Is the 'lump of labour' a self-evident fallacy? The case of Great Britain.

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Introduction

The lump of labour fallacy is nowadays used by policy-makers as one of the strongest arguments against early retirement. The case in essence is that the labour market is not based on a fixed sum of jobs and, consequently, retirement ages can be adjusted without any harm. It may seem logical to argue that increasing the age of retirement may lead to a decrease in youth employment. However, opponents of the lump of labour argue that there is no share of jobs between the young and the old. The dominant literature also tends to support the idea that increasing older workers' employment participation leads to an increase in youth employment; what is good for one is good for all. In other words, the current idea is that the labour market is a dynamic environment, where jobs are created and destroyed at the same time (Cahuc and Zylberberg, 2015), integrating the population whatever is its size and its composition. In summary, supporting the lump of labour fallacy leads one to think that an increase in retirement ages is good for the economy – as it reduces the pension expenditure, raises overall employment and increases tax revenue – and good, consequently, for all workers.

This paper looks at the evolution of the concept of the lump of labour fallacy over time. The first part looks at its origins, its policy implications and recent works dedicated to it, focussing particularly on retirement ages. It is shown that the lump of labour fallacy is used as a theoretical background for much of the recent empirical work but that its background has never been deeply investigated. Using recent British data provided by the Office for National Statistics, the second section of this paper analyses the association between youth unemployment and inactivity and the employment participation of the other age groups. Comparing results obtained in the empirical part with the theoretical background presented in the first section, the conclusion raises further issues that deserve to be investigated in-depth in more detailed research.

Theoretical background

The origins of the notion of a lump of labour are difficult to determine with precision. Usually, the literature refers to the famous book by Henry Mayhew entitled *London Labour and the London Poor* (1864). In this descriptive monograph dedicated to poverty in London during the Victorian era, Mayhew particularly stressed the need to reduce working time in order to improve work

participation of poor non-employed people. The notion of ‘lump work’ is used but it refers to a form of labour subcontracting that was common in the docks and the building trades. Some two decades before Mayhew, John Mills's 1843 novel, *The Stage Coach, or the Road of Life* uses the exact term ‘lump o’ labour’ referring to a given expenditure of effort, relating it to the expectation of a proportionate reward for that effort: ‘and we ought to be well satisfied when we get moderate profits to a lump o’ labour or pain. However, Jack, get on my back, and I’ll carry ye home’ (Mills, 1843, p 174). In its first usages, therefore, the concept of a lump of labour was not properly defined, referring to several aspects of work including its arduousness.

The notion of a lump of labour considered as a fallacy appeared shortly afterwards (Walker, 2000, 2007). In 1891, an article by the economist D. F. Schloss entitled ‘Why Working-Men Dislike Piece-Work’ underlined the idea that labour market dynamics are not based on a *lump-sum of work*. Looking at the potential negative effects of piece work (i.e. jobs paid a fixed piece rate for each unit produced), Schloss highlights the belief ‘so firmly entertained by a large section of our working-classes’ that piece-workers are taking the work of the other categories of workers (Schloss, 1891, p 324). In this view, workers may think that there is a fixed sum of work and that it would be necessary to reduce their productivity in order to keep their jobs when in reality labour market dynamics are not based on a fixed sum of work. According to Schloss, this thinking can be considered as a fallacy – named ‘the theory of the Lump of Labour’ – insofar as statistical measurements do not confirm this belief.

More than one century later, the notion is still often mentioned in order to counter arguments supporting the view that reducing the retirement age – or, at least, not increasing it – would produce a negative effect on youth employment. For instance, Tom Walker has shown that, from 1993 to 2005, the influential *Economist* magazine published seventeen articles about the lump of labour fallacy (Walker, 2007, p 280). Arguing against the lump of labour in an opinion piece published in the *New York Times* in 2003, the economist Paul Krugman qualified the idea of job sharing as a ‘fallacy of the economically naïve left’, and particularly underlined two consequences flowing from this fallacy: on the one hand, that it encourages fatalism as people supporting it believe that new jobs cannot be created; on the other, that it feeds protectionism (Krugman, 2003).

The lump of labour in the UK

‘Industry cannot be compared to a cab rank, on which, as the first cab moves off the rank, the bottom one moves up’. So declared a government spokesman in the House of Commons in 1934 when opposing a Labour Party scheme for a new higher state pension, to be paid at age 60 and

carrying a retirement condition in order to encourage older workers to leave industry and make room for the young unemployed (Macnicol, 1998, p 257). There has been a long debate over the whole question of whether, in a time of high unemployment, older workers should retire a little earlier in order to redistribute jobs to the young (who by and large have far greater family responsibilities and concomitant household expenditure). It might seem obvious that one new 'young' job would be made available for every 'old' one vacated, and that was the belief that motivated the leading trades unionist Ernest Bevin, the research organisation Political and Economic Planning and many others as mass unemployment created such hardship and hopelessness for younger workers in the 1920s and 1930s. It was also the logic behind the Job Release Scheme of 1977-88 (Banks, Blundell, Bozio and Emmerson, 2010) which was introduced as a way of redistributing available jobs to the unemployed. Indeed, the 1980s saw much political and public support for the idea that early retirement was a means of massaging the unemployment statistics by an age-based redistribution of jobs. Over the last 80 years, therefore, there have been pendulum-like swings in policy towards older workers: the 1930s and 1980s were times of economic restructuring, necessitating the existence of a large reserve army of labour, and therefore the emphasis was on early exit; by contrast, the 1950s and the period since the early 1990s have been times of economic growth, albeit sporadic, and accordingly the emphasis has been on retention and an expansion of labour supply.

However, there have always been several problems inherent in such job-redistribution schemes. The labour market may not be like a cab rank, but it certainly resembles a patchwork quilt of considerable complexity, characterised by mismatches of skill, status, location, age, gender, remuneration and so on. It has always been the case that unemployment in the UK has been regionally concentrated in 'black spots', while other areas have done well. Hence in recent years, Merthyr Tydfil has had roughly thirty job-seekers chasing every vacancy, whereas in the City of London there have been approximately seven vacancies per job-seeker. Labour shortages can therefore exist at a time of mass unemployment. Workers who retire may be replaced by technology rather than humans; a factory may close in one area and re-open with a smaller (or bigger) workforce in another area (or in another country); fulltime jobs may be replaced by part-time ones, or vice-versa. In short, a modern labour market is dynamic, not static: old workers with long experience are constantly departing and young ones are joining. The processes of change are exceedingly complex.

Governments in the inter-war years raised many practical objections to all job-redistribution schemes designed to lower unemployment. They offered seemingly-sensible criticisms (such as the length of time it would take to train the unemployed up to the right skill levels, or the spatial

mismatches between job-seekers and vacancies), but at heart their objections were based upon the cardinal principle of neoclassical economics that nothing should be done to interfere with market forces and the 'natural' evolution of the UK economy. Related to this was the view that expanding the supply of labour would automatically create a demand for it – providing that inflation was kept under control and wage levels (that is, employment costs) remained low (then, as now, this was to be assisted by holding down the value of welfare benefits to unemployed people). Nearly all suggestions for state interference in the labour market to create jobs (for example, via public works schemes) were accordingly rejected. The first point to note, therefore, is that the debate has been highly political: those on the right have favoured an expansion of labour supply, with more job-seekers competing for every available job, which has the effect of holding down wages and weakening the bargaining power of organised labour; conversely, those on the left have tended to favour a tightening up of the labour market, with precisely the opposite effect. Virtual full employment in the 1950s and 1960s appeared to have vindicated the view that, if the correct monetary, fiscal and pricing policies were being implemented by a government, then recessions could be avoided (Samuelson, 1958, pp 551–2).

Neoclassical economics is back with us – indeed, it has been for several decades, even if at times it has masqueraded in different guises (as it did under New Labour). Since the 1970s oil price shock and the consequent 1980s recession it has been a long-running macroeconomic strategy to stimulate economic growth by expanding labour supply, thereby holding down wages. The industrial restructuring of the 1980s was assisted by mass unemployment, as a means of deflating the economy and breaking trade union power. Unemployment then fell, rising briefly in 1989-92. However, from the early 1990s the employment rates of nearly all social groups began to rise, albeit slowly (the exceptions were those on disability benefits). In response to this, governments decided to take credit for the inevitable and place an expansion of labour supply at the heart of economic policy. Indeed, for New Labour, such a strategy became absolutely central, figuring strongly in the arguments of theorists like Richard Layard (1997) and Anthony Giddens (2000), and in advocates of labour market activation like Nigel Campbell (1999). Labour market activation to push people off benefits and into work via greater conditionality would not only reduce the welfare bill, it would also boost demand in the economy (since more spending power would be created) and increase income tax revenue. In this way, a seemingly-perfect virtuous circle would be set up. In addition, expansion of labour supply would be anti-inflationary, since more job-seekers looking for jobs would hold down wages. As the government publication *Winning the Generation Game* (2000) put it, 'increasing the number of people effectively competing for jobs actually *increases* the number of jobs in the economy…. More people competing for jobs means that people are less keen to demand wage increases' (Performance and Innovation Unit, 2000, p 39).

It was an intriguing combination of neoclassical supply-side approaches and Keynesian demand-management, and it has had an interesting effect on the old age and social policy agenda, motivating governments to encourage longer working lives and a concomitant raising of state pension ages. The justification is that people are living longer, and that therefore pensions are ultimately unsustainable. Interestingly, age discrimination in employment was 'discovered' exactly at this time – the Equality Act 2010, translating EU regulation into British law, makes it unlawful to discriminate against employees, job seekers and trainees on grounds of age – as a major legitimating principle behind the labour market activation of older people. It is against this background that the phrase 'there is no such thing as a lump of labour' has emerged as possessing canonical significance. In terms of public policies, this belief influenced the 2007 and 2011 Pension Acts respectively raising the state pension age to 66 and abolishing the mandatory retirement age (Lain, 2017).

The lump of labour in the scientific literature

Justification of a lump of labour fallacy is also provided by a large amount of scientific publications. The recent scientific literature focusing on the impact of early retirement schemes on youth employment may be divided into two waves. A first wave, published at the end of the 1970s, underlined the complexity of labour market dynamics, taking into consideration differences across sectors of activity and professions. In 1979, D. Hamermesh and J. Grant published a critical synthesis of the growing literature on work sharing among the labour force, focusing specifically on the relationship between young and older workers. After a short review of the literature, they concluded that 'the degree to which [young workers] are substitutes for older workers is unclear' (Hamermesh and Grant, 1979, p 518). One of the main reasons mentioned for explaining this lack of clarity is the difference in substitution depending on the sector of activity. Indeed, according to Weiss, analysing substitution dynamics requires a 'high degree of disaggregation of industries and labour types' (Weiss, 1977, p 769). The heterogeneity of what is observed depending on the sector of activity is a key point of this first wave of research and the notion of lump of labour is not mentioned as a fallacy.

Twenty years later, a second wave of research, fed by both cross-national databases and time-series datasets, underlined the negative impact of early retirement schemes on youth employment. In an article published in 2000, Esping-Andersen puts the accent on the positive correlation between youth and old employment. Using data from the Organisation for Economic Co-operation and Development (OECD), he stresses that early retirement rates do not impact on youth unemployment outflow and points out the potential negative impact of early retirement on youth employment. In

other words, rather than increasing youth participation, early retirement schemes produce the opposite effect – increasing youth unemployment (Esping-Anderson, 2000). More recently, using American data from the Current Population Survey (CPS), Gruber and Milligan have pointed out that a substitution phenomenon between old and young workers might have occurred during the period 1962-2008. Even though their findings suggest a possible substitution effect between generations, the authors remain nevertheless prudent about it as the period is also characterized by increasing female labour market participation and results observed may be affected by this trend (Gruber and Milligan, 2000). At the same time, many papers underlined the zero-impact (or even, sometimes, the positive correlation) of early retirement schemes (or older workers' employment rates) on youth employment (or youth unemployment) in countries such as the United Kingdom (Banks, Blundell, Bozio and Emmerson, 2010), Germany (Börsch-Supan and Schnabel, 2010), Italy (Brugiavini and Peracchi, 2010), the United States (Munnell and Wu, 2012a; 2012b) and China (Zhang and Zhao, 2014). Confirming what has been found country-by-country, Kalwij, Kapteyn and Vos use panel data for 22 OECD countries over the period 1960-2004. Their findings do 'not support the hypothesis that employment of the young and old are substitutes and finds some minor complementarities of employment in the different age groups' (Kalwij, Kapteyn and Vos, 2009, p 9). Unlike previous works underlying the complexity of the labour market dynamics depending on the sector of activity or the types of labour market, recent analysis – performed at an aggregated level – points out that job sharing is not really efficient. As a consequence, public policies dedicated to job sharing would be inappropriate as they are based on the idea that the labour market operates in a vacuum – based on a fixed number of workers – while this is not the case in reality: higher employment rates may increase the size of the economy and thus create more jobs and demands for other categories of workers. The fact that there would not be a fixed amount of work is assumed as a cause explaining why a decrease in older workers' employment participation does not affect positively youth employment. Association is rather assumed as null or even, in certain cases, having a positive value.

Despite a relative consensus observed in the literature over the last two decades, a few recent papers have shown contradictory results affected by the recent 'great recession' of 2007-2008 or the economic slump caused by the dot-com bubble in 1999-2001, together with an increasing number of reforms of pension systems. This is the case in Italy, which has been subject to many reforms following the great recession (Fornero, 2013). In an article published in 2016, Boeri, Garibaldi and Moen show that, before and after the reform, firms that were more exposed to the increase in employment duration of senior workers significantly reduced youth hirings (Boeri, Garibaldi and Moen, 2016). More precisely, using administrative data, the authors estimate that a lock-in of five workers for one year reduces youth hiring of approximately one full-time equivalent worker. The

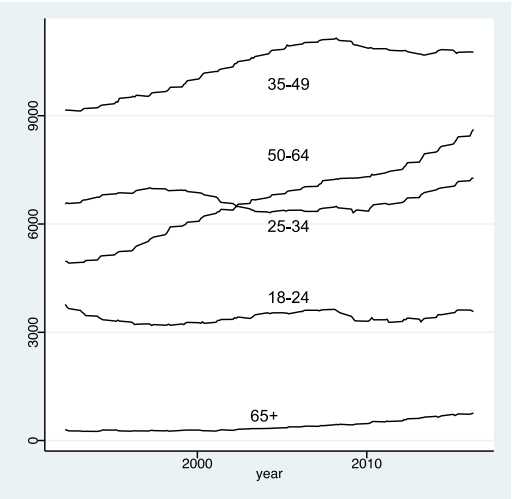
impact of the economic downturn together with pension reforms implemented recently have produced a sharp decrease in youth employment. A similar observation has been made in Norway. Using an administrative dataset covering the full Norwegian population for the period 1994-2004, Vestad estimates that for every additional early retirement pensioner there is room for one new labour market entrant (Vestad, 2013). Looking at the Belgian administrative database from 2005 to 2011 (Wels, 2014b), Wels has shown that substitution varies depending on the type of arrangement used for leaving the labour market (early retirement, part-time early retirement or invalidity) and underlines that job sharing dynamics vary depending on the sector of activity. They are also affected by collective bargaining.

Nevertheless, studies emphasising the positive role played by early retirement on youth employment are still few in number; they show that, over a more recent period, results observed at country level may be different from what has been observed previously. The impact of the great recession together with the increasing number of pension reforms explain this potential trend. According to these new findings, the lump of labour fallacy cannot be considered as a universal law anymore as it is deeply affected by contextual backgrounds.

Empirical perspective: Is the lump of labour fallacy so evident?

Although the lump of labour fallacy is a widespread belief, no recent empirical analysis has been performed on British data. The last paper focusing on this matter was published in 2010 and covered data from 1968 to 2005 (Banks, Blundell, Bozi and Emmerson, 2010). Nothing has been done so far looking at the recent period, characterised by a sharp increase in the employment rate of the older workers. Looking at the average effective age of retirement (AEAR) provided by the OECD (for a definition of this indicator, see Keese, n.d.; for a critical approach, see Wels, 2016), the female AEAR was estimated at 60.7 in 1995 and 62.4 in 2014, the male AEAR was 62.0 in 1995 and 64.1 in 2014. In other words, the actual retirement age has increased by about 1.7 years for women and 2.1 years for men in about twenty years. Looking at the total number of workers by age-group, the figure 1 clearly shows the ongoing trend.

Figure 1. Total employment participation (in thousands) by age-group from 1992 (second quarter) to 2016 (third quarter)



Source: Office National for Statistics (Labour Force Survey) – quarterly adjusted data

From 1992 to 2016, the employment participation of people aged 18-24 has been reduced by 6 percent. The 18-24 is the only age-group that has been affected by a decrease in its employment participation. Over the same period, the gross employment participation of people aged 25-34, 35-49, 50-64 and 65+ has increased respectively by 10, 17, 73 and 150 per cent. These figures bear no comparison with the demographic change as, over the same period, age groups 18-24 and 25-34 have lost less than one per cent of their population while the increase in people aged 35-49, 50-64 and 65 has been respectively of 12, 65 and 30 per cent. The aim of this second part is assessing whether there is an association between the variations in youth employment and the variations of the employment participation of the other age-categories once controlled for the education attendance rate and the economic variations.

Methodology

The methodological framework used in this paper rests on four assumptions. Firstly, we assume that, conversely to what has been done in a large part of the previous research dedicated to this matter, the lump of labour cannot be analysed using variables based on percentages (e.g. the (un)employment rate) as they tend to give the same weight to each age-category while, in the reality, the demographic factor plays a key role and the number of jobs varies from one period to another. It is quite paradoxical that previous research using the lump of labour fallacy as a main argument has performed analyses using percentages and rates rather than gross values. Secondly, we assume that the youth employment participation is too broad an indicator as the definition of what is considered as work in the Labour Force Survey is based on the International Labour Organisation

(ILO) definition for which is considered as a worker people working at least one hour a week (Wels, 2016). Furthermore, the employment participation tends to be affected by variations in school and higher-education attendance. Using the unemployment and the inactivity rates seems a more accurate way to assess the association between youth employment and other age-groups. Thirdly, to determine whether increasing the employment participation of the older workers has an impact on youth employment, it is necessary to take into consideration the full age-structure of the labour market. That is the reason why the association between youth employment and other age-groups (not only the older workers) needs to be taken into consideration. Fourthly, as early retirement schemes do not play a key role in reducing older workers' employment participation anymore, what is relevant is looking on the older workers' employment participation as such rather than looking at their withdrawal as it has been done previously when the Job Release Scheme (JRS) was implemented (Banks, Blundell, Bozio and Emmerson, 2010). Finally, this issue requires analysing carefully time-series data and paying attention to the quality of the statistical modelling for avoiding potential spurious associations.[1]

The statistical models presented below aim at assessing whether and to what extent youth unemployment and inactivity is affected by the older workers' employment participation, once controlled for the change in the demographic structure and the economic context. For that purpose, quarterly adjusted data provided by the Office National for Statistics (ONS) covering the period 1992-2016 have been used. Two main dependent variables (i.e. the variable that the model wants to explain) were used: the total number of people aged 18-24 Not in Employment, Education or Training (NEET), i.e. the number of young people both inactive (but not attending higher education) and unemployed, on the one hand, and the unemployment rate of people aged 18-24 on the other hand. The change in both NEET and unemployment rates is explained using several independent variables: the employment participation of age-group 25-34, 35-49, 50-64 and 65+, the Gross Domestic Product (GDP) at constant price (2004) provided by the Organisation for Economic Co-operation and Development (OECD) and a demographic ratio (the ratio between the total population aged 18-24 and the population aged 25+). Three statistical models were performed. The first model is an Ordinary Least Square Regression (OLS) using gross variables (the total number of

[1] Time-series regressions are likely to be affected by trends and/or seasonal variations that increase artificially the coefficient of determination (R^2), i.e. the proportion of the variance in the dependent variable that is predictable from the independent variable(s). One of the ways of assessing whether there is a spurious association is to look at the *auto-correlation* of the time-series, i.e. the correlation between the values of the process at different times. Despite this risk of spurious regression is well known in the scientific literature (see for example: Granger and Newbold, 1974; Yule, 1921), it is unfortunate that most research on this matter does not provide accurate indicators for evaluating the quality of its model.

people). The second type is an OLS regession based on a moving average calculation for each variable (the mean of each variables over a period of four quarters). Finally, the third model is an OLS regression in which the difference between the value of the variable in time *t* and the value of the variable in time *t-1* is calculated (lag). These three models are consistent with methods used in previous papers dedicated to this topic. Additionally, these models are tested with no-delay on the dependent variable, one-quarter delay and two-quarters delay.[2] Two indicators are provided for estimating the quality of the models: the adjusted R-square and the Durbin-Watson Statistic (Brendt, 1976).[3]

Results

The OLS regression performed using the total number of unemployed and inactive people (NEET) aged 18-24 as a dependent variable (table 1) provides unclear results about the association between non-employment of people aged 18-24 and employment participation of the other age-groups. According to this model, one observes a negative association when looking at age-groups 25-34 and 50-64. It means that an increase in employment participation for people aged 25-34 and 55-64 tends to reduce youth unemployment and inactivity. This is also true when a 1-quarter or 2-quarters delay is introduced for the dependent variable. Conversely, one observes the opposite phenomenon when looking at age-groups 35-49 and 65+. However, the model seems affected by autocorrelations as the R^2 unreasonably high (close to 1).

Table 1 Time-series regression for NEET

	NEET 18-24			**NEET 18-24 Moving Average (4)**			**NEET 18-24 Lag 1**		
	No delay	*1-q*	*2-q*	*No delay*	*1-q*	*2-q*	*No delay*	*1-q*	*2-q*
Empl.25-34	-0.34 **	-0.29 *	-0.27 *	-0.19	-0.24 *	-0.26 *	-0.43 ***	0.03	-0.01
Empl. 35-49	1.67 ***	1.51 ***	1.28 ***	2.47 ***	2.00 ***	1.59 ***	-0.19 **	-0.07	-0.14
Empl. 50-64	-1.09 **	-1.16 ***	-1.33 ***	-1.04 ***	-1.21 ***	-1.42 ***	-0.19 **	-0.13	0.02
Empl. 65+	2.35 ***	2.36 ***	2.41 ***	2.62 ***	2.65 **	2.66 ***	0.16 **	-0.03	0.12
Demo ratio	0.24 **	0.27 ***	0.27 ***	0.25 ***	0.23 **	0.21 **	0.17 **	0.33 ***	0.36 ***
GDP	-2.33 ***	-2.13 ***	-1.8 ***	-3.31 ***	-2.77 ***	-2.19 ***	-0.15 *	-0.14	-0.15
Ajusted R-2	0.86	0.86	0.86	0.92	0.92	0.92	0.37	0.12	0.12
Durbin-Watson	0.5	0.58	0.52	0.13	0.13	0.14	2.26	2.24	1.98

*Note: *=p<0.1 ; **=p<0.05 ; ***=p<0.01*

[2] That is, the models assess respectively the impact of the independent variables on the value of the dependent variable in time *t,* in time *t+1* and in time *t+2*.

[3] The Durbin Watson Statistic is calculated as follow: $d = \frac{\sum_{t=2}^{N}(e_t - e_{t-1})^2}{\sum_{t=1}^{N} e_t^2}$; where N is the number of observations and e_t is the residual associated with the observation at time t. The Durbin Watson statistic aims at assessing whether time-series are auto-correlated as, in order to avoid a spurious regression, one needs to avoid auto-correlation in the time-series. For more information, please read Durbin and Watson, 1971.

Similar results may be observed when introducing a moving average. Again, the association between the employment participation of people aged 25-34 and 50-64 and the NEETs is negative while the association with age-groups 35-49 and 65+ shows positive results. The value of the R_2 is very high (0.92) – which means that the variables introduced in the equation explained 92 per cent of the independent variable's variance. This is typically what can be observed when there is a spurious regression using time-series data. Hence, models 1 and 2 are not relevant in explaining why youth unemployment and inactivity vary over time. The Durbin-Watson Statistic confirms that these models raise a problem of auto-correlation (results obtained using the Durbin-Watson Statistic are very low while they should be close to 2 for confirming that the model is not affected by auto-correlation).

The third model, introducing a lag, is the one that fits the best with the data. The Durbin-Watson statistic shows a result near 2 – which means that there is no autocorrelation problem in the time-series, and the adjusted R_2 is 0.37 (0.12 when a delay of 1 or 2 quarters is introduced) – which means that 37 per cent of variance of the dependent variable is explained by the model. Unemployment and inactivity of people aged 18-24 is negatively associated with the employment participation of age-groups aged from 25 to 64. However, the increase in employment participation of people aged more than 65 has a positive impact on the number young people not in employment, education or training, i.e. the older workers' employment participation is associated with an increase in inactivity and unemployment for people aged 18-24. This puts into question figures provided by previous research papers focusing on this matter.

To ensure the validity of the results observed for the NEET, table 2 looks particularly at the number of unemployed people aged 18-24, distinguishing for types depending on the unemployment duration (up to 6 months, 6-12 months, over 12 months or over 24 months). Only results for the lag 1 are shown in the table as they show satisfactory results for the Durbin-Watson Test and reasonable R-squares.

Table 2. Time series regression for unemployment duration (lag 1, only)

	No delay	**1-q**	**2-q**	**No delay**	**1-q**	**2-q**
	Unemployment up to 6 months 18-24			**Unemployment 6 to 12 months 18-24**		
Empl. 25-34	-0.22 **	-0.16	0.01	-0.22 **	-0.01	-0.17
Empl. 35-49	-0.13	-0.03	-0.16	0.04	-0.1	-0.06
Empl. 50-64	-0.06	0.07	-0.06	0.023	-0.04	-0.01
Empl. 65+	0.03	-0.07	-0.08	-0.083	-0.15	0.28 ***
Demo ratio	0.06	0.00	0.18 *	0.085	0.19 *	0.04
GDP	-0.21 **	-0.34 ***	-0.17	-0.322 ***	-0.07	-0.13
Adj. R-2	*0.10*	*0.10*	*0.59*	*0.15*	*0.03*	*0.06*
DW	*2.37*	*2.43*	*2.27*	*2.24*	*2.10*	*1.92*
	Unemployment over 12 months 18-24			**Unemployment over 24 months 18-24**		
Empl. 25-34	-0.26 **	0.24 **	0.03	-0.14	0.18	0.07

Empl. 35-49	-0.34 ***	-0.10	-0.16	-0.19 *	-0.16	-0.17
Empl. 50-64	-0.13	-0.30 ***	-0.12	-0.27 ***	-0.08	-0.29
Empl. 65+	0.12	0.06	0.16	0.21 **	-0.07	0.10
Demo ratio	0.06	0.37 ***	0.16	0.03	0.20 *	0.04
GDP	0.04	-0.04	-0.03	0.04	0.01	0.04
Adj. R-2	*0.20*	*0.25*	*0.09*	*0.10*	*0.02*	*0.06*
DW	*2.20*	*2.10*	*2.10*	*1.66*	*1.59*	*1.58*

*Note: *=p<0.1 ; **=p<0.05 ; ***=p<0.01*

What can be observed looking at the different unemployment categories is that none of the case shows a significant negative association between youth unemployment and the employment participation of the 65+ age group, conversely to what can be observed for other age-categories. In other words, one cannot assume that the increase in older workers' employment participation is associated with a decrease in youth unemployment. Results are particularly clear when looking at unemployment duration of 6-12 months and over 24 months. In both cases, one observes a strong and significant positive association between youth unemployment and 65+ employment participation. Put in another way, the increase in older workers' employment participation is associated with an increase in youth unemployment. Results are not significant when looking at unemployment under 6 months and over 12 months.

What these results show is that the impact of employment participation on youth unemployment and inactivity might vary depending on the age group that is considered. The paper clearly shows that employment participation of people age 50-64 and 65+ does not have the same effect on youth unemployment and inactivity. Even though it can be assumed that the employment participation of people aged 50-64 tends to reduce unemployment and inactivity for the age group 18-24, the opposite effect is observed when looking at the employment participation of people aged 65 and over. It is a particularly relevant result as the share of the population aged 65+ in employment has increased by 150 per cent over the last two decades.

The method used in this paper is similar to what was used in previous studies looking at this issue, but significantly different results are observed. Nevertheless, there are some limitations to this method (for example, controlling for the GDP gross does not fully control for labour market conditions and the demographic ratio does not account for the population growth over the selected period). More fundamentally, there would be a need to use more accurate methods in further research (for example, latent growth modelling) or life course data that contain longitudinal information about workers' trajectories.

Conclusion

The lump of labour is currently a major theoretical argument used against policies aimed at reducing retirement ages. The debate on whether there is a lump of labour has a very long history, going back at least to Henry Mayhew and David F. Schloss in the late nineteenth century. Yet the dynamics underlying the quantity of jobs and their distribution among the population are still insufficiently discussed. As Tom Walker argued regarding working time reduction policies, 'the claim of a lump-of-labour fallacy is an unwarranted rationalization that obstructs serious discussion of the benefits of shortening work time' (Walker, 2000, p 23). Furthermore, recent empirical evidence does not support this assertion. A small number of papers have recently been published showing that increasing older workers' employment participation has had a negative impact on youth employment. It has to be said that rarely is any empirical *evidence* offered. Instead, supporters of the 'fallacy' view tend to offer *a priori*, dogmatic assertions, to the effect that expanding labour supply will increase aggregate purchasing power and therefore lead to economic growth and more jobs. Such was the line taken by Ros Altman in her recent government report, *A New Vision for Older Workers* (2015), where she claimed that the idea of a 'lump of labour' has been 'roundly discredited by academic studies but still colours people's views'. Yet she cited only three sources in support (very briefly), discussing this complex and crucial question in only a few lines, and offering the argument that, 'as the number of workers aged 55 and over increases, overall employment rises and unemployment falls' (Altman, 2015, pp 21-22).

The empirical part of this paper confirms for Britain what has been recently found for Italy and Norway. Over a period characterised by an increase in the actual retirement age leading to a sharp increase in employment participation over 65, the youth employment participation has fallen, not only because the higher education attendance rate has increased but also because the number of NEETs has substantially increased as well. These findings put into question the lump of labour fallacy and open the way to new research looking in-depth at what are the dynamics underlying job redistribution.

As matter of fact, a more complex investigation of long-run changes in labour force composition by sector, age, gender, skill level, region and so on is needed. Three main aspects should be analysed in depth in order to confirm whether or not there is a lump of labour. First, one needs to look at the association between working time and employment participation. A quick analysis of changes in the UK labour force since the Second World War produces evidence which supports the 'lump of labour' idea, for several reasons. In the first place, the growth of part-time employment since the Second World War has been remarkable and little considered – indeed, this is the form in

which virtually all employment growth has occurred. Since 1951, part-time jobs have grown tenfold. When governments tell us that there are more jobs than ever - some 32,248,000 - they overlook this vital fact. An instructive experiment in necessary scepticism is to give each part-time job a 50 per cent fulltime equivalent. This is somewhat flawed, of course, because the hours of part-time jobs vary so greatly, even applying to only one hour a week. Nevertheless, it is an interesting exercise because it demonstrates that, since 1951, there has been virtually no employment growth at the aggregate level relative to population size: the cake may now be sliced more thinly, but it is a similar size of cake. The evidence is as follows: In 1951, there were 22,600,000 employees, employers or self-employed in the UK labour force. Of these, 831,000 were part-time and 475,000 were out of work through sickness or unemployment. Deducting those out of work from the total therefore reduces it to 22,125,000, and giving each part-time job a 50 per cent fulltime equivalent (415,500) further reduces it to c.21,710,000 fulltime equivalents in 1951. By 2018, the labour market (excluding the unemployed) consisted of 23,715,000 people working fulltime and a massive 8,533,000 working part-time. Giving each part-time job a 50 per cent fulltime equivalent reduces that latter figure to 4,266,000, producing a grand total for 2018 of 27,981,000 fulltime equivalents. The increase in fulltime equivalent jobs between 1951 and 2018 is therefore 6,271,000, or 29 per cent. The increase in total population between 1951 (50,300,000) and 2018 (65,518,000) has been 15,218,000, or just over 30 per cent. Therefore, in terms of fulltime equivalents the labour market is on the face of it almost exactly the same as it was in 1951. In other words, there *is* a lump of labour. This corresponds with what has been contended by the experienced economic historian Roger Middleton that 'at the aggregate level….there has been almost no employment growth in the British economy for nearly forty years' (Middleton, 2000, p 33). Up to now, the contribution of the working time in employment participation has not been evaluated in depth (with few exceptions such as Blundell, Bozio and Laroque, 2011, 2013; Merkl and Wesselbaum, 2011) and the nature of the relationship between working time and employment participation is not well known.

Another cautionary aspect relates to the overall strategy of pushing more older people into work in order to improve the UK's economic performance. In fact, workforce numbers probably have much less of a beneficial effect compared with factors like technology, the price of raw materials, skill levels, the demand for goods and services, and so on. Hence the UK had a higher overall employment rate (with more older men still working) in 1931 (a time of economic recession and mass unemployment) than in 1951 (a time of full-employment prosperity). The employment rate of all women hardly changed between 1931 and 1951, at 34.2 per cent and 34.9 per cent respectively, though that stability included a fall in the employment rate of women aged 60 and over. The employment rate of all men fell over the same period from 90.5 per cent to 87.5 per cent, with the

sharpest fall among men aged 65 and over. In other words, the improved economic performance in 1951 was accompanied by fewer older people working.

A final aspect to consider is whether it is the right strategy for an advanced economy like the UK's to expand via the creation of a large, casualised low-wage sector. Such a strategy may have dysfunctional consequences in the long-term, such as encouraging employers to adopt labour-intensive solutions rather than investing in technological innovations which will eventually produce greater economic growth and improve per worker productivity (currently a source of concern in the UK economy). It is also highly political, in that it minimises questions of redistribution by the state in favour of the philosophy that all must support themselves via waged labour. We also need to remember that many economists today are predicting a dystopian future in which technological developments cause the UK to achieve much greater economic growth with a smaller workforce. There has recently been much discussion of the massive job losses that may well accompany a 'fourth industrial revolution' based upon new developments in artificial intelligence, robotics, nanotechnology and the like (Schwab, 2016). Very recently, there have been concerns expressed about the threat posed to many existing jobs by a 'fourth industrial revolution' just around the corner as workers are displaced by artificial intelligence (Ahmed, 2018). Indeed, the whole history of economic growth has been the story of increasing productivity being achieved with progressively smaller workforces, thanks to technology. Hence the American workforce is twice as large as it was in 1945, yet total productivity has grown eight times: on average, productivity per worker has quadrupled. It is curious that most commentators, especially those at the cutting edge of the new economic strategies, strenuously deny that a lump of labour can possibly exist even when their denial involves ignoring the fact that by and large labour market expansion is constrained by total population expansion: the proportion actually in work thus remains roughly constant.

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