Assessing Factors that Affect the Labour Market Decisions of Young People aged 16 to 24: Research Informing LPC Review of Youth Rates

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Contents

Executive Summary:

This report describes the findings from three strands of investigation:

- **Evaluating the impact of local labour market conditions on the employment and education decisions of young people**. This first statistical investigation uses Longitudinal Education Outcomes [LEO] administrative data, to update the analysis previously carried out by Crawford et. al. (2011) using the Longitudinal Study of Young People in England (LSYPE).

- **Identifying impacts arising from introduction in April 2016 of the National Living Wage for those aged 25 and over, and the 21 to 24 year old rate**. The second strand of statistical work uses LEO data to initially pursue a similar Regression Discontinuity Design [RDD] to that used in existing studies (Crawford et. al, 2011; Dickens, Riley and Wilkinson, 2014)*, but then departs from this method, as key assumptions for its validity are not met.

- The third strand of research **reviews the major policy trends that have altered the context for consideration of NMW youth rates between 1999 and 2019**; and describes what these changes might imply.

- **Evaluating the impact of local labour market conditions on the decisions of young people**

We use multivariate approaches to identify the factors that are significant in determining young people's decisions of whether to continue in education or enter the labour market after the age of 16. Controlling for a number of additional factors, the study tests whether indicators of [county-level] wage and unemployment rates are correlated with the post-16 destinations of young people. The implication is that, if we find such a relationship exists, then one may expect changes to minimum wage regimes [which impact local labour markets] to impact the post-16 decisions of young people. We adopt a similar econometric approach to these previous studies; but use *Longitudinal Educational Outcomes* administrative data.

Here we find statistically significant impacts, but essentially our conclusions are similar to those in previous LPC studies – any statistically significant relationships we identify are so small that, in practice, we confirm previous findings that local wages and unemployment rates do not seem to impact the labour market status of young people between the ages of 17 and 19. It is important to note that this analysis is not estimating causal impacts, but with this caveat in mind, there seems limited potential for minimum wage rates to impact the educational decisions of young people between the ages of 17 and 19 (at the levels of minimum wages, and increases, that we have observed to date).

- **Impacts from April 2016 introduction of National Living Wage for those aged 25 and over**

Our first step in testing for employment impacts from changes to the minimum wage regime in April 2016, adopts a standard RDD approach (following Kreiner et al., 2017) by fitting a 5th-degree polynomial and adding a dummy variable, in place of exact month that a young person turns 25 years old. In this approach, *month of birth* is the forcing variable and the treatment takes a value of 'one' if the individual turns 25 on, or after, April 2016. We do not report detailed econometric findings from the models used in this first stage of the investigation, as they are invalidated by the failure of a key assumption underpinning RDD - that those under the age cut-off (in this case 25 years old) are not impacted by the policy.

We find that during the periods of announcement and introduction of the NLW (from July 2015 onwards), there is a flattening of the age/employment rate relationship between the ages of 22 and 27, when compared to the pre-announcement [financial] year of 2014/2015 [running from April 2014 to March 2015]. As a result, we cannot rely on any findings from analysis using RDD, but our results do suggest some impact from introduction of the NLW.

- **Review of Major Policy trends between 1999 and 2019**

Education Policy Trends: During the period covered by this review, there have been various attempts to reform the structure of *Technical/vocational Education* [including apprenticeships] and this has led to an amount of policy instability. The most recent push for reform can be traced back to the Wolf Report [and to a lesser extent the Leitch Review], with relatively far-reaching reforms set out by BIS (now BEIS) in *New Challenges, New Chances: Further Education and Skills Reform Plan* (2012) and *Rigour and Responsiveness in Skills* (2013). Most recently, recommendations from the report on TE arising from a panel chaired by Lord Sainsbury, fed into the *Technical and Further Education Bill* [2016-2017].

Considering *Academic Education*, we note that few young people who take this pathway will be influenced by minimum wage policy. There is evidence of good returns to study at HE, with returns holding up in the face of expanding graduate supply (Blundell et. al., 2005; Walker and Zhu, 2013); and a recent study on the relative returns to a degree, across subject areas, seems to confirm this (Belfield et. al., 2016). Returns to apprenticeships, and vocational learning at Level 3 and above, are also good and seem to present an alternative to the main 'academic' route (Bibby et. al. 2014). For those young people who perform well at Key Stage 4 and move on to Level 3 study [usually A-levels] the level of the minimum wage would not seem a relevant consideration in the decision over labour market entry.

Whilst the level of the minimum wage may not feature in the deliberations of these young people, when considering labour market entry; it is possible that forms of part-time working have become more important for students, and the level of the minimum wage may impact here. Concern over financial burden was a consideration of the recent Review of Post-18 Education and Funding, led by Philip Augar, which recommended a reduction in higher education tuition fees to £7,500 p.a.

Unemployment, Inactivity and Benefits: The rationale for lower NMW rates for younger age groups, is that young people occupy a more precarious situation in the labour market, and the potential for them to be priced out of the labour market is therefore greater. Justification for this concern is particularly apparent during downturns, when a drop in new 'hires' has a disproportionate impact on young people entering the labour market. Therefore, ALMP towards young people was a particular focus of policymakers following the 2008 recession.

Employment and Wages: Whilst we may characterise the current environment as relatively benign, in terms of the relationship between employment creation and non-wage employment costs; there is no clear evidence that allows understanding of the extent to which policies in this area have made the young relatively cheaper or more expensive to employ, compared to older age groups. To be clear, there have been changes that have impacted young people differentially, for instance, the recent abolition of employer NICs contributions for under 21s and apprentices under 25 (within

certain earnings ranges) - an *Employee Allowance* eliminates employer NICs payments up to a value of £3,000. However, to answer the question of whether these changes have substantially impacted the relative attractiveness of employing different age groups over time, we need evidence from microsimulations.

- **Conclusions and Recommendations**

Findings from **analysis of the factors that impact the employment and education decisions of young people** in the period following the end of compulsory schooling, do not suggest that local earnings and/or unemployment rates are economically significant. Whilst we identify some statistical significance associated with these indicators, the implied impacts are very small. In contrast, we have some evidence that announcement and **introduction of the NLW** across the 2015/16 and 2016/17 financial years, may have boosted the employment prospects of young people well below the age 25 cut-off point. We must be careful in drawing very strong conclusions from this analysis, as **LEO statistics should be considered as 'experimental'**, but these findings do need to be taken into consideration.

More specifically, any consideration of impacts arising from the NLW, take place in a very different policy context. The July 2015 announcement did not simply propose a rise in April 2016, but also flagged a significant rise in the costs of employing those aged 25 and above between April 2016 and 2020, relative to young people below this age. This may be expected to have much more substantial impacts on the employment practices of companies, when compared to NMW announcements that set a path over one year and predicate further rises on the need to avoid negative employment impacts. A NLW announcement that makes no consideration of wider labour market impacts, and sets out what [at the time] amounted to a five year plan, may be expected to create very different impacts to those historically associated with the NMW.

Given the evidence in this report, **we cannot rule out the potential for continued increases in the NLW to have significant positive impacts on the employment prospects of those aged 21 to 23; relative to those aged 24 and over** – with those aged 24 possibly suffering negative impacts due to their closeness to the 25 year old cut off.

The 16 to 17 age rate [introduced Oct 2004]: Whatever their performance at KS4, most young people now stay on for at least a year post-16 and a Raising of the Participation Age [from 2013 onwards] can be seen as a formalisation of this trend. Decisions on whether to enter the labour market tend to be made by most young people at the end of the year in which they turn 17. For young people most likely impacted by changes to the minimum wage, they will be studying Level 2 or below at this point, predominantly within the Further Education environment. With RPA formalising this trend towards near-universal education and training participation at ages 16 and 17, the NMW rate for this age group is no longer impactful of labour market entry decisions. However, it is **potentially impactful in decisions over part-time working**.

The introduction of a youth rate for 18 to 21 year olds in 1999; and the subsequent 2010 reduction to age 21 of entitlement to the main rate, has resulted in a separate **rate for 18 to 20 year olds**. Our review suggests that many **young people potentially impacted by the minimum wage, now enter the labour market between the ages of 18 and 20**; and the attractiveness of technical [vocational]

education and training at Level 2 and below, relative to minimum wage employment, may be a consideration. This is the age when decisions over full labour market participation, versus continuing education, are made by those potentially impacted by NMW policy.

The 21 to 24 age rate: The decision to set the National Living Wage coverage at age 25 and above, resulted in a separate **rate for 21-24 year olds** from April 2016. There seems some justification for this separate rate as this group have much lower median earnings than the 25 to 30 age group; and as a result, the NMW rate for the 21 to 24 group is already 79% of median earnings (LPC, 2018). Similarly, we may expect the 21 to 24 age group to be at a different stage of their labour market careers, compared to those aged 18 to 20 who will be more likely making their first transition to the labour market.

Part-time working: we have not been able to find clear evidence to inform our deliberations over minimum wages and the part-time working of young people. More specifically, discussion of the separate age rates above tends to focus on the trade-off between incentives to remain in education or make the transition to employment. When considering the 18-20 Year Old Rate, it would seem important to consider the incentives for young people making the transition from some form of FE learning to the labour market. For the 21-24 age group we are considering relatively low-skilled workers who may be more easily substitutable by migrant labour. In the case of the 16-17 Year Old Rate, transition to the labour market no longer seems to be a consideration, but we flag part-time working as a potential issue for all young people in this age range.

Apprentice Rate: Cutting across all of our discussion of minimum wages for young people, is the question of the Apprentice Rate, introduced in Oct 2010; which applies to all apprentices aged 16 to 18 and those aged 19 and above for the first year. The expansion of apprenticeships does not seem to have particularly benefited young people; and it would seem reasonable to suggest that much of the expansion [especially in sectors where we find many young people working; and where median wages are low] has not been of high quality (despite policies to better ensure quality). With introduction of the Apprenticeship Levy and the transition to Standards, this would not seem to be a good time for radical policy on the apprenticeship rate.

Possibility for some form of microsimulation evidence: when HMRC wish to gauge the impact on tax or benefit entitlements from a combination of policy changes, they utilise microsimulation models. This does not incorporate behavioural change [in the way that a Computable General Equilibrium (CGE) does], but allows one to see how offsetting changes to take-home pay, benefits and earnings impact work-incentives for different groups in society. The LPC might usefully consider commissioning a scoping study to ask if such models can help illuminate how employment opportunities/incentives have changed for young people in the face of UC introduction, changes to NICs and other payroll taxes; and how this interacts with minimum wage changes.

1. Introduction

This report describes the findings from three strands of investigation. There are two distinct statistical analyses of Longitudinal Education Outcomes [LEO] administrative data; together with a review of the major policy trends that have altered the context for consideration of National Minimum Wage [NMW] youth rates between 1999 and 2019.

The first statistical investigation updates and extends the analysis carried out by Crawford et. al. (2011), which itself builds on the work of De Coulon et. al. (2010) and, to a lesser extent, Dickerson and Jones (2004). Crawford et. al. (2011) analyse data from the Longitudinal Study of Young People in England (LSYPE) to **evaluate the impact of local labour market conditions on the employment and education decisions of young people**. This strand uses multivariate approaches to identify the factors that are significant in determining young people's decisions of whether to continue in education or enter the labour market after the age of 16. Controlling for a number of additional factors, the study tests whether indicators of [county-level] wage and unemployment rates are correlated with the post-16 destinations of young people. The implication is that, if we find such a relationship exists, then one may expect changes to minimum wage regimes [which impact local labour markets] to impact the post-16 decisions of young people. We adopt a similar econometric approach to these previous studies; but use *Longitudinal Educational Outcomes* administrative data.

The second strand of statistical work initially pursues a similar Regression Discontinuity Design [RDD] to that used in existing studies (Crawford et. al, 2011; Dickens, Riley and Wilkinson, 2014), to **identify impacts arising from introduction in April 2016 of the National Living Wage for those aged 25 and over, and the 21 to 24 year old rate**. The RDD approach rests on the assumption that young people born only a few months apart can be considered broadly comparable [especially in terms of facing the same labour market and educational environments]; but if they are either side of [in this case] their 25th birthday, they will be subject to different minimum wage rates. If such assumptions hold, then studies that utilise this approach are able to make a case for better identification of impacts arising from changes to minimum wage frameworks.

The full administrative data record (LEO[1]) links information on individuals in England across the National Pupil Database (NPD), which contains the full school census; data on all HE enrolments in Higher Education Statistics Agency (HESA) data; information on all Further Education enrolments, contained within the Individualised Learner Record (ILR); HMRC employment data (P45 and P14) and Department for Work and Pensions (DWP) Benefits information. Young people included in this study appear in Key Stage 4 (KS4) Performance Tables at the age of 15 [that is, in the year they turn 16], and we are able to analyse post-16 education and labour market transitions for eight cohorts of these young people [who turn 16 in the academic years from 2001/2002 to 2008/2009]. As suggested on the title page, we are very grateful to the Department for Education for provision of the data, and funding from the ESRC [award ES/P000975/1].

Previous statistical studies evaluating minimum wage impacts have generally concluded that incremental increases have not led to large side effects (Dolton et al., 2015; Hafner et al, 2016), but

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[1] https://www.gov.uk/government/publications/longitudinal-education-outcomes-study-how-we-use-and-share-data

the labour market for young people is potentially much more sensitive (Manning, 2016). Crawford et. al. (2011) note that in the wider academic literature, previous studies using time series approaches, have been more likely to identify some impact of unemployment rates and earnings on the education participation decisions of young people (for instance, McVicar and Rice, 2001); when compared to cross-sectional studies (for instance, Micklewright, Pearson and Smith, 1990). Considering LPC-commissioned studies of the potential for minimum wage impacts on the labour market decisions of young people, there seems some limited potential for indirect effects via regional unemployment rates, but little evidence of direct impacts via wages (De Coulon et. al., 2010; Crawford et. al., 2011).

The third strand of research **reviews the major policy trends that have altered the context for consideration of NMW youth rates between 1999 and 2019**; and describes what these changes might imply. For instance, Manning (2016) points out that whilst 'the American teenager' is one of the most studied groups for minimum wage research, increasing educational participation rates have drastically reduced the importance of under-20s amongst minimum wage working. The same is true of the UK, where Raising of the Participation Age [RPA] from 2013 has further altered the policy context for consideration of the 16-17 and 18-20 age rates.

Section 2 sets out the *Data and Methods* used in the two sets of statistical analysis, and Section 3 describes the *Analysis and Findings* from these parts of the study. Section 4 then sets out the *Major Policy Trends that may have Impacted Consideration of Youth Rates* and Section 5 Concludes, bringing together findings from three separate aspects of the investigation. A key focus of Section 5 is whether there are arguments that would justify Low Pay Commissioners being more ambitious with youth rates in the current environment; for each of the 16-17; 18-20 and 21-24 age rates, and the apprenticeship rate – in contrast to the caution around youth rates in the past.

2. Data and Method

2.1 Evaluating the impact of local labour market conditions on the employment and education decisions of young people

We pool LEO data across cohorts of young people [who turn 16 in the academic years from 2001/2002 to 2008/2009] to separately model (i) labour market/education status one year after KS4 [i.e. in the year that young people from these cohorts turn 17] (ii) labour market/education status two years after KS4 [when they turn 18] and (iii) status three years after KS4 [when they turn 19]. We estimate a Linear Probability Model (LPM) with standard errors clustered at school level, and this model controls for gender, ethnicity, Special Educational Needs (SEN), Free School Meals (FSM), urban/rural location, independent school, average local house price, sixth form, Key Stage 2 (KS2) performance, Index of Multiple Deprivation (IMD), school peer effects (from the previous cohort); and whether a young person has English as an additional Language. The main explanatory variables of interest, which we report parameter estimates for in Section 3.1 are:

- Average unemployment rate [for those aged 18-24], at a County level: sourced from the *Annual Population Survey* (APS).
- Median wages, at a County level: sourced from the Annual Survey of Hours and Earnings (ASHE).

We utilise the same identification strategy as previous LPC studies (op. cit.), relying on variation in wages and unemployment rates across local labour markets to identify the extent to which these factors impact the labour market and education decisions (as reflected in observed outcomes) at the ages of 17, 18 and 19 (which during the period under study, is after the completion of compulsory schooling). A key challenge is to capture the impact of these local labour market indicators on the contemporaneous (post-KS4) decisions of young people, whilst controlling for all relevant 'background' characteristics, up to the point of KS4.

For instance, if we were to estimate a naïve regression with only county-level median wages as an explanatory variable and the probability that a young person is observed in education at age 17 as the outcome variable, we may identify a positive coefficient. This would seem to suggest that higher local average wages are associated with a higher probability that a young person will be in education – if higher local wages raise the opportunity cost of education[2], we would have expected the opposite relationship. However, in this naïve regression, such a result would probably arise because wages are acting as a proxy for the background characteristics of a young person. If the county-level average wage is high, young people in the area are more likely to be from affluent backgrounds and [other things remaining equal] more likely to be in education – adding a variety of factors that control for a young person's individual background characteristics to this naive regression brings us

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[2] It is more complicated than this, as young people may take higher local wages as an indication that the returns to education are improving and this may possibly drive them to invest further in education. However, this seems unlikely – young people who are influenced by the level of local wages, at ages 17, 18 and 19 are [by definition] considering the returns to wages associated with lower levels of education. Essentially, this is a data issue – we would ideally have an indicator of the relative returns to high versus low-skilled employment in the local labour market, and a direct indicator of the average level of wages for unskilled workers in the locality. We use average local wages at county-level, in an attempt to replicate previous studies as far as possible.

closer to estimation of the actual impact of local wages on a young person's labour market and educational choices post-16.

The aim here is to update the findings of Crawford et. al. (2011) and so we utilise a similar specification. However, there are key differences with the previous study [in addition to the use of LEO data] – for instance, in our specification family background characteristics are proxied by the Index of Multiple Deprivation[3] and it is not currently possible to merge in exactly same APS and ASHE regional indicators used in the previous study[4]. Also, we do not have the attitudinal indicators that previously provided a locus of control[5] measure – though there are concerns over the use of this measure, which is asked in Wave 2 of the LSYPE, at the point when young people are aged 14/15 [their mock GCSE year]. If we consider that KS4 attainment is potentially endogenous[6], it is hard to argue that this locus of control measure is not.

An important extension to previous studies, is our ability to estimate impacts for specific subgroups of school leavers within LEO cohorts. This allows analysis of a specific group of young people who are more likely to be influenced by changes to the minimum wage. We may expect young people who obtain a D or below [now 3 or below] in Maths and/or English GCSE at KS4 to be more influenced by changes to the minimum wage regime, as they are more likely to consider employment as an option at this point. This provides us with an opportunity to uncover impacts that may have previously been hidden to studies using survey data to identify impacts across full cohorts of learners (many of whom will have levels of attainment at KS4 that mean they are either not impacted by minimum wage changes; or are impacted in a very different way, perhaps via part-time work whilst studying).

Tables 1a, 1b and 1c present the proportions of young people observed in various destination states in the years immediately after KS4. For instance, Table 1 sets out the status of young people during the year they turn 17, for all those who had attended Y11 in a state-funded school in England [between the academic years 2001/02 to 2008/09][7]. The status of a young person in the year they turn 17 [or 18 in Table 2 and 19 in Table 3] is determined using the following approach:

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[3] IMD summarizes seven distinct domains; Income Deprivation, Employment Deprivation, Health Deprivation and Disability, Education Skills and Training Deprivation, Barriers to Housing and Services, Living Environment Deprivation, and Crime. It is worth noting that a component of IMD captures aspects of the local labour market, but this is a common limitation of studies that use this indicator as a proxy for social background.

[4] The APS unemployment rate and ASHE median wage figures used in Crawford et. al. were obtained under *Special Licence*. ONS colleagues have confirmed that it is currently not possible to merge these specific data into LEO and therefore this study uses APS and ASHE indicators at a higher level of geographical aggregation.

[5] *Locus of Control* is a young person's perception of their ability to exercise control over their environment.

[6] In Crawford et. al. (2011) the use of LSYPE data does allow the use of some variables from the NPD, and therefore attainment at KS4. However, the authors (in contrast to De Coulon et. al. 2010) do not include KS4 indicators in their analysis, as they are potentially endogenous – young people may alter their behaviour in exams taken at KS4, based on their perceived labour market prospects after the age of 16. A young person considering the option of a low-paid manual job after school, may reduce their effort in KS4 exams, if the wages associated with this option become more attractive. In line with Crawford et. al. (2011) we omit KS4 attainment from our econometric specification.

[7] Young people in Independent Schools do not feature in our analysis, as key indicators [such as postcode] are missing for these pupils. This omits approximately 7% of each cohort of school leavers from our analysis. Given the social background and educational performance of young people in these schools, this does not seem a serious omission, as very few are likely to be considering minimum wage employment.

1. A young person is recorded as being in education during the year they turn 17, if they have a learning aim in the relevant admin datasets[8] on the 31st October; 31st January or 31st May. The large majority of young people who we record as being in education during the year they turn 17, have a record on 31st October immediately following their completion of KS4 in June/July of the same year. Utilising a young person's education status in the January and May, following the October, we increase the proportion of young people counted as 'in education' [during this first year after KS4] by approximately 6 percentage points [ppts] in the earlier cohorts and 4 ppts in the later ones.

2. If a young person has a learning aim on any of these three dates, they are recorded as being in education. The following regression analysis further differentiates this group into those who do, and those who do not, have an employment record during the year they turn 17 [18 or 19], in addition to any education learning aim. This is the closest we get to identifying part-time working[9] - young people who have both education and employment indicators in the same year are possibly combining education and employment activity. However, it is important to note that they could be moving between these two states during the year they turn 17 and anybody earning below the Lower Earnings Limit, before April 2013 when Real Time Information (RTI) was introduced by HMRC, will also not have an employment record.

3. One advantage of the admin data is that we have more detailed information on the specific institutional destination of those recorded as 'in education' during the year they turn 17 [18 or 19] – destinations include Sixth Form College; School Sixth Form; General Further Education; and 'Other' Further Education [predominantly work-based learning and private training providers]. If a young person has a learning aim in more than one of these types of post-16 educational institution across the Oct, Jan and May dates, the most 'substantial' is recorded as the relevant destination. More specifically, if they are in multiple types of provision across the year, the one that they were in for the most periods is recorded; and if it is a 'tie', the most recent provision is recorded. The exception is School Sixth Form, which takes precedence over General FE and Sixth Form College, even where duration is not the longest.

4. In each year after KS4 we are able to observe the number of days a young person is employed [in that year] and the number of days in receipt of unemployment benefits. The most recent year we observe a destination state is 2011/2012 [the year that the 2008/2009 cohort of school leavers turn 19] and therefore we do not suffer from the loss of information on unemployment benefit spells that arises from the introduction of Universal Credit from 2013 onwards.

5. For young people with no qualification aim across the Oct, Jan and May dates, we use the employment and unemployment benefit spell information to define their destination status[10].

a) If they have one or more employment spells lasting more than 1 day during the year, they are recorded as employed in the relevant post-16 year,

b) A young person without an education record or employment spell, but with an unemployment spell is recorded as unemployed in the relevant year,

c) If the young person has a combination of both unemployment and employment spells over 1 day, we choose the one that is sustained for the longest period,

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[8] ILR, NPD and HESA.

[9] As measures of daily earnings are constructed from 'Number of days worked in the financial year' and 'earnings for the financial year'.

[10] As suggested under 2. above, we also utilise the employment spell information described here to differentiate young people who are, and those who are not, working during the year they have an education learning aim.

d) For young people with no record in the relevant year across any of the administrative datasets, we differentiate between those who have no admin data record in any of the years beyond KS4; and those who we see in at least one year after KS4 [whether that is in employment, unemployment or education]. Young people who have no admin data record in the year they turn, for example, 17 but who have some recorded activity in subsequent years, are recorded in a group that may be (i) inactive, self-employed (self-assessment returns are not currently in the data) or earning under the tax threshold and (ii) those who we do not see in any admin record subsequent to KS4 are categorized 'missing'[11].

Tables 1a, 1b and 1c describe the outcomes from this process of categorisation for young people in the years they turn 17, 18 and 19 respectively; both for the full cohort of school leavers and for those young people who achieve D or below in Maths and/or English GCSE at KS4.

Table 1a: Destination of KS4 [2001/2002-2008/2009] Pupil Population, in the Year they turn 17

Activity status of young people in year turned 17	Full KS4 cohort		Young people achieving D or below in Maths and/or English	
	No.	%	No.	%
In education [no employment record]	2,533,210	49.1	1,288,209	46.0
In education [employment record]	1,379,588	26.8	627,613	22.4
All 'In Education'				
Sixth Form College	491,614	9.5	132,694	4.7
General FE Institution	1,484,305	28.8	1,055,890	37.7
Other FE	302,373	5.9	245,355	8.8
School Sixth Form	1,634,506	31.7	481,883	17.2
Employed	273,011	5.3	228,511	8.2
Unemployed [active benefits]	24,821	0.5	24,011	0.9
Inactive, self-employed or earnings under LEL	797,390	15.5	505,329	18.0
Missing from data post KS4	109,267	2.1	95,290	3.4
Other	38,590	0.8	31,453	1.1
Total	**5,155,877**	**100**	**2,800,416**	**100**

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[11] These individuals may have emigrated, may be deceased and in some cases may actually be inactive, self-employed or earning under the tax threshold for the entire period [we would suggest emigration is the main reason here, but it is not possible to confirm this].

Table 1b: Destination of KS4 [2001/2002-2008/2009] Pupil Population, in the Year they turn 18

Activity status of young people in year turned 18	Full KS4 cohort		Young people achieving D or below in Maths and/or English	
	No.	%	No.	%
In education [no employment record]	1,602,499	31.1	775,350	27.7
In education [employment record]	1,900,321	36.9	817,964	29.2
All 'In Education'				
Sixth Form College	431,070	8.4	100,025	3.6
General FE Institution	1,400,413	27.2	929,898	33.2
Other FE	373,322	7.2	284,855	10.2
School Sixth Form	1,298,015	25.2	278,536	10.0
Employed	633,894	12.3	509,505	18.2
Unemployed [active benefits]	128,584	2.5	121,176	4.3
Inactive, self-employed or earnings under LEL	700,416	13.6	416,650	14.9
Missing from data post KS4	135,318	2.6	115,931	4.1
Other	54,845	1.1	43,840	1.6
Total	**5,155,877**	**100**	**2,800,416**	**100**

Table 1c: Destination of KS4 [2001/2002-2008/2009] Pupil Population, in the Year they turn 19

Activity status of young people in year turned 19	Full KS4 cohort		Young people achieving D or below in Maths and/or English	
	No.	%	No.	%
In education, no employment record	518,586	10.1	377,194	13.5
In education, and employment record	979,968	19.0	608,504	21.7
All 'In Education'				
Sixth Form College	75,103	1.5	41,919	1.5
General FE Institution	915,713	17.8	624,440	22.3
Other FE	358,511	7.0	237,740	8.5
School Sixth Form	149,227	2.9	81,599	2.9
Employed	1,942,180	37.7	875,645	31.3
Unemployed [active benefits]	355,837	6.9	305,509	10.9
Inactive, self-employed or earnings under LEL	1,084,683	21.0	437,324	15.6

Missing from data post KS4	135,762	2.6	116,186	4.2
Other	138,861	2.7	80,054	2.9
Total	5,155,877	100	2,800,416	100

2.2 Identifying impacts arising from April 2016 introduction of the National Living Wage for those aged 25 and over, and the 21 to 24 year old rate.

The LEO data currently include information on employment outcomes up to the 2016/2017 financial year. This allows us to identify for each individual in the relevant cohorts, month-by-month indicators of employment status, before, during and after changes to the minimum wage regime in 2016. We first attempt to build on the Regression Discontinuity Design [RDD] approaches used in the existing literature (Crawford et. al., 2011; Dickens, Riley and Wilkinson, 2014), which identify impacts arising from the introduction of new rates, and the impact of changing relativities between rates for different age groups (Kreiner et. al., 2017). The RDD approach rests on the assumption that young people born only a few months apart can be considered broadly comparable [especially in terms of facing the same labour market and educational environments],but will be subject to different minimum wage rates. If such assumptions hold, then studies that utilise this approach are able to make a case for better identification of impacts arising from changes to minimum wage frameworks.

To evaluate impacts from the April 2016 changes, we investigate the discontinuity for those either side of their 25th birthday on this date. Under this scenario we have a situation where young people just over the age of 25 experience *a sharp real and relative increase in the level of the minimum wage*. This approach utilises a particular strength of the data, that around this discontinuity we have many more observations than one obtains in survey-based studies. The specific econometric approach adopted closely follows that of Kreiner et. al. (2017), but as the following discussion underlines, the findings are not conclusive and the majority of Section 3.2 presents a variety of descriptive analyses to identify (i) why we may not be observing impacts using the RDD approach and (ii) whether the patterns of employment by age, around these 2016 changes, are consistent with a minimum wage impact.

To better understand the data underpinning analyses in Section 3.2, Table A1 of the Appendix sets out the data used in this analysis and Table A2 highlights a small section of this Table, to aid exposition. First consider the cells highlighted in yellow in Table A2. Combining school leaver cohorts between 2001/2002 and 2008/2009, Table A2 shows how we are able to observe all young people who, for instance, (i) turn 22 during the 2014/2015 financial year, provided that (ii) they appear in the relevant Key Stage 4 (KS4) Performance Tables at age of 15 [that is, in the year they turn 16]. In Table A2, the following cells are highlighted in yellow:

- Young people born in the month of April 1992, turn 16 in April 2008 and 22 in April 2014. If they are included in the KS4 Performance Tables for 2007/2008 (because they are part of the Sept 2007 to August 2008 school leaver cohort and in the KS4 performance tables), we can observe their employment status in April 2014, the month they become 22. During the month of April 2014, if we observe an individual from the April 1992 cohort with 16 days or more in employment, they are counted as 'employed' in this month.

- Young people born in the month of May 1992 (who appear in the [Sept to August] 2007/2008 school leaver cohort, because they turn 16 in May 2008), become 22 years old in May 2014. During this month of May 2014, if we observe a young person from this cohort with 16 days or more in employment, they are counted as 'employed' in this month.
- For young people born in June, July or August of 1992, a similar explanation applies - if they feature in the 2007/2008 school leaver cohort KS4 tables, we observe their employment status during June, July or August 2014 when they turn 22.
- Young people born in the month of September 1992 (who appear in the [Sept to August] 2008/2009 school leaver cohort, because they turn 16 in September 2008), become 22 years old in September 2014. 16 days or more in employment counts as 'employed' in this month.
- For young people born in Oct, Nov or December 1992; or January, February or March 1993 a similar explanation applies - as long as they feature in the 2008/2009 school leaver cohort, we are able to calculate monthly employment rates for the period Oct, Nov and Dec 2014; as well as Jan, Feb and March 2015.

The explanation above gives some indication of the population covered by our monthly employment rate estimates, and this is important to keep in mind when considering the findings from analysis in Section 3.2. The employment rates presented will not include individuals if they did not feature in the relevant English KS4 school leaver cohort. Most importantly, it excludes those who are recent[12] immigrants to England and this could be quite a substantial minority, during the period 2014/2015 to 2016/2017[13] – one may therefore consider our employment rate estimates as those that apply mainly to the 'resident' population of England. It is important to remember that this does not only exclude recent immigrants from the EU and/or the rest of world, but also from Wales, Scotland and Northern Ireland and the Republic of Ireland.

In Table A1, the cells highlighted in yellow are those used in initial RDD estimates, as they provide us with some indication of the employment rates that apply to individuals who turn 22 years and 8 months [that is, 22 and 2/3]; 22 and 9 months [that is 22 and 3/4] etc. in April 2016 [all the way up to those who turn 27 in April 2016]. In Table A2 the diagonal highlighted in yellow [which forms the basis of the bulleted description above] is for 12 months between April 2014 and March 2015. Creating a measure of the average employment rate across all 12 of these cells, provides us with an estimate of the employment rate that applies during the month that individuals turn 22, if they turn 22 during the 2014/2015 financial year. Averaging employment rates across all the cells highlighted in green provides us with an estimate of the employment rate that applies during the month that individuals turn 22 and one month [22.083] if this occurs during the 2014/2015 financial year, etc.

In the following analysis we use the data in Table A1 to create figures using both of these approaches and one of the key limitations is that, currently, we do not have the 2009/2010 or 2010/2011 cohorts. Part of the analysis in Section 3.2 is dedicated to ensuring that this current data limitation is not responsible for our emerging findings.

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[12] By 'recent' we mean anybody who migrated to England after the age of 16; who was therefore not enrolled in an English secondary school and who would not feature in either the numerator or denominator of our monthly employment rate estimates.
[13] See for instance, Sturge, G. (2018), *House of Commons Library Briefing Paper: Migration Statistics*, No. SN06077; August.

3. Analysis and Findings[14]

3.1 Evaluating the impact of local labour market conditions on the decisions of young people

Here we find statistically significant impacts, but essentially our conclusions are similar to those in previous LPC studies – any statistically significant relationships we identify are so small that, in practice, we confirm previous findings that local wages and unemployment rates do not seem to impact the labour market status of young people between the ages of 17 and 19. It is important to note that this analysis is not estimating causal impacts, but with this caveat in mind, there seems limited potential for minimum wage rates to impact the educational decisions of young people between the ages of 17 and 19 (at the levels of minimum wages, and increases, that we have observed to date).

This conclusion is driven by the fact that analysis of administrative data involving millions of observations has a greater tendency to identify statistically significant impacts, even when these are in fact very small. For instance, unemployment is measured in percentage points and the median wage is measured in £ per hour. In the case where we have, for instance, a coefficient on the local unemployment rate of 0.00093 [in the regression where our dependent variable is the probability of being in education], a one percentage point increase in the local unemployment rate will increase the probability of being in education by 0.00093 of a percentage-point. In the case where we observe the value of the coefficient for local median wages as -0.00146, this suggests a £1 increase in local median wages will decrease the probability of being in education by 0.00146 of a percentage-point.

Table 2 sets out the parameters of interest from estimation of the first three regression equations, that have as the dependent variable the probability of observing a young person with *Any Education* during the year they turn 17, 18 or 19. In these first estimates we set a very low bar, with a young person seen to have *Any Education* if they have at least one ILR learning aim; are enrolled at a secondary School; or appear in HESA data at the age of 19 [see discussion pages 5 and 6]. Each of the estimates set out in Tables 2 to 4 (and Table A3 of the Appendix) are obtained using the full specification set out in the *Data and Method* section - that is, using a LPM for cohorts 2001/2002 to 2008/2009, with a full set of controls; standard errors clustered at school level; and using county-level unemployment measures from the APS and Median wages from ASHE.

These first set of estimates suggest a statistically significant, positive relationship between local average unemployment rates and the probability we observe young people in education during the first three years after KS4 completion. This holds whether we consider the full cohort, or a subgroup of young people who secure grade D or below in Maths and/or English GCSE at Key Stage 4. The suggestion is therefore that a higher local unemployment rate makes engagement in some form of learning more likely, and this may reflect a greater propensity amongst young people to engage in education when local job opportunities are constrained. In contrast, the parameter on our indicator of county-level median wage is negative and [in some, but not all years] statistically significant. This suggests that the engagement of young people in some form of learning is less likely, when local wages are higher [but as suggested at the start of this section, the scale of any impacts is very small].

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[14] Details of the full models and specification tests are available from the authors on request.

Table 2: Estimating the Impact of Local Labour Market Conditions on the Probability of being in Any Education [2001/2002-2008/2009 KS4 Pupil Population]

All young people	Aged 17	Aged 18	Aged 19
Average unemployment rate [18-24], county level	0.00093*** (0.00014)	0.00124*** (0.00012)	0.00036* (0.00016)
Median wage for full-time employee, county-level	-0.00146*** (0.00042)	-0.00178*** (0.00044)	-0.00693*** (0.00066)
Number of observations	3,799,918	3,803,433	3,809,282
Young People Securing D or Below in Maths and/or English GCSE at Key Stage 4			
Average unemployment rate [18-24], county level	0.00133*** (0.00020)	0.00186*** (0.00018)	0.00098*** (0.00017)
Median wage for full-time employee, county-level	-0.00101 (0.00067)	-0.00149* (0.00681)	-0.00309*** (0.00064)
Number of observations	2,056,415	2,057,294	2,059,936

***statistically significance at 1% level: **statistically significant at 5%: *statistically significant at 10%

The finding of a negative and significant coefficient on local wages and a positive and significant coefficient on local unemployment rates, is consistent with (i) a potential [direct] disincentive effect on educational engagement associated with rising minimum wages; but (ii) a potential [indirect] effect that would increase educational engagement, in the face of higher levels of local unemployment [if rising minimum wages were associated with a rise in unemployment]. In most instances, our estimates associated with local unemployment are 'larger' for the group of young people who secure Maths and/or English DS or below at KS4; and smaller when considering earnings impacts – when compared to estimates gained from the cohort as a whole. However, any differences are not particularly pronounced[15]. These findings are in line with previous studies (most notably Crawford et. al., 2011; De Coulon et. al., 2010), which find some limited indirect impact associated with local unemployment rates and no significant impact associated with wages.

As suggested, any impacts are very small and given that the underpinning identification strategy [in both our own and previous studies], can only be relied on to identify correlations, rather than causal impacts; we do not take findings in Table 2 as implying a likelihood of significant impacts on the labour market and education decisions of young people, from minimum wages that impact local labour market conditions. What does the remainder of the analysis, investigating impacts from local labour markets on young people's decisions, suggest?

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[15] It is useful to consider this finding within the context of 'suggestive evidence' set out in De Coulon et al. (2010) [as flagged in Crawford et. al., 2011] that young people with lower GCSE scores, were more likely to be influenced by conditions in the local labour market.

Tables 3 and 4 model the probability that we observe young people in employment in the years following KS4, with a young person counted as in employment if they worked more than 1 day in the relevant year. Table 3 models this outcome for all young people who also have an education indicator during the relevant year; and Table 4 models employment probability, for those who have no accompanying education indicator in the relevant year [as defined when considering our *Any Education* outcome]. Given our limited ability to identify part-time working, this analysis makes some attempt to differentiate employment outcomes according to whether the young person has additional [educational] commitments, alongside any working.

Table 3: Estimating the Impact of Local Labour Market Conditions on the Probability of having an Employment Spell - for Young People who also have an Education Indicator in the Relevant Year [2001/2002-2008/2009 KS4 Pupil Population]

All young people	Age 17	Age 18	Age 19
Average unemployment rate [18-24], county level	-0.00761*** (0.00024)	-0.00532*** (0.00022)	-0.00430*** (0.00019)
Median wage for full-time employee, county-level	-0.00414*** (0.00101)	-0.00188*** (0.00087)	-0.00158* (0.00074)
Number of observations	1,907,137	1,827,873	1,110,101
Young People Securing D or Below in Maths and/or English GCSE at Key Stage 4			
Average unemployment rate [18-24], county level	-0.00754*** (0.00025)	-0.00583*** (0.00025)	-0.00483*** (0.00022)
Median wage for full-time employee, county-level	-0.00551*** (0.00099)	-0.00358*** (0.00089)	-0.00269** (0.00086)
Number of observations	1,181,273	1,066,461	729,996

***statistically significance at 1% level: **statistically significant at 5%: *statistically significant at 10%

The results from Tables 3 and 4 suggest both local unemployment rates and wages are negatively correlated with the probability a young person is observed in employment. We may take this as an indication that higher levels of local unemployment either reduce employment opportunities directly and/or act as a disincentive to job search – consistent with a-priori expectations. In contrast, the fact that higher wages in the local labour market are associated with a significantly lower probability that a young person will be observed in employment, seems counter-intuitive – when taken together with the findings in Table 2, higher local wages are associated with a lower probability that a young person will be observed in either education or employment.

Table 4: Estimating the Impact of Local Labour Market Conditions on the Probability of having an Employment spell - for Young People who have no Education Indicator in the Relevant Year [2001/2002-2008/2009 KS4 Pupil Population]

All young people	Age 17	Age 18	Age 19
Average unemployment rate [18-24], county level	-0.00752*** (0.00029)	-0.00600*** (0.00026)	-0.00412*** (0.00018)
Median wage for full-time employee, county-level	-0.00486*** (0.00100)	-0.00318*** (0.00089)	-0.00279*** (0.00071)
Number of observations	1,892,781	1,975,560	2,699,181
Young People Securing D or Below in Maths and/or English GCSE at Key Stage 4			
Average unemployment rate [18-24], county level	-0.00721*** (0.00030)	-0.00603*** (0.00026)	-0.00465*** (0.00022)
Median wage for full-time employee, county-level	-0.00560*** (0.00101)	-0.00346*** (0.00089)	-0.00212** (0.00080)
Number of observations	875,142	990,833	1,329,940

***statistically significance at 1% level: **statistically significant at 5%: *statistically significant at 10%

Bringing our various estimates together, the findings can be summarised:

Summary Impact: Average unemployment rate [18-24], county level
- Higher local unemployment rate, higher probability of [any] education
- Higher local unemployment, lower probability of employment (with education indicator)
- Higher local unemployment, lower probability of employment (no education indicator)

Summary Impact: Median wage for full-time employee, county-level
- Higher local wages, lower probability of [any] education
- Higher local wages, lower probability of employment (with Education indicator)
- Higher local wages, lower probability of employment (no Education indicator)

If we also consider findings from Table A3 of the Appendix, which suggest that the probability of a young person being observed in our amorphous missing group (i.e. NEET, self-employed, earning below the tax threshold etc) is positively related to both the local unemployment rate and local median wage rates. These findings may reflect the draw of the grey economy and/or forms of self-employment that are on the margins of the formal economy, with higher wages in the formal economy reflecting greater opportunities for recent school leavers in the informal economy; whilst higher local unemployment rates seem to be associated with fewer employment opportunities for

young people, which pushes them to consider education. However, again we need to note the very small size of impacts implied by the coefficient estimates.

3.2 Impacts from April 2016 introduction of National Living Wage for those aged 25 and over

As suggested in the *Data and Method* section, our first step in testing for employment impacts from changes to the minimum wage regime in April 2016, has been to adopt a standard RDD approach (following Kreiner et al., 2017) by fitting a 5th-degree polynomial and adding a dummy variable, in place of exact month that a young person turns 25 years old. In this approach, *month of birth* is the forcing variable and the treatment takes a value of 'one' if the individual turns 25 on, or after, April 2016. We do not report detailed econometric findings from the models used in this first stage of the investigation, as they are invalidated by the failure of a key assumption underpinning RDD.

More specifically, in our initial RDD analysis we identify a statistically significant decrease in the employment rate for individuals aged 25 and over [of -0.39 percentage points, at the 1% level]. Estimating the same model, but this time assuming that either (i) the policy impact can be expected from the month that the National Living Wage was first announced in July 2015[16] or (ii) when the policy change was officially announced in the October 2015 LPC report, we again identify statistically significant negative impacts [at the 1% level] of -0.83 and -0.77 percentage points, respectively. If the assumptions underpinning our use of RDD were valid, this would suggest negative impacts on the employment of those aged 25 and above. However, choosing another month that should not be associated with negative impacts (for instance, April 2015) we again identify a negative and statistically significant impact of -0.75 percentage points.

Given the very large numbers we are working with, which makes uncovering of statistically significant impacts more likely, and the fact that we gain a similar magnitude of impact in an earlier 'placebo' month, we would not take this as evidence of an employment impact, even if assumptions underpinning the validity of RDD were met. Figure 1 suggests that one key assumption underpinning the validity of RDD does not hold. RDD assumes that those under the age cut-off (in this case 25 years old) are not impacted by the policy, as they are essentially used to create counterfactual estimates. Figure 1 suggests that during the periods of announcement and introduction of the NLW (from July 2015 onwards), we see a flattening of the age/employment rate relationship between the ages of 22 and 27, when compared to the pre-announcement [financial] year of 2014/2015 [running from April 2014 to March 2015]. As a result, we cannot rely on any findings from analysis using RDD.

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[16] When the Chancellor [at the time, George Osborne] announced that substantial benefit cuts would be accompanied by the introduction of a National Living Wage, starting at £7.20 and rising to £9 an hour by 2020, for those aged 25 and above.

Figure 1: Age/Employment Rate Relationships for 2014/15, 2015/16 and 2016/17 Financial Years
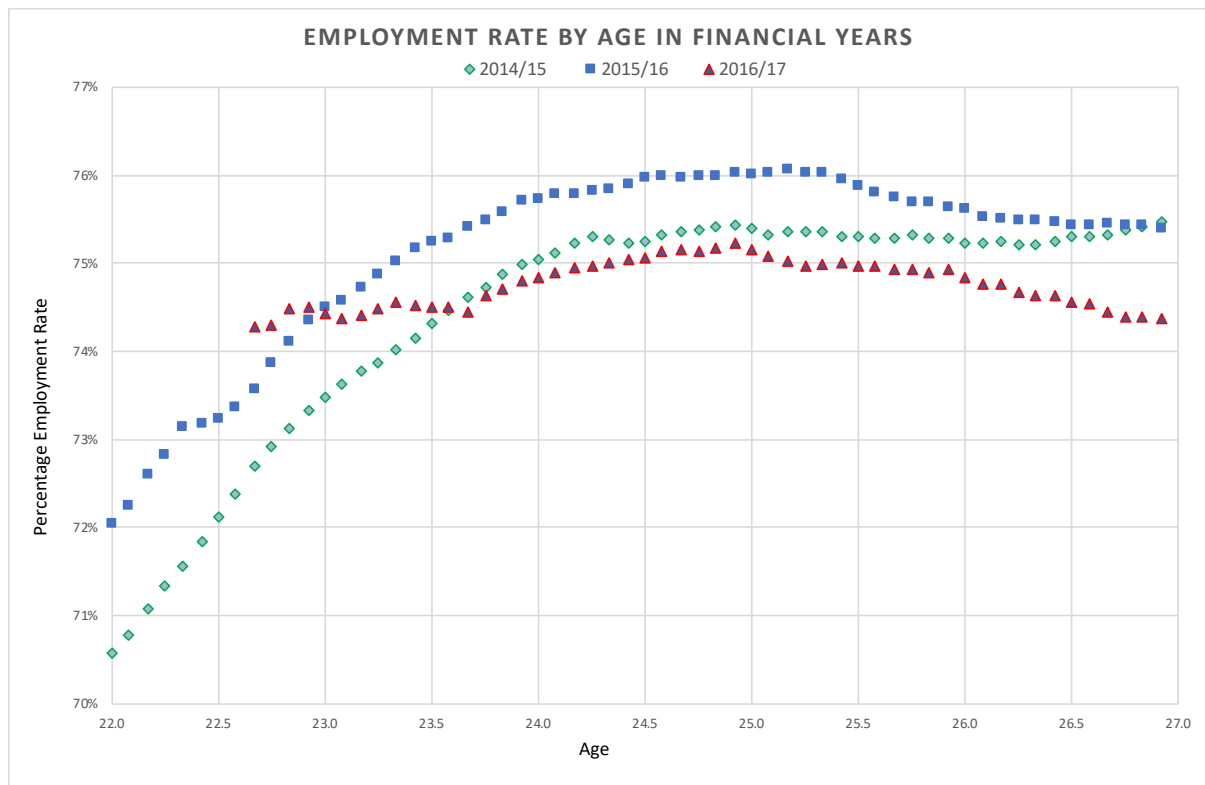
Source: *Longitudinal Educational Outcomes*
NB/ the data for 2016/17 are likely missing some employment starts.

Before considering the data presented in Figure 1, it is important to note that we are almost certainly missing a number of employment starts for the latest year [2016/2017], simply because it is the latest year for which we have admin data. As a result, one should consider the [red] 2016/17 employment rates to be approximately 2 percentage points lower than their true value, but having carried out initial investigation of this, there is little reason to suppose this impact differs significantly across age groups (see later discussions). Figure 1 therefore seems to suggest a possible impact arising from the introduction of a National Living Wage:

- In the 2014/2015 financial year prior to any announcement of a NLW [green in Figure 1], the employment rate in the month individuals turn 22 years old, is 70.6% and this rises steeply until around 24 and 3 months; when it flattens out to an average of around 75.3% between 25 and 27.
- In 2015/2016 the employment rates of young people below the age of around 25.5 experienced a relative increase, with this increase most pronounced for the youngest age group. For most of this year [July 2015 to March 2016] employers were aware of the NLW rate introduction for 25 year-olds and we may expect some change in their employment procedures.
- Finally, in 2016/2017 we can see a further 'flattening' of the age/employment relationship – assuming that the extent of [currently] missing employment starts in 2016/17 does not vary by age group (something that we pursue further in the following discussions), Figure 1 suggests that during the period of announcement and introduction of the NLW, the employment rates of those aged 25+ suffer a <u>relative</u> decline, when compared to those aged significantly less than 25

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(without complete employment starts for 2016/17 it is hard to identify at exactly which age the lines 'pivot' but it would seem to be between the age of 25 and 26).

This is the pattern we might expect if the higher relative cost of employing those aged 25 and above, leads employers to turn to those aged well below 25 to fill certain employment opportunities. In the face of rising costs associated with employing those over the age of 25, employers may look to employ those who are well below this cut-off (as they would not be inclined to employ those just below the cut-off, who will be subject to the higher rate within a short time period). If this is the impact we are observing, then the assumptions underpinning RDD are violated, but before coming to such a strong conclusion, we must first discount immediate issues with the data.

First, it is important to be clear on why we have no figures for the 2016/2017 financial year associated with the months that individuals turn 22 years old; 22 years and 1 month – all the way to 22 years and 8 months. Essentially, as Table A1 of the appendix underlines, August 2015 is the latest year we observe an individual turn 22 years old. To complete Figure 1 we need information from the 2009/10 and 2010/11 cohorts of school leavers, but at the time of publication this is something the research team are pursuing[17]. However, more importantly for the analysis here, we need to discount the potential for the apparent flattening of employment/age relationships in Figure 1 to be driven by issues of missing data arising from this lack of two relevant cohorts.

More specifically, as suggested in the *Data and Method* section, each data point in Figure 1 is calculated by averaging across 12 months of employment rates. For instance, the 70.6% employment rate in Figure 1 is the employment rate during the month that young people turn 22 years old, if this month falls within the 2014/2015 financial year. From the *Data and Method* section, we show how this is an average of the employment rates for those who turn 22 in April, May 2014 etc all the way to March 2015. However, our estimates of employment rates for those who turn 22 in 2015/2016 are not able to draw on a full 12 months of figures, and we need to make sure this does not explain patterns in our data. More specifically:

- Young people born in the month of April 1993, turn 16 in April 2009 and 22 in April 2015. If they are included in the KS4 Performance Tables for 2008/2009 (because they are part of the Sept 2008 to August 2009 school leaver cohort), we can observe their employment status in April 2015, the month they become 22.
- Young people born in the month of May 1993, turn 16 in May 2009 and 22 in May 2015. If they are included in the KS4 Performance Tables for 2008/2009 (because they are part of the Sept 2008 to August 2009 school leaver cohort), we can observe their employment status in May 2015, the month they become 22.
- For young people born in June, July or August of 1993, a similar explanation applies - as long as they feature in the 2008/2009 school leaver cohort, we can observe their employment status in the months of June, July and August 2015 when they turn 22 years old.

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[17] As soon as we are able to secure the necessary permissions to access this additional data, an update to the current report will be published, focusing on this aspect of the analysis.

- For young people born in Sept to Dec 1993; or Jan to March 1994, we do not observe their employment status during the month they turn 22, as they are part of the 2009/2010 school leaver cohort.

This means that in 2014/2015 we have a full 12 months of data underpinning every year/month age employment rate estimate; but for the 2015/2016 financial year we are not able to draw on a full 12 months of data for each year/month age estimate. As we can see from the discussion above, for the month that a young person becomes 22 in the 2015/2016 financial year, we are only able to draw on data from those born between April and August 1993 [as they turn 16 between April and August 2009 and feature in the 2008/2009 school leaver cohort]; for the 2015/2016 estimate of employment rate during the month young people turn 22 years and one month, we can draw on data for those born between March and August 1993; for 22 years and two months, Feb to August 1993, etc. Until we get to the age of around 22 years and 8 months, we are not able to use the full dataset and if there are strong seasonal fluctuations, these may explain the gap between 2014/2015 and 2015/2016 employment rates below the age of 23.

As the discussion above suggests, this is not such a big problem when comparing individuals between the ages of 22 to 22.5 years of age between the 2014/2015 and 2015/2016 financial years, but it is much more of a potential problem for the 2016/2017 financial year when we can only use one month of data for the month individuals turn 22.7 and are only able to use 12 months of data by the 23.7 month estimate – this is the age range where much of our intuition behind an apparent 'flattening' of the employment rates comes from. By dropping months from the measures created in the 2014/2015 financial year, Figure 2 reassures us that the gap between these two periods is not simply due to differences in the extent of seasonal fluctuation associated with the months underpinning the average employment proportions. Specifically, the purple data points are the figures for 2014/2015 adjusted to utilise only the same months as the equivalent comparison monthly age-rates in 2016/2017. As one can see, there is no impact from this issue.

Figure 2: Age/Employment Rate Relationships for 2014/15, 2015/16 and 2016/17 Financial Years: with some Alternative Measures for 2014/15
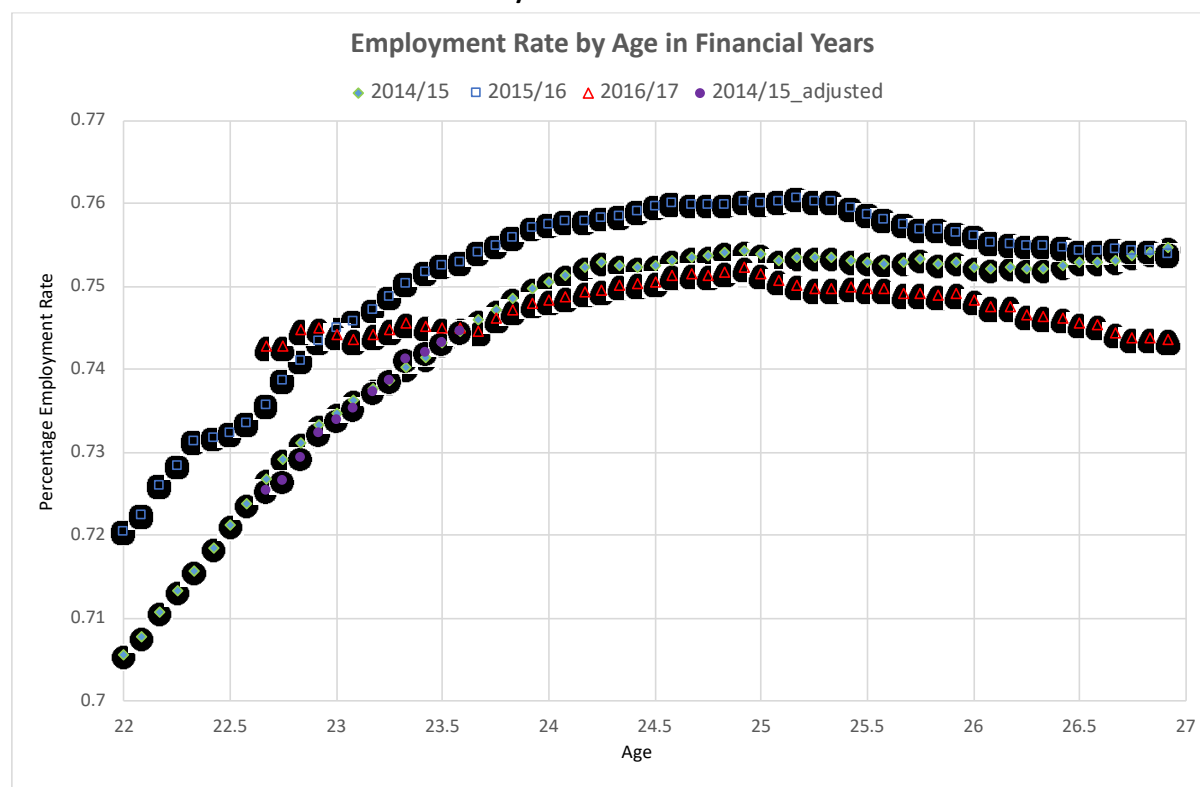
Source: *Longitudinal Educational Outcomes*

Having discounted this potential data issue as a driver of our finding, Appendix Figure A1 discounts a further potential driver of our findings[18]. From April 2013 the introduction of Real Time Information (RTI) means we are likely to receive many more employment starts that relate to young people earning below the tax threshold – if this impact is more pronounced for younger age groups, it could explain the patterns in Figure 1. Figure A1 presents figures in Figure 1 separately for employment spells associated with earnings above and those below the Lower Earnings Limit. This suggests that the introduction of RTI is not driving our findings. Finally, it is worth noting that most of our monthly employment estimates cut across school leaver cohorts, and this makes it less likely that our findings are driven by unobservable differences between school leaver cohorts (possibly arising from policy interventions).

In addition to these manipulations, we conclude this section by considering Figure 3. Figure 3 takes the same approach as Figure 1, but only considering the North East and Yorkshire [areas that have the lowest levels of GDP per capita in England]. A flattening of the employment relationship is more pronounced in these areas, which we may expect as the NLW will be expected to 'bite harder' in areas where wages tend to be lower than the national average.

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[18] We have also gone some way to discount the extent to which there are problems with our measure of 'any employment', creating employment measures that count an individual as employed in a month if they have one day or more in employment in the relevant month. This does not change the shape of our graphs.

Figure 3: Age/employment rate relationships for 2014/15, 2015/16 and 2016/17 financial years: North East and Yorkshire

Source: *Longitudinal Educational Outcomes*

4. Review of Major Policy trends between 1999 and 2019

4.1 Summary of Relevant Education Policy Trends

During the period covered by this review, there have been various attempts to reform the structure of **Technical/vocational education** [including **apprenticeships**] and this has led to an amount of policy instability. The most recent push for reform can be traced back to the Wolf Report[19] [and to a lesser extent the Leitch Review[20]], with relatively far-reaching reforms set out by BIS (now BEIS) in *New Challenges, New Chances: Further Education and Skills Reform Plan* (2012) and *Rigour and Responsiveness in Skills* (2013). Most recently, recommendations from the report on TE arising from a panel chaired by Lord Sainsbury[21], fed into the *Technical and Further Education Bill* [2016-2017]. The key themes are:

- Policies to **increase the number of young people on apprenticeships** and **raise the quality of Technical Education [TE]**. This has had mixed success, as it is hard to expand numbers and improve quality at the same time. For instance, in 2009/2010 there was a significant expansion in apprenticeship numbers, but mainly fuelled by growth in individuals aged 25 and over (in many cases acting to simply formalise skills they already had and/or 'rebadging' existing jobs as apprenticeships). Many of these new apprenticeships lasted less than a year; and were particularly focused in sectors of the economy not traditionally associated with extensive apprenticeship learning (*Retailing and Wholesaling*, *Business Studies*, *Adult social care*, and *Health care*); but where we often see a predominance of minimum wage employment. Concerns over quality have led to requirements that new apprenticeships last a minimum of one year and that all young people who do not achieve Level 2 in Maths and English at Key Stage 4 must continue studying these subjects until 19, many as part of *Traineeships* [a 'pre-apprenticeship' offer for those who don't achieve the necessary qualifications by age 18].
- Impacts from the ongoing raft of policy changes [Apprenticeship Levy, move to Apprenticeship Standards, introduction of T Levels, etc] cannot yet be clearly discerned, but there are clearly **concerns over the apprenticeship offer as a route to employment for young people**.
- Considering TE more generally, young people who perform poorly at KS4 tend to take Further Education pathways; and are more likely to study Level 1 or Level 2 vocational qualifications post-16 (such as the old NVQ offer). For these young people the interaction between minimum wage rates and the technical education landscape is particularly important. The perceived returns to FE learning will be an important consideration, alongside the direct financial support available and government funding flowing to this sector. Unfortunately, **perceptions of the value of level 1/level 2 vocational learning may still be unfavourable,** even though evidence suggests otherwise[22]; and **Further Education has suffered financially, relative to other areas of education**, over the period under study. Over the past 20 years FE has been the poor relation of the education system and whilst radical change is ongoing, these are not likely to increase

[19] Wolf, A. (2011) *Review of vocational education: the Wolf report*. London: BIS/DfE

[20] Leitch, S. (2006) *Prosperity For All In The Global Economy - World Class Skills*. London: HM Treasury.

[21] Blagden, S., Robinson, B., Sainsbury, D., West, S. and Wolf, A. (2016), *Report of the Independent Panel on Technical Education*, April

[22] There have been a series of investigations that attempt to capture the value of learning in Further Education (FE) in England, using matched admin. data (including, Patrignani and Conlon, 2011; Buscha and Urwin, 2013; Bibby et. al., 2014; Cerqua and Urwin, 2015; Bibby et. al., 2015; Hedges et. al., 2018). This programme of analysis estimates good returns to learning at all levels of FE, including for those who hold an NVQ2 or NVQ1 as their highest level of learning.

funding per head. For instance, over the last 20 years spending per pupil [16 to 18 year olds] in FE has gone from around 50% higher than spending per pupil in Secondary schools, to around 10% lower[23].

Considering **Academic Education**, we may at first note that few young people who take this pathway will be influenced by minimum wage policy. There is evidence of good returns to study at HE, with returns holding up in the face of expanding graduate supply (Blundell et. al., 2005; Walker and Zhu, 2013); and a recent study on the relative returns to a degree, across subject areas, seems to confirm this[24]. Returns to apprenticeships, and vocational learning at Level 3 and above, are also good and seem to present an alternative to the main 'academic' route (Bibby et. al. 2014). For those young people who perform well at Key Stage 4 and move on to Level 3 study [usually A-levels] the level of the minimum wage would not seem a relevant consideration in the decision over labour market entry.

- However, from 2006 Universities in England were allowed to charge fees of up to £3,000 (up from £1,200[25]), to be paid following graduation, via income-contingent loans; and following the Browne Review in 2010, the cap was raised to £9,000 a year in September 2012. Further adjustments were put forth in the 2015 budget, with a proposed fee increase in line with inflation from the 2017-18 academic year onwards, and the planned scrapping of maintenance grants from September 2016. In England, tuition fees are now capped at £9,250 a year for UK and EU students, with around 76% of institutions charging the full amount in 2015-16.
- This is a substantial increase in the financial burden placed on young people. Whilst the level of the minimum wage may not feature in the deliberations of these young people, when considering labour market entry; it is possible that **forms of part-time working have become more important for students**[26], and the level of the minimum wage may impact here[27]. Concern over this burden was a consideration of the recent Review of Post-18 Education and Funding, led by Philip Augar, which recommended a reduction in higher education tuition fees to £7,500 p.a..
- There have been various policy developments in schools, such as the changes implemented following The Wolf Review (affecting the 2013/14 Key Stage 4 cohort onwards), which heralded major changes in the qualifications taken by young people at age 16, particularly those from disadvantaged backgrounds. However, perhaps the most important change in context over the past 20 years has been **the continued increase in education and training participation at the ages of 16 and 17** - formalised in a Raising of the Participation Age, which first impacted those turning 16 before the end of August 2013. Even for young people who do not achieve a qualification above Level 2, it is between the ages of 18 and 20 that they now attempt to enter the labour market.

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[23] Belfield, C., Crawford, C. and Sibieta, L. (2016), "Long-run comparisons of spending per pupil across different stages of education", *The Institute for Fiscal Studies.*

[24] Belfield, C., Britton, J., Buscha, F., Dearden, L., Dickson, M., van der Erve, L., Sibieta, L., Vignoles, A., Walker, I. and Zhu, Y. (2018), *The relative labour market returns to different degrees*, Department for Education.

[25] The original figure was £1,000, introduced in 1998.

[26] There is a literature on part-time working in HE, but as the conclusion to this review suggests, it does not provide the insights we require. See for instance, Little, B. (2002), "UK institutional responses to undergraduates' term-time working ", *Higher Education*, Volume 44, Issue 3–4; pp 349–360.

[27] Crawford, et. al. (2011) suggest that higher wages associated with the 16-17 old NMW rate encouraged young people in full-time education to take up more part-time work, relative to higher-wage areas.

- The Education Maintenance Allowance (EMA) was introduced in September 2004 and removed in January 2011. This provided means-tested support for 16- to 19-year-olds in full-time post-compulsory education. The scheme is still in operation in Northern Ireland, Scotland and Wales, and has been replaced by a new bursary scheme in England. Dearden et al. (2009) suggest that the introduction of EMA had a significant impact on the decision of young people to continue in education, but the magnitude of any effect is not large and the change in levels of support in this area have not substantially changed the policy context since 1999.
- In the following discussions it is important to note that the (i) continued increase in education and training participation at the ages of 16 and 17[28]; (ii) the relatively poor funding outcome for Further Education (and concerns over quality); and (iii) an increased financial burden for university students [with the exception of Scottish students studying in Scotland] hold across all the devolved regions.

4.2 Unemployment, Inactivity and Benefits: Policy Trends

Active Labour Market Policy: The rationale for lower NMW rates for younger age groups, is that young people occupy a more precarious situation in the labour market, and the potential for them to be priced out of the labour market is therefore greater. Justification for this concern is particularly apparent during downturns, when a drop in new 'hires' has a disproportionate impact on young people entering the labour market[29]. Therefore, ALMP towards young people was a particular focus of policymakers following the 2008 recession.

Gregg (2015)[30] characterises the policy response to increased youth unemployment following the 2008 downturn, as constituting three separate strands. We have already discussed a raising of the participation age and the drive to reduce numbers of NEET young people; as well as the push to increase apprenticeships and other reforms to technical education. Alongside these policy strands, Gregg characterises ALMP as attempting to *close the gap between school leaving and job entry*. The Future Jobs Fund (2009), was designed to do just this - providing work experience for young people. However, it was replaced in 2011 by the *Work Programme* which is delivered by private companies and does not contain a substantial component that ensures young people can obtain on-the-job work experience – significantly weakening its usefulness for young people according to the author.

We may also consider changes in **Careers Services** for young people as relevant in considering how policymakers attempt to *close the gap between school leaving and job entry*. The 1999 Education White Paper introduced the government-run *Connexions* service to provide careers advice, particularly to young people at risk of being NEET. The Coalition government withdrew funding for Connexions from 2010, though some local authorities continued activities in this area as part of the commitment to deliver a raising of the participation age. The careers advice component of Connexions became the National Careers Service, but most careers advice became embedded within

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[28] Despite the fact that RPA only applies in England.

[29] It is a standard of Labour Economics textbooks that recessions have a disproportionate impact on young people, as companies respond to declining orders with a freeze on hiring, 'hoarding' the [usually older] staff they have invested in and whose knowledge/experience is highly valuable. Young people's reliance on new hiring, especially as they make the school-to-work transition, means they are impacted early in any downturn.

[30] Gregg, P. (2015), "Youth unemployment in the UK: Cyclical fluctuations and the struggle for structural reform", in Dolado, J. [eds], *No Country for Young People? Youth Labour Market Problems in Europe*, VoxEU and CEPR.

schools and FE colleges; and the Youth Contract was launched in 2011 as a response to rising youth unemployment. Gregg (2015) suggests that, "these new agencies were initially poorly integrated into existing networks and have consequently struggled to add much value".

With the introduction of the Work Programme, the ALMP offer for young people returned to broadly what was in place prior to 2008, with the New Deal [introduced in 1998 by the Labour government] providing training and voluntary work for the unemployed; with only a limited subsidized employment component. The 'New Deal for Young People' covered those aged 18 to 24. Participants in the New Deal programmes first went through a period of job-search assistance (the Gateway phase) before being offered training or alternative programmes (the New Deal options phase). Individuals aged 18 to 24 were referred to the NDYP at a point 6 months on from their claim start date, whilst for those aged 25+ referral did not occur until 18 months following claim start date.

There has been policy change in this area [for instance, Universal Credit is considered in the next section], but overall the components of mandated job search [associated with an increasing majority of benefits, including those covering disability], together with training and other support opportunities, have not changed. The UK labour market has recovered well since 2008 and this has been reflected in falling youth unemployment. However, there is no reason to think that, if the UK economy were to slip into recession, that the rise in youth unemployment would be any less dramatic than in 2008. The policy environment is very similar to that which was in place when the last downturn raised youth unemployment and any expansion of job subsidy/provision to the young has been reversed following introduction of the Work Programme.

Welfare-to-work and benefits[31]: Minimum wages can be seen within the 'making work pay' policy context, as they have the potential to impact Replacement Ratios, potentially encouraging young people out of unemployment and inactivity. However, they also have the potential to reduce low-wage employment opportunities, negatively impacting the probability that an individual makes the unemployment to employment transition. Furthermore, we need to consider the extent to which young people, who are officially inactive, are working in the informal sector. Again, the potential impacts of rising minimum wages are not clear, as they could improve the wage returns from working in the formal sector; or push more jobs into the informal sector. Our review of existing evidence has not provided an indication of the scale of these various impacts and therefore it is hard to speculate on which dominates.

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[31] Over the period of review, the core 'offer' of benefits and ALMP has been focused on young people aged 18 and over. It is more bureaucratically challenging for young people aged 16 and 17 to live independently and claim benefits. For instance, to claim Universal Credit (UC), one must be 18 or over "in most cases", but the minimum age for claiming UC is 16 years old. For 16 and 17 year olds to claim UC one of a number of special circumstances must apply, including (i) limited capability to work, (ii) caring responsibilities; (iii) be in a couple where the partner has childcare responsibilities; (iv) pregnancy or (v) be without parental support.

4.3 Employment and Wages: Relevant Policy Developments

Universal Credit [UC] is an integrated, income-related, working age credit, that is available to individuals both in, and out of, work. When fully rolled out, it will replace Working Tax Credits, Child Tax Credits, Housing Benefit, Income Support, income-based JSA and income-related Employment and Support Allowances. It is important to consider carefully the potential impact of UC, as the 'in-work support' it will offer will impact the labour supply decisions of individuals who find themselves in low paid employment for long periods of time. The UC 'work allowance' is an amount that can be earned before UC entitlement begins to be 'tapered away', and this aims to reduce the high marginal tax [benefit withdrawal] rates that individuals can face when transitioning from unemployment to employment; also making work for a small number of hours financially worthwhile (an improvement from the 16-hour requirement in the current tax credit system).

As already suggested, evidence on the interaction between minimum wages and the welfare system is limited, and this is particularly the case when we consider young people. There are reports that consider levels of welfare alongside minimum wages, but they do not provide the insight and evidence we require[32]; as there is no attempt to simulate the impacts on different groups that arise when welfare and minimum wage policies change. There are studies that have considered how much minimum wages compensate for reductions in the generosity of welfare, but these do not provide evidence for younger age groups[33].

Given the relatively recent introduction of Universal Credit and ongoing delays to roll-out, it is unsurprising that clear insights into how this change will impact young people in the age groups considered in this review is not currently available. There are a number of publications from bodies such as the Institute for Fiscal Studies that use a microsimulation model to obtain insights into the differential impacts that UC will have for the work incentives of different groups in the population. For instance, Adam and Browne (2013)[34] use the IFS microsimulation model to consider how the average Replacement Ratios and Participation Tax Rates will likely be impacted by UC and conclude that [given the scale of reform] these averages change very little. However, this conceals substantial variation in impacts across different groups within the working population – unfortunately the detail only provides for insights across groups according to relationship/marital status and the related status regarding dependents. There is a lack of evidence in this area on expected impacts on work incentives according to the age groups that are the focus of this review.

Consideration of the incentives to employ young people [Demand for labour], needs to take into account the potential impacts of **employment/payroll taxes**. Can we discern clear implications for minimum wage policy, from changes to the costs associated with employing young people?

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[32] See for instance, Brewer, M. and Joyce, R. (2010), *Welfare Reform and the Minimum Wage*, 2010 Election Briefing Note No. 8 (IFS BN95)

[33] Browne, J. (2015), *The Impact of the UK Government's Tax, Welfare and Minimum Wage Reforms in Wales*, Institute for Fiscal Studies.

[34] Adam, S. and Browne, J. (2013), "Do the UK government's welfare reforms make work pay?" *Institute for Fiscal Studies*, Working Paper W13/26.

Generally, one can characterise the UK as having relatively low costs to the employer associated with employing an individual[35] – whatever their age. The costs of employing an individual do not seem to have been a particular barrier to employment generation in the UK. This is quite a broad statement and clearly there are different political/disciplinary perspectives[36]. However, it would seem hard to argue that the rate of employment generation in the UK has been hampered by excessive employment regulation, given the current state of the labour market. Rising costs associated with employing a young person could have a negative impact on employment generation, and if this were the case, we would be worried that higher minimum wages would worsen the situation. This does not seem to be the case, but as with the discussion of evidence on impacts arising from UC, it is hard to secure evidence.

Whilst we may characterise the current environment as relatively benign, in terms of the relationship between employment creation and non-wage employment costs; there is no clear [micro-simulation type] evidence that allows understanding of the extent to which policies in this area have made the young relatively cheaper or more expensive to employ, compared to older age groups. To be clear, there have been changes that have impacted young people differentially, for instance, the recent abolition of employer NICs contributions for under 21s and apprentices under 25 (within certain earnings ranges) - an *Employee Allowance* eliminates employer NICs payments up to a value of £3,000. However, to answer the question of whether these changes have substantially impacted the relative attractiveness of employing different age groups over time, we need evidence from **microsimulations.**

The July 2015 **National Living Wage** announcement did not simply propose a rise in April 2016, but also flagged a significant rise in the costs of employing those aged 25 and above between April 2016 and 2020, relative to young people below this age. This may have more substantial impacts on the employment practices of companies, when compared to NMW announcements that set a path over one year and predicate further rises on the need to avoid negative employment impacts. As LPC publications suggest, there is a desire to retain lower minimum wage rates for young people [below the age of 25] but also to avoid a substantial and potentially distortive wage differential between the 21-24 NMW and NLW rates.

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[35] See for instance, OECD http://www.oecd.org/employment/oecdindicatorsofemploymentprotection.htm
[36] For two very different perspectives, see Department for Business, Innovation and Skills (2012), *Employment regulation, employment and growth: consideration of international evidence*, Sept; and Shackleton, J. R. (2017), *Working to Rule: The Damaging Economics of UK Employment Regulation*, Institute of Economic Affairs.

5. Conclusions and Recommendations

The findings from **analysis of the factors that impact the employment and education decisions of young people** in the period following the end of compulsory schooling, do not suggest that local earnings and/or unemployment rates are economically significant. Whilst we identify some statistical significance associated with these indicators, the implied impacts are very small. In contrast, we have some evidence that announcement and **introduction of the NLW** across the 2015/16 and 2016/17 financial years, may have boosted the employment prospects of young people well below the age 25 cut-off point. We must be careful in drawing very strong conclusions from this analysis, as **LEO statistics should be considered as 'experimental'**, but these findings do need to be taken into consideration.

More specifically, any consideration of impacts arising from the NLW, take place in a very different policy context. The July 2015 announcement did not simply propose a rise in April 2016, but also flagged a significant rise in the costs of employing those aged 25 and above between April 2016 and 2020, relative to young people below this age. This may be expected to have much more substantial impacts on the employment practices of companies, when compared to NMW announcements that set a path over one year and predicate further rises on the need to avoid negative employment impacts. A NLW announcement that makes no consideration of wider labour market impacts, and sets out what [at the time] amounted to a five year plan, may be expected to create very different impacts to those historically associated with the NMW (and can explain why we may see such impacts, even when the gap between NLW and 21-24 year old rates subsequently narrowed). If employers face short-term costs of adjustment [to changing minimum wage regimes], then these are more likely to be worth incurring if the proposed increase is significant and spans five years.

Given the evidence in this report, we cannot rule out the potential for continued increases in the NLW to have significant positive impacts on the employment prospects of those aged 21 to 23; relative to those aged 24 and over – with those aged 24 possibly suffering negative impacts due to their closeness to the 25 year old cut off. Remembering that our findings relate mainly to the 'native' population of England, a Brexit scenario where low wage workers find it harder to migrate to the UK, may accentuate any impacts – as the potential for native workers over the age of 25 to be 'substituted' by immigration from the EU, would be reduced[37].

Can we expect these impacts to feedback into negative impacts on education, as the employment prospects of young people improve and raise the opportunity cost of education?

Our findings on NLW impacts could be due to an increasing number of under-25s moving out of self-employment, the grey economy or education; into employment. The important question for this study is, are they likely being drawn away from education? From the evidence presented here, we do not uncover impacts that can be considered large – even with significant enhancements to the model used and the data underpinning this, we would require a 100-fold increase in the size of impacts to consider them economically significant. However, as the discussion above suggests, one

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[37] It is worth noting that analysis of LFS data, focused on a wider population, does not uncover the findings presented in Figure 1.

must be careful when relying on historical analysis that relates to environments covered by the NMW, and project these to the future where we have a NLW.

Having set out headline findings from the analytical component of this study, we now summarise how the policy context has changed over the last 20 years and what our findings imply for the various youth rates:

The 16 to 17 age rate [introduced Oct 2004]: Whatever their performance at KS4, most young people now stay on for at least a year post-16 and a Raising of the Participation Age [from 2013 onwards] can be seen as a formalisation of this trend. Decisions on whether to enter the labour market tend to be made by most young people at the end of the year in which they turn 17. For young people most likely impacted by changes to the minimum wage, they will be studying Level 2 or below at this point, predominantly within the Further Education environment. With RPA formalising this trend towards near-universal education and training participation at ages 16 and 17[38], the NMW rate for this age group is no longer impactful of labour market entry decisions. However, it is **potentially impactful in decisions over part-time working[39]** and this is an issue to which we return.

The introduction of a youth rate for 18 to 21 year olds in 1999; and the subsequent 2010 reduction to age 21 of entitlement to the main rate, has resulted in a separate **rate for 18 to 20 year olds**. Our review suggests that many **young people potentially impacted by the minimum wage, now enter the labour market between the ages of 18 and 20**; and the attractiveness of technical [vocational] education and training at Level 2 and below, relative to minimum wage employment, may be a consideration. This is the age when decisions over full labour market participation, versus continuing education, are made by those potentially impacted by NMW policy. The returns to Level 2 and Level 1 vocational qualifications are close to the lower bound placed by minimum wage rates; particularly in certain occupations and sectors [such as retail, hospitality and cleaning & maintenance] and in regions and countries such as the North East of England and Northern Ireland.

Furthermore, when considering changes to policy in the area of Technical Education, they do not seem to herald an improvement in the funding per pupil for learning in FE; there is concern over a lack of emphasis at lower levels of vocational learning [there are currently no Level 2 T-levels and the removal of Apprenticeship Frameworks has left a further gap]; and the perception of poor earnings returns seems to persist. However, whilst this discussion suggests some potential for NMW increases to have a negative impact on incentives to invest in learning for this age group, our econometric analysis suggests that any such impacts are negligible. Also, this group are unlikely to be impacted by any 'spillover' effect from the NLW [which we cannot rule out], therefore there would seem to be some potential for a raising of this 18 to 20 rate.

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[38] 94% of pupils were in sustained education, employment or apprenticeships in the year after key stage 4 in 2016/2017 [Department for Education, *Destinations of key stage 4 and key stage 5 students, England*].

[39] Given the near-universal education and training participation of this age group, policies aimed at the unemployed, employed and inactive have little relevance.

The 21 to 24 age rate: The decision to set the National Living Wage coverage at age 25 and above, resulted in a separate **rate for 21-24 year olds** from April 2016. There seems some justification for this separate rate as this group have much lower median earnings than the 25 to 30 age group; and as a result, the NMW rate for the 21 to 24 group is already 79% of median earnings (LPC, 2018). Similarly, we may expect the 21 to 24 age group to be at a different stage of their labour market careers, compared to those aged 18 to 20 who will be more likely making their first transition to the labour market.

Individuals in this 21 to 24 age group, are more likely to be impacted by changes to non-wage labour costs reviewed in Section 3 above, so our lack of clear evidence is particularly limiting when considering discussions for this age group (though it is worth noting that changes to NICs have seemingly been targeted to improve employment for those aged under 21). However, it is important to note additional issues that loom larger for this age group – for instance, the potential impacts from a change to migration policy. Whatever the specific outcome of Brexit, it is reasonable to suggest there will be some reduction to freedom of movement and therefore a reduction in immigration. In sectors such as retail and hospitality, we see many young people working and these sectors are highly reliant on EU labour. Employers may increase their demand for young people in the native population, as a result of reductions in immigration, but there is no current indication of the potential magnitude associated with any such effect.

It is hard to come to clear recommendations regarding the 21 to 24 age rate – other than age, there would seem to be less justification for differentiation from the group aged 25+. In the current labour market context, being aged 16 to 17 implies continued education and training; and then [for the young people who are potentially impacted by minimum wage rates], transition to the labour market can be considered to occur between ages 18 and 20. In this respect, the 21-24 age group bear no obvious difference to the 25+ age group. However, as already suggested, median earnings for this group are substantially lower than the median for those aged 25 to 30; and as a result the bite of the 21 to 24 rate is already high. Balanced against this caution is the desire to not open up huge relative differences in rates, between those aged 21-24 and the 25+ age group [which may be expected to accentuate any impacts from the NLW, which we have some emerging evidence to support].

Part-time working: we have not been able to find clear evidence to inform our deliberations over minimum wages and the part-time working of young people. More specifically, discussion of the separate age rates above tends to focus on the trade-off between incentives to remain in education or make the transition to employment. When considering the 18-20 Year Old Rate, it would seem important to consider the incentives for young people making the transition from some form of FE learning to the labour market. For the 21-24 age group we are considering relatively low-skilled workers who may be more easily substitutable by migrant labour. In the case of the 16-17 Year Old Rate, transition to the labour market no longer seems to be a consideration, but we flag part-time working as a potential issue for all young people in this age range.

When considering NMW rates for part-time working, there is some potential for impacts across the whole of the education ability spectrum – for instance, the increasing burden of a university education may make this form of working more important. How important is part-time working for

young people in FTE and how do minimum wages impact? At present the review of existing evidence cannot answer this question, and whilst our econometric analysis would suggest negligible impacts, it is important to note that our identification of part-time working is limited [for reasons of the data]. As Manning (2016) points out, it is also hard to interpret impacts for this group, as a "finding that hours and employment fall when minimum wages rise could be a backward-bending labor supply curve as teenagers seek to earn a certain amount of income to finance their education but otherwise want to spend as much time as possible on their studies".

Apprentice Rate: Cutting across all of our discussion of minimum wages for young people, is the question of the Apprentice Rate, introduced in Oct 2010; which applies to all apprentices aged 16 to 18 and those aged 19 and above for the first year. The expansion of apprenticeships does not seem to have particularly benefited young people; and it would seem reasonable to suggest that much of the expansion [especially in sectors where we find many young people working; and where median wages are low] has not been of high quality (despite policies to better ensure quality). With introduction of the Apprenticeship Levy and the transition to Standards, this would not seem to be a good time for radical policy on the apprenticeship rate.

Possibility for some form of microsimulation evidence: when HMRC wish to gauge the impact on tax or benefit entitlements from a combination of policy changes, they utilise microsimulation models. This does not incorporate behavioural change [in the way that a Computable General Equilibrium (CGE) does], but allows one to see how offsetting changes to take-home pay, benefits and earnings impact work-incentives for different groups in society. The LPC might usefully consider commissioning a scoping study to ask if such models can help illuminate how employment opportunities/incentives have changed for young people in the face of UC introduction, changes to NICs and other payroll taxes; and how this interacts with minimum wage changes. When attempting to draw clear implications for those aged 16 to 24, we are considering an environment with four separate minimum wage rates; relative to a rate for those aged 25+; attempting to accommodate changes to payroll taxes and UC. Such questions are best illuminated using some form of economic model [including microsimulation] and existing research does not currently provide sufficient insight on how the relative costs of employing young people from the different age groups have changed.

APPENDIX

Table A1: Correspondence Between Birth Cohorts and Monthly Employment Estimates

	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Apr-17
Apr-87	27																																				
May-87	26.91667	27																																			
Jun-87	26.83333	26.91667	27																																		
Jul-87	26.75	26.83333	26.91667	27																																	
Aug-87	26.66667	26.75	26.83333	26.91667	27																																
Sep-87	26.58333	26.66667	26.75	26.83333	26.91667	27																															
Oct-87	26.5	26.58333	26.66667	26.75	26.83333	26.91667	27																														
Nov-87	26.41667	26.5	26.58333	26.66667	26.75	26.83333	26.91667	27																													
Dec-87	26.33333	26.41667	26.5	26.58333	26.66667	26.75	26.83333	26.91667	27																												
Jan-88	26.25	26.33333	26.41667	26.5	26.58333	26.66667	26.75	26.83333	26.91667	27																											
Feb-88	26.16667	26.25	26.33333	26.41667	26.5	26.58333	26.66667	26.75	26.83333	26.91667	27																										
Mar-88	26.08333	26.16667	26.25	26.33333	26.41667	26.5	26.58333	26.66667	26.75	26.83333	26.91667	27																									
Apr-88	26	26.08333	26.16667	26.25	26.33333	26.41667	26.5	26.58333	26.66667	26.75	26.83333	26.91667	27																								
May-88	25.91667	26	26.08333	26.16667	26.25	26.33333	26.41667	26.5	26.58333	26.66667	26.75	26.83333	26.91667	27																							
Jun-88	25.83333	25.91667	26	26.08333	26.16667	26.25	26.33333	26.41667	26.5	26.58333	26.66667	26.75	26.83333	26.91667	27																						
Jul-88	25.75	25.83333	25.91667	26	26.08333	26.16667	26.25	26.33333	26.41667	26.5	26.58333	26.66667	26.75	26.83333	26.91667	27																					
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Sep-88	25.58333	25.66667	25.75	25.83333	25.91667	26	26.08333	26.16667	26.25	26.33333	26.41667	26.5	26.58333	26.66667	26.75	26.83333	26.91667	27																			
Oct-88	25.5	25.58333	25.66667	25.75	25.83333	25.91667	26	26.08333	26.16667	26.25	26.33333	26.41667	26.5	26.58333	26.66667	26.75	26.83333	26.91667	27																		
Nov-88	25.41667	25.5	25.58333	25.66667	25.75	25.83333	25.91667	26	26.08333	26.16667	26.25	26.33333	26.41667	26.5	26.58333	26.66667	26.75	26.83333	26.91667	27																	
Dec-88	25.33333	25.41667	25.5	25.58333	25.66667	25.75	25.83333	25.91667	26	26.08333	26.16667	26.25	26.33333	26.41667	26.5	26.58333	26.66667	26.75	26.83333	26.91667	27																
Jan-89	25.25	25.33333	25.41667	25.5	25.58333	25.66667	25.75	25.83333	25.91667	26	26.08333	26.16667	26.25	26.33333	26.41667	26.5	26.58333	26.66667	26.75	26.83333	26.91667	27															
Feb-89	25.16667	25.25	25.33333	25.41667	25.5	25.58333	25.66667	25.75	25.83333	25.91667	26	26.08333	26.16667	26.25	26.33333	26.41667	26.5	26.58333	26.66667	26.75	26.83333	26.91667	27														
Mar-89	25.08333	25.16667	25.25	25.33333	25.41667	25.5	25.58333	25.66667	25.75	25.83333	25.91667	26	26.08333	26.16667	26.25	26.33333	26.41667	26.5	26.58333	26.66667	26.75	26.83333	26.91667	27													
Apr-89	25	25.08333	25.16667	25.25	25.33333	25.41667	25.5	25.58333	25.66667	25.75	25.83333	25.91667	26	26.08333	26.16667	26.25	26.33333	26.41667	26.5	26.58333	26.66667	26.75	26.83333	26.91667	27												
May-89	24.91667	25	25.08333	25.16667	25.25	25.33333	25.41667	25.5	25.58333	25.66667	25.75	25.83333	25.91667	26	26.08333	26.16667	26.25	26.33333	26.41667	26.5	26.58333	26.66667	26.75	26.83333	26.9167	27											
Jun-89	24.83333	24.91667	25	25.08333	25.16667	25.25	25.33333	25.41667	25.5	25.58333	25.66667	25.75	25.83333	25.91667	26	26.08333	26.16667	26.25	26.33333	26.41667	26.5	26.58333	26.66667	26.75	26.8333	26.91667	27										
Jul-89	24.75	24.83333	24.91667	25	25.08333	25.16667	25.25	25.33333	25.41667	25.5	25.58333	25.66667	25.75	25.83333	25.91667	26	26.08333	26.16667	26.25	26.33333	26.41667	26.5	26.58333	26.66667	26.75	26.83333	26.91667	27									
Aug-89	24.66667	24.75	24.83333	24.91667	25	25.08333	25.16667	25.25	25.33333	25.41667	25.5	25.58333	25.66667	25.75	25.83333	25.91667	26	26.08333	26.16667	26.25	26.33333	26.41667	26.5	26.58333	26.6667	26.75	26.83333	26.91667	27								
Sep-89	24.58333	24.66667	24.75	24.83333	24.91667	25	25.08333	25.16667	25.25	25.33333	25.41667	25.5	25.58333	25.66667	25.75	25.83333	25.91667	26	26.08333	26.16667	26.25	26.33333	26.41667	26.5	26.5833	26.66667	26.75	26.83333	26.91667	27							
Oct-89	24.5	24.58333	24.66667	24.75	24.83333	24.91667	25	25.08333	25.16667	25.25	25.33333	25.41667	25.5	25.58333	25.66667	25.75	25.83333	25.91667	26	26.08333	26.16667	26.25	26.33333	26.41667	26.5	26.58333	26.66667	26.75	26.83333	26.91667	27						
Nov-89	24.41667	24.5	24.58333	24.66667	24.75	24.83333	24.91667	25	25.08333	25.16667	25.25	25.33333	25.41667	25.5	25.58333	25.66667	25.75	25.83333	25.91667	26	26.08333	26.16667	26.25	26.33333	26.4167	26.5	26.58333	26.66667	26.75	26.83333	26.91667	27					
Dec-89	24.33333	24.41667	24.5	24.58333	24.66667	24.75	24.83333	24.91667	25	25.08333	25.16667	25.25	25.33333	25.41667	25.5	25.58333	25.66667	25.75	25.83333	25.91667	26	26.08333	26.16667	26.25	26.3333	26.41667	26.5	26.58333	26.66667	26.75	26.83333	26.91667	27				
Jan-90	24.25	24.33333	24.41667	24.5	24.58333	24.66667	24.75	24.83333	24.91667	25	25.08333	25.16667	25.25	25.33333	25.41667	25.5	25.58333	25.66667	25.75	25.83333	25.91667	26	26.08333	26.16667	26.25	26.33333	26.41667	26.5	26.58333	26.66667	26.75	26.83333	26.91667	27			
Feb-90	24.16667	24.25	24.33333	24.41667	24.5	24.58333	24.66667	24.75	24.83333	24.91667	25	25.08333	25.16667	25.25	25.33333	25.41667	25.5	25.58333	25.66667	25.75	25.83333	25.91667	26	26.08333	26.1667	26.25	26.33333	26.41667	26.5	26.58333	26.66667	26.75	26.83333	26.91667	27		
Mar-90	24.08333	24.16667	24.25	24.33333	24.41667	24.5	24.58333	24.66667	24.75	24.83333	24.91667	25	25.08333	25.16667	25.25	25.33333	25.41667	25.5	25.58333	25.66667	25.75	25.83333	25.91667	26	26.0833	26.16667	26.25	26.33333	26.41667	26.5	26.58333	26.66667	26.75	26.83333	26.91667	27	
Apr-90	24	24.08333	24.16667	24.25	24.33333	24.41667	24.5	24.58333	24.66667	24.75	24.83333	24.91667	25	25.08333	25.16667	25.25	25.33333	25.41667	25.5	25.58333	25.66667	25.75	25.83333	25.91667	26	26.08333	26.16667	26.25	26.33333	26.41667	26.5	26.58333	26.66667	26.75	26.83333	26.91667	27
May-90	23.91667	24	24.08333	24.16667	24.25	24.33333	24.41667	24.5	24.58333	24.66667	24.75	24.83333	24.91667	25	25.08333	25.16667	25.25	25.33333	25.41667	25.5	25.58333	25.66667	25.75	25.83333	25.9167	26	26.08333	26.16667	26.25	26.33333	26.41667	26.5	26.58333	26.66667	26.75	26.83333	26.91667
Jun-90	23.83333	23.91667	24	24.08333	24.16667	24.25	24.33333	24.41667	24.5	24.58333	24.66667	24.75	24.83333	24.91667	25	25.08333	25.16667	25.25	25.33333	25.41667	25.5	25.58333	25.66667	25.75	25.8333	25.91667	26	26.08333	26.16667	26.25	26.33333	26.41667	26.5	26.58333	26.66667	26.75	26.83333
Jul-90	23.75	23.83333	23.91667	24	24.08333	24.16667	24.25	24.33333	24.41667	24.5	24.58333	24.66667	24.75	24.83333	24.91667	25	25.08333	25.16667	25.25	25.33333	25.41667	25.5	25.58333	25.66667	25.75	25.83333	25.91667	26	26.08333	26.16667	26.25	26.33333	26.41667	26.5	26.58333	26.66667	26.75
Aug-90	23.66667	23.75	23.83333	23.91667	24	24.08333	24.16667	24.25	24.33333	24.41667	24.5	24.58333	24.66667	24.75	24.83333	24.91667	25	25.08333	25.16667	25.25	25.33333	25.41667	25.5	25.58333	25.6667	25.75	25.83333	25.91667	26	26.08333	26.16667	26.25	26.33333	26.41667	26.5	26.58333	26.66667
Sep-90	23.58333	23.66667	23.75	23.83333	23.91667	24	24.08333	24.16667	24.25	24.33333	24.41667	24.5	24.58333	24.66667	24.75	24.83333	24.91667	25	25.08333	25.16667	25.25	25.33333	25.41667	25.5	25.5833	25.66667	25.75	25.83333	25.91667	26	26.08333	26.16667	26.25	26.33333	26.41667	26.5	26.58333
Oct-90	23.5	23.58333	23.66667	23.75	23.83333	23.91667	24	24.08333	24.16667	24.25	24.33333	24.41667	24.5	24.58333	24.66667	24.75	24.83333	24.91667	25	25.08333	25.16667	25.25	25.33333	25.41667	25.5	25.58333	25.66667	25.75	25.83333	25.91667	26	26.08333	26.16667	26.25	26.33333	26.41667	26.5
Nov-90	23.41667	23.5	23.58333	23.66667	23.75	23.83333	23.91667	24	24.08333	24.16667	24.25	24.33333	24.41667	24.5	24.58333	24.66667	24.75	24.83333	24.91667	25	25.08333	25.16667	25.25	25.33333	25.4167	25.5	25.58333	25.66667	25.75	25.83333	25.91667	26	26.08333	26.16667	26.25	26.33333	26.41667
Dec-90	23.33333	23.41667	23.5	23.58333	23.66667	23.75	23.83333	23.91667	24	24.08333	24.16667	24.25	24.33333	24.41667	24.5	24.58333	24.66667	24.75	24.83333	24.91667	25	25.08333	25.16667	25.25	25.3333	25.41667	25.5	25.58333	25.66667	25.75	25.83333	25.91667	26	26.08333	26.16667	26.25	26.33333
Jan-91	23.25	23.33333	23.41667	23.5	23.58333	23.66667	23.75	23.83333	23.91667	24	24.08333	24.16667	24.25	24.33333	24.41667	24.5	24.58333	24.66667	24.75	24.83333	24.91667	25	25.08333	25.16667	25.25	25.33333	25.41667	25.5	25.58333	25.66667	25.75	25.83333	25.91667	26	26.08333	26.16667	26.25
Feb-91	23.16667	23.25	23.33333	23.41667	23.5	23.58333	23.66667	23.75	23.83333	23.91667	24	24.08333	24.16667	24.25	24.33333	24.41667	24.5	24.58333	24.66667	24.75	24.83333	24.91667	25	25.08333	25.1667	25.25	25.33333	25.41667	25.5	25.58333	25.66667	25.75	25.83333	25.91667	26	26.08333	26.16667
Mar-91	23.08333	23.16667	23.25	23.33333	23.41667	23.5	23.58333	23.66667	23.75	23.83333	23.91667	24	24.08333	24.16667	24.25	24.33333	24.41667	24.5	24.58333	24.66667	24.75	24.83333	24.91667	25	25.0833	25.16667	25.25	25.33333	25.41667	25.5	25.58333	25.66667	25.75	25.83333	25.91667	26	26.08333
Apr-91	23	23.08333	23.16667	23.25	23.33333	23.41667	23.5	23.58333	23.66667	23.75	23.83333	23.91667	24	24.08333	24.16667	24.25	24.33333	24.41667	24.5	24.58333	24.66667	24.75	24.83333	24.91667	25	25.08333	25.16667	25.25	25.33333	25.41667	25.5	25.58333	25.66667	25.75	25.83333	25.91667	26
May-91	22.91667	23	23.08333	23.16667	23.25	23.33333	23.41667	23.5	23.58333	23.66667	23.75	23.83333	23.91667	24	24.08333	24.16667	24.25	24.33333	24.41667	24.5	24.58333	24.66667	24.75	24.83333	24.9167	25	25.08333	25.16667	25.25	25.33333	25.41667	25.5	25.58333	25.66667	25.75	25.83333	25.91667
Jun-91	22.83333	22.91667	23	23.08333	23.16667	23.25	23.33333	23.41667	23.5	23.58333	23.66667	23.75	23.83333	23.91667	24	24.08333	24.16667	24.25	24.33333	24.41667	24.5	24.58333	24.66667	24.75	24.8333	24.91667	25	25.08333	25.16667	25.25	25.33333	25.41667	25.5	25.58333	25.66667	25.75	25.83333
Jul-91	22.75	22.83333	22.91667	23	23.08333	23.16667	23.25	23.33333	23.41667	23.5	23.58333	23.66667	23.75	23.83333	23.91667	24	24.08333	24.16667	24.25	24.33333	24.41667	24.5	24.58333	24.66667	24.75	24.83333	24.91667	25	25.08333	25.16667	25.25	25.33333	25.41667	25.5	25.58333	25.66667	25.75
Aug-91	22.66667	22.75	22.83333	22.91667	23	23.08333	23.16667	23.25	23.33333	23.41667	23.5	23.58333	23.66667	23.75	23.83333	23.91667	24	24.08333	24.16667	24.25	24.33333	24.41667	24.5	24.58333	24.6667	24.75	24.83333	24.91667	25	25.08333	25.16667	25.25	25.33333	25.41667	25.5	25.58333	25.66667
Sep-91	22.58333	22.66667	22.75	22.83333	22.91667	23	23.08333	23.16667	23.25	23.33333	23.41667	23.5	23.58333	23.66667	23.75	23.83333	23.91667	24	24.08333	24.16667	24.25	24.33333	24.41667	24.5	24.5833	24.66667	24.75	24.83333	24.91667	25	25.08333	25.16667	25.25	25.33333	25.41667	25.5	25.58333
Oct-91	22.5	22.58333	22.66667	22.75	22.83333	22.91667	23	23.08333	23.16667	23.25	23.33333	23.41667	23.5	23.58333	23.66667	23.75	23.83333	23.91667	24	24.08333	24.16667	24.25	24.33333	24.41667	24.5	24.58333	24.66667	24.75	24.83333	24.91667	25	25.08333	25.16667	25.25	25.33333	25.41667	25.5
Nov-91	22.41667	22.5	22.58333	22.66667	22.75	22.83333	22.91667	23	23.08333	23.16667	23.25	23.33333	23.41667	23.5	23.58333	23.66667	23.75	23.83333	23.91667	24	24.08333	24.16667	24.25	24.33333	24.4167	24.5	24.58333	24.66667	24.75	24.83333	24.91667	25	25.08333	25.16667	25.25	25.33333	25.41667
Dec-91	22.33333	22.41667	22.5	22.58333	22.66667	22.75	22.83333	22.91667	23	23.08333	23.16667	23.25	23.33333	23.41667	23.5	23.58333	23.66667	23.75	23.83333	23.91667	24	24.08333	24.16667	24.25	24.3333	24.41667	24.5	24.58333	24.66667	24.75	24.83333	24.91667	25	25.08333	25.16667	25.25	25.33333
Jan-92	22.25	22.33333	22.41667	22.5	22.58333	22.66667	22.75	22.83333	22.91667	23	23.08333	23.16667	23.25	23.33333	23.41667	23.5	23.58333	23.66667	23.75	23.83333	23.91667	24	24.08333	24.16667	24.25	24.33333	24.41667	24.5	24.58333	24.66667	24.75	24.83333	24.91667	25	25.08333	25.16667	25.25
Feb-92	22.16667	22.25	22.33333	22.41667	22.5	22.58333	22.66667	22.75	22.83333	22.91667	23	23.08333	23.16667	23.25	23.33333	23.41667	23.5	23.58333	23.66667	23.75	23.83333	23.91667	24	24.08333	24.1667	24.25	24.33333	24.41667	24.5	24.58333	24.66667	24.75	24.83333	24.91667	25	25.08333	25.16667
Mar-92	22.08333	22.16667	22.25	22.33333	22.41667	22.5	22.58333	22.66667	22.75	22.83333	22.91667	23	23.08333	23.16667	23.25	23.33333	23.41667	23.5	23.58333	23.66667	23.75	23.83333	23.91667	24	24.0833	24.16667	24.25	24.33333	24.41667	24.5	24.58333	24.66667	24.75	24.83333	24.91667	25	25.08333
Apr-92	22	22.08333	22.16667	22.25	22.33333	22.41667	22.5	22.58333	22.66667	22.75	22.83333	22.91667	23	23.08333	23.16667	23.25	23.33333	23.41667	23.5	23.58333	23.66667	23.75	23.83333	23.91667	24	24.08333	24.16667	24.25	24.33333	24.41667	24.5	24.58333	24.66667	24.75	24.83333	24.91667	25
May-92	21.91667	22	22.08333	22.16667	22.25	22.33333	22.41667	22.5	22.58333	22.66667	22.75	22.83333	22.91667	23	23.08333	23.16667	23.25	23.33333	23.41667	23.5	23.58333	23.66667	23.75	23.83333	23.9167	24	24.08333	24.16667	24.25	24.33333	24.41667	24.5	24.58333	24.66667	24.75	24.83333	24.91667
Jun-92	21.83333	21.91667	22	22.08333	22.16667	22.25	22.33333	22.41667	22.5	22.58333	22.66667	22.75	22.83333	22.91667	23	23.08333	23.16667	23.25	23.33333	23.41667	23.5	23.58333	23.66667	23.75	23.8333	23.91667	24	24.08333	24.16667	24.25	24.33333	24.41667	24.5	24.58333	24.66667	24.75	24.83333
Jul-92	21.75	21.83333	21.91667	22	22.08333	22.16667	22.25	22.33333	22.41667	22.5	22.58333	22.66667	22.75	22.83333	22.91667	23	23.08333	23.16667	23.25	23.33333	23.41667	23.5	23.58333	23.66667	23.75	23.83333	23.91667	24	24.08333	24.16667	24.25	24.33333	24.41667	24.5	24.58333	24.66667	24.75
Aug-92	21.66667	21.75	21.83333	21.91667	22	22.08333	22.16667	22.25	22.33333	22.41667	22.5	22.58333	22.66667	22.75	22.83333	22.91667	23	23.08333	23.16667	23.25	23.33333	23.41667	23.5	23.58333	23.6667	23.75	23.83333	23.91667	24	24.08333	24.16667	24.25	24.33333	24.41667	24.5	24.58333	24.66667
Sep-92	21.58333	21.66667	21.75	21.83333	21.91667	22	22.08333	22.16667	22.25	22.33333	22.41667	22.5	22.58333	22.66667	22.75	22.83333	22.91667	23	23.08333	23.16667	23.25	23.33333	23.41667	23.5	23.5833	23.66667	23.75	23.83333	23.91667	24	24.08333	24.16667	24.25	24.33333	24.41667	24.5	24.58333
Oct-92	21.5	21.58333	21.66667	21.75	21.83333	21.91667	22	22.08333	22.16667	22.25	22.33333	22.41667	22.5	22.58333	22.66667	22.75	22.83333	22.91667	23	23.08333	23.16667	23.25	23.33333	23.41667	23.5	23.58333	23.66667	23.75	23.83333	23.91667	24	24.08333	24.16667	24.25	24.33333	24.41667	24.5
Nov-92	21.41667	21.5	21.58333	21.66667	21.75	21.83333	21.91667	22	22.08333	22.16667	22.25	22.33333	22.41667	22.5	22.58333	22.66667	22.75	22.83333	22.91667	23	23.08333	23.16667	23.25	23.33333	23.4167	23.5	23.58333	23.66667	23.75	23.83333	23.91667	24	24.08333	24.16667	24.25	24.33333	24.41667
Dec-92	21.33333	21.41667	21.5	21.58333	21.66667	21.75	21.83333	21.91667	22	22.08333	22.16667	22.25	22.33333	22.41667	22.5	22.58333	22.66667	22.75	22.83333	22.91667	23	23.08333	23.16667	23.25	23.3333	23.41667	23.5	23.58333	23.66667	23.75	23.83333	23.91667	24	24.08333	24.16667	24.25	24.33333
Jan-93	21.25	21.33333	21.41667	21.5	21.58333	21.66667	21.75	21.83333	21.91667	22	22.08333	22.16667	22.25	22.33333	22.41667	22.5	22.58333	22.66667	22.75	22.83333	22.91667	23	23.08333	23.16667	23.25	23.33333	23.41667	23.5	23.58333	23.66667	23.75	23.83333	23.91667	24	24.08333	24.16667	24.25
Feb-93	21.16667	21.25	21.33333	21.41667	21.5	21.58333	21.66667	21.75	21.83333	21.91667	22	22.08333	22.16667	22.25	22.33333	22.41667	22.5	22.58333	22.66667	22.75	22.83333	22.91667	23	23.08333	23.1667	23.25	23.33333	23.41667	23.5	23.58333	23.66667	23.75	23.83333	23.91667	24	24.08333	24.16667
Mar-93	21.08333	21.16667	21.25	21.33333	21.41667	21.5	21.58333	21.66667	21.75	21.83333	21.91667	22	22.08333	22.16667	22.25	22.33333	22.41667	22.5	22.58333	22.66667	22.75	22.83333	22.91667	23	23.0833	23.16667	23.25	23.33333	23.41667	23.5	23.58333	23.66667	23.75	23.83333	23.91667	24	24.08333
Apr-93	21	21.08333	21.16667	21.25	21.33333	21.41667	21.5	21.58333	21.66667	21.75	21.83333	21.91667	22	22.08333	22.16667	22.25	22.33333	22.41667	22.5	22.58333	22.66667	22.75	22.83333	22.91667	23	23.08333	23.16667	23.25	23.33333	23.41667	23.5	23.58333	23.66667	23.75	23.83333	23.91667	24
May-93	20.91667	21	21.08333	21.16667	21.25	21.33333	21.41667	21.5	21.58333	21.66667	21.75	21.83333	21.91667	22	22.08333	22.16667	22.25	22.33333	22.41667	22.5	22.58333	22.66667	22.75	22.83333	22.9167	23	23.08333	23.16667	23.25	23.33333	23.41667	23.5	23.58333	23.66667	23.75	23.83333	23.91667
Jun-93	20.83333	20.91667	21	21.08333	21.16667	21.25	21.33333	21.41667	21.5	21.58333	21.66667	21.75	21.83333	21.91667	22	22.08333	22.16667	22.25	22.33333	22.41667	22.5	22.58333	22.66667	22.75	22.8333	22.91667	23	23.08333	23.16667	23.25	23.33333	23.41667	23.5	23.58333	23.66667	23.75	23.83333
Jul-93	20.75	20.83333	20.91667	21	21.08333	21.16667	21.25	21.33333	21.41667	21.5	21.58333	21.66667	21.75	21.83333	21.91667	22	22.08333	22.16667	22.25	22.33333	22.41667	22.5	22.58333	22.66667	22.75	22.83333	22.91667	23	23.08333	23.16667	23.25	23.33333	23.41667	23.5	23.58333	23.66667	23.75
Aug-93	20.66667	20.75	20.83333	20.91667	21	21.08333	21.16667	21.25	21.33333	21.41667	21.5	21.58333	21.66667	21.75	21.83333	21.91667	22	22.08333	22.16667	22.25	22.33333	22.41667	22.5	22.58333	22.6667	22.75	22.83333	22.91667	23	23.08333	23.16667	23.25	23.33333	23.41667	23.5	23.58333	23.66667

Table A2: Birth Cohorts and Monthly Employment Estimates [Section Enlarged]

	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14	Jan-15	Feb-15	Mar-15
Dec-91	22.33333	22.41667	22.5	22.58333	22.66667	22.75	22.83333	22.91667	23	23.08333	23.16667	23.25
Jan-92	22.25	22.33333	22.41667	22.5	22.58333	22.66667	22.75	22.83333	22.91667	23	23.08333	23.16667
Feb-92	22.16667	22.25	22.33333	22.41667	22.5	22.58333	22.66667	22.75	22.83333	22.91667	23	23.08333
Mar-92	22.08333	22.16667	22.25	22.33333	22.41667	22.5	22.58333	22.66667	22.75	22.83333	22.91667	23
Apr-92	22	22.08333	22.16667	22.25	22.33333	22.41667	22.5	22.58333	22.66667	22.75	22.83333	22.91667
May-92	21.91667	22	22.08333	22.16667	22.25	22.33333	22.41667	22.5	22.58333	22.66667	22.75	22.83333
Jun-92	21.83333	21.91667	22	22.08333	22.16667	22.25	22.33333	22.41667	22.5	22.58333	22.66667	22.75
Jul-92	21.75	21.83333	21.91667	22	22.08333	22.16667	22.25	22.33333	22.41667	22.5	22.58333	22.66667
Aug-92	21.66667	21.75	21.83333	21.91667	22	22.08333	22.16667	22.25	22.33333	22.41667	22.5	22.58333
Sep-92	21.58333	21.66667	21.75	21.83333	21.91667	22	22.08333	22.16667	22.25	22.33333	22.41667	22.5
Oct-92	21.5	21.58333	21.66667	21.75	21.83333	21.91667	22	22.08333	22.16667	22.25	22.33333	22.41667
Nov-92	21.41667	21.5	21.58333	21.66667	21.75	21.83333	21.91667	22	22.08333	22.16667	22.25	22.33333
Dec-92	21.33333	21.41667	21.5	21.58333	21.66667	21.75	21.83333	21.91667	22	22.08333	22.16667	22.25
Jan-93	21.25	21.33333	21.41667	21.5	21.58333	21.66667	21.75	21.83333	21.91667	22	22.08333	22.16667
Feb-93	21.16667	21.25	21.33333	21.41667	21.5	21.58333	21.66667	21.75	21.83333	21.91667	22	22.08333
Mar-93	21.08333	21.16667	21.25	21.33333	21.41667	21.5	21.58333	21.66667	21.75	21.83333	21.91667	22
Apr-93	21	21.08333	21.16667	21.25	21.33333	21.41667	21.5	21.58333	21.66667	21.75	21.83333	21.91667
May-93	20.91667	21	21.08333	21.16667	21.25	21.33333	21.41667	21.5	21.58333	21.66667	21.75	21.83333
Jun-93	20.83333	20.91667	21	21.08333	21.16667	21.25	21.33333	21.41667	21.5	21.58333	21.66667	21.75
Jul-93	20.75	20.83333	20.91667	21	21.08333	21.16667	21.25	21.33333	21.41667	21.5	21.58333	21.66667
Aug-93	20.66667	20.75	20.83333	20.91667	21	21.08333	21.16667	21.25	21.33333	21.41667	21.5	21.58333

Table A3: The Impact of Local Labour Market Conditions on the Probability that a Young Person does not Appear in Employment, Unemployment or Education Administrative Records

All young people	Age 17	Age 18	Age 19
Average unemployment rate [18-24], county level	0.00443*** (0.00052)	0.00337*** (0.00032)	0.00291*** (0.00015)
Median wage for full-time employee, county-level	000665*** (0.00193)	0.00635*** (0.00127)	0.00501*** (0.00066)
Number of observations	3,799,918	3,803,433	3,809,282
Young People Securing Grade D or Below in Maths and/or English GCSE at Key Stage 4			
Average unemployment rate [18-24], county level	0.00357*** (0.00042)	0.00278*** (0.00024)	0.00270*** (0.00017)
Median wage for full-time employee, county-level	0.00474** (0.00161)	0.00450*** (0.00094)	0.00418*** (0.00071)
Number of observations	2,056,415	2,057,294	2,059,936

***statistically significance at 1% level: **statistically significant at 5%: *statistically significant at 10%

Figure A1: Considering Employment Rate Estimates for those Earning Above LEL

Employment rate by Age in Financial Years

◆ 2014/15　□ 2015/16　▲ 2016/17　◇ 2014/15_abv10000　■ 2015/16_abv10000
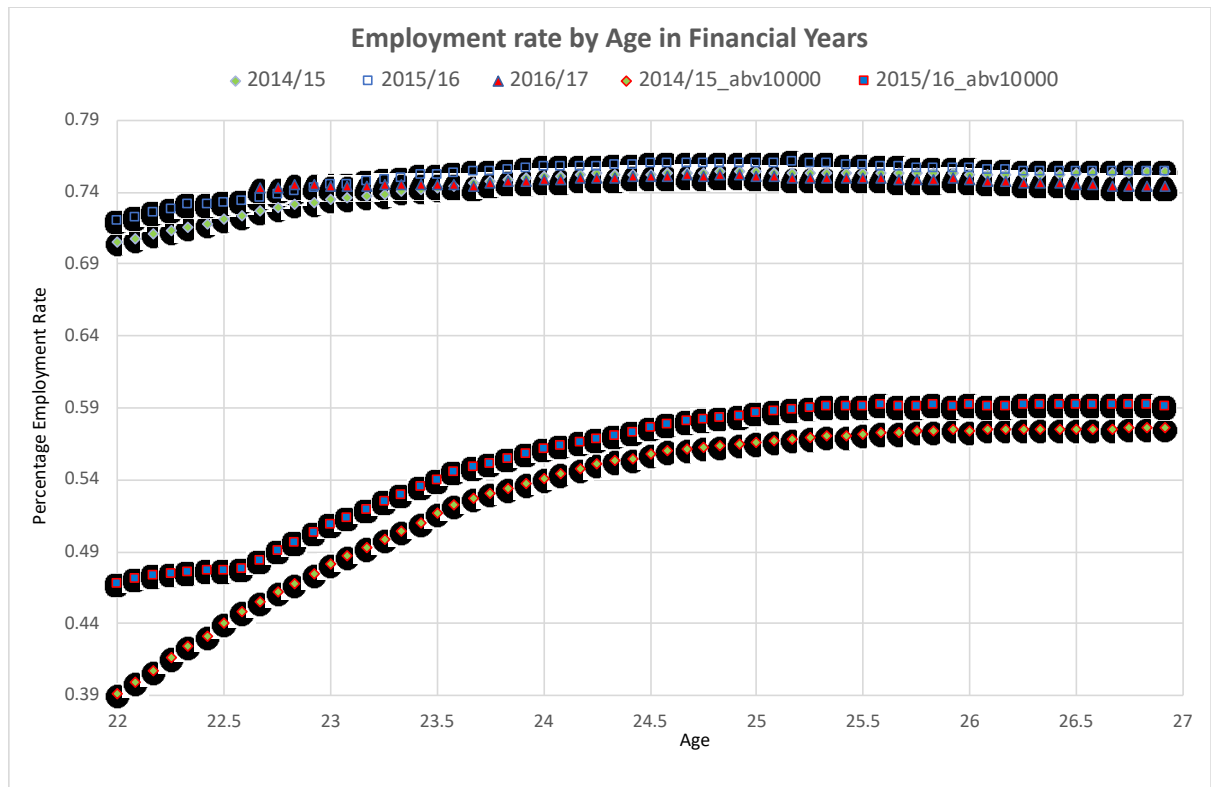
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