hours per year; no qualifications = 904.5 hours per year; degree = 695.8 hours per year.

Post-retirement

Add 124.8 hours per year to pre-retirement hours, so home production time:

All men = 839.5 hours per year; no qualifications = 1029.3 hours per year; degree = 820.6 hours per year.

1931

Pre-retirement

Construct estimates based on a fraction of 1971 home production time:

1931 (1) = 124.7 hours per year (1/4 of 1971); 1931 (2) = 249.4 hours per year (1/2 of 1971); 1931 (3) = 374.0 hours per year (3/4 of 1971).

Post-retirement

In all three cases, add 93.6 hours per year to pre-retirement hours, so home production time:

1931 (1) = 218.3 hours per year; 1931 (2) = 343.0 hours per year; 1931 (3): 467.6 hours per year.