

How to Measure Underemployment?

David N. F. Bell and David G. Blanchflower

Abstract

One of the factors that may inhibit reductions in unemployment as the economy recovers is the extent to which existing workers would like to work more hours and employers may prefer to let them work longer hours before making new hires. This phenomenon suggests that the unemployment rate does not capture the full extent of excess capacity in the labor market. But how should it be measured? In this paper we argue that the United States does not have the necessary statistical tools to calibrate this form of underemployment. We describe an index that captures the joint effects of unemployment and underemployment and provides a more complete picture of labor market excess capacity. We show how this index can be implemented using British data and describe its evolution over the Great Recession. Comparisons of our index with unemployment rates suggest that unemployment rates understate differences in labor market excess capacity by age group and overstate differences by gender. We also show that being unable to work the hours that one desires has a negative effect on well-being. Finally, we recommend that the Current Population Survey conducted by the US Bureau of Labor Statistics might be extended to enable the construction of an equivalent US index.

JEL codes: J01, J11, J21, J23, J38, J64

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INTRODUCTION

Despite growth in employment, unemployment rates in the United States have been slow to fall over the last couple of years. The growth in nonfarm payrolls has averaged 191,000 a month over the last year, but the number of unemployed has fallen only by about 81,000 a month. This slow decline is in large part due to nonparticipants (so-called inactives) entering the labor force and taking up jobs. In other words, those who were not counted in the labor force (i.e., who had dropped out of the labor force) are the ones taking up jobs, not those actively looking for employment, thus slowing the rate of unemployment decline. The six measures of underutilization the Bureau of Labor Statistics publishes called U-1 through U-6—the unemployment rate is U-3—have all been slow to move. Of interest is the fact that all six moved pretty closely together (see table 1). The bad news is that it will be especially hard to get the unemployment rate down, but the good news is that wage pressure is unlikely to rise anytime soon.¹

The Federal Open Market Committee (FOMC) is continuing to stimulate the economy through quantitative easing and low interest rates. It is, however, perfectly possible that unemployment rates will take much longer to get down to 7 percent or even 6.5 percent if nonparticipants continue taking jobs. The Fed has set criteria to slow stimulus by tapering asset purchases² and raising interest rates.³ It is also possible that workers (i.e., those in the labor force) are hours constrained and when the recovery takes hold, rather than firms hiring new workers, especially unemployed workers, we will see an increase in existing workers' average number of hours. According to latest data available, average weekly hours of all

1. Christopher Erceg and Andrew Levin (2013) argue that nonparticipants have been pushing down on wages. In a forthcoming paper David Blanchflower and Adam Posen provide supporting empirical work to suggest that is indeed the case.

2. In testimony before Congress on July 17, 2013, Chairman Ben Bernanke explained the path of tapering of asset purchases was dependent on improvements in the labor market, "If the incoming data were to be broadly consistent with these projections, we anticipated that it would be appropriate to begin to moderate the monthly pace of purchases later this year. And if the subsequent data continued to confirm this pattern of ongoing economic improvement and normalizing inflation, we expected to continue to reduce the pace of purchases in measured steps through the first half of next year, ending them around midyear. At that point, if the economy had evolved along the lines we anticipated, the recovery would have gained further momentum, unemployment would be in the vicinity of 7 percent, and inflation would be moving toward our 2 percent objective." See testimony at www.federalreserve.gov/newsevents/testimony/bernanke20130717a.pdf.

3. In the minutes of its June 2013 meeting the FOMC said "in particular, the Committee decided to keep the target range for the federal funds rate at 0 to 0.5 percent and currently anticipates that this exceptionally low range for the federal funds rate will be appropriate at least as long as the unemployment rate remains above 6½ percent, inflation between one and two years ahead is projected to be no more than a half percentage point above the Committee's 2 percent longer-run goal, and longer-term inflation expectations continue to be well anchored. In determining how long to maintain a highly accommodative stance of monetary policy, the Committee will also consider other information, including additional measures of labor market conditions, indicators of inflation pressures and inflation expectations, and readings on financial developments." See the minutes of the FOMC meeting at www.federalreserve.gov/monetarypolicy/files/fomcminutes20130619.pdf.

employees in June 2013 were 34.5, higher than in June 2012 (34.4), June 2011 (34.3), June 2010 (34.1), or June 2009 (33.8) and only marginally below its prerecession level of 34.6 hours in June 2008. So what explains rising hours and rising employment but slowly falling unemployment?

In this paper we report on some remarkable data from the United Kingdom, which suggest that there has been a marked increase in the number of workers who are *hours constrained* and consequently unable to provide the hours they would like to work. This increase has occurred even though average hours have risen. To our knowledge, the data to perform this exercise are not available in the United States, in particular in the Current Population Survey, which is used to calculate the unemployment rate. In the United Kingdom the unemployment rate is calculated from the Labour Force Survey (LFS) from the UK Office of National Statistics (ONS), which contains questions on whether an individual would like to work more or fewer hours at the going wage, and if so how many more or fewer hours they would like to work. That is, we can determine if workers believe they are hours constrained, how much of a problem that is, and whether it has increased during the recession. It turns out that it has and by a lot. In addition, we have evidence that the underemployed in the United Kingdom are especially unhappy—data to examine levels of well-being among hours-constrained workers are also unavailable in the United States. We have no evidence for the United States to determine whether workers are underemployed, or overemployed, in terms of the number of hours they would like to work compared with the hours offered by their employer.

We find that in the United Kingdom, over time, the total number of hours of (mostly older) workers who say they would like fewer hours, has fallen, but the number of hours of those saying they would like more hours has risen rapidly. Currently the underemployment rate in the United Kingdom is equivalent to adding approximately 1.9 percentage points to the unemployment rate. Based on average hours it is equivalent to 625,000 additional jobs.⁴ Underemployment is especially high among young workers, whereas older workers would, on average, like to work fewer hours. This suggests that there is potential for mutually beneficial exchange of hours between older and younger workers. Older workers who are part-time want to stay part-time or retire. Youngsters face a double whammy: They can't get a job and if they do, they can't get enough hours. This potentially has big implications for policy, because it implies that there is more labor slack in the economy than perhaps has been realized. The potential for workers (insiders) to take advantage of the recovery by increasing hours rather than creating new jobs, at the expense of the unemployed (outsiders), seems marked. For once the United States can learn from the United Kingdom!

4. Based on single month data (X01: Labour Force Survey Single Month Estimates, www.ons.gov.uk). UK employment in May 2013 was 29,573,937 with an employment to population rate of 58.1 percent compared with 29,481,885 in January 2008 (60.3 percent). Unemployment was 2,557,511 (8 percent) in May 2013 compared with 1,599,113 (5.1 percent) in January 2008.

THE BELL-BLANCHFLOWER UNDEREMPLOYMENT INDEX

In a recent paper (Bell and Blanchflower 2013) we reported on a new way of calculating the amount of slack in the UK economy. We construct an underemployment index, which combines measures of excess capacity on the intensive (hours) and extensive (jobs) margins of the labor market. Our measure is more general than the unemployment rate because it is affected by the willingness of current workers to supply additional hours—underemployment. It is also different from an underemployment rate calculated by the ONS because it counts the number of hours workers say they want to work—whether more or less—at going rates of pay. The ONS simply counts the number of workers who say they want more hours. For any given unemployment rate, a higher underemployment index implies that reductions in unemployment will be more difficult to achieve because existing workers are seeking more hours—there is excess capacity in the internal labor market. If the underemployment index is high relative to the unemployment rate and there is an upturn in demand, cost-minimizing producers will offer existing workers longer hours, thus avoiding recruitment costs and the costs of uncertainty associated with new hires. The unemployment rate will not fall so rapidly in a recovery when the underemployment index is relatively high.

We define our underemployment index in hours rather than people space and calculate it from individual data provided in the quarterly LFS.⁵ Data are available from 1996 on hours preferences for those who want more hours, but sufficient data to estimate the index are available only from 2001Q2. Like the unemployment rate, the underemployment index is expressed as a percentage. It can be thought of as measuring the ratio of net unemployed hours to total available hours assuming that the hours preferences of the employed at current wages are met. It implicitly assumes that the employed who do not express a wish to change their hours are content and that the unemployed would prefer to work on average the same number of hours as the employed.⁶ We begin by transforming the unemployment rate into a measure based on hours. Equation 1 incorporates hours of work into the definition of the unemployment rate. The unemployment rate implicitly allocates equal hours to the employed and the unemployed. We set these hours at \bar{h} , average hours worked by employed workers. The term involving the product of average hours worked and employment is by definition equal to the sum of all hours worked in the economy.

$$u = \frac{U}{U + E} = \frac{U\bar{h}}{U\bar{h} + E\bar{h}} = \frac{U\bar{h}}{U\bar{h} + \sum_i h_i} \quad (1)$$

5. The data are available for download at <http://discover.ukdataservice.ac.uk/series/?sn=2000026>.

6. We also estimated weekly hours regressions among the employed using the LFS. We used these estimates to predict hours for the unemployed. The predicted hours were not significantly different from mean hours among the employed. Hence we opted for the simpler formulation using mean hours among the employed.

The next step is to add the intensive margin of the labor market. Preferences over hours are not realized for all workers: Some say they want more hours, others would prefer fewer hours. We include these stated preferences in our index, taking them at face value. The sum of preferred additional hours is given by $\sum_k \tilde{h}_k^U$, where the index k is defined over all workers who wish more hours. Similarly, aggregate preferred reduction in hours is given by $\sum_j \tilde{h}_j^O$, where the index j is defined over all workers who wish fewer hours. We assume that transactions costs prevent exchange of working time between these groups. The net effect of these desired changes in hours is then added to the numerator of equation 1 to complete the underemployment index, u_{BB} , which is given in equation 2.

$$u_{BB} = \frac{U\bar{h} + \sum_k \tilde{h}_k^U - \sum_j \tilde{h}_j^O}{U\bar{h} + \sum_i h_i} \quad (2)$$

If the desired increase in hours equals the desired reduction in hours, then u_{BB} simply reproduces the unemployment rate: Excess capacity in the labor market is only influenced by the extensive margin. But u_{BB} will differ from the unemployment rate if there is excess supply (or excess demand) on the internal labor market. The underemployment index could therefore be greater, or less, than the unemployment rate. It would be lower than the unemployment rate when reductions in aggregate desired hours exceed increases in aggregate desired hours. This measure presents a more complete picture of excess demand or excess supply in the labor market as a whole than does the unemployment rate. It may also offer advantages over the unemployment rate as a means of calibrating the output gap.

The index is not affected by desired increases and reductions as long as they are equal in size. Thus, it does not capture the extent of *mismatch* in the internal labor market. Mismatch would be high when large numbers of workers wishing to increase their hours coexist in the labor market with large numbers wishing to reduce their hours. The sum of desired increases and reductions in hours, which is given by $\sum_k \tilde{h}_k^U + \sum_j \tilde{h}_j^O$, is a possible indicator of such mismatch. Our underemployment index is relatively easy to calculate from successive waves of the LFS microdata. We add the desired additional hours of those who say they want to work more hours. Similarly, we sum the desired reductions in hours for those who claim they would like to work fewer hours. We also use the LFS to estimate employment, unemployment, and average hours of work. All of these statistics are converted to national aggregates using weights supplied with the LFS. We include the employed, self-employed, family workers, and those on government schemes when calculating total employment and average working hours. Together these calculations provide all five of the components necessary to calculate our underemployment index, which is u_{BB} in equation 2. We also seasonally adjust the data using the X-13ARIMA-SEATS seasonal adjustment method. This is an enhanced version of the X-11 Variant of the Census Method II seasonal adjustment

program (Shiskin, Young, and Musgrave 1967). As we show below, the seasonally adjusted estimates are little different from the unadjusted estimates we reported in our earlier paper. Quarterly seasonal effects are relatively small.

Following the practice of the ONS, claims of underemployment among those aged between 16 and 18 and working 40 or more hours and those aged over 18 and working 48 hours or more are disregarded.⁷ Similarly, those aged between 16 and 18 and working 15 or fewer hours and those aged over 18 and working 20 hours or less were disregarded.

EMPIRICAL RESULTS

Table 2 reports quarterly estimates from 2001Q2 to 2013Q1 of our UK underemployment index both seasonally adjusted and unadjusted. We report the official ONS seasonally adjusted estimate of the unemployment rate along with our own estimate from the microdata to ensure comparability. The two unemployment series are very close and any differences are likely to arise primarily from small variations in the seasonal adjustment procedures used. It is clear that underemployment has risen sharply since 2008 especially.⁸ The new seasonally adjusted estimate of underemployment of 9.8 percent for 2013Q1 is unchanged from the seasonally adjusted estimate in the previous quarter, even though the unadjusted estimate rose slightly from 9.6 to 9.8 percent.⁹ This reflects the fact that prior to the early 2000s, the demands for reduced hours exceeded those for increased hours. Since then the balance has changed, first turning positive in 2006Q2 as the unemployment rate started to rise—it was 5.3 percent in 2006Q1 and rose to 5.6 percent in 2006Q2. It first hit 10 million hours in the second quarter of 2009. In 2013Q1 approximately 55 percent of the net additional desired hours was due to full-timers.

Figure 1 plots both the underemployment and unemployment rates calculated from our data; the widening gap between the series is apparent. It is also clear that the underemployment rate was below the unemployment rate through the beginning of 2006. Figure 2 plots all five of the series in table 2. It shows how closely the underemployment series move together as well as how close the three unemployment series are. There is little difference between the raw and seasonally adjusted underemployment series. The same is true of the various unemployment rates. Figure 3 plots the difference in percentage points

7. Office of National Statistics, *People in Work Wanting More Hours Increases by 1 Million Since 2008*, November 28, 2012, www.ons.gov.uk/ons/dcp171776_289024.pdf.

8. The Office of National Statistics, the United Kingdom's equivalent of the US Bureau of Labor Statistics, has also noted that underemployment has risen sharply; indeed they calculate that the number of workers wanting more hours stood at 3.05 million in April–June 2012. The ONS defines underemployment levels and rates based on the *number of workers*. See www.ons.gov.uk/ons/rel/lmac/underemployed-workers-in-the-uk/2012/sty-underemployed-workers-in-the-uk.html.

9. We also report seasonally unadjusted differences in parentheses.

between the underemployment and unemployment series separately for both the seasonally adjusted and unadjusted series, which has clearly risen over time.

So the amount of labor market slack in the UK economy remains large. Large numbers of workers want to increase their hours and are willing to do so without any increase in their hourly wage rate. Of course, some workers would like to work fewer hours. As described previously, we take account of this in our underemployment measure. Table 3 reports the total number of hours that workers would like to work split between those who say they want more hours and those who say they want fewer. Figure 4 plots aggregate increases and reductions in desired hours. The gap has risen sharply since 2008. Total hours of those wanting more hours rose from 41.7 million in 2012Q4 to 42.1 million in 2013Q1. Total hours of those who want fewer hours fell slightly from 22.6 million to 22.2 million. Thus, the *net* quantity of additional hours required was 19.9 million, up from 19.1 million in the previous quarter. Assuming average weekly hours of 32.0, as reported in the latest ONS data release from July 2013 for March–May 2013, this amounts to approximately 625,000 additional jobs, up from 600,000 jobs a quarter earlier, based on average hours of 31.9 from December 2012–February 2013.¹⁰ No sign of recovery here.

Note in table 3 that we have data on the number of desired additional hours from 1996Q2 but data on the desired reductions in hours are not available until 2001Q2; all that is reported are the number of people who are in this category. Hence our underemployment index starts in 2001Q2. Figure 5 plots the aggregate increases in desired hours starting in 1996. It is notable that the number of additional hours desired at an unemployment rate of around 8 percent in 1996 was around 30 million hours compared with around 42 million hours in 2013 for a slightly lower unemployment rate. This suggests a changing balance between the internal and external labor markets in the United Kingdom such that, for a given unemployment rate, there are now more workers who wish to increase their hours.

Hour constraints do not augur well for consumption: Why would the consumer spend if their income is constrained and savings can only last for so long? Of particular concern is that this underemployment especially impacts the young. It seems that they face a double whammy: They have especially high unemployment rates, but if they are employed, they have far fewer hours than they would like.¹¹ Table 4 presents unemployment rates and estimates of the underemployment index for four age groups—ages 16–24, 25–49, 50–64, and 65 and over. Seasonally adjusted underemployment rates are shown in figure 6. In 2013Q1, the gap between the underemployment rate (29.8 percent) and the unemployment rate (21 percent) was 8.8 percent for those aged less than 25. The size of this gap drops

10. Office of National Statistics, *Labor Market Statistics, July 2013*, table 7, www.ons.gov.uk/ons/dcp171778_315111.pdf.

11. For analysis of the problem of youth unemployment in the United Kingdom, see Bell and Blanchflower (2010a, 2010b, 2011a, 2011b).

progressively with age. For those aged 25–49 it is 2.1 percent. The gap becomes negative for those over the age of 50 because in aggregate the desired reduction in hours exceeds the desired increase in hours for this age group. This may reflect a desire to retire or to move from full- to part-time employment. In our data those aged between 50 and 64 had an unemployment rate of 4.7 percent and an underemployment rate of 3.8 percent in 2013Q1. Those above state retirement age (65 plus) had an unemployment rate of 2.1 percent and an underemployment rate of –2.1 percent, indicating, among all the age groups, this group expressed the strongest desire to *reduce* their working hours. So older workers have more hours than they want and younger workers have fewer hours than they want. The underemployment rates show that the wide differences that exist between age-specific unemployment rates are amplified when one takes into account desired increases or reductions in hours worked.

The reverse is true for gender-specific unemployment and underemployment. Figure 7 shows seasonally adjusted unemployment and underemployment rates for males and females. For the period 2001 to 2013, UK unemployment rates for females have been consistently lower than those for men. However, the underemployment rate for females increased more strongly than that for males from the start of the recession and surpassed it in 2011. Though women may be more likely than men to find some employment, they are more likely to express a desire to increase their hours because women are more likely to be employed part-time. Calibrating excess capacity in the labor market using an underemployment index rather than focusing on the unemployment rate shows that levels of excess capacity are roughly balanced across the genders—a finding that is clearly at odds with a simple comparison of unemployment rates.

As we showed earlier, the large increase in underemployment coincided with the increase in unemployment at the beginning of the recession in 2008. The underemployment index rose from 0.69 in 2008Q3 to 1.49 by 2009Q3 as real wages fell, as seen in table 5, which plots nominal and real wage growth using data from the Annual Survey of Hours and Earnings (ASHE) along with the annual consumer price index.¹² Nominal median hourly and weekly wage growth is obtained by deducting the consumer price index from the wage growth. It is clear there has been a sharp decline in real wages at the same time as unemployment has risen, even though average number of hours has in fact risen. Average hours for full-timers were 36.9 in December 2007–February 2008 compared with 36.7 in March–May 2011 and 37.5 in March–May 2013. For part-timers average hours were 15.5 in December 2007–February 2008 compared with 15.5 in March–May 2011 and 15.9 in March–May 2013. While economists have typically made inferences about utility based on the revealed preference paradigm, a more recent literature attempts to calibrate utility directly using survey responses to questions on subjective

12. The ASHE is an annual firm-level panel survey of wages covering a random sample of 1 percent of all National Insurance numbers, which are the UK equivalent of Social Security numbers.

well-being or happiness. These typically ask questions such as “Overall, how satisfied are you with your life nowadays?” (Life), where 0 is “not at all satisfied” and 10 is “completely satisfied.” This question is asked in the United Kingdom’s individual-level Annual Population Survey (APS) for 2011–12.¹³ Using the same 10-point scale respondents to the APS are also asked (1) “whether the things you do in your life are *worthwhile*” (Worthwhile); (2) “how *happy* did you feel yesterday?” (Happy); and (3) “how *anxious* did you feel yesterday?” (Anxious).

There is consistent evidence that subjective well-being is related to age, marital status, gender, health, and employment status, *inter alia*. In relation to employment status, the unemployed have lower levels of life satisfaction than the employed, controlling for other characteristics (Blanchflower et al. 2013). Given our previous analysis, we might hypothesize that underemployment and overemployment also have negative effects on life satisfaction. Past literature does suggest a negative relationship—e.g., Dooley, Prause, and Ham-Rowbottom (2000), Dooley (2003), and Friedland and Price (2003). However, these studies do not use large-scale datasets that include direct responses to questions about the extent of underemployment or overemployment. Unfortunately the APS does not jointly capture data on overemployment and subjective well-being. But it does have some data on underemployment. Hence it is possible to compare the effects of unemployment and underemployment on well-being.

Average values for the happiness, life satisfaction, “life is worthwhile,” and anxiety measures for different types of employment status are shown in table 6. Data are drawn from the APS in 2011 and 2012 and weighted using the well-being weight constructed by ONS. Respondents are categorized as employees, self-employed, unemployed, and out of the labor force (retired and not retired). The employed and self-employed are subdivided by full-time, part-time, and whether they wish to move from part-time to full-time. Amongst the employed, the highest levels of happiness and life satisfaction are found amongst those working part-time who do not want a full-time job (*part-time did not want full-time*).¹⁴ In contrast, part-timers who want a full-time job (*part-time wants full-time*) have lower levels of satisfaction than either part-timers who did not want a full-time job or full-time employees. This group also performed badly on mental health scores including anxiety.

Next we run two sets of regressions where we model responses to APS questions on happiness, life satisfaction, anxiety, and the “life is worthwhile” questions. The equations are estimated using ordinary least squares with the dependent variables in each case drawn from a 10-point scale. The sample for the

13. Office of National Statistics, “Measuring What Matters,” www.ons.gov.uk/ons/guide-method/user-guidance/well-being/index.html.

14. The UK government in its monthly labor market data release reports the number of part-timers who want full-time jobs and number of part-timers who do not. The latest estimates for March–May 2013 are 1,446,000 and 5,167,000 respectively, from 1,259,000 and 5,251,000, respectively, two years earlier in March–May 2011. See table 3 in *Labor Market Statistics, July 2013*, www.ons.gov.uk/ons/dcp171778_315111.pdf.

first set of regressions is drawn from all adults, while the second set is restricted to employees. Results are shown in tables 7 and 8. Both sets of equations contain a large number of common controls that are listed at the bottom of the tables. We focus on the coefficients relating to labor market status and to the desired working time of respondents.

One striking feature in table 7 is that the coefficients on happiness, life satisfaction, anxiety,¹⁵ and “life is worthwhile” tend to have the same sign and all are either significant or not significant, at the 5 percent level. Two exceptions are the coefficient on government training scheme in the happiness equation and the coefficient on the number of hours of unpaid overtime in the life satisfaction equation. These coefficients are not significant at the 5 percent level, whereas the equivalent coefficients in the other equations are significant.

Table 7 implies that, compared with a part-time employee who does not want full-time work, those on government training schemes score worse. Differences between employees and family workers are not significant. But for the unemployed, especially those who have been out of work for more than 12 months, there is a very significant drop in life satisfaction. The data in the APS support this widely replicated finding. Full-time workers have lower life satisfaction measures than part-timers who are content with the length of their working time. However, part-timers who want to work full-time have significantly lower levels of life satisfaction than part-timers who are content with their hours. The coefficients on this indicator of underemployment suggest that part-time workers who are hours-constrained have lower levels of well-being than those who are content with their working time. The sizes of the coefficients vary between 33 and 64 percent of the coefficients on being unemployed for less than 12 months, implying that underemployment is less damaging to life satisfaction than unemployment but nevertheless does cause a significant reduction.

In addition to the “part-time wants full-time” variable, we include a further variable, which indicates whether an employee wants more hours, irrespective of their full-time/part-time status. This has a significant, but much smaller, negative effect on life satisfaction, implying that the “part-time wants full-time” variable captures most of the negative effect of underemployment on life satisfaction.

We do capture one indicator of overemployment—the number of hours of unpaid overtime that an employee believes that he/she is working. This is different from the question asked in the LFS and used in our previous analysis about whether a worker wishes to reduce their working time. The coefficients are all negative, though, as mentioned earlier, the coefficient on life satisfaction is not significant. This is tentative evidence in support of the argument that overemployment also has a negative effect on well-being.

15. We use “not anxious” in tables 7 and 8 as our dependent variable to maintain comparability with the definitions of the dependent variables in our other equations.

The results in table 8 focus on employees only. Again there are four equations, seeking to explain the 10-point scale responses to questions on happiness, life satisfaction, anxiety, and “life is worthwhile.” The excluded category is part-time employees who do not wish to work full-time. Full-timers score significantly lower on measures of well-being than do part-time workers. Again, those working part-time, but who want to work full-time, experience significantly lower levels of well-being than do those who are content with working part-time. The restriction of the sample to those who are currently working does not change the direction or significance of the coefficients measuring differences in levels of well-being between different categories of employees. Similarly, conditional on the part-time wants full-time dummy, the dummy on wanting more hours is also negative and significant. These coefficients are smaller than their equivalents on the part-time-wants-full-time dummy. Again, these results support the hypothesis that the well-being of the underemployed is lower than that of workers who are satisfied with their hours. Similarly the significantly negative coefficients on the hours of unpaid overtime variable suggest a negative well-being effect from overemployment. Because the sample is limited to employees, we are also able to include an earnings variable. In all cases the coefficients are positive and significant. So money raises happiness (Blanchflower and Oswald 2004a, 2004b), and the underemployed are especially unhappy.

Underemployment in the United Kingdom has risen sharply since the start of the recession and shows no sign of declining soon. It appears that underemployment lowers well-being. The question is what to do about it, especially given it is hitting the young relatively harder.

CONCLUSION

Our argument in this paper is that it is possible to construct a comprehensive measure of excess capacity in the labor market—an underemployment index—which encompasses both its intensive and extensive margins. This has three main advantages. First, for macro analysis, the underemployment index is a broader measure of excess capacity than the unemployment rate. We have demonstrated that the United Kingdom has experienced wide variation in the underemployment index at broadly similar unemployment rates. In these circumstances, the argument that upward pressure on wage costs depends solely on the extensive margin of the labor market is perhaps rather strong. At a minimum, the underemployment index provides a testable alternative to the use of the unemployment rate in macro relationships. Second, the underemployment index reveals subtle differences in levels of excess capacity that are not apparent from a simple comparison of unemployment rates. Unemployment rates are generally used as the main statistical measure of excess labor capacity. Comparisons with their underemployment equivalents show that unemployment rates *underestimate* the real differences in excess labor capacity between age groups but *overestimate* differences between genders. Third, we have shown that underemployment and overemployment have negative effects on well-being. In relation to the labor market, the well-being

literature has tended to focus on unemployment. This finding adds a new dimension to this literature. Clearly our finding is consistent with standard labor supply theory, but this demonstration of the well-being effects of hours disequilibrium perhaps shifts the policy focus towards trying to understand how the hours of those in work might be adjusted to enhance well-being.

Like the United Kingdom, the United States has a highly flexible labor market, with a fluid boundary between its intensive and extensive margins. As the nature of work changes, the unemployment rate will become an increasingly unreliable metric for excess capacity in the labor market. Unfortunately the data necessary to compile an equivalent underemployment index in the United States are not available. It would make sense for the Bureau of Labor Statistics to experiment with additional questions in the Current Population Survey that would allow the construction of our underemployment index.

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Table 1 Annual alternative measures of labor underutilization in the United States, unadjusted, 2007–13 (percent)

	2007	2008	2009	2010	2011	2012	2013 (June)
U-1 Persons unemployed 15 weeks or longer, as a percent of the civilian labor force	1.5	2.1	4.7	5.7	5.3	4.5	4
U-2 Job losers and persons who completed temporary jobs, as a percent of the civilian labor force	2.3	3.1	5.9	6	5.3	4.4	3.9
U-3 Total unemployed, as a percent of the civilian labor force (official unemployment rate)	4.6	5.8	9.3	9.6	8.9	8.1	7.6
U-4 Total unemployed plus discouraged workers, as a percent of the civilian labor force plus discouraged workers	4.9	6.1	9.7	10.3	9.5	8.6	8.2
U-5 Total unemployed, plus discouraged workers, plus all other persons marginally attached to the labor force, as a percent of the civilian labor force plus all persons marginally attached to the labor force	5.5	6.8	10.5	11.1	10.4	9.5	9.1
U-6 Total unemployed, plus all persons marginally attached to the labor force, plus total employed part time for economic reasons, as a percent of the civilian labor force plus all persons marginally attached to the labor force	8.3	10.5	16.2	16.7	15.9	14.7	14.3

Note: Persons marginally attached to the labor force are those who currently are neither working nor looking for work but indicate that they want and are available for a job and have looked for work sometime in the past 12 months. Discouraged workers, a subset of the marginally attached, have given a job-market-related reason for not currently looking for work. Persons employed part time for economic reasons are those who want and are available for full-time work but have had to settle for a part-time schedule. Updated population controls are introduced annually with the release of January data. February 2013 estimate is seasonally adjusted.

Source: Bureau of Labor Statistics, The Employment Situation, June 2013, www.bls.gov/news.release/pdf/empisit.pdf.

Table 2 UK unemployment and underemployment rates, seasonally adjusted and unadjusted, 2001Q2–2013Q1 (percent)

Year	Quarter	Unemployment rate (percent unadjusted)	Unemployment rate (percent seasonally adjusted)	ONS		Underemployment rate (percent unadjusted)	Underemployment rate (percent seasonally adjusted)
				unemployment rate (percent seasonally adjusted)	unemployment rate (percent seasonally adjusted)		
2001	Q2	4.9	5.1	5.1	5.1	4.6	4.8
	Q3	5.4	5.1	5.1	5.1	5.2	4.8
	Q4	5.1	5.2	5.2	5.2	4.7	4.9
2002	Q1	5.3	5.2	5.2	5.2	5.0	4.9
	Q2	5.1	5.2	5.2	5.2	4.7	4.9
	Q3	5.6	5.3	5.4	5.4	5.4	5.1
	Q4	5.0	5.2	5.2	5.2	4.6	4.8
2003	Q1	5.2	5.2	5.2	5.2	5.0	4.9
	Q2	4.8	5.0	5.0	5.0	4.5	4.7
	Q3	5.3	5.1	5.1	5.1	5.0	4.6
	Q4	4.8	4.9	4.9	4.9	4.2	4.5
2004	Q1	4.8	4.8	4.9	4.9	4.6	4.5
	Q2	4.7	4.9	4.9	4.9	4.2	4.4
	Q3	4.9	4.7	4.8	4.8	4.7	4.3
	Q4	4.7	4.8	4.8	4.8	4.3	4.5
2005	Q1	4.7	4.7	4.8	4.8	4.5	4.4
	Q2	4.7	4.8	4.8	4.8	4.6	4.8
	Q3	5.0	4.8	4.8	4.8	5.0	4.6
	Q4	5.1	5.2	5.2	5.2	4.9	5.1
2006	Q1	5.3	5.3	5.3	5.3	5.4	5.3
	Q2	5.5	5.5	5.6	5.6	5.5	5.7
	Q3	5.8	5.6	5.6	5.6	6.0	5.6
	Q4	5.5	5.6	5.6	5.6	5.5	5.8
2007	Q1	5.6	5.6	5.6	5.6	5.8	5.8
	Q2	5.3	5.4	5.4	5.4	5.3	5.5
	Q3	5.6	5.4	5.4	5.4	5.8	5.5
	Q4	5.1	5.2	5.3	5.3	5.1	5.3
2008	Q1	5.2	5.2	5.3	5.3	5.5	5.5
	Q2	5.3	5.4	5.4	5.4	5.5	5.7
	Q3	6.2	5.9	6.0	6.0	6.8	6.5
	Q4	6.3	6.4	6.5	6.5	7.1	7.2
2009	Q1	7.2	7.2	7.2	7.2	8.2	8.2
	Q2	7.8	7.9	7.9	7.9	9.1	9.3
	Q3	8.2	7.9	8.0	8.0	9.7	9.3
	Q4	7.7	7.9	7.9	7.9	8.9	9.1

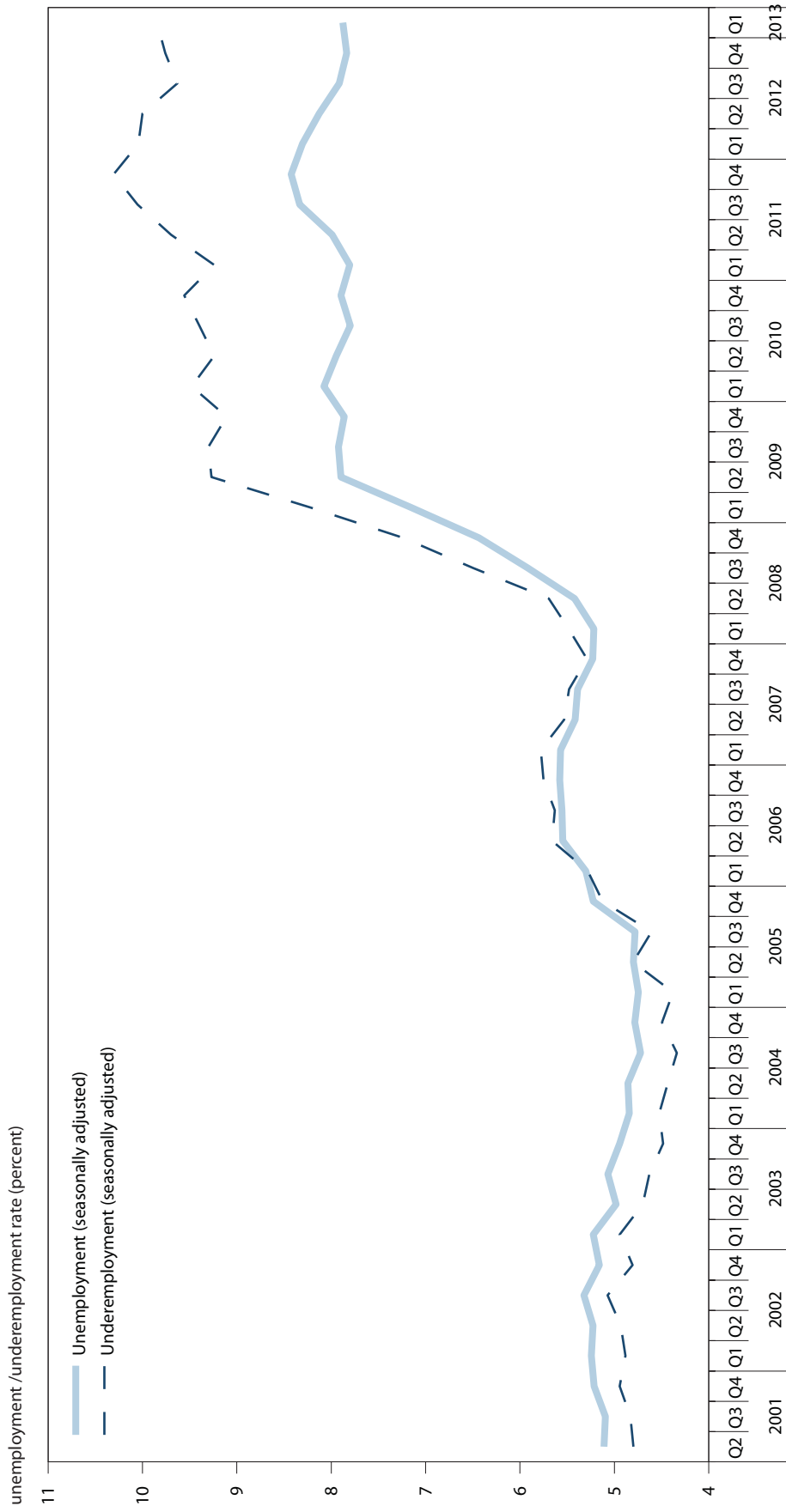
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Table 2 UK unemployment and underemployment rates, seasonally adjusted and unadjusted, 2001Q2–2013Q1 (percent) (continued)

Year	Quarter	Unemployment rate	Unemployment rate	ONS unemployment rate	Underemployment rate	Underemployment rate
		(percent unadjusted)	(percent seasonally adjusted)	(percent seasonally adjusted)	(percent unadjusted)	(percent seasonally adjusted)
2010	Q1	8.1	8.1	8.2	9.5	9.5
	Q2	7.8	7.9	8.0	9.0	9.2
	Q3	8.0	7.8	7.9	9.8	9.4
	Q4	7.8	7.9	8.0	9.4	9.6
2011	Q1	7.8	7.8	7.9	9.2	9.2
	Q2	7.9	8.0	8.1	9.5	9.7
	Q3	8.6	8.3	8.4	10.4	10.1
	Q4	8.3	8.4	8.5	10.1	10.3
2012	Q1	8.3	8.3	8.3	10.0	10.0
	Q2	8.0	8.1	8.2	9.8	10.0
	Q3	8.1	7.9	8.0	10.0	9.6
	Q4	7.7	7.8	7.9	9.6	9.8
2013	Q1	7.9	7.9	8.0	9.8	9.8

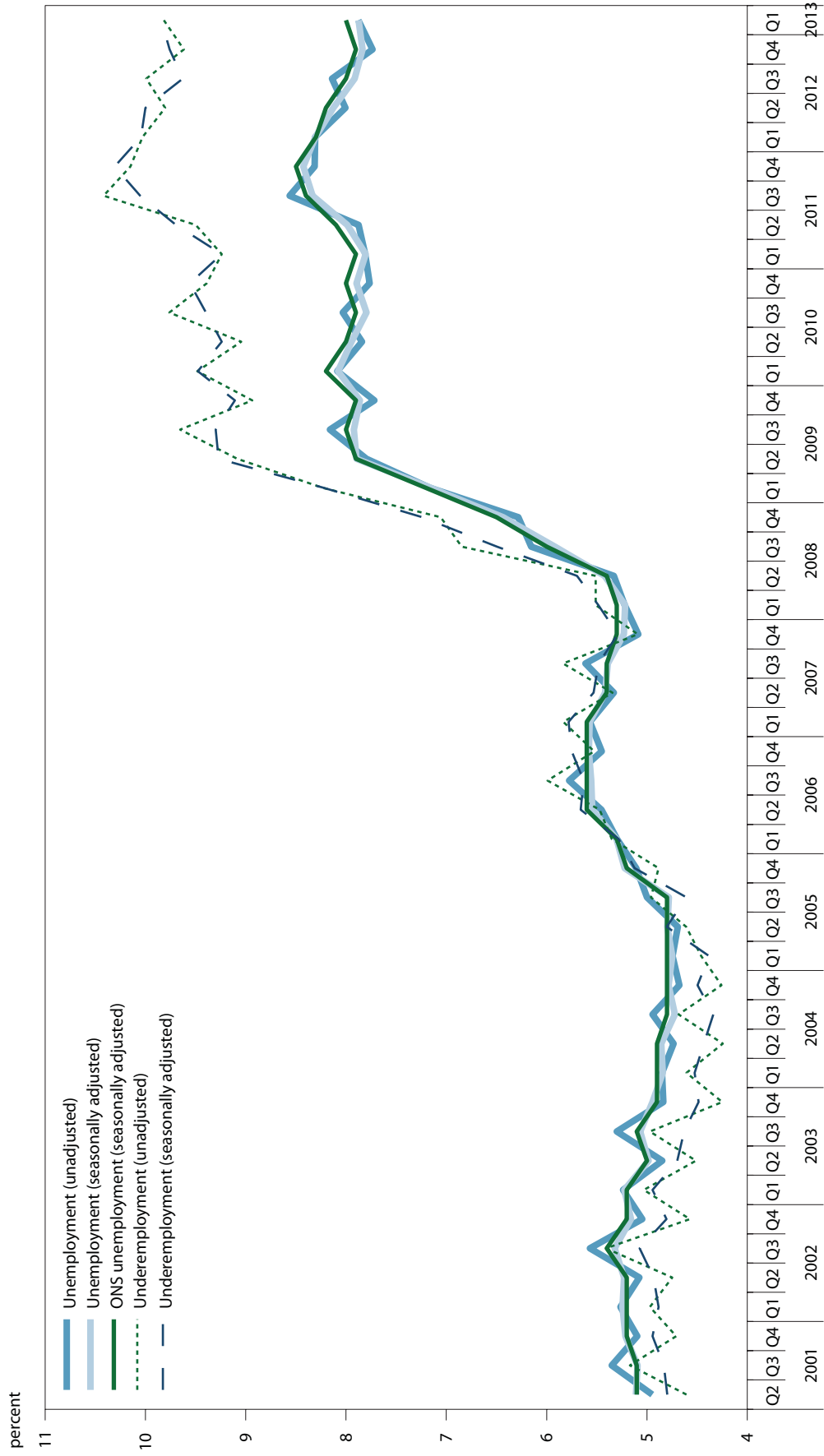
Source: UK Office of National Statistics (ONS); authors' calculations.

Figure 1 Excess capacity in the UK labor market, seasonally adjusted, 2001Q2–2013Q1



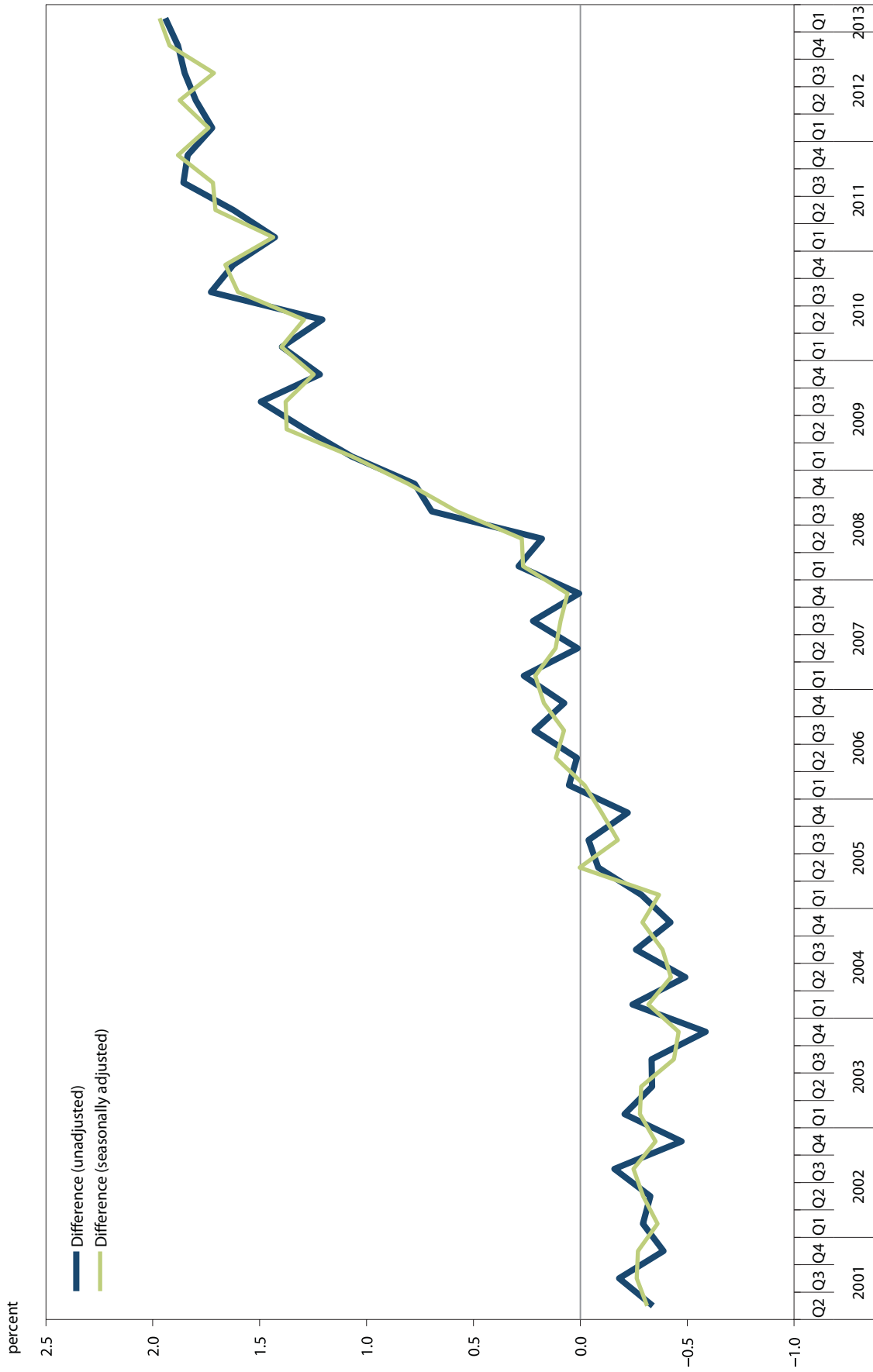
Source: UK Office of National Statistics, Labour Force Survey; authors' calculations.

Figure 2 Unemployment and underemployment, seasonally adjusted and unadjusted, 2001Q2–2013Q1



Source: UK Office of National Statistics (ONS); authors' calculations.

Figure 3 Difference between underemployment and unemployment rates, seasonally adjusted and unadjusted, 2001Q2–2013Q1



Source: UK Office of National Statistics, Labour Force Survey; authors' calculations.

Table 3 Aggregate increases and reductions in desired hours, seasonally adjusted, 1996Q2–2013Q1 (million hours per week)

Year	Quarter	Desired increase in hours	Desired reduction in hours
1996	Q2	31.4	n.a.
	Q3	33.1	n.a.
	Q4	33.9	n.a.
1997	Q1	32.9	n.a.
	Q2	32.3	n.a.
	Q3	31.1	n.a.
	Q4	30.5	n.a.
1998	Q1	30.1	n.a.
	Q2	30.2	n.a.
	Q3	29.5	n.a.
	Q4	29.6	n.a.
1999	Q1	29.1	n.a.
	Q2	27.8	n.a.
	Q3	27.7	n.a.
	Q4	25.8	n.a.
2000	Q1	25.9	n.a.
	Q2	26.0	n.a.
	Q3	25.9	n.a.
	Q4	24.8	n.a.
2001	Q1	24.0	n.a.
	Q2	22.8	25.6
	Q3	22.6	25.3
	Q4	22.7	25.1
2002	Q1	22.3	25.7
	Q2	23.1	25.8
	Q3	23.1	25.6
	Q4	22.4	25.7
2003	Q1	23.0	25.6
	Q2	23.2	26.0
	Q3	22.9	27.0
	Q4	22.9	27.2
2004	Q1	22.7	25.7
	Q2	22.6	26.8
	Q3	22.3	25.6
	Q4	22.1	24.9

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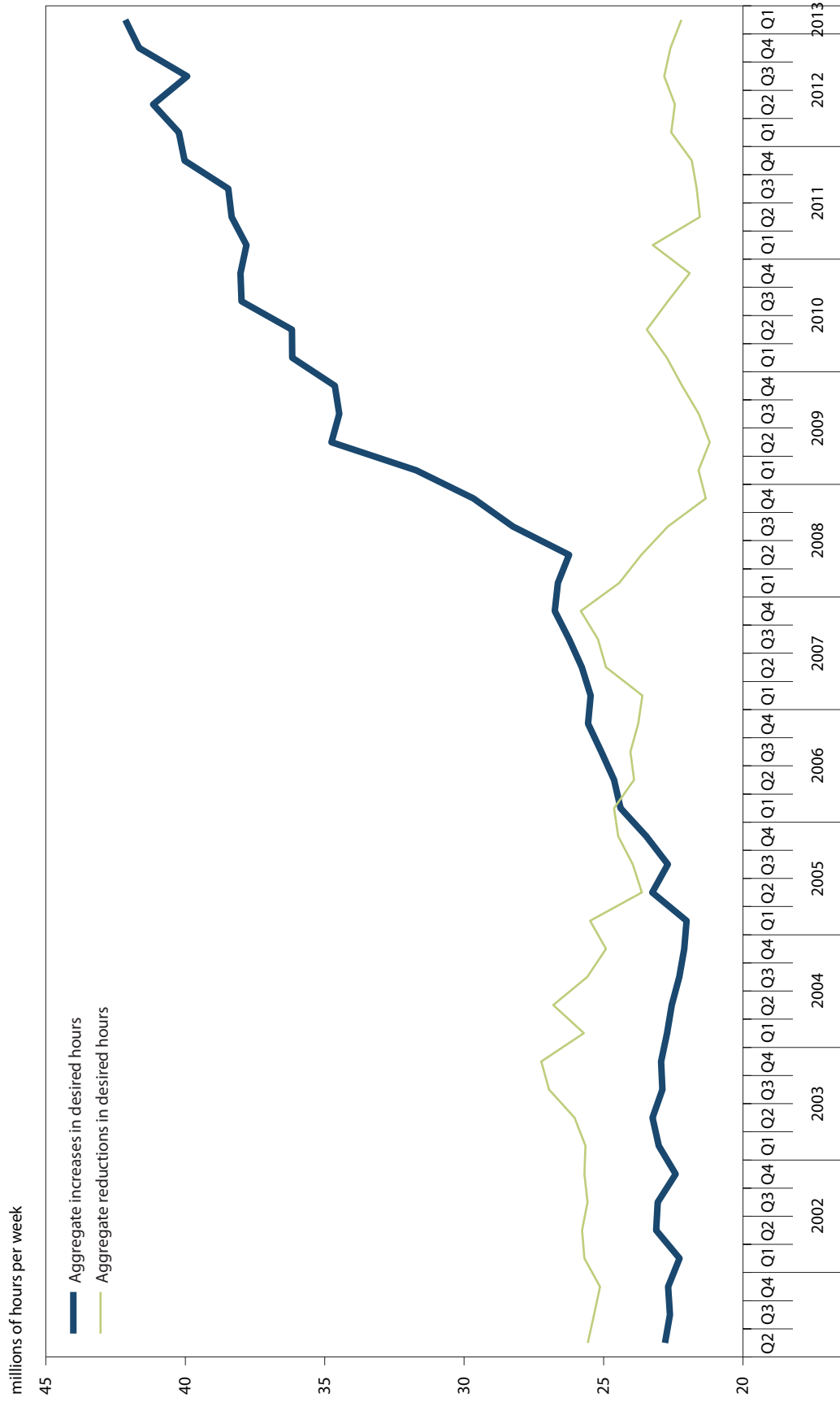
Table 3 Aggregate increases and reductions in desired hours, seasonally adjusted, 1996Q2–2013Q1 (million hours per week) *(continued)*

Year	Quarter	Desired increase in hours	Desired reduction in hours
2005	Q1	22.0	25.5
	Q2	23.3	23.6
	Q3	22.7	24.0
	Q4	23.5	24.5
2006	Q1	24.4	24.6
	Q2	24.6	23.9
	Q3	25.1	24.0
	Q4	25.6	23.8
2007	Q1	25.5	23.6
	Q2	25.8	24.9
	Q3	26.2	25.2
	Q4	26.8	25.8
2008	Q1	26.6	24.4
	Q2	26.2	23.6
	Q3	28.3	22.7
	Q4	29.7	21.3
2009	Q1	31.7	21.6
	Q2	34.8	21.2
	Q3	34.5	21.6
	Q4	34.6	22.2
2010	Q1	36.2	22.7
	Q2	36.2	23.4
	Q3	38.0	22.7
	Q4	38.0	21.9
2011	Q1	37.8	23.2
	Q2	38.3	21.5
	Q3	38.5	21.7
	Q4	40.0	21.8
2012	Q1	40.2	22.6
	Q2	41.2	22.4
	Q3	39.9	22.8
	Q4	41.7	22.6
2013	Q1	42.1	22.2

n.a. = Data on desired reduction in hours are not available until 2001Q2.

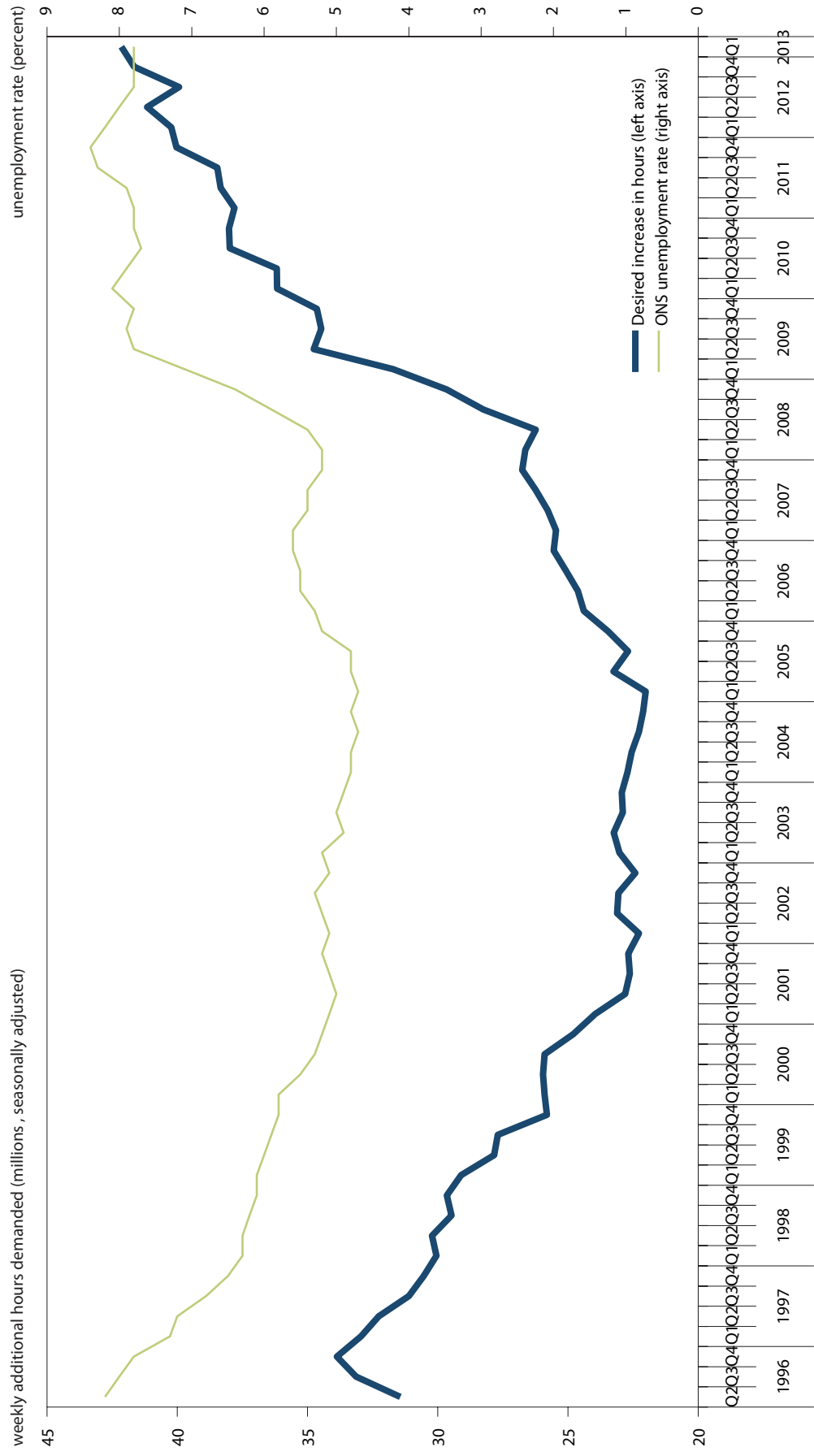
Source: UK Office of National Statistics, Labor Force Survey.

Figure 4 Aggregate increases and reductions in desired hours, seasonally adjusted, 2001Q2–2013Q1



Source: UK Office of National Statistics, Labour Force Survey; authors' calculations.

Figure 5 Desired additional hours and unemployment rate, 1996Q2–2013Q1



Source: UK Office of National Statistics (ONS), Labour Force Survey; authors' calculations.

Table 4 Underemployment and unemployment rates by age, seasonally adjusted, 2001Q2–2013Q1 (percent)

Year	Quarter	Age 16–24		Age 25–49		Age 50–64		Age 65 plus	
		Underemployment	Unemployment	Underemployment	Unemployment	Underemployment	Unemployment	Underemployment	Unemployment
2001	Q2	15.8	11.9	3.8	4.2	0.5	3.4	-0.8	2.7
	Q3	15.8	11.9	3.7	4.1	0.8	3.2	-0.6	2.2
	Q4	16.6	12	3.7	4.2	0.9	3.3	-0.5	1.9
	Q1	16.4	12.6	3.7	4.2	0.6	3.2	0.8	1.8
2002	Q2	16.1	12.4	3.7	4.1	1.1	3.2	-0.5	2.4
	Q3	16.7	12.2	3.8	4.3	1.1	3.5	-1	2.8
	Q4	16.5	12.3	3.5	4	1	3.6	-1.8	2.9
	Q1	17.2	12.4	3.6	4	0.7	3.5	-1	1.7
2003	Q2	17	12.8	3.3	3.7	0.5	3.4	0.6	2.2
	Q3	16.9	12.5	3.3	4	0.3	3.2	-0.3	2.5
	Q4	16.2	12.5	3.3	3.8	0.1	3.1	0.7	2.3
	Q1	16.7	12	3.2	3.7	0.2	3.1	0	2.7
2004	Q2	16.5	12.1	3.1	3.7	0	3	-0.6	2.3
	Q3	16.5	12.2	3	3.5	0	2.9	-0.5	2.1
	Q4	16.6	12.4	3.1	3.5	0.1	2.8	0.7	1.8
	Q1	16.3	12.7	3	3.5	0.2	2.8	0.1	2.6
2005	Q2	17.3	12.3	3.3	3.5	0.6	2.9	0.5	2.3
	Q3	17.6	12.7	3.1	3.5	0.4	2.8	0.6	2
	Q4	18.6	12.8	3.6	3.8	0.6	2.9	-0.1	2.6
	Q1	18.3	14.2	3.9	4	0.6	3	0	2.7
2006	Q2	19.1	13.7	4.2	4.3	0.7	3	-0.1	2.4
	Q3	19.1	14.3	4.3	4.3	0.7	3.1	0.1	2.4
	Q4	19.2	14.3	4.4	4.3	0.7	3.3	-0.7	2.4
	Q1	19.6	14.4	4.3	4.2	0.8	3.1	-0.5	1.7
2007	Q2	19.3	14.5	4	3.9	0.5	3.2	0.1	2.2
	Q3	19.5	14.6	4	3.9	0.5	3.2	-0.9	2.9
	Q4	19.4	14.6	3.9	3.8	0.3	3.2	-1.2	1.7

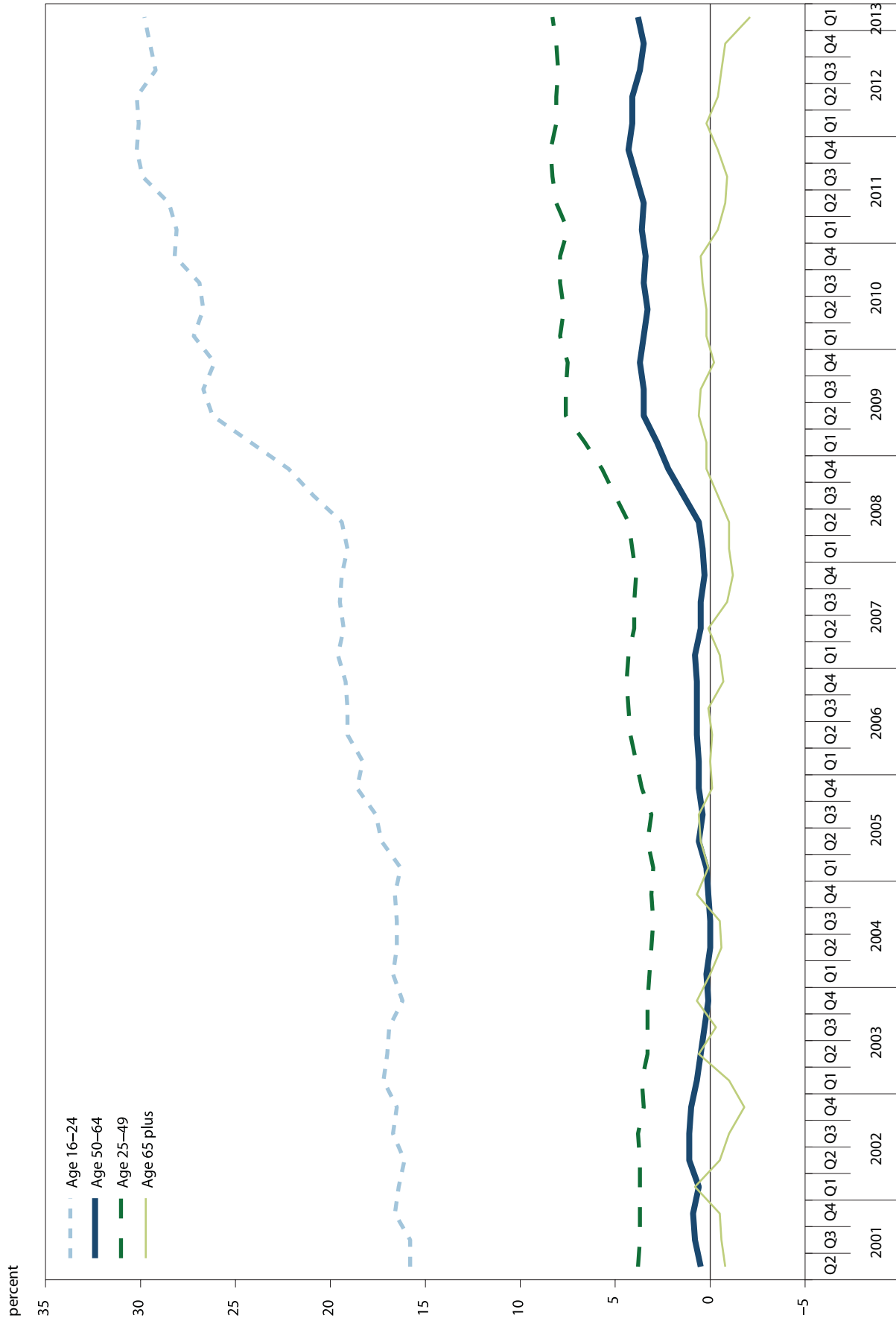
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Table 4 Underemployment and unemployment rates by age, seasonally adjusted, 2001Q2–2013Q1 (percent) (continued)

Year	Quarter	Age 16–24		Age 25–49		Age 50–64		Age 65 plus	
		Underemployment	Unemployment	Underemployment	Unemployment	Underemployment	Unemployment	Underemployment	Unemployment
2008	Q1	19.1	14	4.1	3.9	0.4	3	-1	1.4
	Q2	19.4	13.8	4.3	4	0.6	3	-1	1.9
	Q3	20.9	14.4	5	4.4	1.4	3	-0.4	2.2
	Q4	22.2	15.5	5.7	4.9	2.2	3.4	0.2	2.5
2009	Q1	24.2	16.7	6.6	5.5	2.8	3.9	0.2	2.5
	Q2	26.2	18.1	7.6	6.3	3.5	4.3	0.6	2.6
	Q3	26.7	19.5	7.6	6.3	3.5	4.7	0.5	3.1
	Q4	26.1	19.7	7.5	6.3	3.7	4.7	-0.2	3.2
2010	Q1	27.2	19.5	7.9	6.5	3.5	5	0.2	3.1
	Q2	26.7	20	7.7	6.3	3.3	4.8	0.2	3.1
	Q3	26.9	19.6	7.9	6.3	3.5	5	0.4	2.6
	Q4	28.2	19	7.9	6.3	3.4	4.9	0.5	2.2
2011	Q1	28.1	20.4	7.5	6.1	3.6	4.8	-0.4	2.5
	Q2	28.5	20	8.1	6.3	3.5	4.9	-0.8	1.9
	Q3	29.9	20.6	8.3	6.6	3.9	4.8	-0.9	2.2
	Q4	30.2	22	8.4	6.5	4.3	5	-0.4	3
2012	Q1	30.1	22.4	8.1	6.4	4.1	5.2	0.2	2.9
	Q2	30.2	22.1	8.1	6.4	4.1	5.1	-0.4	3.2
	Q3	29.2	21.7	8	6.2	3.7	4.9	-0.6	2.5
	Q4	29.5	20.8	8.1	6.2	3.5	4.8	-0.8	2.2
2013	Q1	29.8	21	8.3	6.2	3.8	4.7	-2.1	2.1

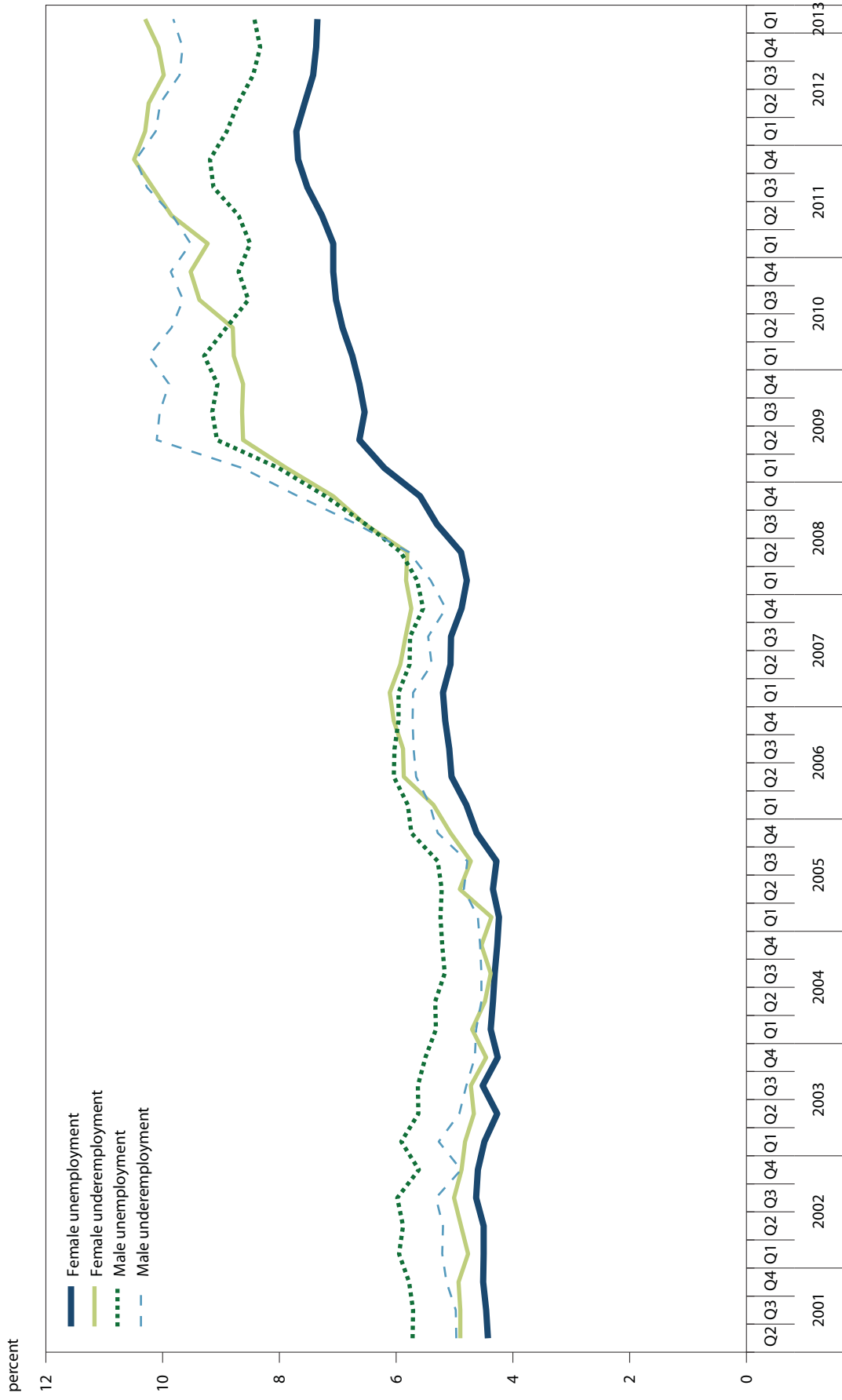
Source: UK Office of National Statistics; authors' calculations.

Figure 6 Underemployment by age group, seasonally adjusted, 2001Q2–2013Q1



Source: UK Office of National Statistics, Labour Force Survey; authors' calculations.

Figure 7 Underemployment and unemployment by gender, seasonally adjusted, 2001Q2–2013Q1



Source: UK Office of National Statistics, Labour Force Survey; authors' calculations.

Table 5 Median weekly and hourly wage growth rates using Annual Survey of Hours and Earnings and consumer price index, 1998–2012

Year	Consumer price index	Nominal		Real	
		Hourly	Weekly	Hourly	Weekly
1998	1.6	4.3	4.5	2.7	2.9
1999	1.3	4.1	3.2	2.8	1.9
2000	0.8	3.6	3.9	2.8	3.1
2001	1.2	4.7	4.7	3.5	3.5
2002	1.3	4.4	4	3.1	2.7
2003	1.4	3.4	3.3	2	1.9
2004	1.3	4.9	4.7	3.6	3.4
2005	2.1	3.1	2.9	1	0.8
2006	2.3	4	3.5	1.7	1.2
2007	2.3	3.1	3.2	0.8	0.9
2008	3.6	4.4	4.7	0.8	1.1
2009	2.2	3.7	1.9	1.5	-0.3
2010	3.3	1.2	2.1	-2.1	-1.2
2011	4.5	1.1	0.4	-3.4	-4.1
2012	2.8	1.4	1.5	-1.4	-1.3

Source: UK Office of National Statistics.

Table 6 Well-being scores

Employment status	Happiness	Life satisfaction	Anxious	Worthwhile
Employee	7.3	7.5	3.1	7.8
Part-time did not want full-time	7.5	7.7	3	8
Part-time wants full-time	6.9	6.9	3.2	7.4
Full-time	7.3	7.5	3.1	7.7
Self-employed	7.4	7.5	3.1	7.9
Part-time did not want full-time	7.7	7.8	2.9	8.2
Part-time wants full-time	6.9	6.9	3.4	7.5
Full-time	7.4	7.5	3.1	7.8
Unemployed	6.7	6.5	3.5	6.9
Out of labor force, not retired	6.7	6.9	3.7	7.3
Out of labor force, retired	7.7	7.8	2.8	7.9

Note: Data are weighted by well-being weight. Average scores reported on a scale of 1 to 10; see text.

Source: Annual Population Survey, April 2011–April 2012.

Table 7 Well-being equations, 2011–12

Variable	Happy	Life satisfaction	Not anxious	Worthwhile
Government training scheme	-.1230 (0.85)	-.7986 (6.67)	-.5737 (3.02)	-.4397 (3.83)
Family worker	.2059 (1.90)	-.0297 (0.33)	-.0453 (0.32)	.1119 (1.30)
Unemployed <12 months	-.5577 (15.46)	-1.0559 (35.35)	-.6042 (12.78)	-.7169 (25.04)
Unemployed >=12 months	-.6940 (14.95)	-1.2345 (32.12)	-.4915 (8.07)	-.9094 (24.66)
Full-time	-.1306 (7.17)	-.1110 (7.36)	-.1373 (5.75)	-.1099 (7.61)
Part-time wants full-time	-.3587 (9.38)	-.5446 (17.20)	-.2024 (4.04)	-.3473 (11.44)
Wants more hours	-.0612 (2.37)	-.1574 (7.36)	-.1723 (5.09)	-.0537 (2.62)
Number of hours unpaid overtime	-.0068 (4.36)	-.0015 (1.18)	-.0189 (9.23)	.0032 (2.63)
Constant	7.061	7.295	-3.370	7.525
Adjusted R ²	0.07	0.126	0.042	0.092
N	165,227	165,278	164,974	164,570

DDA = UK Disability Discrimination Act

Notes: All equations also include controls for gender, year, age (7), region (10), ethnicity (12), marital status (5), out of the labor force (20) and highest qualifications (78), DDA disabled, DDA disabled and work-limiting disability. Excluded categories are ages 45–54; North East; white; employee, part-time does not want full-time, and not disabled. T-statistics are in parentheses.

Source: Annual Population Survey, April 2011–April 2012.

Table 8 Well-being equations for employees, 2011–12

Variable	Happy	Life satisfaction	Not anxious	Worthwhile
Full-time	-.2221 (8.76)	-.3179 (15.97)	-.1751 (5.10)	-.2731 (14.79)
Part-time wants full-time	-.3827 (9.08)	-.5998 (18.13)	-.1182 (2.07)	-.3975 (12.93)
Wants more hours	-.0738 (2.66)	-.1461 (6.70)	-.19145 (5.08)	-.0620 (3.06)
Number of hours unpaid overtime	-.0101 (5.78)	-.0046 (3.42)	-.02128 (8.97)	.0003 (0.25)
Log weekly earnings	.0410 (2.20)	.1355 (9.29)	.07158 (2.84)	.0717 (5.29)
Constant	7.603	7.374	-3.521	8.026
Adjusted R ²	0.021	0.051	0.019	0.046
N	65,855	65,851	65,809	65,753

DDA = UK Disability Discrimination Act

Notes: all equations also include controls for gender, year, tenure, age (7), region (10), ethnicity (12), industry (8), size of farm (6), occupation (8), DDA disabled, DDA disabled and work-limiting disability. Excluded categories are ages 45–54; North East; white; employee, part-time does not want full-time, and not disabled. T-statistics in parentheses

Source: Annual Population Survey, April 2011–April 2012.