



BANK OF ENGLAND

Speech

What's in a week's work?

Speech given by

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Introduction

Thank you very much for inviting me here to speak to you. The start of the new year is traditionally a time for reflections on the past twelve months, and resolutions for the year ahead. I would like to use this opportunity to reflect on the world of work, and in particular the reasons why the average length of the working week has recently started shrinking, after recovering somewhat from its financial-crisis low. This has an important bearing on the outlook for inflation. And, since the Monetary Policy Committee expected it to rise, not fall, what I have to say follows the spirit of our resolution to learn more systematically from past errors, as we discussed in the November *Inflation Report*.¹

To set the scene for my analysis, I would like to start by looking at recent patterns in working hours in the UK, highlighting the differing experiences of men and women, and younger and older workers. The central question I will try to answer today is whether these changes are going to endure.

What does this mean for inflation and monetary policy? A shortening in the working week could, by itself, add to inflationary pressure in the labour market. The intuition is that firms seeking to increase production would be able to do this only by recruiting more workers – rather than through their existing employees working more – which is more costly.² And the cause of the shortening week is important. If it reflects long-term supply conditions in the labour market, or in other words, how long people *would like* to work, then the level of potential supply in the economy may be lower over the next few years.

The rest of my speech, therefore, sets out: some context on the changing face of the working week; analysis of how it might evolve over the next few years; and exploration of what might be driving the changes. I will finish by explaining how this contributes to my assessment of the state of the economy, and my vote on interest rates.

Setting the scene

A broad sweep of the past 150 years suggests that the length of the average working week in the UK has fallen fairly steadily over this time (Chart 1). A typical week for a full-time worker is now just under forty hours long, compared to over sixty in 1860. Of course, this comparison is somewhat distorted by the omission of some important work – such as unpaid housework or childcare – from these statistics.³ But these qualifications do not alter the bigger picture that average working hours have fallen. And the question remains as to the economic forces behind this.

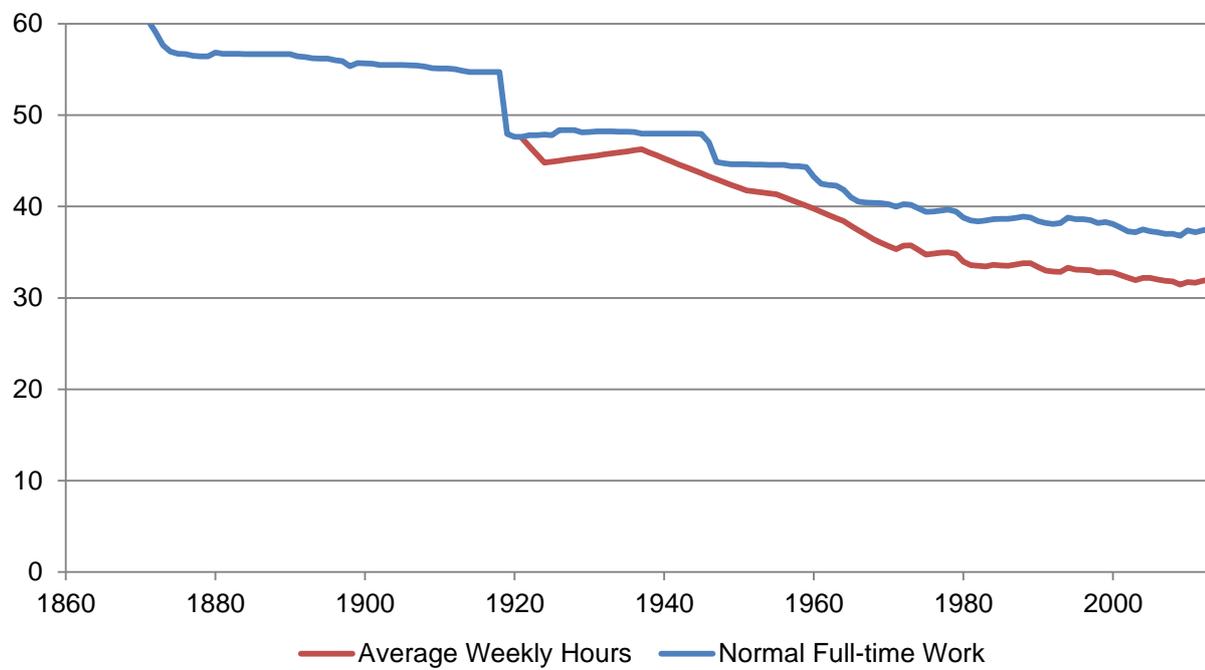
¹ See the box on pages 44-45 of the November *Inflation Report* (Bank of England, 2015).

² In the short term, improved productivity performance could allow firms to produce more even without an increase in workers or the working week; but in time this would be likely to feed through into faster growth in hourly pay.

³ Ngai and Pissarides (2008) point out that technical change has allowed some people, who would historically have been fully engaged in working at home, to begin participating in paid work, so that the average number of hours of market work per head of population has fallen by appreciably less.

This trend has gone hand in hand with large changes in the make-up of the labour force. The most obvious development is that women are now far better represented in the workforce than they once were: the proportion of women who are active in the labour market has risen from under 45% in 1970 to nearly 58%

Chart 1: The Shrinking Working Week



now. For both men and women, participation in the labour market also depends significantly on age. Young people are now more likely to remain in education for longer, delaying their entry to the labour market, or at least limiting the hours that they are available to work. And a gradual increase in the retirement age over the past twenty years has raised the participation of old people.⁴

That increase in the retirement age reflects the balance of two forces (Bloom, Canning and Moore, 2014). Rising life expectancy leads to delayed retirement while rising incomes lead to earlier retirement. For much of the twentieth century the income effect dominated, while most recently the balance has shifted to the longevity effect.

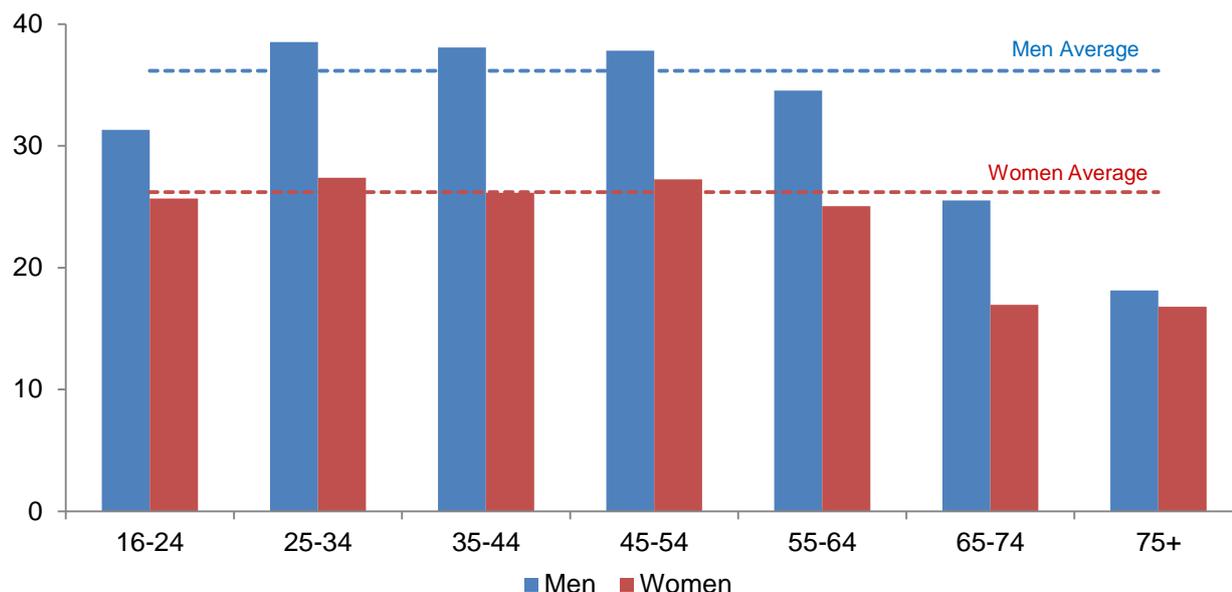
These changes to the structure of the labour force have an important bearing on the length of the average working week, because there are substantial differences in hours worked according to both the age and gender of workers. Chart 2 illustrates the distribution for a sample of workers in 2015 Q3. The biggest difference across age groups is found in men: young and old workers are more likely to have part-time jobs than those aged 25-64; and whilst it is also true that older women are likely to work fewer hours than their

⁴ Since 1996, the average age of retirement for men has risen from around 63 to nearly 65; for women from around 60.5 to just under 63.

younger counterparts, the average number of hours worked by women as a group is lower than that of men. This reflects the fact that part-time work is much more common for women than men.

So if the mix of employment changes, for example because of a change in the demographic structure of the population, or because part-time working becomes more popular amongst those close to retirement, then

Chart 2: Average Hours in 2015Q3 by Age and Gender



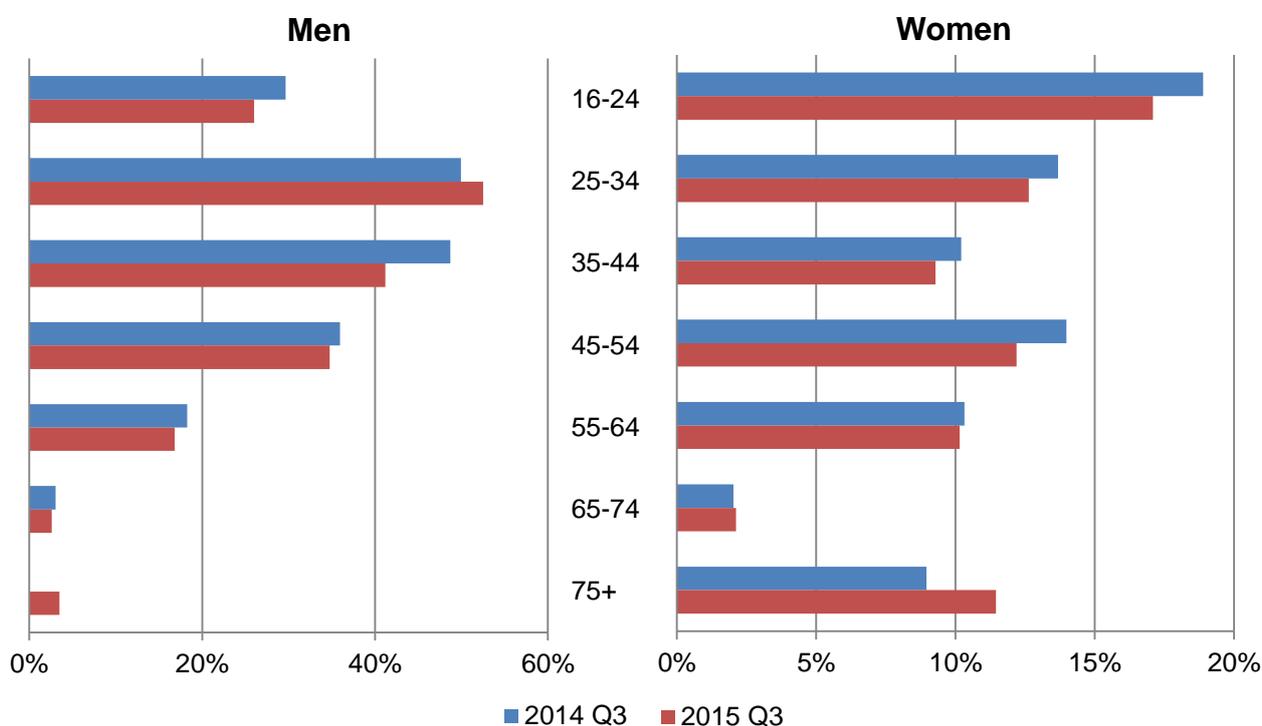
this will lead to a change in the average number of hours per working week. Comparing the changes in average hours between 2014 Q3 and 2015 Q3, this mix effect accounts for around one-third of the fall in the average working week for men; but it does not account for the change for women.⁵ The outcome for men reflects the fact that the proportion working part-time increased from 13 per cent to 13.4 per cent, concentrated predominantly among men aged 16-24 and men aged 65 or older. There was also an increase in the proportion of men in the labour force aged 55-64.

Some of the changes have been influenced by developments following the financial crisis. The share of the workforce working part time but who wanted to work full time more than doubled between 2008 and 2012. What happens to this group as the economy continues to recover provides an important clue to the permanence of changes in working patterns. If they move into full-time work as demand picks up, we might expect the shorter working week to be a temporary phenomenon. But if more were to move from being involuntarily to *voluntarily* part time, then the reduced week might be longer-lasting.

⁵ In 2014Q3 the mean working week was 31.72 hours, falling by ¼ per cent to 31.49 hours in 2015Q3. The drop for men was 0.32 hours while for women it was 0.15 hours. These figures are not seasonally adjusted.

A combination of cyclical and structural factors may therefore be at play in explaining the trends in hours. Breaking down the share of part-time workers who would rather work full time by age and gender, Charts 3 shows that the overall proportion has declined, even as the number of part-time workers has increased. Aside from the change between 2014 Q3 and 2015 Q3, the most striking aspect of these data is that only a small proportion of both men and women aged fifty-five and over who work part-time would prefer full-time jobs. Secondly, while 30 per cent of men and 45 per cent of women aged 16-24 work part time, only a relatively small proportion of these would prefer full-time jobs. The majority of those working part-time in this age-group are students whom part-time work suits.

Chart 3: The Proportion of Part-time Workers Who Would Prefer To Work Full-time



Given the importance of the mix effects that I described above, I would now like to turn to them.

Influence of mix effects

One approach to thinking about how we might expect the length of the working week to evolve over the next couple of years is to look closely at how many people have recently been moving between different segments of the labour market, and to trace through what a continuation of these rates of movement implies for future labour market conditions.

I have conducted such an exercise by looking at recent rates of transition between full-time employment, involuntary part-time employment, voluntary part-time employment, unemployment and inactivity.⁶ Inactive

⁶ I have used the average of the last four quarterly transition rates so that the results are not biased by seasonal patterns.

people are those who are not currently choosing to participate in the labour market; these individuals may be actively studying or enjoying their retirement!

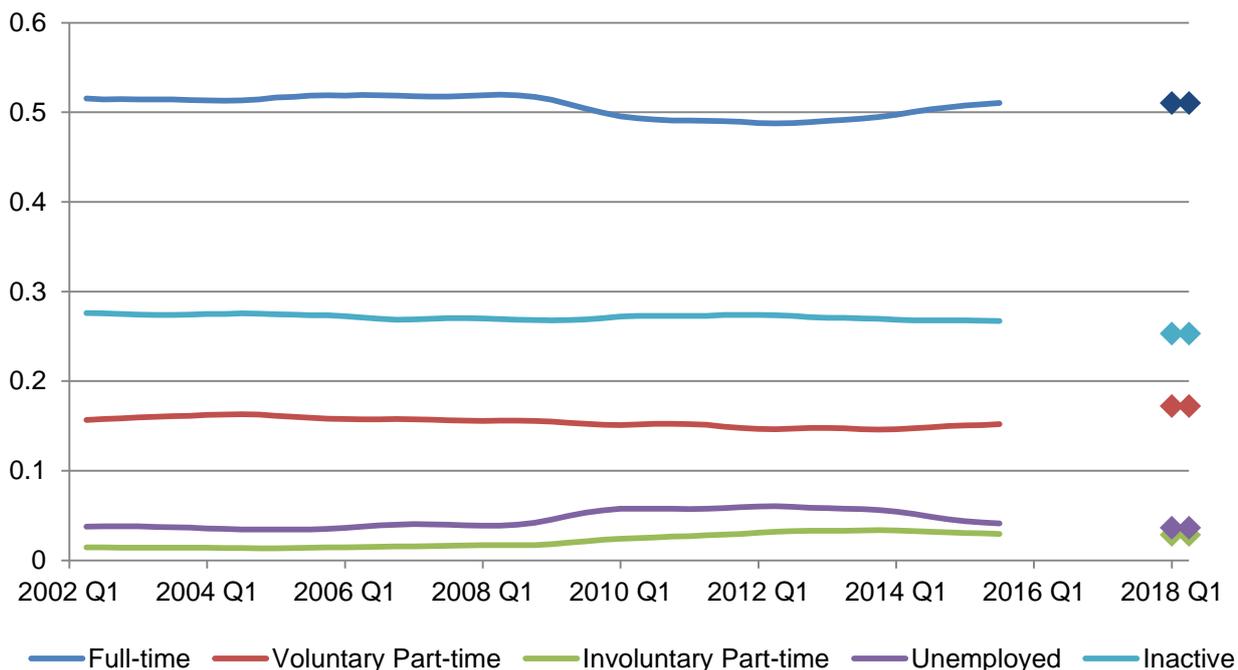
It might be useful to give an example of the types of transition rates that I observe. If I take those who are involuntarily part-time employed in one quarter, the recent flows imply that next quarter 80 per cent will remain involuntarily part-time employed, around 8 per cent will move to either full-time employment or become satisfied with working part time, and the remaining individuals will be split fairly evenly between unemployment and inactivity. Similarly, looking at flows into involuntary part-time employment, 80 per cent will have been in the same situation in the previous quarter, around 5 to 6 per cent will have been either unemployed, employed full time or happily part-time employed, while the remainder will have been not previously participating in the labour market.

In an attempt to allow for the important differences in age- and gender-specific transition rates, especially of those entering and leaving the labour market, I have carried out the above simulation separately for men and women and for the following age-groups: 16-24; 25-54; 55-64; 65-69.

Unfortunately the Labour Force Survey does not provide the necessary information on people aged 70 and older. However, the people I do know about supplied more than 99% of the total hours worked in the economy in the last year, and so my findings are likely to be a good illustration of what we might expect the situation to be for the whole adult population which is, of course, what the MPC is interested in.

Combining the results of the simulations of the future structure of the labour market described above with forecast changes in the demographic composition of the population produces a simple projection of what we might expect the situation to be in two years' time.

Chart 4: Simulated Labour Market States in Two Years' Time



The results are detailed in Chart 4. I find that current transition rates imply a future with more voluntary part-time employment, a greater proportion of the population participating in the labour force, and a rate of involuntary part-time employment that remains elevated when compared to its pre-crisis average.

In particular, the pick-up in the rate of voluntary part-time employment is mainly composed of an increased rate amongst younger and older workers which, to me at least, seems plausible given the increase in the proportion of younger people enrolled in education in recent years discussed previously, and the large increase in the participation rates of older women that is likely to continue as the state pension age is brought in line with that for men.

The prediction of a persistent, elevated rate of involuntary part-time employment is perhaps more surprising, but could, I think, be related to the possibility that the British labour market has recently become worse at matching those seeking a new job with firms who have a vacancy, what is known in economics as a decline in matching efficiency (Speigner, 2015). While these findings may be partly a cyclical phenomenon, it is possible that we are close to a new equilibrium in the labour market that involves some individuals having to spend more time in part-time employment whilst searching for the full-time job that they desire. In addition, perhaps previously some people working full-time and some people not participating in the labour market would have preferred a part-time job, and now, in part due to the increasing flexibility of business managers and owners like you, these types of roles are increasingly being created.

In order to use this projection to form a view on what we might expect to happen to the average and total number of hours worked in the economy, I have chosen to fix the length of the working week at its current level for each of the three employment categories, and to then recalculate the aggregate figure using the projected labour force mix as described previously.

Table 1: Forecast Comparison – Simulation Model and November Inflation Report

Growth, over the next two years, in:	Simulation Exercise	November Inflation Report
Average hours worked per week	-1.3%	0.8%
Total hours worked per week	1.9%	3.4%

In Table 1 I compare the results of my simple forecast for what we might expect in two years' time with that which the Monetary Policy Committee constructed in November. You will see that, as you no doubt anticipated, the increase in part-time employment translates into a fall in the average number of hours worked per week, which is markedly different to my expectation of a few months ago.⁷ Interestingly, however, given the increase in labour market participation that the model is predicting, the growth in total hours worked is less far from the last *Inflation Report* forecast.

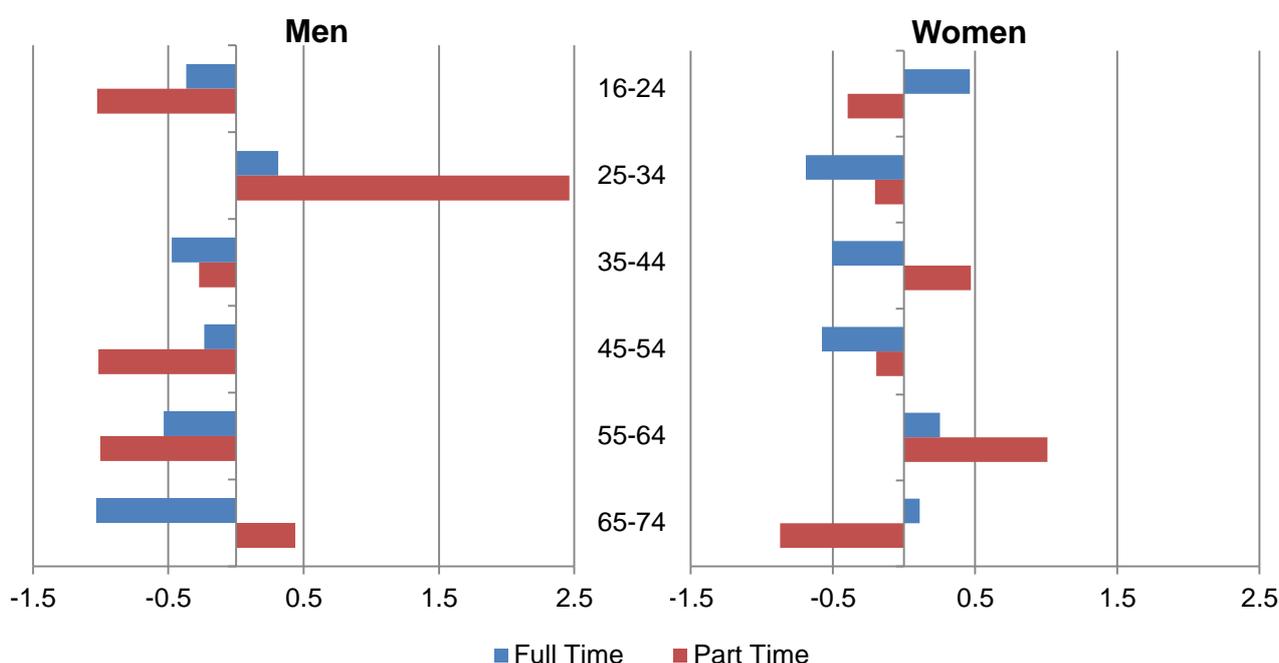
I should make clear at this point at least two caveats to this exercise. First, I have assumed that transition rates will remain constant at their current level, whereas this is unlikely to be the case. In particular, flow rates into and out of involuntary part-time employment remain elevated and subdued, respectively, relative to their pre-crisis levels. Secondly, I have considered only changes in the mix of the different types of employment with a fixed number of average hours per category. It may well be the case that, as well as there being changes to the mix of employment types in the future, there is also a resumption of the long-run fall in the average number of hours worked by full-time workers. I will turn to this now.

⁷ Most of the forecast change in average hours is due to the changing proportions in the different types of employment, rather than the changing demographic composition of the population.

Income and Labour Supply

I noted that, over the last year, mix effects have accounted for only a third of the decline in hours worked among men, and very little among women. Chart 5 suggests that the decline in hours worked has been fairly general. So it is natural to ask what else might be going on as well. I would in particular like to focus on the fact that, after a sustained period in which pay was stagnant or falling in real terms, real average weekly earnings rose by 2.9% in the year to 2015 Q3.

Chart 5: The Change in Working Hours between 2014 Q3 and 2015 Q3



Economists, as befitting the stereotype, do not reach a firm conclusion about whether higher pay leads to people working more or less. On one hand it reduces the amount of time needed to deliver any given standard of living (the income effect); but on the other it increases the incentive to work (the substitution effect).

The first effect should arise from any increase in wealth. Henley (2004), looking at the United Kingdom and van Huizen (2014), looking at the Netherlands, find clear evidence of such effects. But of course here there is no offsetting substitution effect.

Macroeconomic analysis

A substantial amount of empirical work has gone into trying to understand the observation due to Gali (1999) that, after an improvement in productivity, working hours decline. A number of explanations have been offered. One is that an improvement in productivity may portend an improvement in the underlying rate of

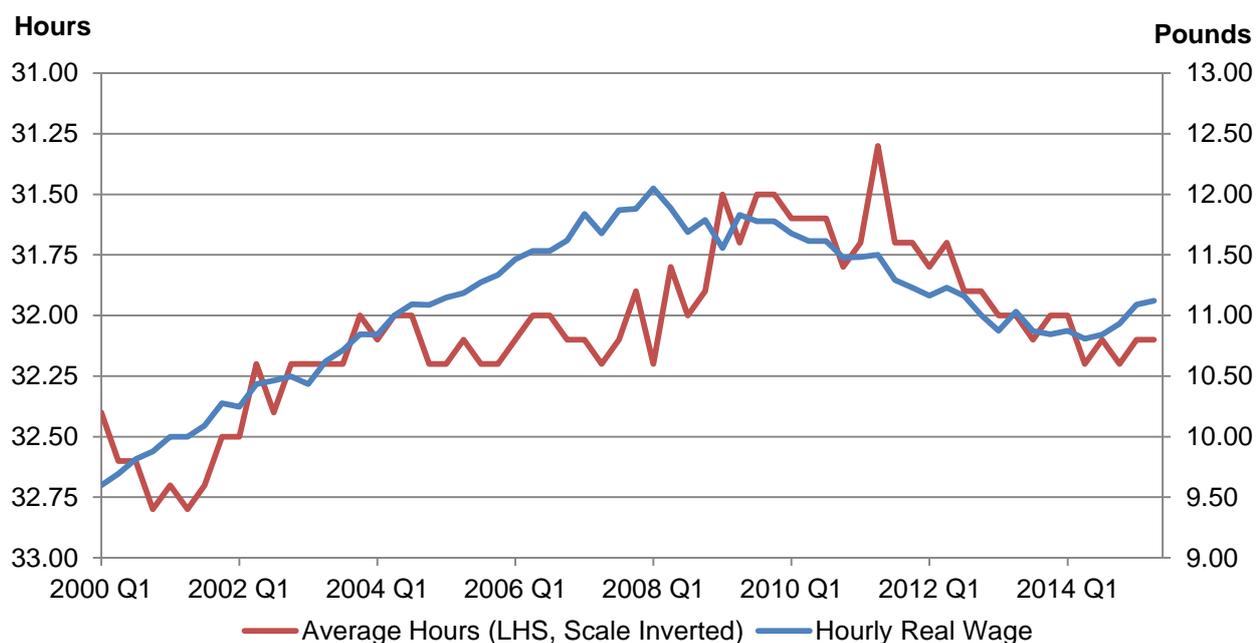
productivity growth leading to expectations of wage increases (Lindé, 2009). A plausible response to that is, that, if people have the choice, they may prefer to cut back on working hours now and supply more in the future when wages are expected to be higher. An alternative explanation offered (Francis and Ramey, 2005) is that people become used to a particular consumption level and are reluctant to change it, with the implication that they reduce hours worked if productivity improves, Rebei (2014) argues that data for the United States support this view.

Rather surprisingly, this issue has generally been discussed in a context in which it is simply assumed that there is no long-run relationship between rates of pay and hours of work. In the Appendix I set out a simple model which allows for this possibility. The balance between the two forces- increasing labour input and decreasing labour input depends on the rapidity with which the incremental benefit (marginal utility) from consumption declines as consumption increases. If the decline is rapid, then the income effect will dominate, because the benefits of extra spending power are relatively small. If, however, the decline is slow, then the substitution effect will dominate because people derive a large amount of benefit from the extra spending. Most of the evidence (e.g. Hall, 1988, Evers, de Mooij and van Vuuren, 2008) on household behaviour suggests that the decline is relatively rapid, with the implication that an increase in hourly wages should be expected to depress hours worked.

Evers, de Mooij and van Vuuren (2008) survey a group of microeconomic studies covering several countries. They find that, on average, for men an increase in real hourly pay of ten per cent results in a fall in labour input of 0.7 per cent. For women the effect is much more powerful, at 3.4 per cent. They quote only two studies for the United Kingdom, by Arellano and Meghir (1992) and Arrufat and Zabalza (1986) who find effects of 4.9 and 13.3 per cent respectively.

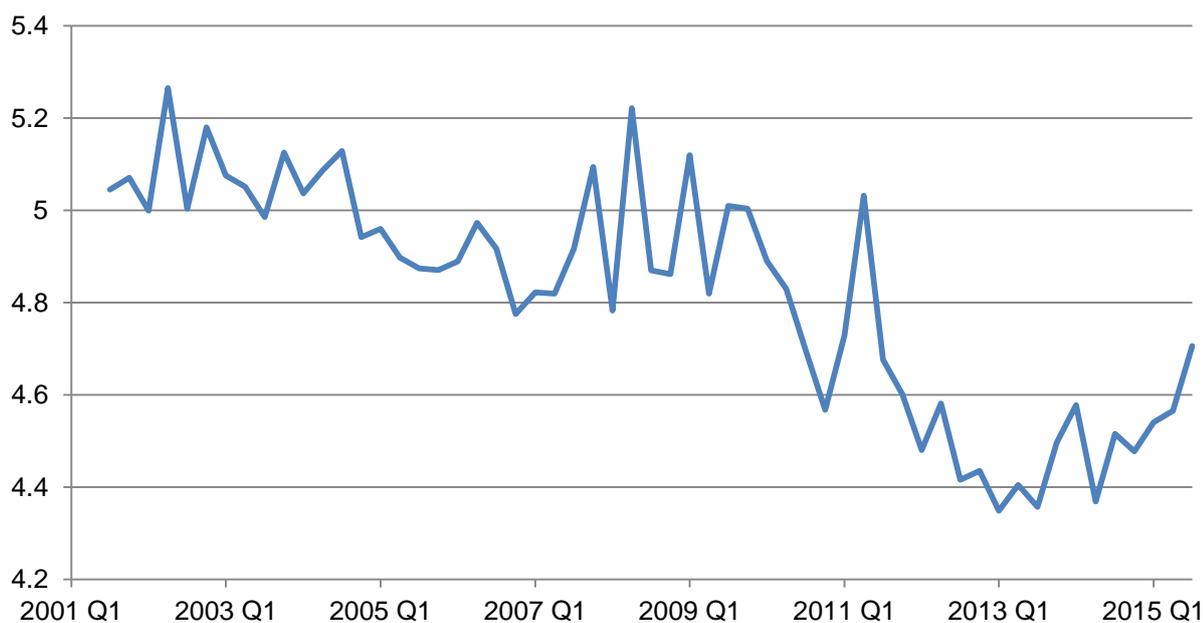
The big picture over the past one hundred and fifty years in the UK is that people have taken advantage of rising hourly pay rates partly by working shorter weeks, and partly through higher weekly incomes. As you will recall from my earlier comments, there has been a progressive fall in average weekly hours since 1860. At the same time, real average hourly wages have increased. This is shown for the recent past in Chart 6, which compares real average hourly wages with average hours worked in the UK. Combining these data on hours and wages into one model, I can explore their relationship in the UK as a whole.

Chart 6: Average Hours and Real Wages



One notable change in working hours to emerge following the financial crisis is in the gap between actual hours that people have worked, and their usual working hours. Chart 7 shows that in the run-up to the crisis this stood at around five hours a week. This reflects the fact that some respondents to the labour market survey were on holiday or on sick leave, amongst other reasons, and so despite having jobs, worked zero hours in the survey week. At the onset of the crisis, though, this gap shrank significantly – perhaps as concerns about the economic outlook led people to take fewer days of leave than normal.

Chart 7: Difference between Usual and Actual Hours Worked per Week



A more complete model should therefore consider both the impact of higher pay on actual hours worked, and the gap between actual and usual hours. Examining the data for the UK over the past fifteen years, I find that there are two long-run relationships at play. Table 2 provides details of the results. The first suggests that the level of hourly pay does have an influence on the number of hours worked, in contrast to the theoretical models I discussed earlier. I find that an increase in pay of ten per cent leads to a 0.8 per cent reduction in hours worked. Secondly, the ratio of usual to actual hours is stable in the long run, with usual hours around 15% above actual hours – equivalent to around five hours compared to a usual working week of thirty-two hours. In the short run, of course, it is possible for the economy to be pushed away from these equilibrium relationships, but over time it will converge back towards them.

Table 2: Average Hours, Usual Hours and Real Hourly Wage

Long-run relationship:	Actual hours and wages	Actual and Usual hours	
Actual hours	1.00	1.00	
Usual hours	0.00	-1.00	
Real hourly wage	0.08 (0.03)	0.00	
Constant	-3.65	0.14	

Short-run relationship:	Growth in actual hours	Growth in usual hours	Growth in real wages
Response to the long-run relationship between actual hours and the real wage	-0.49 (0.14)	-0.09 (0.06)	0.52 (0.36)
Response to the long-run relationship between actual and usual hours	-0.16 (0.17)	0.14 (0.07)	0.52 (0.45)

Notes: relationship estimated using data from 2001Q3 to 2015Q3. Data source: ONS and own calculations.

Microeconomic analysis

Besides this aggregate picture for the UK, I can also use survey data from individual respondents that are reported in the ONS's quarterly Labour Force Survey. This asks people about their employment, earnings and qualifications. I know a bit more about its operation of this survey than about other official surveys because I was in the sample about ten years ago. Participants are approached five times, at intervals of approximately three months. On each occasion they are asked about their hours of work and any jobs that they have, amongst other things.⁸ And on the first and last occasion they are asked how much they are paid. A comparison of changes in rates of pay and changes in hours worked can provide some clues as to how people respond to changes in pay rates.⁹

Table 3: Examining the Determinants of Hours Worked in the Labour Force Survey

Men	All (70405 obs)		Hourly Paid only (28070 obs)	
	Coefficient	t-statistic	Coefficient	t-statistic
Change in Log Wage	-0.06	-14.58	-0.03	-5.38
Log Hours	-0.40	-128.77	-0.36	-79.51
Under Hours	0.03	5.96	0.07	10.19
Over Hours	0.07	5.73	0.07	3.51
Women	All (72918 obs)		Hourly Paid only (36445 obs)	
Change in Log Wage	-0.07	-16.22	-0.06	-8.61
Log Hours	-0.25	-97.96	-0.26	-70.3
Under Hours	0.06	17.67	0.08	17.11
Over Hours	0.11	9.31	0.12	6.27

⁸ An element of care is needed in the use of the survey. Inevitably reported hours worked declines between wave 1 and wave 5. This is not merely a consequence of people working longer hours being more likely to drop out, but is also the case for people who participate fully in the survey. The reasons behind this are not clear to me, but there must a possibility that the decline is due to measurement error, with the consequence that both average and total hours worked, as reported in the official data, are under-reported. On the other hand there is no evidence that this effect has become more acute recently.

Other statistical problems can also arise. To the extent that people are paid for their jobs, and the number of hours fluctuates, it follows, as a matter of arithmetic that a reduction in the number of hours worked will be associated with an increase in pay per hour. This distortion can be avoided by looking at reported weekly pay per hour of usual work rather than per hour of actual work, what might be called the usual hourly wage.

⁹ At least this can be done if we are prepared to make the assumption that people have more flexibility in the hours that they work than in the rate of pay for their job. This is not a completely innocuous assumption. If we assume that pay rates reflect people's underlying productivity and that this is not greatly affected by the job that they do, then this identification assumption is valid. If, however, people fixed their rates of pay and then waited for employers to recruit them, a feature of Galii's (2008) model of the labour market, it would not be true.

Table 3 shows the results of this analysis.¹⁰ In this model, I examine the influence of several drivers on the percentage growth in hours worked between the first and last points in the survey. First is the percentage change in the real hourly wage, which captures the effect of pay on the number of hours worked. Secondly, I include the initial level of hours worked, which captures ‘mean reversion’ in hours: in other words, whether those working long weeks tend to reduce their hours over time, and vice versa. Finally, I try to assess whether those who wanted to work more or fewer hours initially, actually succeeded in doing so. The variables ‘Under hours’ and ‘Over hours’ measure how many fewer or more hours, respectively, an individual wanted to work, as a percentage of their initial working week.

I find, for men that an increase in the hourly wage of ten per cent leads to a reduction of 0.6 per cent in hours worked, while for women the corresponding figure is 0.7 per cent. The fact that the figures are lower for people who report themselves as hourly paid might be an indication that the overall coefficients are an overestimate of the magnitude of the effect, but even the average of the figures for hourly paid men and women (a reduction of 0.45 per cent in response to an increase in pay of ten per cent) is surprisingly close to the aggregate figure. So the individual data support the idea that as incomes rise, average hours of work are likely to decline.

As for the other drivers of hours, there is clear evidence of mean reversion: people who worked long hours when first observed tended to have reduced their hours a year later, and the reverse is true of people whose initial working week was short. And people who wanted to increase their hours work succeeded in doing so, albeit not by very much. More surprisingly, those who wanted to reduce their working week were unsuccessful: their hours actually went up compared to others who were initially happy with their working weeks.

Implications and Conclusions

Drawing the strands of my analysis together, I have tried to examine what is driving the length of the working week using three models. One looked at the flows to and from different parts of the labour market; one looked at the labour market as a whole, and a third looked at individuals’ responses to a detailed labour market survey. In this final section, I ask what each predicts for the outlook on the working week over the next few years.

All three models point to the conclusion that the working week is likely to shorten further. There is a range of predictions: the aggregate model suggests a modest fall of around 0.3% over the next three years, while the survey-based model forecasts a 1.3% fall and the flows-based model a reduction of 1.6%. As Table 4 shows, the average fall between 2015 Q4 and 2018 Q3 is around 0.3% per year. This loss of labour input is

¹⁰ The regression equations also include time dummies.

material. Each forecast is, of course, no more than a forecast, and the precise outcome will depend on other factors such as the growth in real wages, and the size of the gap between usual and actual working hours.

Table 4: Comparison of the Fall in Average Weekly Hours Worked from 2015 Q4 to 2018 Q3

	Change in hours worked
Model of labour market flows	-0.5
Aggregate UK model	-0.1
Survey-based model	-0.4
<hr/>	
Average	-0.3

But, as the Governor observed yesterday (Carney, 2016), the broad picture that the models paint is one of a labour market returning to normal, after the disruption of the financial crisis.

What implications does this have for cost pressures? A fall in the length of the working week means that in the absence of productivity gains, firms will produce less output.¹¹ As a result, unit wage costs – which measure the average wage per unit of output – will be higher than they would otherwise be. For me, unit wage costs are the most important indicator of domestic costs: sustained growth in these at more than two per cent per year is not consistent with the inflation target, unless other costs – of raw materials and imports – are growing more slowly than this, as they are at the moment. The most recent figure, for 2015 Q3, was of unit wage costs growing at 2.3 per cent per year. And although average weekly pay has been weak in the latest numbers, I do expect costs to pick up over the medium term.

How far does this recent weakness in average pay simply reflect the fall in average working hours? For the workers paid on an hourly basis, or paid hourly for overtime, a fall in hours will be reflected immediately in Average Weekly Earnings. But, to the extent that the effect arises because of a normalisation of the relationship between actual hours worked and usual hours of work, it is unlikely that there would be immediate adjustments in weekly pay reflecting this. Separately of course, it is important not to lose sight of

¹¹ I am grateful to Ben Broadbent for stressing this point.

the fact that data are subject to both measurement errors and random fluctuations; an attempt to explain every short-term movement in key series runs the risk of over-diagnosis. The pause in growth of average weekly earnings coming at the same time as a marked fall in average hours per week may be no more than a co-incidence.

Whatever the causes of the recent weakness, inflation is unlikely to recover back to target without a marked improvement in wage growth. This is particularly true given the backdrop of further recent falls in the oil price driving petrol and energy-related costs down. The general tightening in the labour market, as indicated by the continued fall in the unemployment rate, means that this is likely to happen, in my view. But the outlook for costs themselves is tighter than it seems just on the basis of average wages: the shortening of the average working week is likely to push up on costs in a material way.

The world of work is changing. If, as I hope, the next few years see more normal growth in real wages, we should expect to see a modest leisure dividend. Although many people will continue to feel that they need to work long hours, and some people would like to work longer than they currently do, the average working week is likely to fall slightly. Indeed, flexible working may facilitate this process. As always, the outcome will be a balance between people's need to make ends meet, preferences for leisure, and the requirements of efficiently-run businesses. But its implications for inflationary pressures cannot be overlooked.

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Appendix: A Simple Model of the Influence of Wage Rates on Hours Worked

Following Gali (2008), I assume that people derive welfare from consumption, C , but that hours of work, H have the effect of reducing welfare. Gali suggests a welfare function of the form

$$U(C, H) = \frac{C^{1-\sigma}}{1-\sigma} - \frac{H^{1+\varphi}}{1+\varphi} \quad \sigma \neq 1$$

$$U(C, H) = \log(C) - \frac{H^{1+\varphi}}{1+\varphi} \quad \sigma = 1$$

Suppose also that the hourly wage is w . Then, making the simplifying assumption that all wage income is consumed, the individual faces a budget constraint

$$C = wH$$

If people maximise their utility subject to the budget constraint the maximisation problem can be written as

$$\underset{C, H}{Max} V = \frac{C^{1-\sigma}}{1-\sigma} - \frac{H^{1+\varphi}}{1+\varphi} + \mu(wH - C)$$

The first-order conditions are, for all values of σ

$$C^{-\sigma} = \mu$$

$$H^{\varphi} = \mu w$$

Writing $c = \log(C)$ and $h = \log(H)$ this gives the relationship

$$\log(H) = \frac{1-\sigma}{\sigma+\varphi} \log(w)$$

It can be seen that, with $\sigma > 1$ this has the property that an increase in the wage rate leads to a reduction in hours worked. If $\sigma = 1$, then there is no impact. When $\sigma < 1$ an increase in the wage rate leads to an increase in hours worked.