Resolution Foundation

Intergenerational Commission

REPORT

FEBRUARY 2017

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STUDY, WORK, PROGRESS, REPEAT?

How and why pay and progression outcomes have differed across cohorts

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Acknowledgements

We would like to thank Geoff Tily of the TUC for comments on an earlier draft of sections of this report. Any remaining errors or admissions are of course the authors' own.

We would like to thank the Nuffield Foundation for supporting this research. The views expressed are not necessarily those of the Nuffield Foundation, and any errors remain the authors' own.

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Executive Summary

This paper is the fifth report for the Intergenerational Commission, which was launched in the summer of 2016 to explore questions of intergenerational fairness that are currently rising up the agenda and make recommendations for repairing the intergenerational social contract. As previous analysis has highlighted, these questions are gaining prominence because there is evidence of a generational living standards challenge in a range of areas. From experiences in the labour market, to asset-building in the form of a house and a decent pension, to what can be expected from the welfare state, the social contract between the generations shows signs of fraying.

Jobs and pay clearly play a central and interconnected role in this wider question of intergenerational living standards. The labour market is the major source of household incomes over working lives (especially so with a working-age welfare state currently in retreat), the vehicle through which saving for retirement takes place, and the main means (outside of the family) of putting together a deposit on a home. On this basis, the finding that millennials who have entered work so far have made no earnings progress on generation X before them is a cause for concern. Of course, much of this will relate to the fact that their labour market experience has so far been dominated by the downturn, but there may be more structural factors at play here too.

In trying to assess how the lifetime incomes of younger (and future) cohorts – and their prospects for retirement – will compare with their parents' and grandparents', it is therefore their potential employment and earnings paths that are likely to matter most. The best source for clues as to what the future holds is usually a detailed understanding of experiences to date. As such, this paper explores the structural, compositional and dynamic factors that have driven cohort earnings trends, and in particular the dominance or not of the downturn in explaining what has happened. We track trends over the past couple of decades, and while our focus is on the beginning of careers, we capture the whole of working lives.

All cohorts have been affected by stagnating then falling pay in the 21st Century, but younger ones have fallen back most

Setting aside the UK's record employment performance and focusing on pay trends, as this report does, the direction of travel over the past 15 years sets the context for faltering outcomes across generations.

Pay growth stagnated in the mid-2000s due to the wedge that opened up between pay and productivity growth, an experience that was **followed by the 2009-2014 period of falling pay** after the financial crisis. This recent history means that the promise that successive cohorts earn significantly more than those who came before at the same age is under threat, with most five-year birth cohorts currently earning fairly similar wages to those born around 10 years before them.

But these effects are starkest for younger cohorts. Stagnating and then falling pay hit them in the early part of their careers or just as they were entering the world of work, when pay improvements are usually most rapid. As such, the oldest millennials (born 1981-85) are earning £40 per week less around the age of 30 than those born 10 years earlier earned at the same age. And the next group of millennials (born 1986-90) have had the same levels of weekly pay in their early- and mid-20s as those born 15 years before them did.

This report explores the population and jobs market changes that underpin these faltering cohort-on-cohort earnings improvements, and the mechanisms via which year-on-year increases in cohorts' pay have slowed down.

Changing personal characteristics continue to provide a 'compositional' cohort-on-cohort boost to pay, but less so for millennials

While much of the story on cohort wages in inextricably intertwined with macro-economic developments in recent decades – and in particular the impact of the downturn – some trends are relatively distinct. We know that population characteristics have changed over time in various ways. For example, the UK has experienced profound changes in both educational attainment and migration levels. So when comparing the pay of cohorts at the same age we may not be comparing like with like.

A detailed look at these 'compositional' shifts in individual characteristics reveals:

- Very gradual shifts by sex, with a **slowly-rising share of employees who are female** in each generation at the same age – roughly a 0.5 percentage point increase in the female employee share for each generation.

- **Large shifts in the educational attainment of successive generations**. So, while one-in-four (24 per cent) members of generation X (born 1966-80) had a degree-level qualification at age 25, among millennials (born 1981-2000, the older half of whom have reached age 25) this figure is one-in-three (34 per cent). However the rate of increase in educational attainment has slowed. For example, members of the 1972-74 three-year birth cohort were around one-third more likely to have a degree at age 28-30 than members of the cohort three years before them, but members of the 1984-86 cohort were only 7 per cent more likely than their predecessors.

- **Big changes in migration**. For example, the share of those aged 25 born outside the UK has so far increased from 11 per cent for generation X to 19 per cent for millennials. In addition, the characteristics of foreign-born employees have changed for younger cohorts in particular, with A8 EU accession from 2004 onwards shifting the group towards typically lower-skilled occupations.

'Decomposition' techniques allow us to look at these changes in combination (along with changes in where cohorts live and their age composition) and estimate their individual and combined impact on the real pay of each five-year birth cohort during 2007-2015 compared to those at the same age 10 years before.

We find that across cohorts, rising educational attainment dominates and has boosted cohort-on-cohort pay changes across the board. Country of birth has dragged on pay slightly for younger cohorts, and rising female participation for older cohorts, but these effects are much smaller. The dominant role of qualifications means that **the total compositional effect from changing individual characteristics is positive for all cohorts.** In other words, all else equal population changes would be expected to boost pay for each cohort compared to those at that age 10 years prior.

Importantly, though, the size of this effect is not the same for all cohorts. In particular, the 'qualifications boost' for the millennial cohorts born since 1981 is less than half its average size for older cohorts. This may partly reflect the fact that the boost is always higher within older cohorts, for example because graduate wages progress more rapidly as they age. But it is also likely to be linked to declining relative increases in educational attainment over time. The implication is that rapid and consistent improvements in educational attainment have previously delivered a large compositional boost to the pay of each cohort compared to those before, and that a new approach to boosting the quantity and quality of qualifications may be needed to make the same gains in future.

Changes in the types of jobs held by millennials have pressed down on cohort-on-cohort wage improvements

As well as the broad population trends discussed above, **the type of jobs on offer in the UK labour market have been changing.** Two trends stand out in current debates, and merit consideration from a generational perspective:

- **The rise of self-employment, precariousness and non-standard employment forms,** which is often thought to be particularly relevant to younger cohorts. For example, millennials in their mid-20s (particularly men) have so far been around 25 per cent more likely to work part time than members of generation X at the same age. Growth in zero-hours contracts can only be measured very recently, but has also been strongest among the very youngest. And, while not all self-employment can be considered precarious, slight increases in self-employment among non-graduate millennials in particular point to growth among younger cohorts in a less secure form of working that is likely to be relatively low-paid.

  Overall there is some evidence that non-standard and potentially more insecure employment forms are more common for younger cohorts compared to their predecessors at the same age, but evidence on the combined scale of these shifts and their impact on pay trends is not conclusive.

- **Changing occupational and industrial structures.** Previous Resolution Foundation research has shown that the 'hollowing out' of occupational structures connected to the automation of tasks previously done by humans has mainly led to growth in higher-skilled jobs in the UK. However, the effects are not entirely consistent across cohorts. We find that for the cohort born in 1951-55 compared to those at the same age 10 years before, the share of employment in the three highest-paying occupational groups grew most up to 2007-2015. But for the 1981-85 cohort, the growth was strongest in the three lowest-paying occupational groups, including a 32 per cent increase in the share of this group of older millennials doing caring and leisure jobs compared to those 10 years prior.

The same decomposition techniques as used to understand the impact of changing individual characteristics between cohorts allow us to summarise these trends. We find that shifting job characteristics – predominantly from changing occupational shares and part-time working patterns – have boosted mean pay for baby boomer (born 1946-65) and generation X (born 1966-80) cohorts compared to the pay of those at the same age 10 years before.

But **changing job characteristics have put downward pressure on cohort-on-cohort wage improvements for older millennials** (born 1981-90). In other words, the combination of a shift towards part-time working in the 20s and some downward pressure from occupational changes means that those born in the 1980s are now doing lower-paying jobs than cohorts at the same age were 10 years before them.

In combination, the reduced compositional boost and the changing world of work has weighed heavily on cohort-on-cohort pay progression among millennials

Combining thee separate people- and job-specific decomposition analyses, we can summarise compositional effects on the pay of different cohorts during 2007-2015 compared to that of cohorts at the same age 10 years before:

- **Across all baby boomer and generation X cohorts, changes in both personal and job characteristics provide compositional boosts,** meaning that holding all else equal, differences in their characteristics and the jobs they are doing would be expected to drive up their pay relative to the cohorts 10 years before.
- **For the oldest millennial cohort (born 1981-85) however, the compositional effect is close to zero.** This comprises a small boost to cohort-on-cohort pay changes at age 26-30 from improved qualifications, which is roughly cancelled out by a drag associated with the shift towards part-time working and lower-paying industries.
- **For the next millennial cohort (born 1986-90) there has in fact been an overall compositional drag on cohort wage improvements** at the very beginning of careers, driven predominantly by a shift towards lower-paying occupations and higher levels of part-time working.

These findings for younger cohorts are profound. This is because a compositional pay boost across cohorts and over time should be considered the norm given overarching qualifications patterns and occupational shifts. A zero or negative compositional contribution to cohort-upon-cohort wage improvements for those born in the 1980s – compared to continuing compositional boosts for older cohorts – looks likely to provide part of the explanation for why pay has fallen back most for younger cohorts in recent years. This makes clear that ascribing all changes in cohort earnings patterns to the financial crisis and the pay squeeze that followed is a limited and inaccurate reading of generational earnings trends.

These pressures have been amplified by declining 'wage returns' associated with various personal and job characteristics

These compositional shifts don't tell us the whole story, however. For example, we find basically no compositional effect on the pay of the 1986-90 cohort compared to the pay of those 10 years before them, but we know that they currently earn around £40 per week less. To complete the picture, we also **need to consider the changing 'wage return' recorded by cohorts** after holding compositional factors constant. Such returns apply both to cohorts as a whole and to groups with specific characteristics (such as level of educational attainment or country of birth) within them.

In general, the generational pay picture for the various groups we look at is similar to the overall picture we have described. For example, graduates and non-graduates, and full- and part-time workers in successive generations have each experienced similar wage declines compared to their counterparts in previous generations.

Overall, and fitting the picture we described at the outset of larger cohort-on-cohort pay differences for younger cohorts, **the wage returns effect increases gradually with age: it is negative for the cohorts born in the 1970s and 1980s when we compare their pay to those 10 years before, but positive for older cohorts.**

Looking at the interaction of compositional and wage return factors, we can split cohorts into three groups:

- **For the millennial cohorts born in the 1980s, wage declines within groups with certain characteristics have combined with a lack of compositional boost** – or even a compositional drag – to deliver lower weekly pay than the cohort 10 years before had at the same age.
- **For cohorts born in the 1970s, falling wage returns have been counteracted by changes to personal and job characteristics** that would all else equal boost pay, so that their pay is slightly higher compared to those at the same age 10 years before.
- **For older cohorts, both compositional changes and rising wage returns have contributed to higher pay levels** compared to those at the same age 10 years before (although we mustn't forget that these cohorts are not completely free of pay effects – they all still sit below where the cohort five years before was at the same age).

The stalling of cohorts' wage progression has been driven by a combination of falling levels of starting pay…

We have so far discussed changing individual and job characteristics between cohorts and the wage levels associated with these – what might be called a 'static' comparison of two points in time. But cohorts are broadly made up of the same people year-on-year, meaning that a picture of how individuals progress in the labour market – a 'dynamic' perspective – is also essential for assessing how cohorts have got to where they are today and what the future might hold.

The gains brought by each year-on-year pay increase are of course dependent on what the starting point is: if people begin their careers on much lower wages than they did in the past then future wages will be lower too even if annual increases remain strong. We find that this is exactly what happened for the millennial cohorts born in the 1990s. While starting wages were rising or flat for the 1970s and 1980s cohorts, **the 1993-95 cohort had a starting wage (at ages 17-20) that was 25-30 per cent (or £40-£50 per week) lower than the cohort nine years before them**. Given this cohort entered the jobs market during 2010-2015, the impact of the downturn here is clear. The open question is the extent to which this lower starting point will feed through to where earnings end up over the course of careers.

...Reduced frequencies of job-to-job moves...

Moving forwards in careers from each individual's (and cohort's) starting wage, the strongest tool for changing one's rate of pay is moving from one job to another. This is particularly true when young, when the pay increases associated with moving jobs are much greater, for example the typical real pay rise for someone moving jobs in their mid-20s is around 15 per cent.

In this light, **it is concerning that job mobility has fallen across the board, and fallen particularly fast for younger cohorts:** millennials so far have been about 30 per cent less likely to move jobs in their 20s than generation X before them. And looking at more narrowly-defined birth cohorts, just 1-in-25 people born in the mid-1980s moved jobs from year-to-year when they were in their mid-20s – half the rate for those who were born a decade before them.

Job moves have also fallen at older ages, but because they are much less common when older and bring a smaller typical pay increase, the declining mobility of younger cohorts appears most damaging for their pay progress.

Given that this decline in mobility began in the early 2000s, and that the move rate remains below where it should be relative to the strength of the labour market, more structural factors than the impact of the crisis are at play here.

And this fall in the job move rate looks particularly concerning when we consider that it may be having wider effects. For example, it may be keeping employees at longer tenures where annual pay rises are lower. Or a low move rate may prevent 'knock-on' wage effects on other staff across the age range as a result of departing employees prompting firms to rethink their pay offer to other staff to prevent further losses.

..And declining returns from remaining with a firm

The flipside of falling job mobility – and small reductions in the likelihood of exiting and entering the jobs market at a given age compared to previous cohorts – is an increase in tenure with employers. In particular, longer tenures with firms – spells of five years or more – have increased. For example, around the age of 30 43 per cent of the 1971-75 cohort had been with their employer for five years or longer, a figure which has risen to 47 per for the 1981-85 cohort a decade later.

Crucially, **at the same time as tenure has risen, the annual real pay increases that employers offer to their long-serving staff has fallen**. For example, referring to the same two cohorts around the age of 30 mentioned above, the typical annual real pay increase

for employees who have been with their firms for five years or more has fallen from a healthy 4 per cent for the early 1970s cohort to close to zero today for the early 1980s cohort. Given that many more employees stay in jobs each year than move, even when young, this is a profound shift in our labour market, and one that appears to be enduring beyond the financial crisis at least to some extent.

Lower pay rises for those staying with firms are the biggest driver of slowing cohort pay progression, with the slowdown larger for younger cohorts

These trends in job moves and tenure can help us answer the crucial question of why the wages of all cohorts, but particularly younger ones, appear to be improving more slowly year-on-year than they did in the past. Our modelling determines the role that moving jobs, remaining with a firm and exiting or entering work – and the pay rises associated with them – play in explaining changes in progression rates between two cohorts at the same age.

We find that a **decline in the pay rises associated with staying with an employer over a year, particularly at longer tenures, is the dominant factor in explaining the slowdown in cohort progression**. Declining tenure returns account for on average around four fifths of the reduction in annual cohort progression rates across the age range over the past two decades.

For younger employees only, the falling likelihood of job moves and a reduction in the pay increases associated with them have increased the slowdown in their progression rates, on top of this tenure effect that has been felt by everyone.

From a cohort perspective, this means that those born between the late 1970s and late 1980s – feeling the (connected) effects of less of a pay boost from moving jobs, a lower likelihood of moving jobs, and lower pay rises when they stay with their firm – have experienced a larger slowdown in annual progression rates than older cohorts born before this.

To characterise this, we can imagine how much higher different cohorts' wages would be if progression rates had not deteriorated over the last 15 years, but rather reflected the performance at each age around the turn of the millennium. In this hypothetical scenario, we find that the 1963-65 cohort would have an average wage 40 per cent higher than it does today, and the 1981-83 cohort 69 per cent higher. Both this millennial cohort and this baby boomer cohort have clearly felt the effects of the cyclical and structural labour market shifts of the past two decades. However, the younger of these two cohorts, at the formative stage of careers, has felt these effects more strongly.

Re-starting the cohort wage progression that characterised the 20th Century is central to renewing the social contract between the generations

This report lifts the lid on the drivers underpinning slowing cohort wage progression across generations – but particularly for millennials – in recent decades. Much of what has changed is connected to the financial crisis and the pay squeeze that followed it. But as our analysis sets out, a broad range of factors – including growth rates in educational

attainment, the impact of changing occupational structures, the rise of atypical working, a structural decline in job mobility, and the enduring impact of lower pay rises when employees stay with firms for long periods – have contributed to stagnating pay growth between cohorts and slower progression rates within them.

Far from putting cohorts' recent pay experiences entirely down to an 'accident of history' – the bad luck of experiencing a large pay squeeze, particularly in the formative stage of careers – there is plenty to consider in terms of how these outcomes can be prevented and unwound in future. A range of policy areas – including further and higher education policy; lifelong learning and human capital development by employers; the interaction between pension contributions and pay; the role of employment law and labour market regulation; and investment and productivity initiatives – are relevant in this regard.

Given the importance of earnings trajectories to lifetime incomes for each generation, the key questions are how we can get current and future cohorts back onto the pay progression tracks of old, and how we can ensure that the promise of generation-up-on-generation pay progress is kept in decades to come. To this end, The Intergenerational Commission will continue to develop its understanding of different cohorts' experience in the labour market and consider what interventions might be warranted as part of a renewal of the intergenerational social contract.

Section 1

Introduction

Steady progress on living standards over the course of the 20th Century has cemented the notion that each generation will do better than the one before, including a higher wage at the equivalent age, as a fundamental aspect what it means to live in modern Britain. But as previous analysis for the Intergenerational Commission has shown, millennials – the generation born between 1981 and 2000 – have so far earned no more than generation X before them. In order to frame and contextualise the detailed analysis to follow in this report, this introductory section unpacks this finding. We explore trends for more specific birth cohorts within each generation to get an initial view on the varied impacts of recent economic trends according to life stage. And we consider factors beyond the financial crisis and subsequent pay squeeze that may affect the past and future earnings progression of cohorts at different ages.

Cohort earnings progress has stalled for all generations, but the young appear most affected

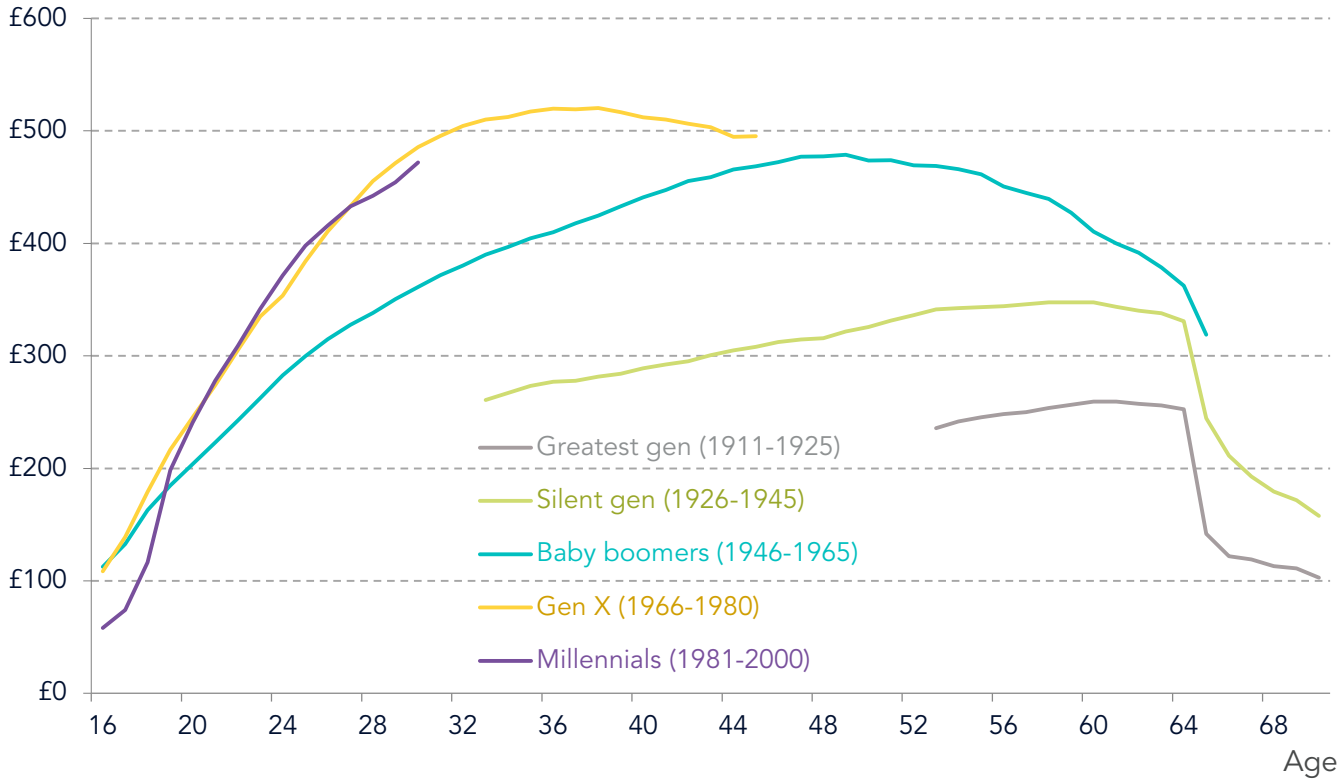
The build-up of experience in the labour market combines with a person's human capital such that we expect individual earnings to rise with age at least until the later decades of careers. Simultaneously, the steady march of economic growth means we expect young people to earn more than their predecessors did at the same age. This was the case for successive cohorts since the Second World War. But as Figure 2 shows, for commonly-defined generations spanning 15 or 20 years,[1] both of these expectations have recently been disrupted. Most striking is the fact that the millennials so far have earned no more per week than generation X did at the same age.[2] In addition, as the earnings of older members of generation X have fallen slightly in real terms in their late 30s, they are earning only slightly more than the post-war boomer generation (see Box 1 for details on how we account for inflation throughout this report).

1 See the launch report for the Intergenerational Commission for more details on how we define generations, and the distinction between generations, more narrowly-defined birth cohorts, and those at different life stages: L Gardiner, *Stagnation generation: The case for renewing the intergenerational contract*, Resolution Foundation, July 2016

2 Throughout this report we focus on weekly earnings, because they are more closely linked to living standards than hourly, and allow us to fully capture the impacts of shifts in full- and part-time working. However, the differences between cohorts and generations that we describe, and the decompositions of changes in subsequent sections, are very similar when hourly earnings are used. As background, Figure 37 in Annex 2 provides a comparison of weekly and hourly cohort earnings trends.

Figure 1: **Median pay by age for each generation: UK, 1975-2016**

Median real weekly pay for all employees (CPIH-adjusted to 2016 prices)



Notes: Figures for each generation are derived from a weighted average of estimates by single year of age for each single-year birth cohort within that generation; generations are included if at least five birth years are present in the data. For the years in which it is available, published Annual Survey of Hours and Earnings pay estimates (which cover the UK as a whole, as opposed to the microdata which only covers Great Britain) are used as control totals, and the results from each individual dataset are indexed to those from the Annual Survey of Hours and Earnings to create a consistent series over time. See Box 1 for details on the measure of inflation used.

Source: RF analysis of ONS, *Quarterly Labour Force Survey*; ONS, *Annual Survey of Hours and Earnings*; ONS, *New Earnings Survey Panel Dataset*

The broad generations in Figure 1 are very helpful for getting a summary picture of trends over a long time-frame. But by averaging over a large age range they smooth over period effects, in particular the post-recession period of falling pay – the 'pay squeeze' – of 2009-2014. In addition, because not all members of each generation have reached the ages displayed (we include generations when at least five birth years are present in the data) the picture this approach provides will change in future as subsequent members come through. This is not to say that comparisons of broad generations are not valid – particularly given their salience in the public understanding of intergenerational issues – but that more detailed analysis is necessary for a full picture.

i Box 1: Accounting for inflation

In previous analyses of earnings patterns across generations for the Intergenerational Commission (and wider Resolution Foundation analysis of earnings trends over time) we have deflated results using RPIJ. This captures a basket of goods that includes measures of housing costs, using an alternate formula to the main RPI index.

We previously judged RPIJ the best deflator of those available because:

- CPI – the headline inflation measure – takes no account of housing costs, which our analysis suggests are an important aspect in any judgement of living standards trends.
- RPI – formerly the headline inflation measure – does include housing, but has fallen out of favour due to concerns about the extent to which the formula might overstate inflation.
- CPIH – a variant on the CPI that includes owner occupiers' housing costs via the 'rental equivalence' method – had lost its national statistic status due to problems with rents data.

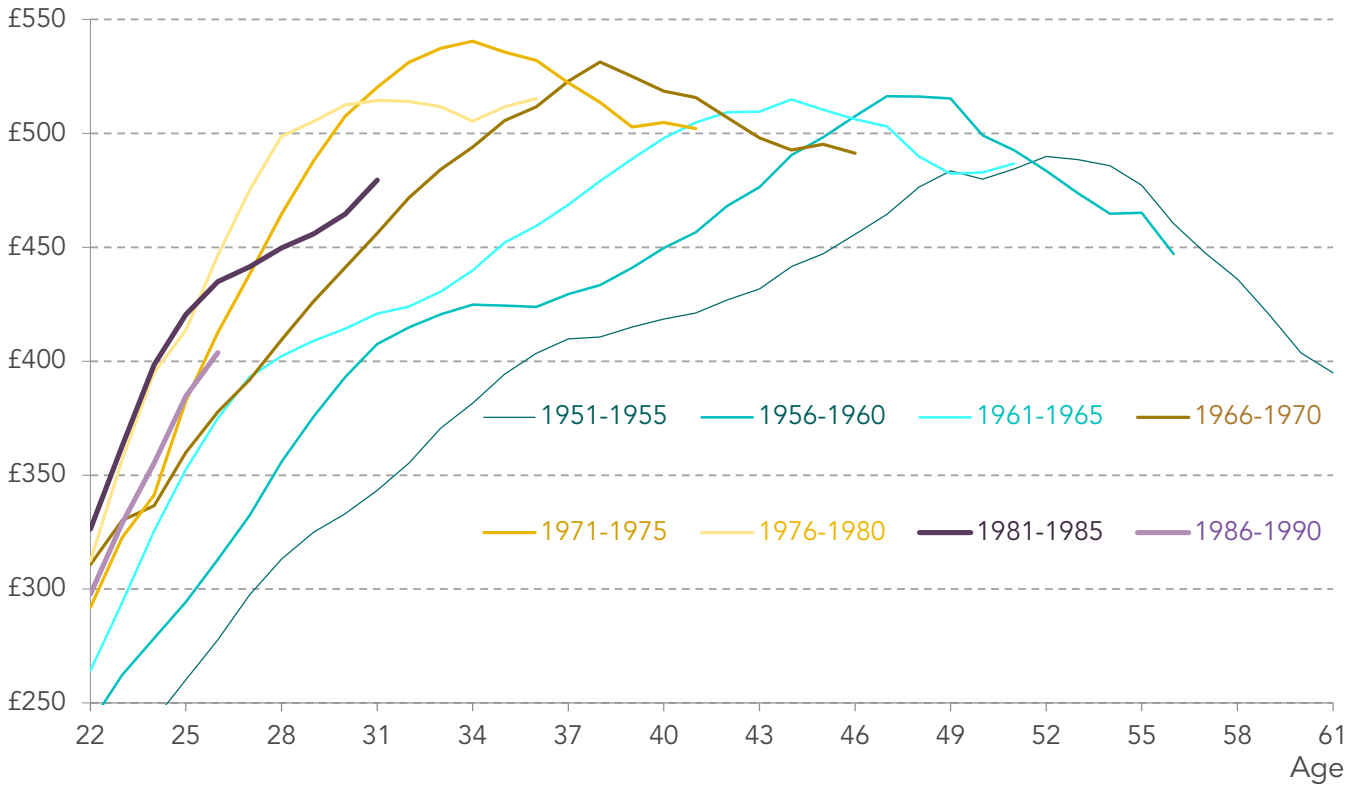
RPIJ has therefore up until now been the only widely-accepted inflation measure with national statistic status and some housing cost coverage. However, following a major review of methods for capturing inflation, the National Statistician has announced that CPIH is to become the headline inflation measure from March 2017, having dealt with the problems with the rents data and having been reaccredited as a national statistic. On this basis – and given that it accounts for housing costs, including council tax, the absence of which was the main drawback of the previous headline measure – we have switched to CPIH as our preferred index for deflating earnings.

CPIH is published from 2005 onwards by the Office for National Statistics, which also estimates a historic CPIH index for 1998-2004 which we use to extend the series backwards. Prior to 1988 we estimate the index using changes in RPI, in line with common practice.

As such, Figure 2 shows the same picture but for five-year birth cohorts. Here the impact of the post-recession pay squeeze is clearer. Hitting millennial cohorts in the early part of their careers or just as they were entering the labour market, the squeeze has meant that the 1986-90 cohort, for example, had lower earnings at age 26 than the cohort 15 years before. But it's also clear from this more detailed breakdown that all cohorts were hit by the downturn: each of the five-year cohorts in generation X have median real earnings in line with those ten years before them at the same age, and baby boomer cohorts have all dipped below at least the previous cohort. As Figure 36 and Figure 37 in Annex 2 show, these trends hold true for both the mean and median, hourly earnings as well as weekly, and when isolating three-year birth cohorts instead of five-year ones.

Figure 2: **Median pay by age for each five-year birth cohort: UK, 1975-2016**

Median real weekly pay for all employees (CPIH-adjusted to 2016 prices)



Notes: Figures for each cohort are derived from a weighted average of estimates by single year of age for each single-year birth cohort; cohorts are only included if all five birth years are present in the data. For the years in which it is available, published Annual Survey of Hours and Earnings pay estimates (which cover the UK as a whole, as opposed to the microdata which only covers Great Britain) are used as control totals, and the results from each individual dataset are indexed to those from the Annual Survey of Hours and Earnings to create a consistent series over time. See Box 1 for details on the measure of inflation used.

Source: RF analysis of ONS, *Quarterly Labour Force Survey*; ONS, *Annual Survey of Hours and Earnings*; ONS, *New Earnings Survey Panel Dataset*

While all cohorts experienced the pay squeeze, the younger ones appear to have been set back the most in terms of the comparison to previous cohorts, perhaps connected to the fact that the squeeze came at the point in careers when pay progression is usually most rapid. While most cohorts are now earning around the same as those ten years before, the younger cohorts are earning substantially less than peers ten years earlier, reaching pay levels of peers 15 years previously for the very youngest.

The literature on the scarring effect of unemployment early in life is well-rehearsed.[3] But there is evidence too that graduating into a weak labour market with subdued pay growth also has an enduring impact on lifetime earnings.[4] The question is therefore whether millennials' future earnings path will regain some of the ground lost, or whether their trajectory has been permanently lowered?

Although they have less of their careers still ahead of them, older cohorts are also at risk of longer-term impacts resulting from the downturn and subsequent pay squeeze. For

3 P Gregg & E Tominey, *The wage scar from youth unemployment*, University of Bristol, February 2004

4 P Oreopoulos, T von Wachter, A Heiz, *The short- and long-term career effects of graduating in a recession*, NBER Working Paper 12159, April 2006

example, the typical 60-64 year old had more than double the private pension wealth of the typical 50-54 year old in 2012-14, hinting that a large share of retirement funds are raised towards the end of careers.[5] As such, the pay squeeze and increase in joblessness associated with the recent downturn (although the latter was less severe than in previous recessions) will be likely to feed-through most strongly to retirement income adequacy for older (rather than younger) workers.

The post-recession pay squeeze is a dominant factor, but certainly not the only one

The impact of the period of falling pay that followed the financial crisis isn't the only factor up for debate when considering cohort earnings trajectories. Previous analysis for the Intergenerational Commission has shown that stagnation in cohort-on-cohort pay progress had set in even before the downturn, with the early-1980s cohort making no pay progress at age 25 (before the financial crisis landed) at all on the late-1970s cohort.[6]

Earnings flat-lined in the pre-crisis period in part because of the opening up of a wedge between productivity growth and pay growth. That is, output per hour worked continued to rise at roughly the same rate it had in previous years, but less of the gain associated with that improvement in productivity found its way through to employee's pay packets. As a future Intergenerational Commission paper will explore, an increasing share of overall labour compensation was instead accounted for by non-wage elements such as employer pension contributions, with no indication that this was a cyclical or temporary phenomenon.

Above and beyond downturn-related factors, younger workers are also likely to have been hit by the fact that – as our previous analysis has shown – the rate at which people move from one job to another has been falling since the turn of the century.[7] This matters because such job-to-job moves are a key mechanism for pay advancement, particularly at the beginning of careers.

The persistence of various disappointing labour market trends eight years on from the start of the financial crisis also hints that what once was considered cyclical may in fact be structural. For example, productivity has now grown below its pre-2008 trend in every quarter of the past nine years, and the Office for Budget Responsibility has revised down its forecast for trend productivity growth.[8] As such, the recent experience of stagnating then falling pay – which this report examines from a cohort earnings perspective – is likely to have structural as well as cyclical trends underpinning.

Moving away from the macro-economy, there is evidence that the emergence of precarious and 'gig economy' working – to some extent connected to the downturn but enduring beyond it and driven by other factors such as new technologies – has disproportionately affected younger workers.[9] And the 'hollowing out' of mid-skilled jobs

5 Based on analysis of ONS, *Wealth and Assets Survey Wave 4*. See A Corlett, *As time goes by: Shifting incomes and inequality between and within generations*, Resolution Foundation, February 2017

6 L Gardiner, *Stagnation generation: The case for renewing the intergenerational contract*, Resolution Foundation, July 2016

7 L Gardiner, *RF Earnings Outlook: Q4 2015*, Resolution Foundation, April 2016

8 M Whittaker, *Budget 2016 response*, Resolution Foundation, March 2016

9 L Gardiner, *Zero-hours contracts: The latest figures and analysis*, Resolution Foundation, April 2014

associated with automation – while overall driving a shift towards higher paid jobs – has downgraded opportunities for many young men.[10] On the other hand, self-employment has grown most rapidly for older workers.[11]

These changes are varied, complex and fluid, but it is hard to argue that such shifts in the nature of work have had no cohort-specific effect.

But it's not just changes in the kind of jobs people do that impact on pay and progression, changes in people matter too. Long-standing population trends signal that cohorts, even when compared at the same age, will have different characteristics which may contribute to divergent outcomes.

For example, growth in the number of people going to university over time might boost the earnings of younger cohorts but delays the labour market entry point and may draw out the initial progression period as graduates find their feet. Similarly, improving opportunities for women and policy shifts around maternity, childcare and the State Pension age mean the gender imbalance in the working population has gradually eroded. And the shift in the composition of the labour force towards migrants – who tend to be young or of prime age and, in the post-accession period at least, typically lower paid – will have dragged down the headline level of pay of young cohorts in particular.[12]

The combined impact of changes in individual characteristics and shifts in the nature of jobs has been explored for the workforce as a whole – and found to play an important role in explaining pay trends in recent periods[13] – but a cohort perspective may reveal different insights.

10 D Tomlinson, 'No country for young men?', *Resolution Foundation blog*, 9 February 2017

11 C D'Arcy & L Gardiner, *Just the job – or a working compromise? The changing nature of self-employment in the UK*, Resolution Foundation, May 2014

12 To be clear, this is a straight 'compositional' effect in which the inclusion of lower paid migrants in the pay data pulls down on the average. This is not the same as implying that the presence of migrant labour has any impact on the wages received by UK-born workers. That possibility is explored in previous Resolution Foundation work: S Clarke, *A Brave New World: How reduced migration could affect earnings, employment and the labour market*, Resolution Foundation, August 2016

13 L Gardiner & M Whittaker, *Why 2014 hasn't been the year of the pay rise*, Resolution Foundation, November 2014

Navigating this report

In this report – the fifth published as evidence to the Intergenerational Commission – we attempt to disentangle these various trends in order to answer the questions of *why* and *how* cohort lifetime earnings trajectories have changed:

- The following section, **Section 2**, addresses the first of these questions, via a **'static' analysis of people and the jobs they do**. We compare different cohorts at the same age in order to understand the pay impact of both compositional changes and shifts in the returns associated with specific personal and job characteristics. We look at the occupations and industries each cohort is in. And we delve into generational trends in non-standard employment.

- **Section 3** addresses the second question – the 'how' – via a **'dynamic' analysis of the drivers of stalling cohort progression**. We explore the major transitions via which individuals' earnings change – changing firms, building tenure with an employer, or exiting and entering the jobs market. We attempt to understand the channels through which the productivity-pay decoupling and subsequent pay squeeze dampened progression and the differential impact across cohorts. This allows us to consider how far cohorts are from where they might have been in the absence of the worsening of cohort progression rates over the past two decades.

- **Section 4** provides brief **concluding remarks**, signalling what our findings mean for the future pay paths of different cohorts and what they mean for the Intergenerational Commission.

Given they are at a formative stage and have more of their careers still ahead of them, much of the focus of the paper is on the pay progress of the millennial generation and younger members of generation X. However, throughout this analysis we compare cohorts across the age range, to build up a picture of pay and progression over the life course.

Section 2

People and the jobs they do

Having set out our headline findings on recent trends in cohort pay, in this section we explore the extent to which these can be explained by the differences between cohorts in terms of both their personal characteristics and the kind of jobs they're doing at a given age. We consider trends in educational attainment, migration, sex and where in the country people live in order to understand population shifts. And we discuss both trends in self-employment and other 'non-standard' employment types, and changing occupational and industrial structures, to understand jobs market shifts. We bring these together in an overarching 'decomposition' that determines the extent to which such changes can explain pay differences at a given age, and the differential impacts across younger and older cohorts.

This 'static' analysis of why pay has changed across cohorts is followed in the next section by analysis of the 'dynamics' of progression routes and how these have shifted over the past two decades.

Younger cohorts are better educated and more strongly composed of those born outside the UK

In considering broad pay trends such as those shown in Figure 2 in the previous section, an important and valid qualifier is that even though cohorts are compared at the same age (a better approach to understanding differences between generations than comparisons between those at different life stages at the same point in time) the comparison is still not truly like-for-like. For example, we know that welcome progress in female labour market participation, rising educational attainment and higher migration mean that today's young workers don't look the same as yesterday's. Here – using Labour Force Survey data (see Box 2 for details) – we explore how these trends manifest themselves across generations, and how they interact to affect pay differences between cohorts at the same age.

i Box 2: Data used in this report

In the previous section we presented analysis of cohort earnings trends over as long a time-period as possible by combining information from different surveys of pay: the Annual Survey of Hours and Earnings (ASHE) over 1997-2015 (considered the most accurate source for pay data), the New Earnings Survey (NES, its predecessor) over 1975-1996, and the Labour Force Survey (LFS) for 2016.

In the remaining sections of this report we use the LFS for analysis – the largest household survey regularly conducted by the Office for National Statistics, and the primary source of information on labour market trends.

The main drawbacks of this dataset are that it covers a more limited time period than our combined-datasets analysis in the previous section (1992-2016 for headline descriptive information, 1995-2016 for the 'static' decompositions presented in this section, and 1998-2016 for the 'dynamic' decompositions in the next). In addition, LFS pay data is generally regarded as less accurate because it is self-reported rather than collected from businesses' payroll records as in NES/ASHE.

The main advantages are that the LFS captures information on individual characteristics, including qualification levels and country of birth, which the business surveys do not. In addition, it has a longitudinal element (which we exploit for the progression analysis in the following section) that includes a record of labour market exit and entry (the business surveys have a panel structure but miss this). This allows us to decompose cohort progression rates into their drivers.

The shorter time-series over which data is available – particularly in terms of the analysis of cohort progression rates in the following section – means we cannot compare as many cohorts at the same life stage as we would like. But data covering at least around two decades still gives us a reasonable period over which to compare outcomes.

Finally, like all the surveys mention here the LFS doesn't capture data on self-employed earnings. This means that all analysis pertaining to pay in this report relates to employees only – however we do discuss trends in the incidence of self-employment across cohorts in this section.

More women and more degrees

Turning to the first of these trends – rising female labour market participation – there has been a gradual shift in the share of those in employment who are women (who, although the gender pay gap is narrowing, are still typically paid significantly less than men) in each generation at each age. Specifically, between the ages of 32 and 45 women made up an average of 45.7 per cent of baby boomers in employment, a figure which has so far risen 0.6 percentage points to 46.3 per cent for generation X.[14] Between the ages of 18 and 30 there has been a very similar uplift from generation X to millennials – a 0.5 percentage point increase from 46.9 per cent to 47.4 per cent. These rather gradual shifts may mask more marked differences between cohorts in terms of women's skills and the kind of work they are doing at a given age – a topic we return to at later points in this section.

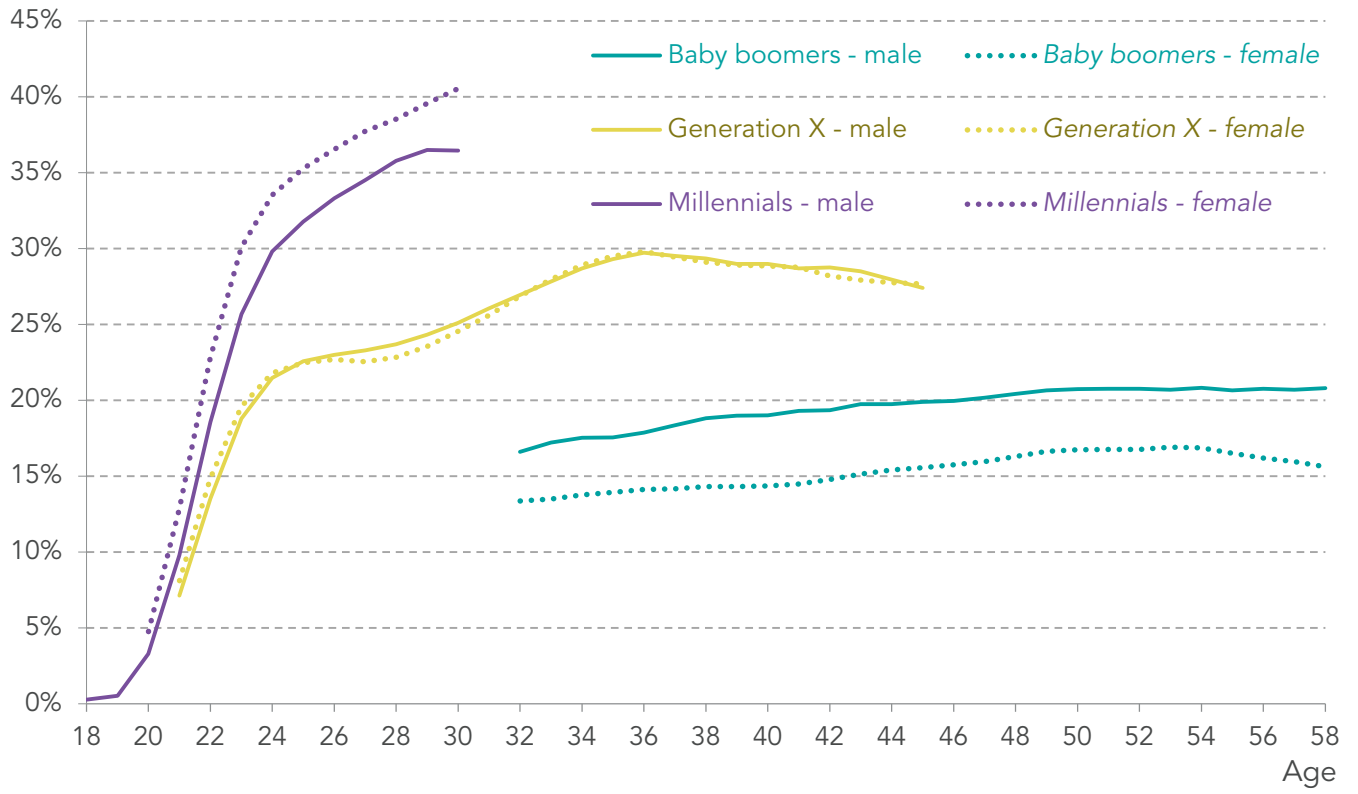
One such difference is educational attainment, the clearest manifestation of which has been increasing numbers of young people going to university. At age 36, the proportion of (younger) baby boomers with a degree or equivalent qualification was 16 per cent, increasing by over four fifths to 30 per cent for members of generation X at the same age.

14 The comparison is made for an age range in which at least five birth years of each cohort are present in the data throughout. As such, the picture may shift (most likely towards a bigger gap in the female share of employment between successive generations), as the rest of generation X ages (and likewise for the comparison between millennials and generation X at younger ages).

This generational progress has continued: at age 25 the proportion of generation X with a degree-level qualification was 24 per cent, but for the millennials (the older half of whom have reached age 25) this figure has so far increased by nearly half to 34 per cent.

Figure 3 disaggregates these trends by sex, and makes clear that this overall generational progress in achieving degree-level qualifications has been much more pronounced for women. For example, women in the baby boomer generation have been around 4 percentage points less likely to hold degree-level qualifications compared to men in their generation at the same age; for generation X the rates are almost exactly equal; and for millennials, women have so far been about 3 percentage points more likely to hold degrees at a given age. This is one area where different trends in generational progress within the sexes are particularly apparent.

Figure 3: **Proportion of generation with a degree or equivalent qualification at each age, by sex: UK, 1992-2016**

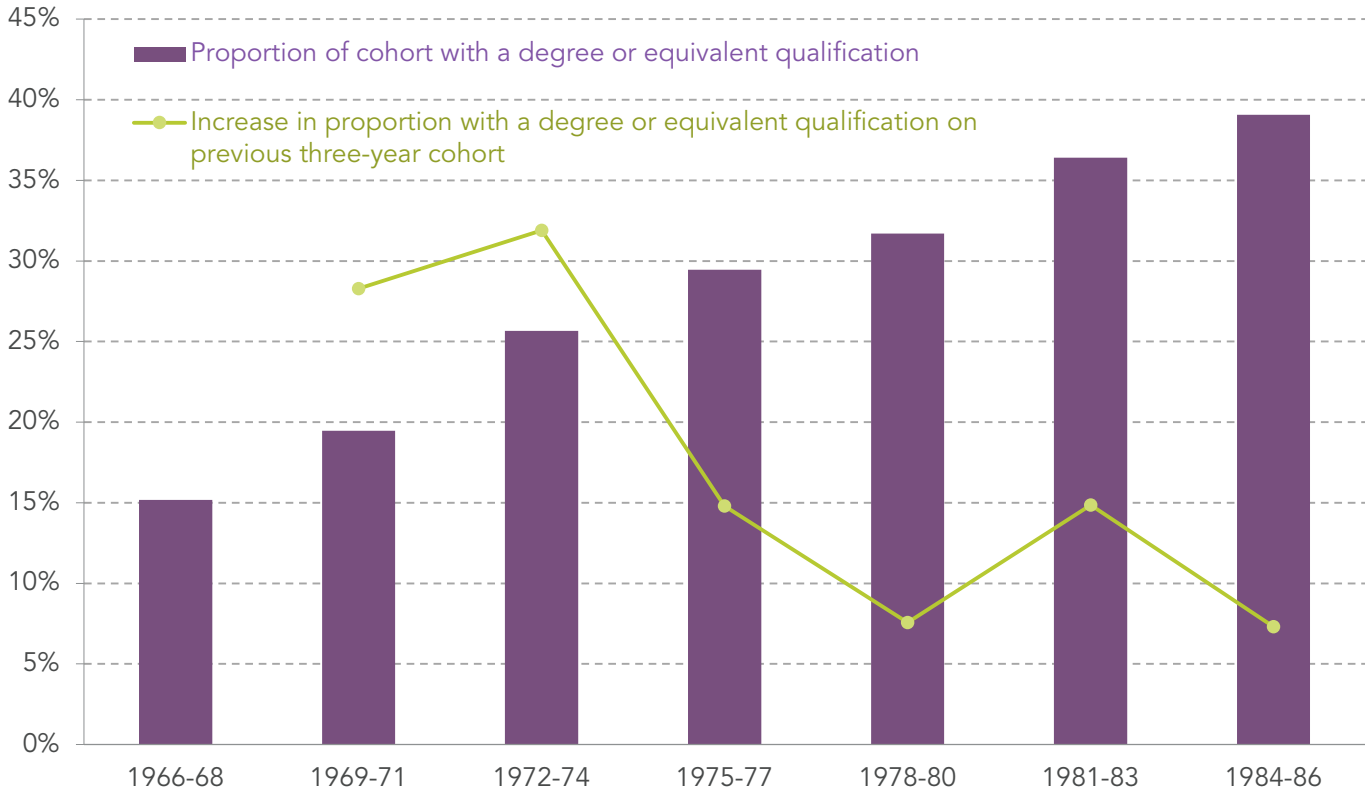


Notes: Generations are only included if at least five birth years are present in the data. Data smoothed using a three-year rolling average over the age range. Estimates based on Great Britain only pre-1995.

Source: RF analysis of ONS, *Quarterly Labour Force Survey*

Although the gaps between generations in the proportion holding degrees are consistently large, the suggestion in the statistics mentioned above is that the relative improvement between generations is slowing.[15] Figure 4 explores this suggestion in more detail, by comparing the proportion with degrees in successive three-year cohorts at age 28-30. It shows a similar pattern of continued stepwise improvements – although with small declines in the *absolute* increase between cohorts – and the line highlights that the *relative* cohort-on-cohort increase has been falling much faster. This is not particularly surprising given the relatively low starting position of the oldest cohorts shown. Nonetheless, the clear message is that although expanding higher educational participation continues to this day, given the sheer size of the group now gaining degrees, the largest relative improvements relating to this qualification level are almost certainly behind us.

Figure 4: **Proportion of three-year cohort with a degree or equivalent qualification at age 28-30: UK, 1994-2016**



Notes: Cohorts are only included if all three birth years are present in the data for ages 28-30. Estimates based on Great Britain only pre-1995.

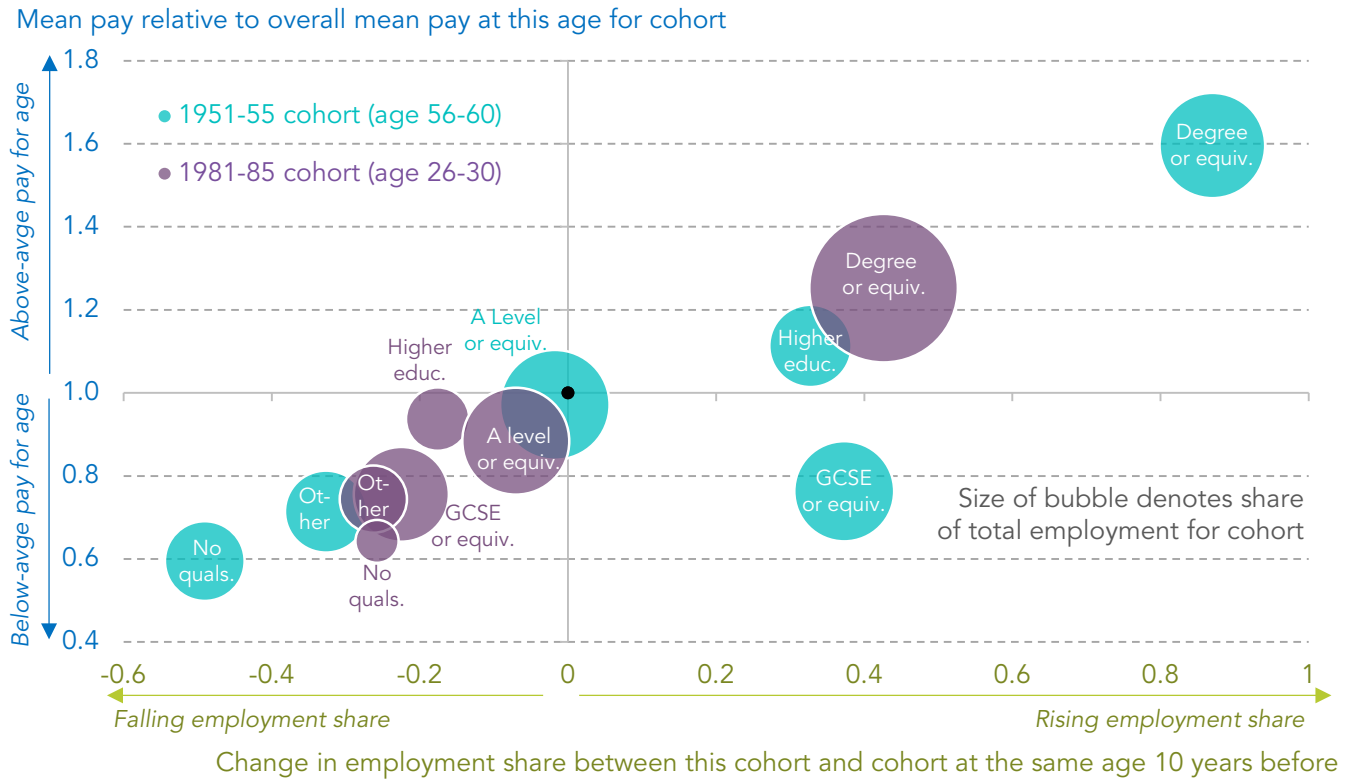
Source: RF analysis of ONS, *Quarterly Labour Force Survey*

But of course, the qualifications picture through the generations is not just about the numbers getting a degree. As such, Figure 5 shows changes across different qualification levels for employees in one younger cohort (age 26-30) and one older one (age 56-60), in each case compared to a cohort 10 years older than them at the same age. The

15 However, given not all millennials have completed their education yet the increase in the proportion with degrees between the millennials and generation X may very likely widen further.

horizontal axis shows the change in the employment share in different qualification groups between these cohorts and their equivalents 10 years prior, and the vertical axis shows the average pay level for each qualification relative to the overall average for that age group. So a pattern aligned on an upward-sloping diagonal from bottom left to top right indicates an improving compositional picture, with cohort-on-cohort growth in qualifications that attract higher pay levels, and decline in lower-paid qualifications.

Figure 5: **The changing employee qualifications structure for the 1951-55 and 1981-85 cohorts compared to those at the same age 10 years before: UK, 2007-2015 compared to 1997-2005**



Source: RF analysis of ONS, *Quarterly Labour Force Survey*

Such an upward sloping diagonal is just what we see for both the cohorts shown in Figure 5. Focusing first on the 1981-85 cohort at age 26-30, there was a 43 per cent increase in the share of employees with degrees compared to the 1971-75 cohort at the same age, and a 26 per cent reduction in the share with no qualifications.

However, the trends for the older cohort are ever more striking, with an 87 per cent increase in the share of employees with degrees in the 1951-55 cohort at ages 56-60 compared to the 1941-45 cohort. The relative pay differences between qualification levels are also much larger at this later stage of careers, which will reflect the compound

effect of higher starting salaries at higher levels of educational attainment, and the steeper earnings progression from that starting point that degree-level qualifications in particular typically bring.[16]

As such it's important to be clear that – given the different ages of the two cohorts we focus on – this presentation is not evidence of a change in the graduate premium for more recent graduates (although we might speculate on whether such a large gap will open up for the 1981-85 cohort later in life with so many more degree-holders in it than the 1951-55 cohort). The clear picture that does emerge from Figure 4 and Figure 5, however, is one of continuous – but narrowing – cohort-on-cohort improvements in qualifications levels.

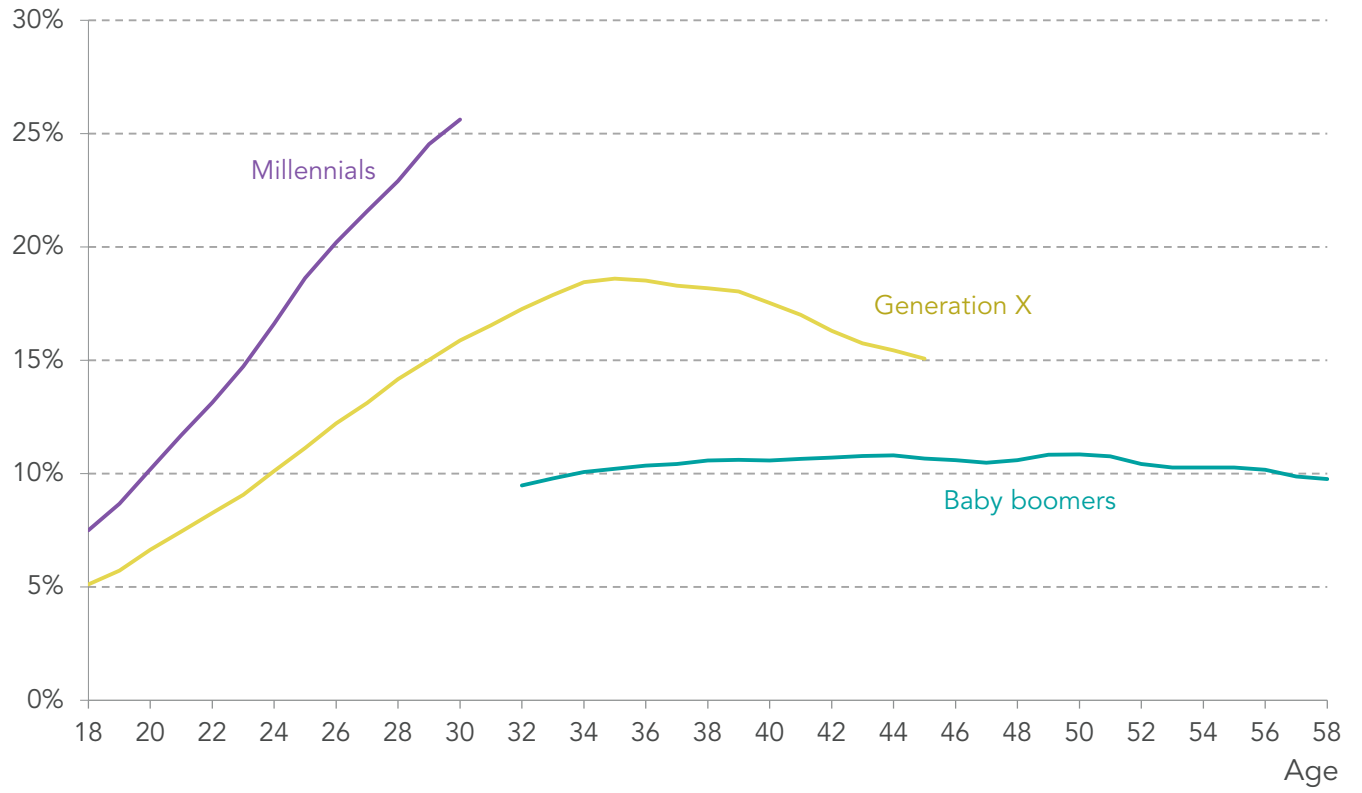
More migrants

Beyond rising gender parity in the workplace and continued improvements in educational attainment, changing migration patterns stand out as the other area in which cohorts are likely to differ fairly substantially in their characteristics at a given age. Figure 6 confirms that this is the case, showing for example an increase of roughly four fifths (so far) in the migrant share[17] of the 30-something population between the baby boomers and generation X, and an increase of around three fifths (so far) in the 20-something population between generation X and the millennials.

16 C D'Arcy & D Finch, *Finding your routes: Non-graduate pathways in the UK's labour market*, Resolution Foundation, May 2016

17 We use the word migrant here to refer to those born outside the UK.

Figure 6: **Proportion of generation born outside the UK at each age: UK, 1992-2016**



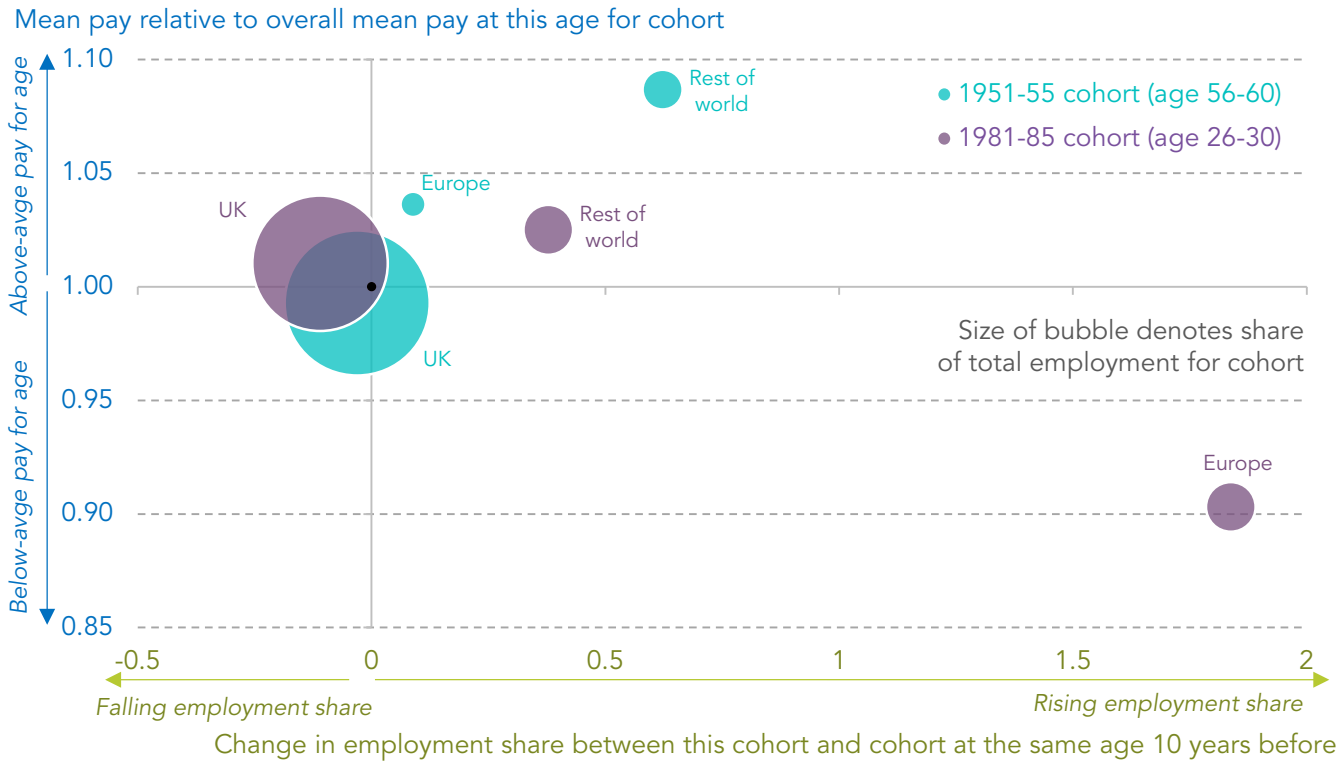
Notes: Generations are only included if at least five birth years are present in the data. Data smoothed using a three-year rolling average over the age range. Estimates based on Great Britain only pre-1995.

Source: RF analysis of ONS, *Quarterly Labour Force Survey*

Delving beneath these headline trends, the impacts of migration patterns on pay are far from clear-cut. This is both because the origin of migrants to the UK has changed markedly in recent decades, and because migrants tend to arrive in early adulthood and so particularly affect certain cohorts.

Figure 7 (which shows the same cohort comparisons as Figure 5 but this time according to country of birth rather than qualification level) provides some insights into these changes.

Figure 7: **Changes in employees' country of birth for the 1951-55 and 1981-85 cohorts compared to those at the same age 10 years before: UK, 2007-2015 compared to 1997-2005**



Source: RF analysis of ONS, *Quarterly Labour Force Survey*

It shows that for the 1951-55 cohort, the relatively small shares of migrants from both Europe and the rest of the world earn more on average than UK-born employees at this stage of life, therefore having a positive effect on overall pay levels, and a growing one relative to the 1941-45 cohort at the same age. The younger 1981-85 cohort is in a very different position: the share of migrants in the employee workforce is larger; the growth in the number of European-born employees on the 1971-75 cohort at that age 10 years previously is a staggering 184 per cent; and this group has lower pay than the average at that age, therefore dragging down average pay levels overall.

Two things are likely to explain this different picture at different stages of life. First particularly in the era of free movement of EU citizens into and out of the UK, very many foreign-born workers haven't stayed in the UK forever but rather come for a few months or years before returning to their country of origin. Indeed, it is quite likely that those who've built more secure and better-paid careers are more inclined to stay, while those in lower-paid work are less strongly attached. Such patterns could well explain part of the boosting effect that foreign-born employees are having on cohort pay levels at older ages.

But likely much more prominently, the accession of A8 countries to the EU in 2004 has shifted the composition of European migrants to the UK towards the lower-skilled,[18]

18 Unfortunately Labour Force Survey data no longer allows us to disaggregate the European-born group any further.

fundamentally reshaping the impact that migration from this part of the world has had on earnings patterns, particularly for younger employees and those in certain occupations.[19] Future trends in this area are far from clear. The best that can be said is that with a big shift in migration policy now very likely following the EU referendum result, the future path of these cohort-on-cohort changes is much less like to be 'more of the same' than we might expect when thinking about qualifications or sex.

Changes in personal characteristics continue to support improvements in cohort-on-cohort wages, but the size of the boost has declined

There are many other trends we might consider when thinking about how different characteristics across cohorts at the same age affect pay trends – such as ethnicity and disability status – however changes to how these variables are defined in the Labour Force Survey over time negate detailed analysis.[20] Therefore, to bring the analysis in this sub-section together and consider the combined pay impact of changing cohort characteristics, we add in just location and specific age. On this basis, we conduct a series of 'decompositions' of the role that changes in multiple and overlapping characteristics have played in cohort-on-cohort wage changes.

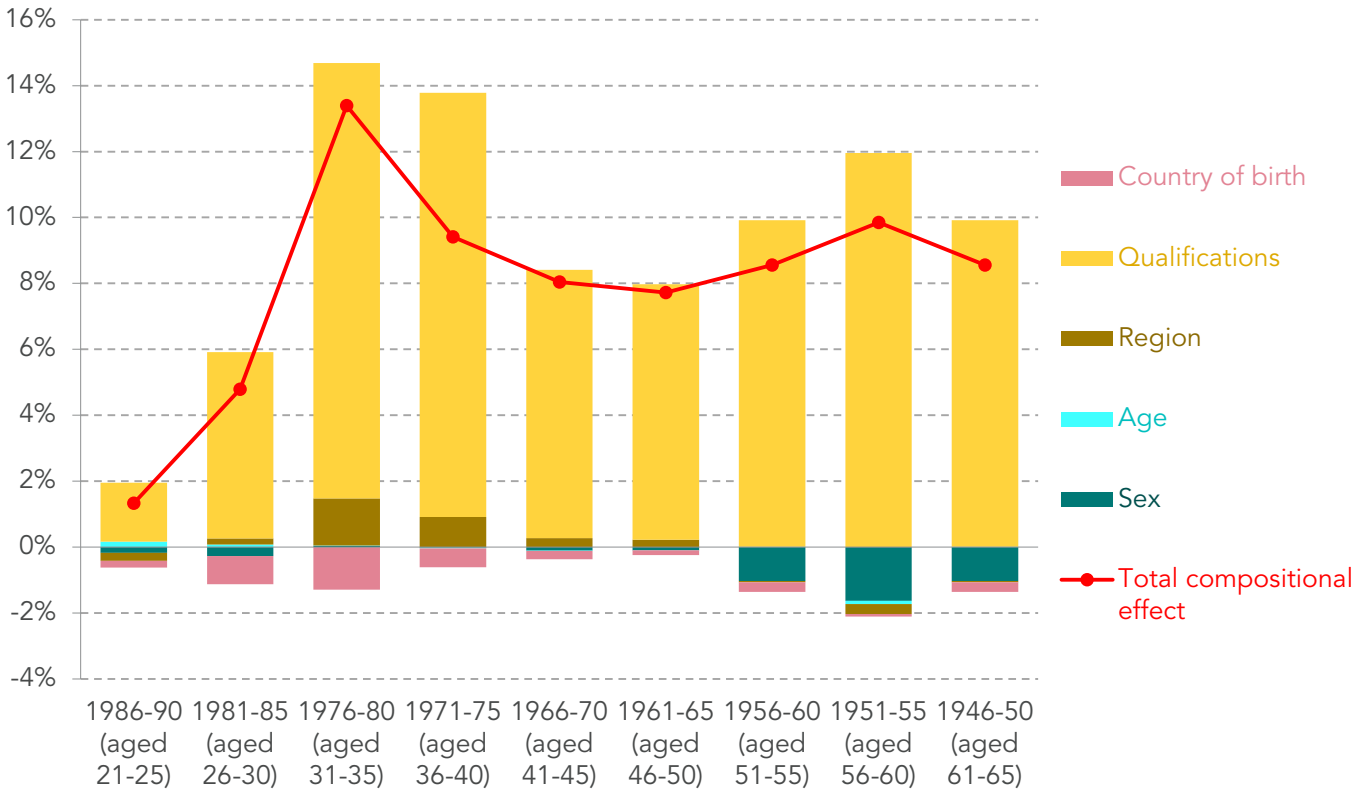
Our results are presented in Figure 8. Each bar shows a separate decomposition, comparing the cohort at the age specified to the cohort at the same age 10 years before (2007-2015 compared to 1997-2005). Via a regression model we calculate an average pay 'premium' or 'penalty' associated with each individual characteristic – for example holding a degree-level qualification or being born in Europe – across the cohorts captured at that age. By multiplying these fixed coefficients by the change in the frequency of each characteristic across cohorts, we derive the net effect of changes within each set of characteristics, and the overall compositional effect. (Annex 1 provides full details on our method).

19 S Clarke, *A brave new world: How reduced migration could affect earnings, employment and the labour market*, Resolution Foundation, August 2016

20 For more information on discontinuities in measures of disability in the LFS, see: L Gardiner, *Retention deficit: A new approach to boosting employment for people with health problems and disabilities*, Resolution Foundation, June 2016. Measures of ethnicity are less problematic but also suffer from methodological changes (see: S Milburn, *2011 changes to how Ethnicity is asked on Labour Force Survey*, Office for National Statistics, September 2013). However, at a high level of aggregation it is possible to compare broad trends: for example, at age 28-30 8 per cent of the 1966-70 cohort were from a minority-ethnic background, rising to 11 per cent for the 1971-75 cohort, 16 per cent for the 1976-80 cohort, and 17 per cent for the 1981-85 cohort.

Figure 8: **The effect of changing individual characteristics on pay growth between cohorts and those at the same age 10 years before: UK, 2007-2015 compared to 1997-2005**

Compositional effects on changes in real mean weekly pay for all employees (CPIH adjusted)



Notes: Compositional effect estimated using a regression model to determine the average wage return to different characteristics over the entire period, returns are then multiplied by the changing share of successive cohorts with each characteristic (see Annex 1 for full details). See Box 1 for details on the measure of inflation used.

Source: RF analysis of ONS, *Quarterly Labour Force Survey*

There are three things to take away from these results:

- First, changes in individual characteristics across cohorts have been toward higher-earning groups and all else equal would serve to 'boost' cohort-on-cohort pay changes across the age range over the past couple of decades – shown by the fact that the total compositional effect is positive across the board.

- Second, controlling for overlapping individual characteristics makes clear that qualification levels are by far the dominant factor in this – they provide a compositional boost to cohort-on-cohort pay changes at every age, and are always the largest single factor. Country of birth has a small 'drag' effect for younger cohorts, region a small boost effect for younger cohorts, and sex a small drag effect for older cohorts (likely connected to rising female labour market participation later in life particularly prompted by the increasing State Pension age for women), but these effects are far smaller.

- Finally, the relative size of the pay boost from qualifications improvements (and therefore the overall compositional effect attributable to changes in individual characteristics) is smaller for younger cohorts, dropping in particular for the

millennial cohorts born since 1981 to less than half its average size for the rest. This very closely mirrors the presentation in Figure 4 of the decreasing relative increases in the share of graduates in successive cohorts, but it may also reflect that fact that pay differentials between graduates and non-graduates are lower at the beginning of careers than later in life (i.e. an age effect rather than a cohort effect).

In sum, while it is right to consider the impact of a range of changes including those connected to gender equality and migration trends, the overriding story in terms of shifting characteristics between cohorts at the same life stage is of continually improving levels of educational attainment putting upward pressure on pay changes. This is not surprising – indeed it is one of the primary functions via which modern economies grow and become more productive over time – and the Resolution Foundation's decompositions for the employee workforce as a whole over time have consistently shown similar effects.[21]

However, what stands out as new from this cohort-based analysis is that the rate of progress looks to be slowing, such that younger cohorts are seeing less of a boost on their predecessors than older ones. The pattern here is not entirely surprising – for example even if as a country we consistently achieved the same year-on-year increase in the *numbers* attending university, the *relative* cohort-on-cohort improvement in the degree-holding *rate* would naturally decrease. And in fact, as we've shown, the *absolute* cohort-upon cohort increases have fallen somewhat as well. The implication is that rapid and consistent educational attainment improvements from a low base in previous decades have delivered much but a different approach may be needed in the future.

The bottom line is that recent cohorts are the most educated that the country has ever produced but their pay is not reflecting this increase in education. They are studying more but earning less than previous cohorts.

Younger cohorts have shifted towards atypical employment and down the occupational and industrial hierarchies

In this sub-section we turn from individual characteristics to changes in the characteristics of jobs that individuals in successive cohorts are doing at the same age. We focus in particular on two often-discussed trends: the rise of 'non-standard' or 'precarious' employment forms; and shifting industrial structures that are often connected to the role of automation in 'hollowing out' formerly mid-paying jobs. And we bring this analysis together in decompositions similar to those above, to show how cohort-on-cohort changes in job characteristics have affected pay.

However before delving into these specifics it's worth reminding ourselves of the high-level trends in labour market participation over the generations. Unlike pay trends, these are largely quite positive. As the Intergenerational Commission's launch report set out, both the millennials and generation X have so far been less likely to be unemployed than baby boomers or preceding generations at a given age.[22]

For example at age 26 they both (so far) have had an average unemployment rate of 8 per cent, compared to 11 per cent for baby boomers at that age. And employment trends have

21 L Gardiner & M Whittaker, *Why 2014 hasn't been the year of the pay rise*, Resolution Foundation, November 2014

22 L Gardiner, *Stagnation generation: The case for renewing the intergenerational contract*, Resolution Foundation, July 2016

been correspondingly strong, particularly for women in these two younger generations. These trends will reflect both the expansion of opportunities for women discussed previously in this section, and the fact that unemployment in the most recent recession did not rise anywhere near as high as it did in the 1980s one (which all of the millennials and generation X avoided) or the early 1990s one (which all of millennials and the vast majority of generation X avoided).

Putting aside job quality, a large quantity of labour market engagement is usually the most sure-fire route to securing improving living standards for low income households – and has been more markedly so during the most recent employment surge.[23] As such, we should have as context when exploring some more concerning trends around pay that today's record-performing jobs market is one of the best legacies older generations could have delivered to today's younger ones.

The emergence of non-standard employment?

An increase in precarious working practices is often raised as an issue that has affected younger workers in particular, and one potentially connected to their poorer pay performance in recent years. This is often symbolised in the rise of the 'gig economy' of tech-driven platforms that facilitate disaggregated, task-based and usually self-employed work. However the gig economy has proven elusive in the data,[24] and recent Resolution Foundation research into self-employment growth has shown that it is complex but about much more than apps, and far broader than just a face of rising precariousness.[25]

The broader reality is more complex too, with trends described as 'atypical', 'precarious' and 'insecure' often conflated. In this sub-section we look across the indicators we have available over a long-enough time period to arrive at a balanced picture of the generational impact of trends in self-employment, non-standard working and precariousness.

Turning first to part-time working – the most 'standard' and long-standing of the employment forms that might be described as 'atypical', but still a minority sport and one that carries a significant hourly pay penalty[26] – we find that more of the millennials worked part time in their 20s than previous generations. At age 25 for example, 20 per cent of millennials in employment who've reached that age so far worked part time, compared to 15 per cent of generation X (who've so far very closely tracked the baby boomers).

The separate trends for men and women are shown in Figure 9. We find that hidden beneath the relative parity between baby boomers and generation X so far has been a decrease in the proportion of women working part-time at each age, and an increase in the proportion of men. For millennials so far part-time working has increased markedly in the 20s compared to generation X – an effect that disappears by the age of 30 for women

23 P Gregg & L Gardiner, *The road to full employment: What the journey looks like and how to make progress*, Resolution Foundation, March 2016

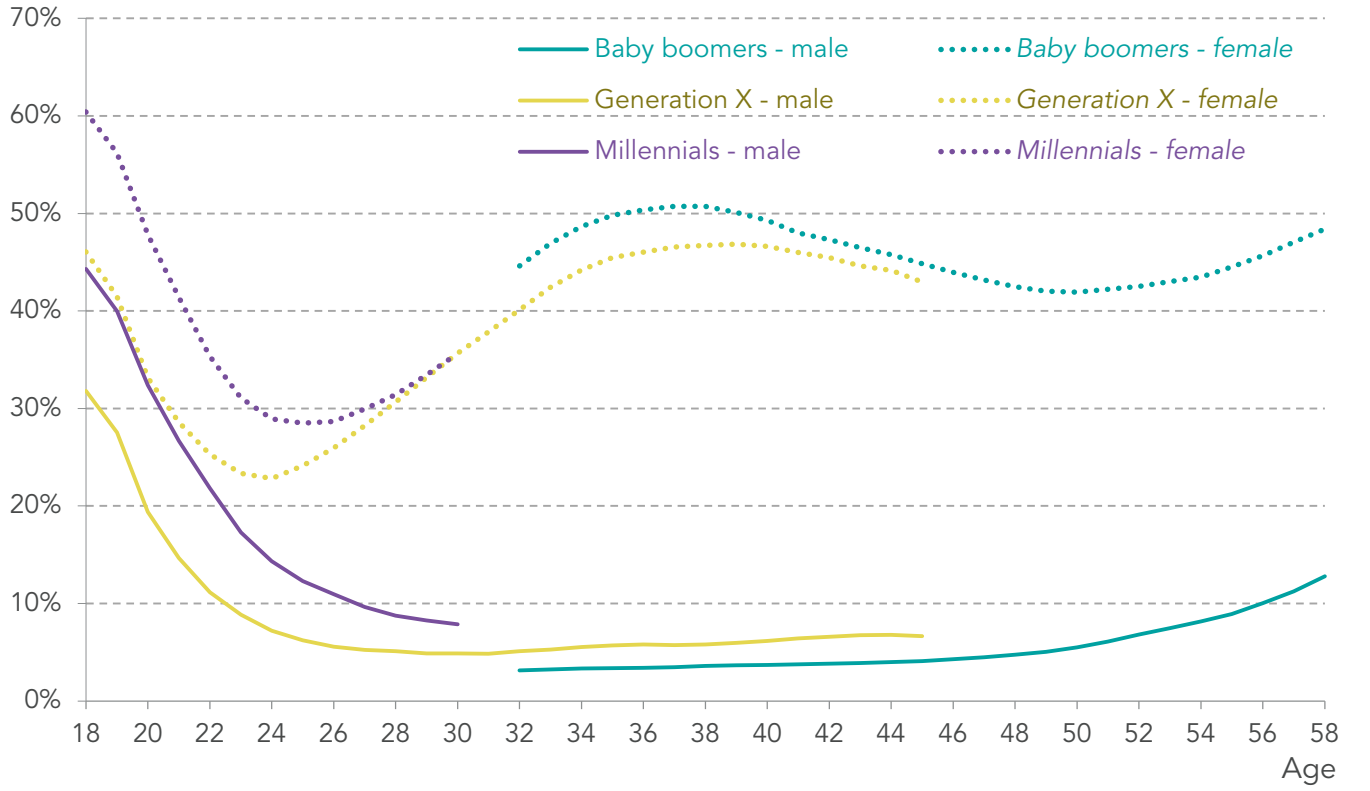
24 L Gardiner, 'The gig economy: Revolutionising the world of work, or the latest storm in a teacup?' *Resolution Foundation blog*, 23 October 2015

25 D Tomlinson & A Corlett, *A tough gig? The nature of self-employment in 21st Century Britain and policy implications*, Resolution Foundation, February 2017

26 A Manning & B Petrongolo, *The part-time pay penalty*, Centre for Economic Performance Discussion Paper 679, London School of Economics and Political Science, March 2005

but not for men. From the perspective of 'insecurity', the generationally-skewed growth in men working part time may be particularly concerning, as research has shown that these increases have been strongly concentrated in low-wage work.[27]

Figure 9: **Proportion of generation in employment working part time at each age: UK, 1992-2016**



Notes: Generations are only included if at least five birth years are present in the data. Data smoothed using a three-year rolling average over the age range. Estimates based on Great Britain only pre-1995.

Source: RF analysis of ONS, *Quarterly Labour Force Survey*

The most emblematic target for claims of rising insecurity is not such slow-burning trends in part-time working however, it is the rise of zero-hours contracts (ZHCs) in recent years. But these have only been captured from the early 2000s in the Labour Force Survey, and the big increase from 2013 onwards is thought to have been in no small part driven by greater recognition of the term among survey respondents as it hit the headlines.

Combined with still rather small numbers on ZHCs, this means that it is not possible to draw out cohort trends in any detail. However, a limited analysis suggests that ZHCs are strongly concentrated at the bottom of the age range, and have become more so for newly-entering cohorts (even if this is again to some extent driven by greater recognition). For example, 6 per cent of the 1991-95 cohort were on a zero-hours contract at age 21, compared to just 1 per cent of the 1986-90 cohort. Of course many of these

27 C Belfield et al., *Two decades of income inequality in Britain: The role of wages, household earnings and redistribution*, Institute for Fiscal Studies, January 2017

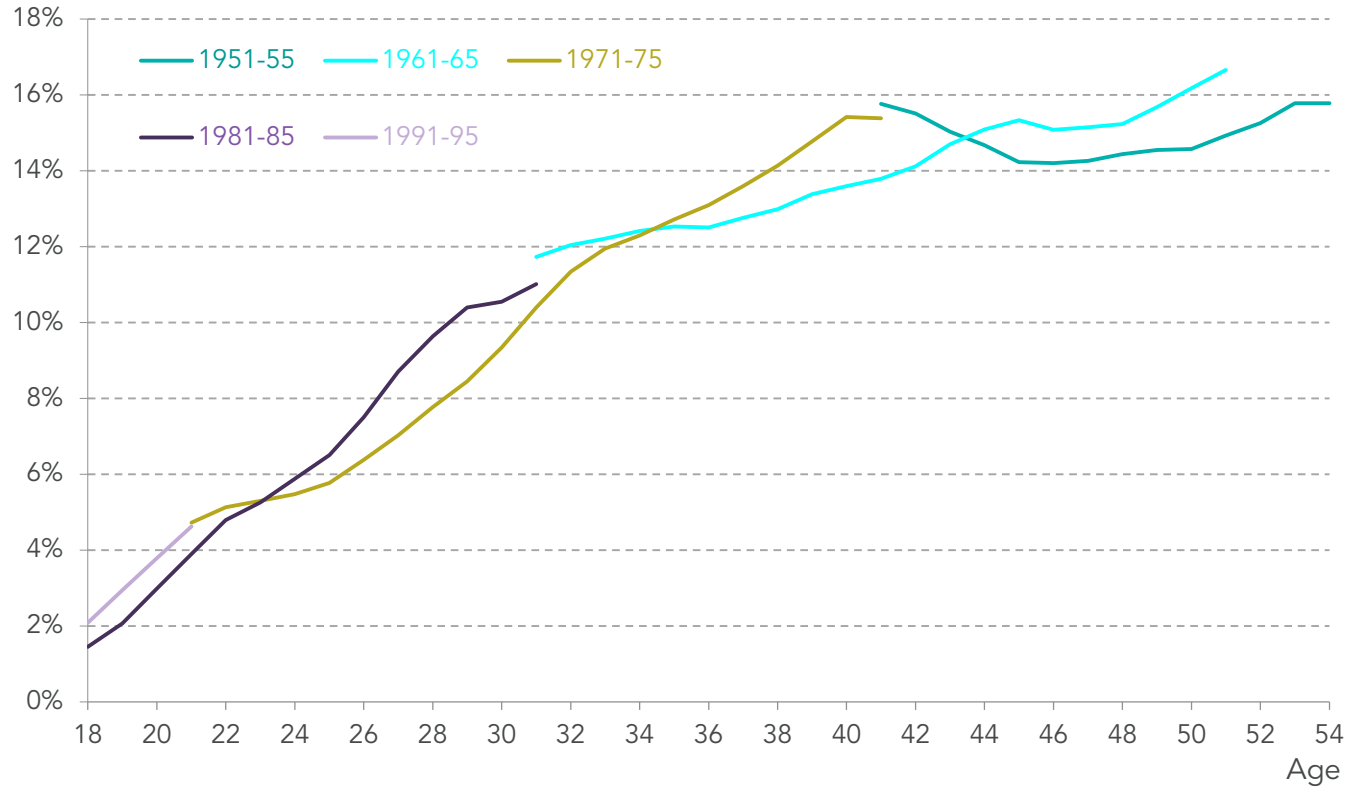
workers will be students who may in particular appreciate the flexibility this contract type brings, but the increase between successive five-year birth cohorts is nonetheless quite striking.

Looking at other contractual forms that have been used as proxies for insecure work,[28] there is far less evidence of rising precariousness for young cohorts compared to those before them at the same age. Working temporarily has stayed constant across generations (and the fact that more graduates than non-graduates temp at any given age calls into question the extent to which temporary contracts signify precariousness). Shift working has also barely changed at all. And regular reliance on paid overtime has fallen for younger cohorts.

Turning from 'insecurity' or 'precariousness' as variously defined to self-employment, Figure 10 shows trends for selected five-year birth cohorts a decade apart. Alongside the general increase in the likelihood of working as self-employed as people age, there's is an evident increase in self-employment shares more recently for each cohort.

28 For example, see: '4.5 million people in insecure work, reveals Citizens Advice' *Citizens Advice press office*, 13 June 2016

Figure 10: **Proportion of selected five-year birth cohorts in employment who are self-employed: UK, 1992-2016**



Notes: Cohorts are only included if all five birth years are present in the data. Data smoothed using a three-year rolling average over the age range. Estimates based on Great Britain only pre-1995.

Source: RF analysis of ONS, *Quarterly Labour Force Survey*

There is also something of a U-shape visible in each cohort. This will reflect overall trends in the self-employed share of the workforce – which peaked at 14 per cent in 1994, fell back to 12 per cent around 2002 and has risen since to around 15 per cent today.[29] It suggests that overall, self-employment growth (as a share of employment rather than in terms of absolute numbers, which have grown most strongly for the old given rising overall participation levels and the higher likelihood of working as self-employed) has been felt fairly evenly across the life course.

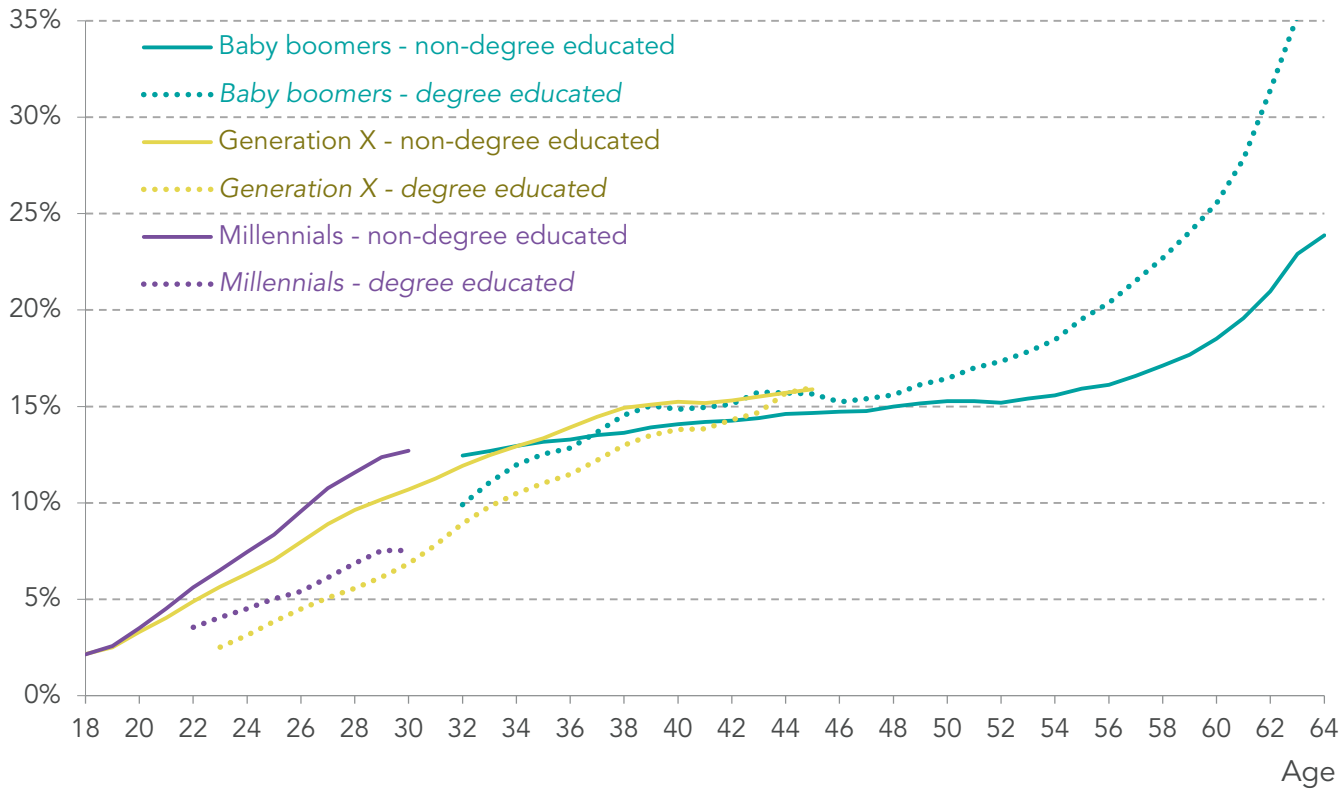
Self-employment per-se is not necessarily a cause for concern (from a living standards perspective, rather than in terms of its fiscal implications, for example). Previous Resolution Foundation analysis has shown that the majority of those who became self-employed since the beginning of the downturn did so as a positive choice rather

29 S Clarke, '2016 was a quiet year for the British economy – but was it the calm before the storm?', *Resolution Foundation blog*, 15 February 2017

than seeing it as a last resort,[30] and we've also shown that the majority of the growth in this period has been in sectors that might be termed relatively 'privileged' (rather than 'precarious').[31]

Nonetheless, there are areas in which some concern may be warranted. One such area relates to the divergent trends across generations in self-employment shares for graduates and non-graduates. The upward sloping lines in Figure 11 show that the propensity to work as self-employed increases over the life course. The fact that the dotted (degree educated) and solid (non-degree educated) lines converge in the late-30s/early-40s additionally implies that educational attainment has a strong bearing on how this shift in propensity plays out. In simple terms, younger non-graduates are more likely than younger graduates to work as self-employed, but this ordering flips from mid-career onwards.

Figure 11: **Proportion of generation in employment who are self-employed, by educational attainment: UK, 1992-2016**



Notes: Generations are only included if at least five birth years are present in the data. Data smoothed using a three-year rolling average over the age range. Estimates based on Great Britain only pre-1995.

Source: RF analysis of ONS, *Quarterly Labour Force Survey*

30 C D'Arcy & L Gardiner, *Just the job – or a working compromise? The changing nature of self-employment in the UK*, Resolution Foundation, May 2014

31 D Tomlinson & A Corlett, *A tough gig? The nature of self-employment in 21st Century Britain and policy implications*, Resolution Foundation, February 2017

What's also evident is a slightly greater divergence between graduate and non-graduate millennials at younger ages compared to generation X. The implication is that overall increases in the self-employed share of the workforce have been partly driven by members of younger cohorts without degrees – more likely to be trading in the gig economy or in traditional low-paid self-employment than running start-ups on silicon roundabout.

Crucially, the data we use doesn't allow us to connect these cohort and generational trends in self-employment to their earnings patterns (indeed there is very little data on self-employed earnings at all), so self-employment is not included in the decompositions to follow. However we know that compared to employees they both typically earn less and experienced a much larger earnings squeeze following the financial crisis.[32] So there are reasons enough to be somewhat concerned about the impact such trends are having on pay and progression opportunities for younger cohorts.

More generally, only a limited number of indicators of 'insecurity' or 'non-standard working' are available over a long-enough time period to be included in our decomposition analyses. So our understanding of the connections between the changes discussed in this sub-section and how compositional shifts in the jobs market are underpinning cohort-on-cohort pay changes at a given age remains speculative. Increases in part-time working, slight increases in non-graduate self-employment for millennials, and perhaps zero-hours contract growth all point to a more diverse and potentially less secure range of ways of working. But the combined scale of these, their impact on pay trends across cohorts and whether there are other new ways of working that the data is failing to capture altogether are far from clear.

Changing occupational and industrial structures

Polarising occupational structures connected to the automation of tasks previously done by humans probably sits alongside the rise in self-employment and other atypical or precarious employment forms as one of the UK's two dominant narratives on broad labour market changes over recent years.

The argument runs that the declining employment shares of occupations previously found in the middle of the pay distribution – particularly roles like machine operatives and secretarial work that have been most vulnerable to technological progress – has driven a 'hollowing out' of the jobs market towards both lower- and higher-skilled jobs, signalling growing wage inequality and potentially a threat to overall employment levels if the upward march of automation continues.

Previous Resolution Foundation analysis has shown that the relative decline of previously mid-skilled jobs is indeed evident in the UK, but that the outcomes are perhaps not as concerning as the traditional hollowing out narrative (often relating to the US, from where much of the hollowing out research originates) generally runs.[33] In particular, the growth in employment shares in the UK over the past two decades has overwhelmingly been in higher-paying occupations rather than lower-paying ones. And

32 A Corlett, *Resolution Foundation Earnings Outlook Q2 2016*, Resolution Foundation, October 2016

33 A Corlett, *Robot wars: Automation and the labour market*, Resolution Foundation, July 2016

the wage distribution hasn't become more unequal in this period: occupations move around the distribution and entirely new roles crop up over time, meaning there isn't a straight read through from changing job shares to changing pay distributions.

With record-high employment rates and alternative research that has countered some of the larger estimates of the technological threat to jobs,[34] it's also a stretch to believe that the aggregate number of jobs in the UK is under near-term threat.

However, it would be wrong to conclude that these trends signal no problems at all. One concern is that changing occupational structures may remove the traditional progression stepping-stones for those at the beginning of careers in particular sectors (these may be an underlying factor of the changing progression dynamics we present in Section 3, for example). But more pertinently for this analysis, previous research for the Intergenerational Commission focusing on millennial men has shown that (connected to the rise in part-time working for men in younger cohorts described above) US-style hollowing out in which lower-paying roles form increasing shares of total employment *is* evident among younger men – much more so than it is for either young women or older age groups.[35]

Covering both men and women, Figure 12 provides a similar picture. Using the same graphical presentation and cohort comparisons as in Figure 5 and Figure 7 earlier in this section, it shows growth or decline in occupation shares at a given age relative to cohorts at the same age 10 years previously.

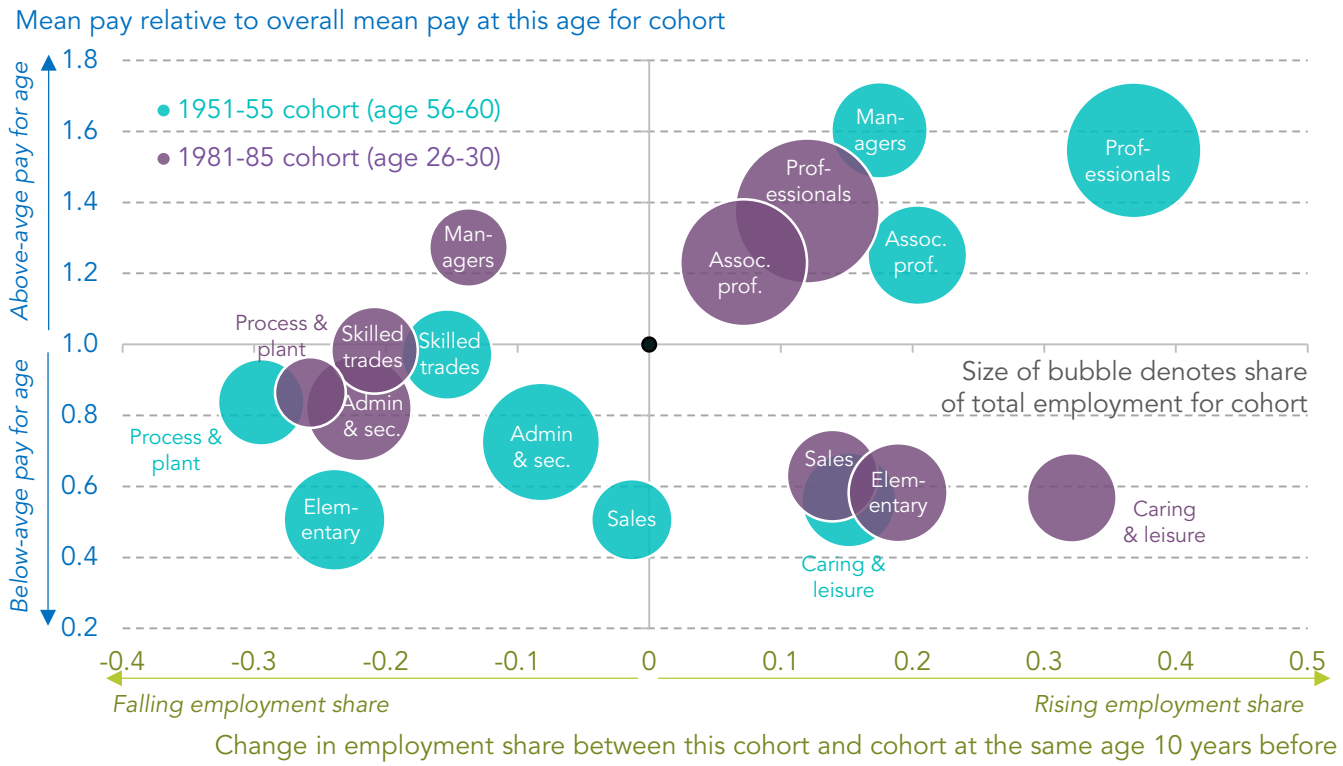
We find that both the younger and older cohorts captured have rising employment shares relative to predecessor cohorts in both higher-paying and lower-paying occupational groups. However, the growth is strongest at the top for the 1951-55 cohort, and strongest at the bottom for the 1981-85 cohort, signalling a drag effect on overall pay levels. In fact, the three fastest growing occupations for the 1951-55 cohort compared to the 1941-45 cohort at the same age 10 years before are the three highest paying; whereas for the 1981-85 cohort growth is strongest in the three lowest paying occupations. At the extreme, there has been a 32 per cent increase in the employment share of caring and leisure roles undertaken by 26-30 year olds compared to the cohort at that age 10 years before.

Changing industrial structures – which will be connected to the polarisation effects described above as well as long-term shifts towards the service sectors in the UK – are less clear-cut, but show signs of a similarly more concerning pattern for younger cohorts. For both the 1981-85 and the 1951-55 cohorts the strongest relative growth on the cohort at that age 10 years before has been in public services. Such jobs are relatively average-paying and so have little compositional effect. However, for the older 1951-55 cohort the next strongest growth has been in the two highest-paying sectoral groups (agriculture, mining energy and fuels; and finance and business services). In contrast,

34 M Arntz, T Gregory & U Zierhan, *The risk of automation for jobs in OECD countries: A comparative analysis*, OECD Social, Employment and Migration Working Papers 189, 2016

35 D Tomlinson, 'No country for young men?', *Resolution Foundation blog*, 9 February 2017

Figure 12: **The changing occupational structure for employees in the 1951-55 and 1981-85 cohorts compared to those at the same age 10 years before: UK, 2007-2015 compared to 1997-2005**



Notes: Changes in occupational coding frames are overcome using probabilistic matching based on dual-coded datasets provided by the Office for National Statistics. Analysis is tested over a shorter time-period using non-dual coded data to ensure these techniques are not distorting the results. See L Gardiner & A Corlett, *Looking through the hourglass: Hollowing out of the UK jobs market pre- and post-crisis*, Resolution Foundation, March 2015 for more details.

Source: RF analysis of ONS, *Quarterly Labour Force Survey*

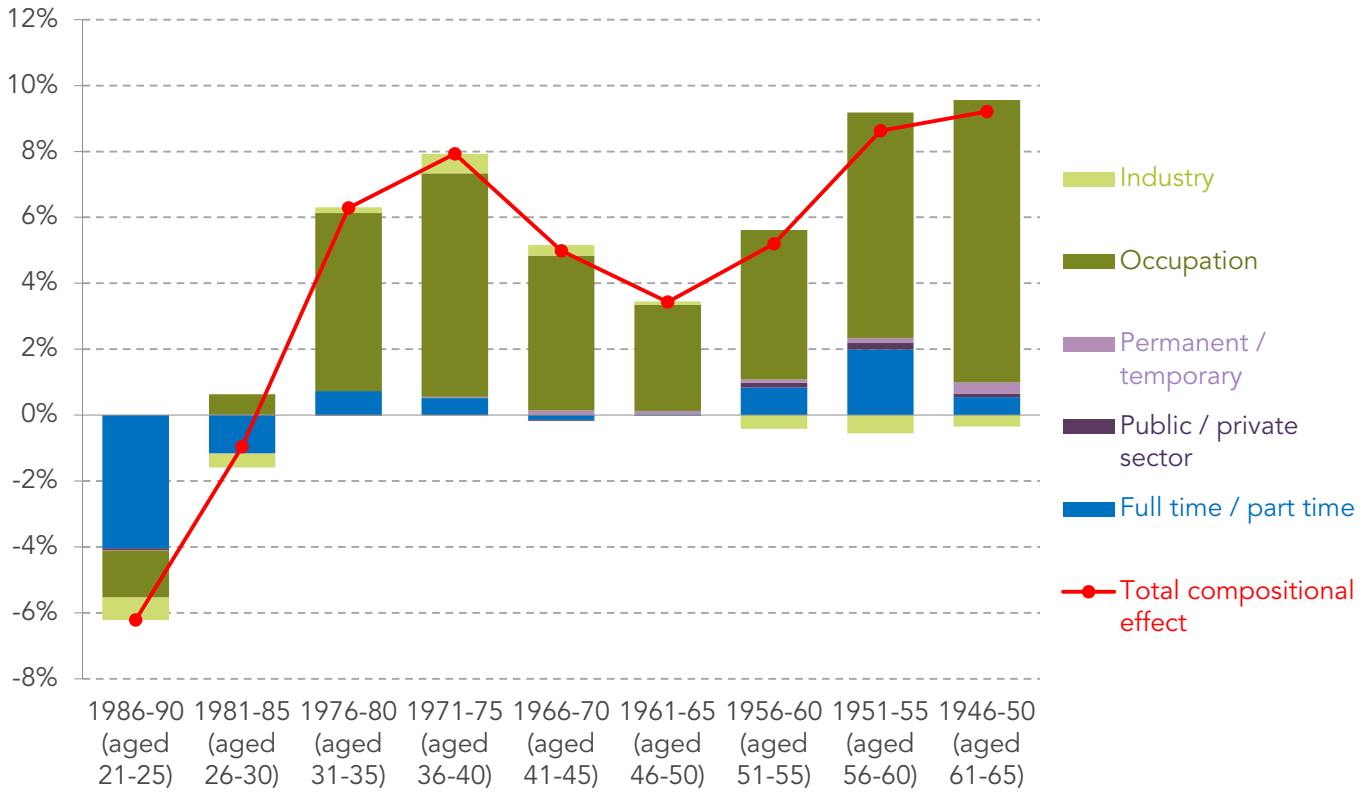
for the 1981-85 cohort the next strongest growth on the cohort 10 years before has been in the low-paid services grouping of hospitality, retail, transport and storage, signalling downward pressure on pay relative to the experiences of the older cohort.

The job characteristics of millennial cohorts have dragged on cohort-on-cohort wage improvements

Having discussed broad trends in job characteristics in this sub-section, we bring these together in Figure 13. It presents decompositions of the various multiple and overlapping job characteristics so far discussed (that are captured in our data over the entire time period) using the same approach as in Figure 8.

Figure 13: **The effect of changing job characteristics on pay growth between cohorts and those at the same age 10 years before: UK, 2007-2015 compared to 1997-2005**

Compositional effects on changes in real mean weekly pay for all employees (CPIH-adjusted)



Notes: Compositional effect estimated using a regression model to determine the average wage return to different characteristics over the entire period, returns are then multiplied by the changing share of successive cohorts with each characteristic (see Annex 1 for full details). See Box 1 for details on the measure of inflation used.

Source: RF analysis of ONS, *Quarterly Labour Force Survey*

Our results show a similar – but more extreme – pattern as the one detailed in Figure 8. Shifting job characteristics – predominantly from changing occupational shares for each cohort compared to that at the same age 10 years before – have boosted pay for baby boomer (born 1946-65) and generation X (born 1966-80) cohorts, but put downward pressure on cohort-on-cohort wage improvements for millennials (born 1981-2000). As with rising qualification levels discussed above, an improving profile of occupations is something that could be regarded as normal given productivity improvements and the long-term shift towards higher-skilled jobs. The fact that these effects are not felt by all cohorts is a new and important finding.

For the two millennial cohorts in this analysis the largest drag effect is in fact from a shift towards part-time working (as described above, and in contrast to older cohorts where a shift towards full-time working relative to cohorts 10 years prior provides a small uplift) with smaller downward effects from occupational changes (for the youngest) and broad industrial shifts.

In sum, the combination of a shift towards part-time working in the 20s and some downward pressure from occupational and industrial changes means that those born

in the 1980s are now doing lower-paying jobs than cohorts at the same age 10 years before them. This explains some of the stagnation in cohort-on-cohort pay growth that we highlighted in Section 1.

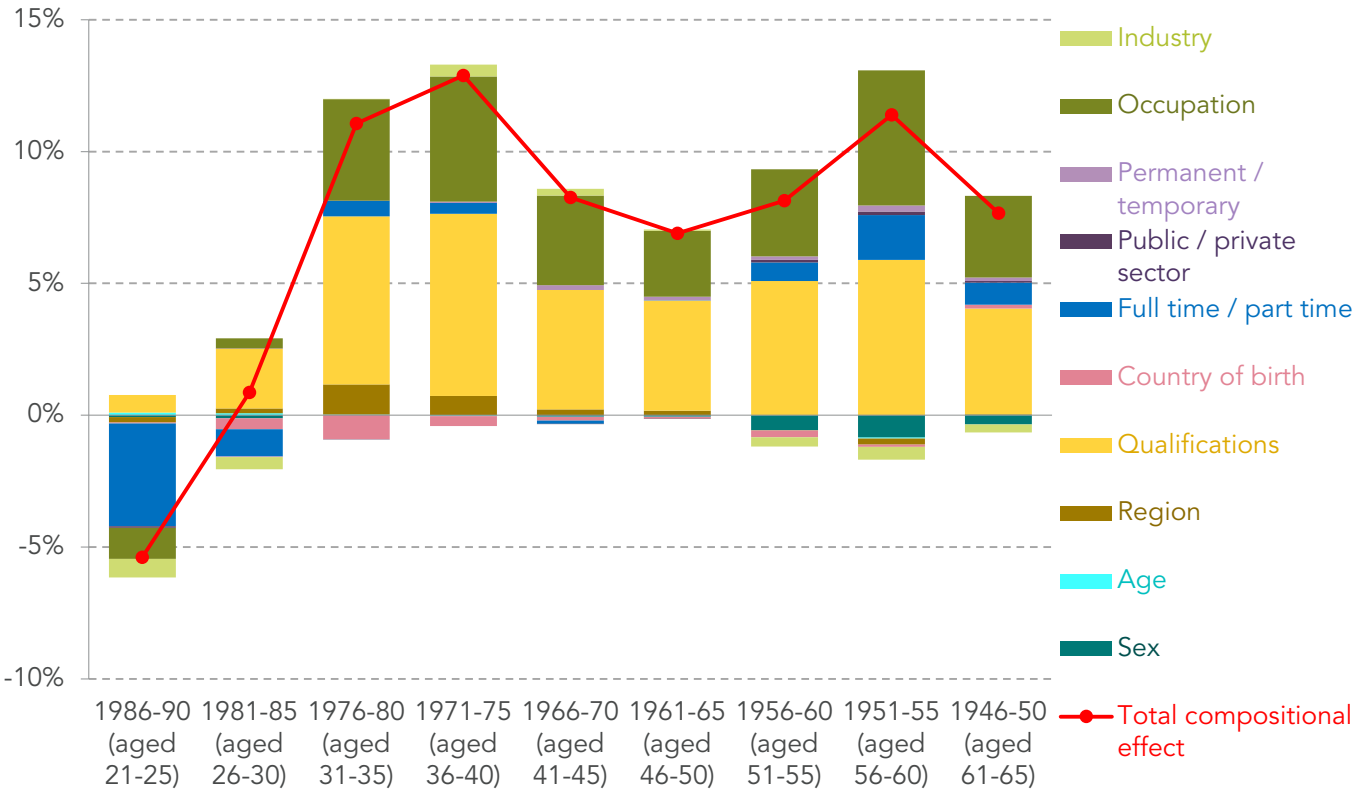
Relative to older generations, compositional shifts have dragged down cohort wage improvements for millennials

Having considered individual and job characteristics separately, here we bring them together in overall decompositions comparing the latest cohorts at each age with those at the same age 10 years before.

The results – shown in Figure 14 – reconfirm the patterns described in the preceding sub-sections. For baby boomer cohorts and cohorts in generation X, the combined effect of having different personal characteristics than those at the same age 10 years previously and different job profiles provides an average pay boost of 9.5 per cent compared to that prior cohort. This is driven predominantly by improving educational attainment cohort-on-cohort and a shift towards better-paying occupations.

Figure 14: **The combined effect of changing individual and job characteristics on pay growth between cohorts and those at the same age 10 years before: UK, 2007-2015 compared to 1997-2005**

Compositional effects on changes in real mean weekly pay for all employees (CPIH adjusted)



Notes: Compositional effect estimated using a regression model to determine the average wage return to different characteristics over the entire period. Returns are then multiplied by the changing share of successive cohorts with each characteristic (see Annex 1 for full details). See Box 1 for details on the measure of inflation used.

Source: RF analysis of ONS, *Quarterly Labour Force Survey*

For the oldest millennial cohort (born 1981-85) however, the compositional effect is close to zero, with a small boost to cohort-on-cohort pay changes at age 26-30 from improved qualifications roughly cancelled out by a drag effect from the shift towards part-time working and lower-paying industries. And for the next millennial cohort (born 1986-90) there has in fact been an overall compositional *drag* on cohort wage improvements at the very beginning of careers, driven predominantly by a shift towards lower-paying occupations and higher levels of part-time working.

As we have made clear in the discussion above, a compositional pay boost across cohorts and over time should be considered the norm given overarching qualifications patterns and occupational shifts. And given the large qualifications boost for older cohorts relative to those before them and the fact that most qualifications are gained by the early 20s, it would very likely have been so for those in their 20s in previous decades (unfortunately our data does not capture older cohorts at this age). This finding of near-zero and then negative overall compositional effects for the youngest cohorts captured in our data is therefore a profound shift, and one that helps us to understand the differences between cohorts in terms of the overall wage patterns previously shown in Figure 2.

Considering the future briefly we might speculate that, because they have mostly finished education, the cohorts born in the 1980s will carry their relatively smaller uplift from qualification improvements with them as they progress through their careers. A key question for these cohorts is therefore the extent to which the effects of those job characteristics exerting downward pressure on cohort earnings changes – industries, occupations and part-time working – will reverse in coming years.

Likewise, a key question for cohorts not yet captured in our data is whether the old rate of cohort-on-cohort qualifications improvements is a thing of the past or can be re-established to some degree. Given past progress, this will most likely involve a continued focus on the numbers going to university, but also attention beyond degree-level qualifications to other levels at which significant shifts in attainment can be achieved.

In summary, we have seen that 1970s cohorts, for example, currently have pay levels similar to those 10 years previously at the same age. But they generally are far more qualified and working in higher-status occupations than their peers 10 years before, trends that would normally lead to higher pay across generations. This suggests that pay levels for given personal and job characteristics are substantially below those of those 10 years before, and this is what we turn to next.

Declining cohort-on-cohort wage returns to individual and job characteristics have been quite uniform, but weighed more heavily for the young

So far this section has discussed in detail various changes in the characteristics of cohorts and the jobs they do at a given age, summarised in the decompositions above. To conclude, we briefly consider the other half of the equation: the part of cohort-on-cohort wage improvements at a given age that *isn't* explained by compositional factors, which can be termed the 'wage returns' effect.

This wage returns effect can be broken down into general cohort-on-cohort improvements in returns (i.e. pay levels for all groups of workers), and changing returns to specific individual and job characteristics from one cohort to the next (i.e. changes in

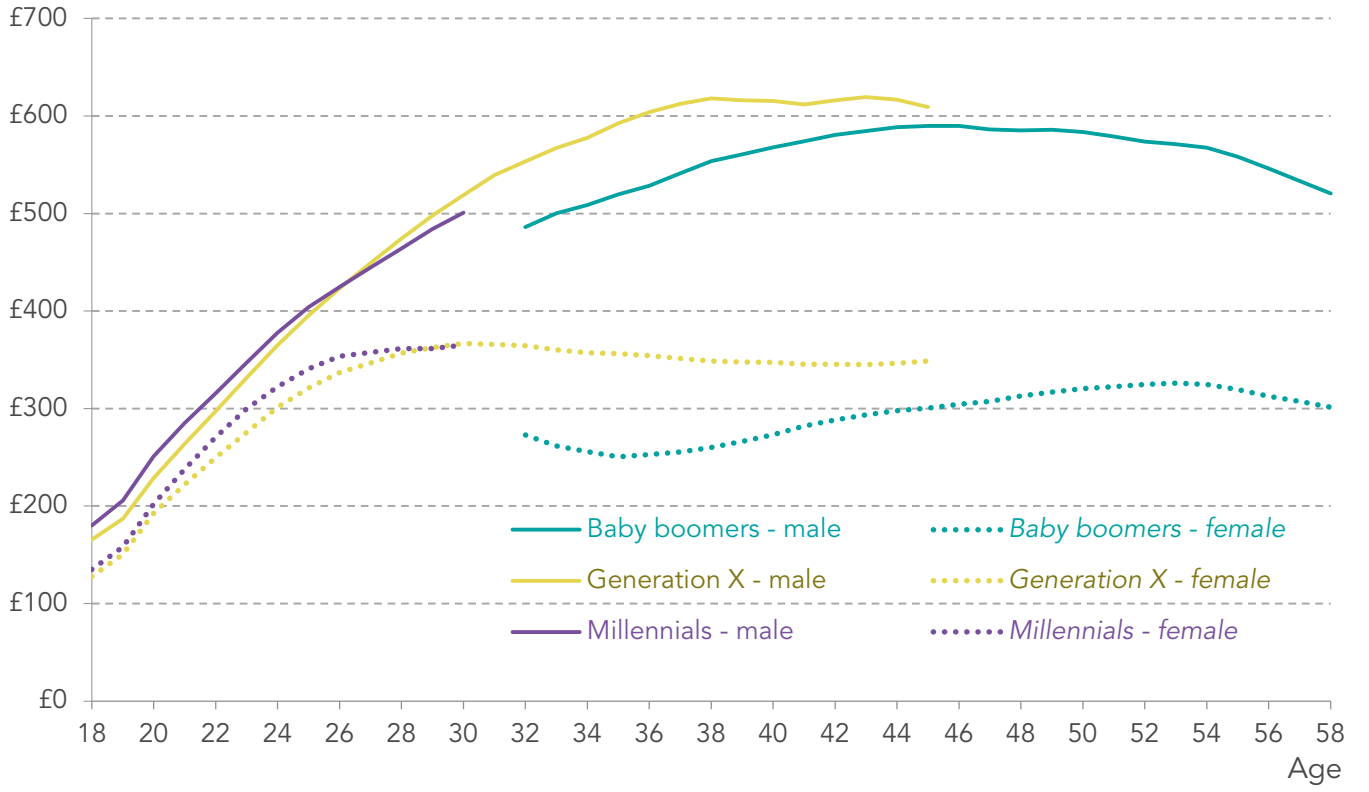
the return to – say – having a degree). In this sub-section we first consider how generational wage trends have differed for those with certain characteristics, as an introduction to our decomposition of the 'wage returns' effect into its constituent parts.

Gender pay returns

Turning first to differing pay returns for men and women across the generations, Figure 15 summarises trends since 1992. We find a similar direction of travel in terms of generational pay stagnation for both men and women in each generation, but a slightly more marked slowdown for men. For example, the oldest men in generation X are closer to their baby boomer counterparts at the same age than generation X women are; and the oldest male millennials are below their generation X counterparts at 30, whereas female millennials are roughly in line.

Figure 15: **Median pay by age for each five-year birth cohort, by sex: UK, 1992-2016**

Median real weekly pay for all employees (CPIH-adjusted to 2016 prices)



Notes: Cohorts are only included if all five birth years are present in the data. Data smoothed using a three-year rolling average over the age range; see Box 1 for details on the measure of inflation used. Estimates based on Great Britain only pre-1995. See Box 1 for details on the measure of inflation used.

Source: RF analysis of ONS, *Quarterly Labour Force Survey*

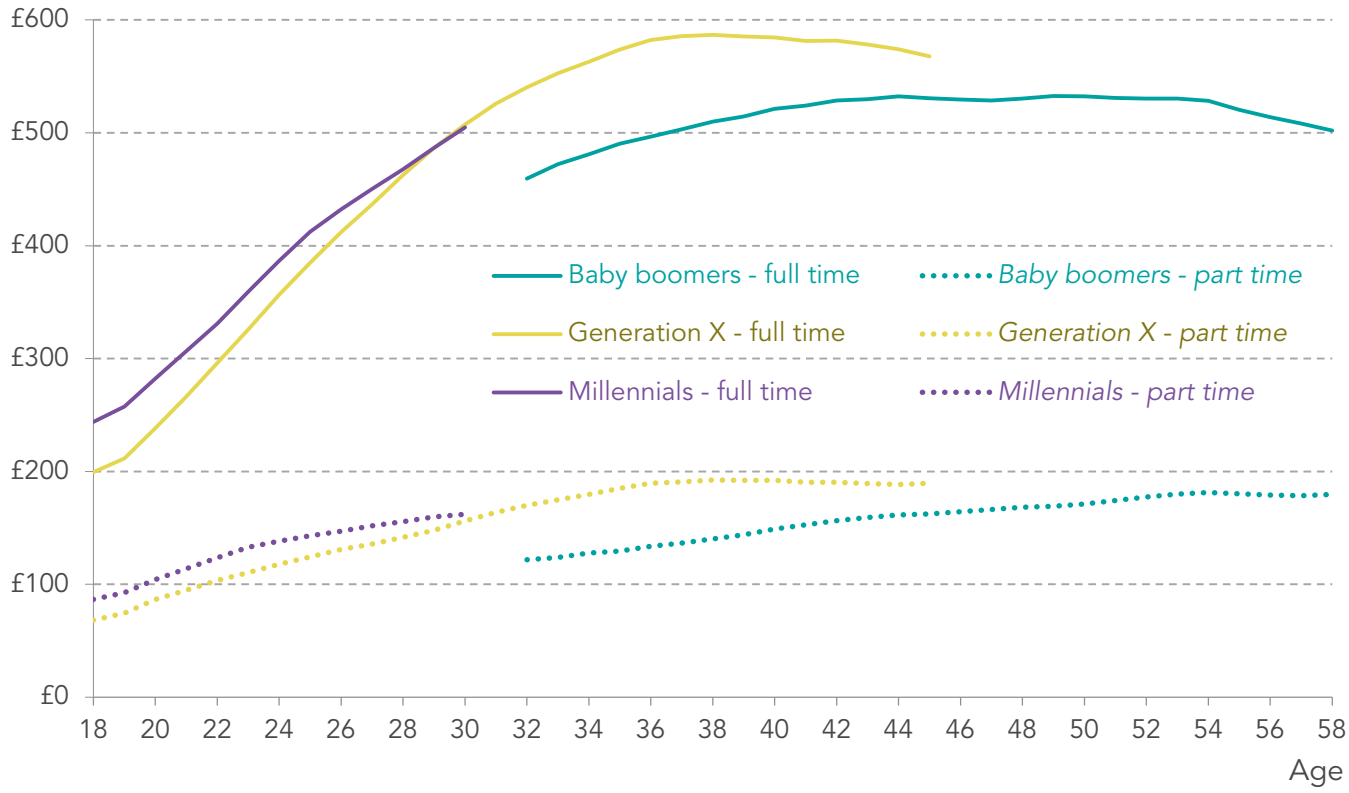
As previous analysis for the Intergenerational Commission has set out (focusing on hourly pay for which overall trends are fairly similar), the fact that the oldest millennials have very similar earnings patterns across the sexes at age 30 to generation X before them means that the gender pay gap – which in the 20s is much lower for millennials than it is for generation X – opens back up. This suggests that generational improvements in gender pay differences are stalling when the traditional challenges associated with having children arise.[36]

Working hours pay returns

Turning next to a consideration of how pay trends have shifted from generation-to-generation across full- and part-time employees, we again find that the overall pattern holds for both groups. In fact, as Figure 16 shows (though it is to some extent obscured by the scale), relative improvements have been slightly larger for part-time employees

Figure 16: **Median pay by age for each five-year birth cohort, by working hours: UK, 1992-2016**

Median real weekly pay for all employees (CPIH-adjusted to 2016 prices)



Notes: Cohorts are only included if all five birth years are present in the data. Data smoothed using a three-year rolling average over the age range; see Box 1 for details on the measure of inflation used. Estimates based on Great Britain only pre-1995. See Box 1 for details on the measure of inflation used.

Source: RF analysis of ONS, *Quarterly Labour Force Survey*

36 L Gardiner, 'Is the gender pay gap on the brink of closure for young women today?', *Resolution Foundation blog*, 4 January 2017

in each generation. For example 25-year-old full-time millennials have so far earned 7 per cent more than generation X at the same age; for part-time employees the equivalent figure is 15 per cent.

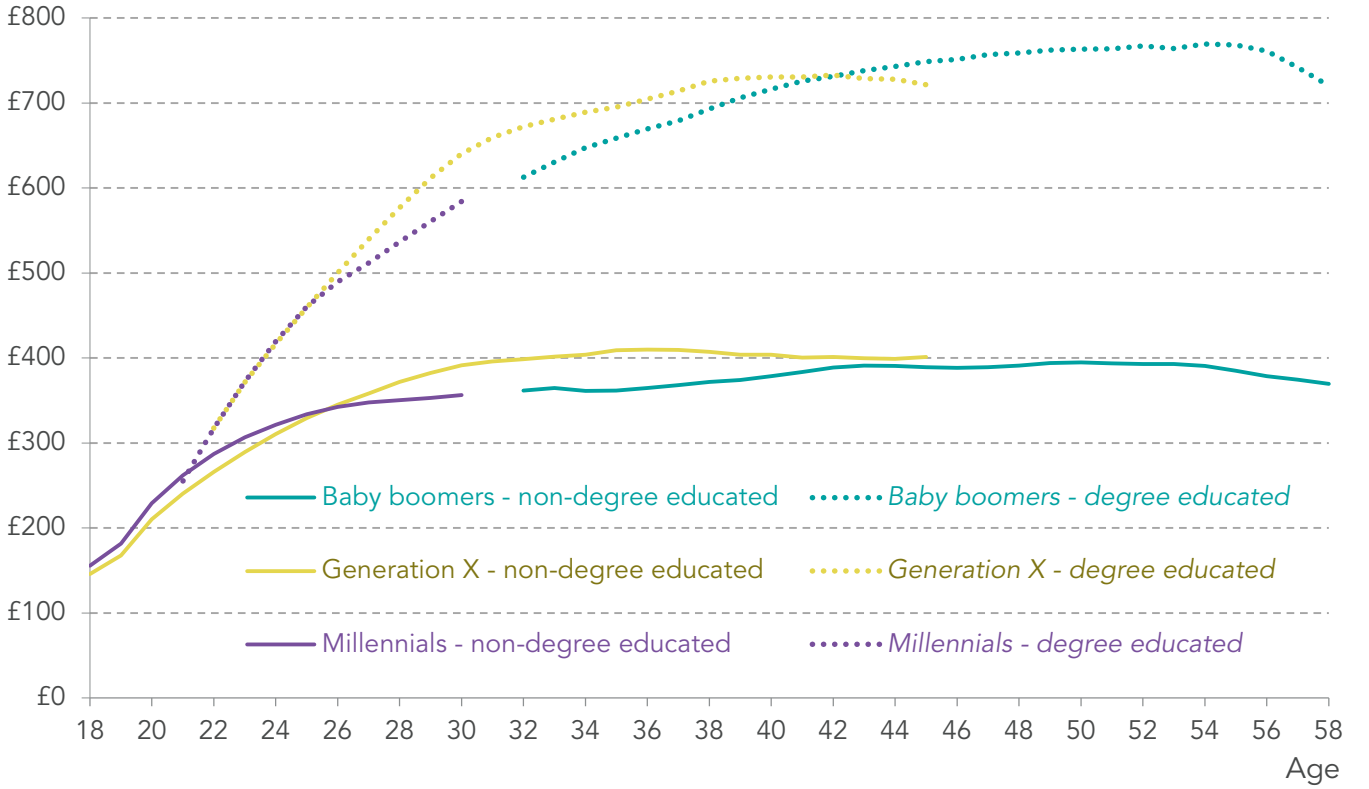
It's worth noting that millennials record modest improvements in pay relative to generation X in both the full- and part-time employee groups. This runs slightly counter to the overall picture in Figure 1, but is evidence of the role of the compositional drag effect of increased part-time working in the 20s, discussed above.

Qualification pay returns

In a similar vein, Figure 17 shows generational wage trends for employees with degrees and those without. The fact that both categories of millennials are doing worse relative to generation X (and likewise generation X compared to baby boomers) than the overall picture presented in Figure 1 highlights the compositional *boost* provided by rising levels of educational attainment across cohorts that we described above.

Figure 17: **Median pay by age for each five-year birth cohort, by educational attainment: UK, 1995-2016**

Median real weekly pay for all employees (CPIH-adjusted to 2016 prices)



Notes: Cohorts are only included if all five birth years are present in the data. Data smoothed using a three-year rolling average over the age range. See Box 1 for details on the measure of inflation used. Estimates based on Great Britain only pre-1995. See Box 1 for details on the measure of inflation used.

Source: RF analysis of ONS, *Quarterly Labour Force Survey*

Indeed, isolating these 'within-group' trends shows that the oldest millennials so far look on track to achieve the same real wage at a given age as the baby boomers with similar qualifications did some decades before. Of course, it is very likely these comparisons are not like-for-like, particularly given that a much higher share of millennials hold degrees than baby boomers did at the same age, but nonetheless the reversion to an earnings trajectory two generations back is quite striking.

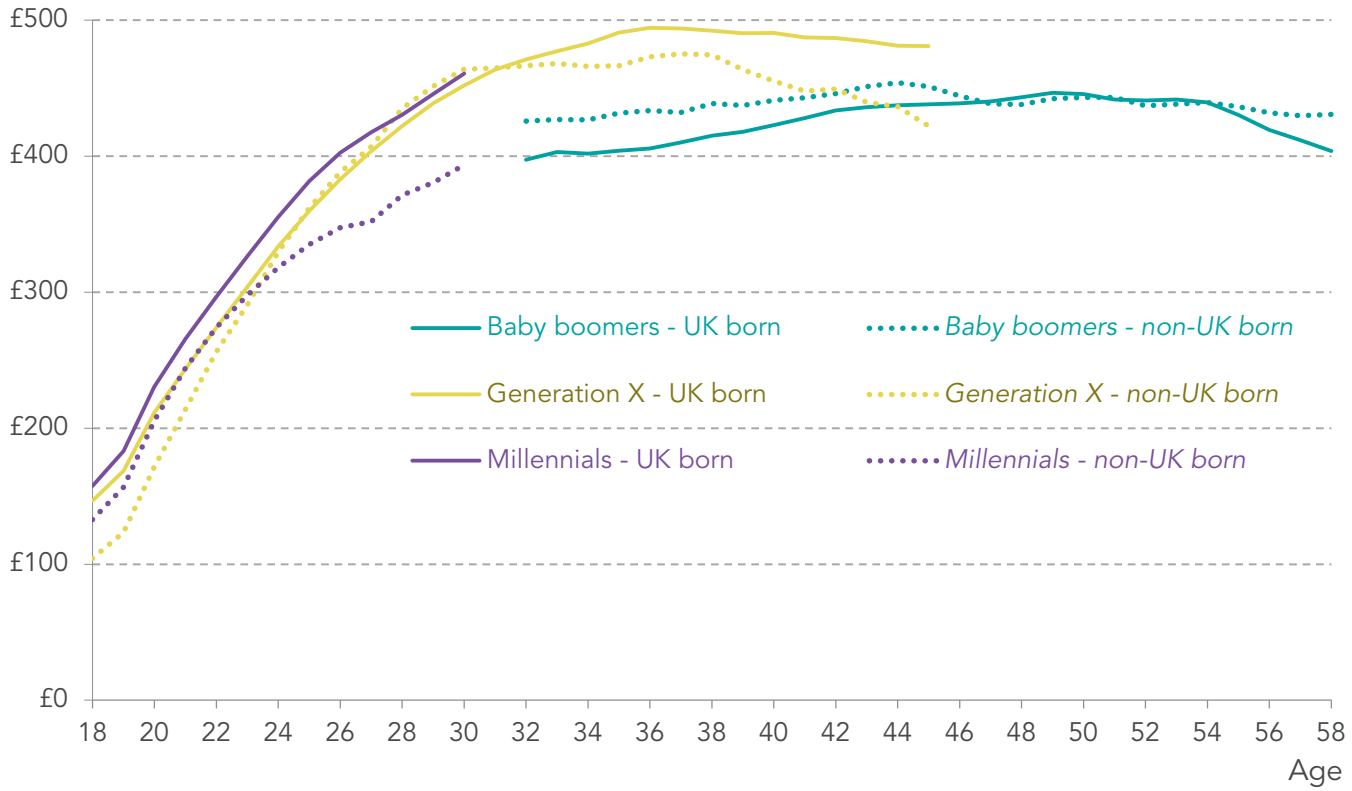
Indeed, the enormity of this needs some taking in. Young graduates now are earning the same as graduates born over two decades before did at the same point in their careers. There we far more graduates in 1960 than there were before the Second World War but the idea that they might earn no more than the previous group at the same age would have been beyond belief. But that is the world we are in today. Much research on returns to having a degree reflects wages of graduates compared to non-graduates within a cohort. This is done because there has been the expectation that of course they would earn more than graduates five, ten or twenty years ago. The stagnation in graduate pay has thus been widely missed.

Country of birth pay returns

Finally, and in a break from the relatively consistent trends within groups described above, Figure 18 shows generational pay trends separately for UK born and non-UK born employees. In particular, it highlights that millennials born outside the UK have experienced a sharp divergence from non-UK born members of generation X and appear on track to match or even fall short of the earnings of non-UK born baby boomers at the same age. Likewise, older non-UK born members of generation X have diverged sharply from their UK-born counterparts and dropped below non-UK born baby boomers at the same age in the latest data. These divergences will reflect the shift towards lower-skilled A8 immigration over the past decade described earlier in this section.

Figure 18: **Median pay by age for each five-year birth cohort, by country of birth: UK, 1992-2016**

Median real weekly pay for all employees (CPIH-adjusted to 2016 prices)



Notes: Cohorts are only included if all five birth years are present in the data. Data smoothed using a three-year rolling average over the age range. See Box 1 for details on the measure of inflation used; estimates based on Great Britain only pre-1995. See Box 1 for details on the measure of inflation used.

Source: RF analysis of ONS, *Quarterly Labour Force Survey*

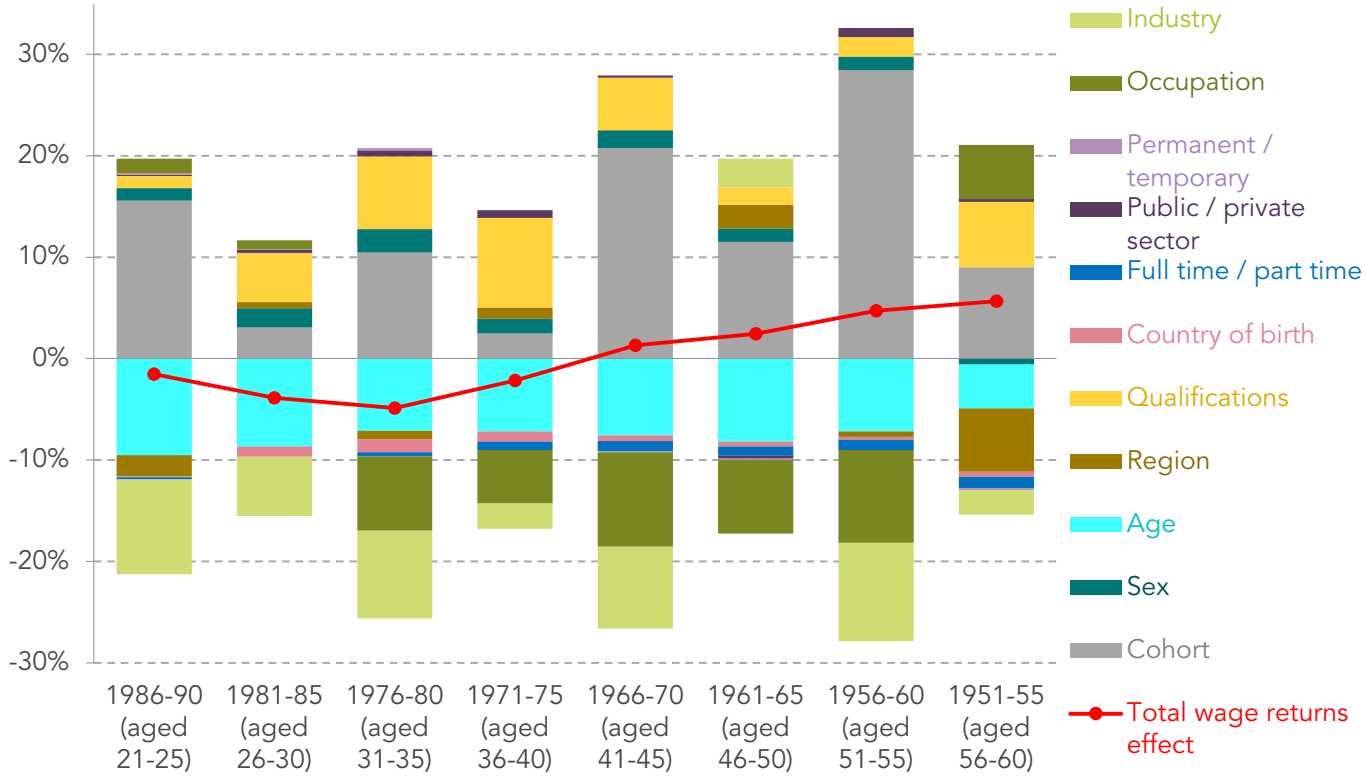
The flipside of these patterns is that when isolating just the UK-born members of each generation, we find that millennials so far have earned slightly more than members of generation X at the same age (and generation X are further above baby boomers than the overall picture in Figure 1 suggests).

Taken together, wage return effects appear negative for younger cohorts and positive for older ones

Of course, as in earlier parts of this section, these various characteristics overlap. For example the generational wage differences for non-UK born, degree educated men working full time will reflect some interaction of the trends isolated above. For this reason, Figure 19 presents the results of our wage returns decompositions, which separate the changing returns to (pay level associated with) overlapping characteristics from generalised cohort-on-cohort improvements in wage returns.

Figure 19: **The combined effect of changing wage returns to characteristics on pay growth between cohorts and those at the same age 10 years before: UK, 2007-2015 compared to 1997-2005**

Wage returns effects on changes in real mean weekly pay for all employees (CPIH-adjusted)



Notes: Wage returns effect estimated using separate regression models to determine the average wage return to different characteristics for each cohort, returns are then multiplied by the average share of employees with each characteristic over the whole period (see Annex 1 for full details). The 1946-50 cohort is omitted due to volatile effects. See Box 1 for details on the measure of inflation used.

Source: RF analysis of ONS, *Quarterly Labour Force Survey*

As in the analysis of the impact of changing characteristics earlier in this section, each bar in Figure 19 shows a separate decomposition, comparing the cohort at the age specified to the cohort at the same age 10 years before (2007-2015 compared to 1997-2005). Via a series of regression models we calculate a pay premium or penalty associated with each individual characteristic – for example holding a degree-level qualification or being born in Europe – separately for each of the cohorts captured at that age, and also an overall pay return (the constant of each of the regressions) for each cohort as a whole. By multiplying these changing coefficients by the average frequency of each characteristic across cohorts at that age, we derive the net effect of changing wage returns within each set of characteristics, and the overall wage returns effect. (Annex 1 provides full details on our method).

The wage returns effects in Figure 19 are quite volatile, but two patterns are evident. First, the overall pattern, given by the red line, can be interpreted as showing that holding workforce composition constant, wages have fallen compared to cohorts 10 years previously for young cohorts. In contrast, older cohorts have still achieved real pay gains relative to those 10 years before them. Secondly, the overall wage effect is

effectively a story of two parts: the part that applies to all workers (shown by the grey bars) which is positive but strongest for older cohorts; and the part reflecting returns to specific characteristics such as qualifications and occupations.

In relation to these returns to specific characteristics, the picture is more mixed, but there are two major stories worth reflecting on. First, holding everything else constant, the returns to qualifications are positive and therefore rising for all cohorts compared to those at the same age 10 years previously. But the returns to industry and especially occupation for given qualification levels are falling. So graduates continue to earn more than non-graduates doing the same jobs – in fact increasingly so – but the value of being in a higher-status job or what were higher-paying industries is falling.

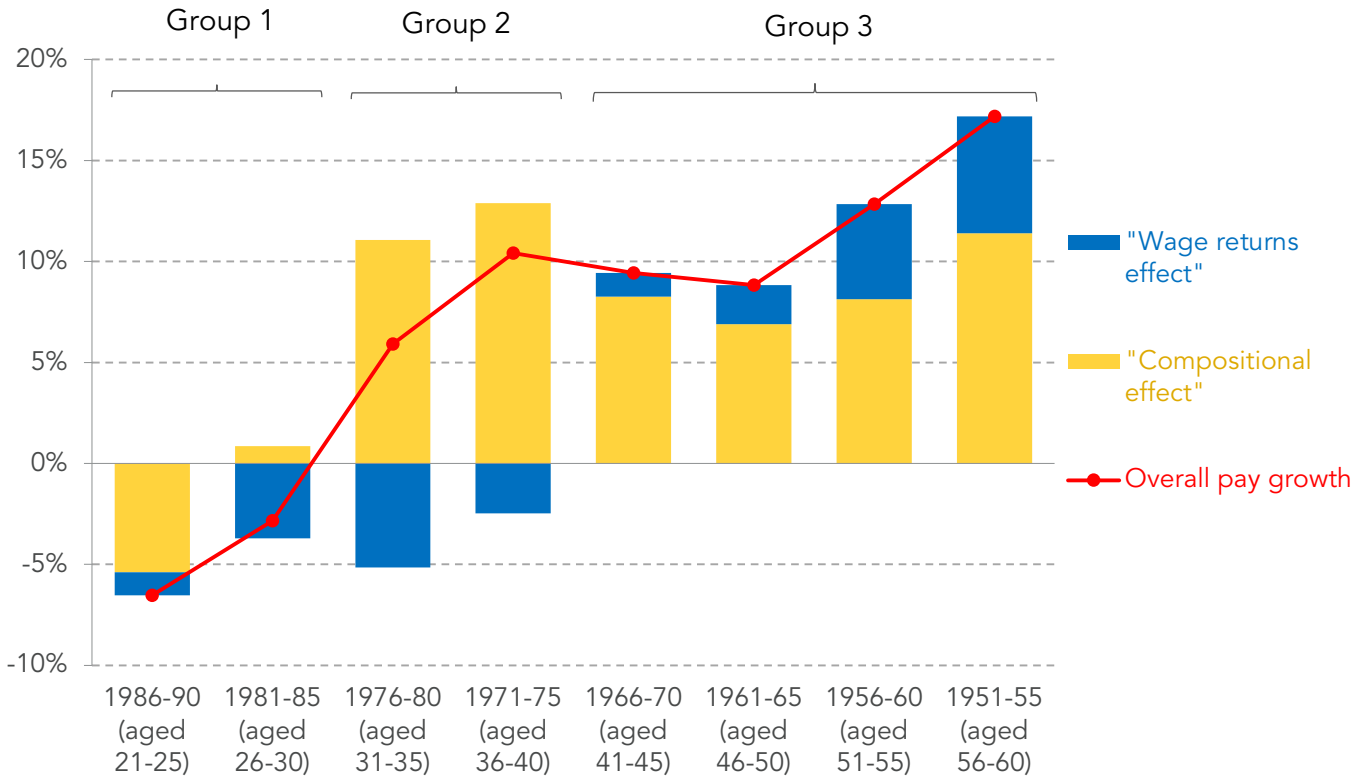
Secondly, within each cohort those who are older are also doing worse compared to 10 years before, shown by the consistently negative wage returns associated with each single year of within-cohort age. Essentially, as we have seen throughout this study, the normally rising age-earnings profile has stalled with cohorts going sideways as they age rather than earning more.

Overall cohort wage improvements as a function of compositional and wage returns effects

By definition, the overall wage returns effect discussed above is the difference between the compositional effects identified earlier in this section, and overall wage changes between each of these cohorts and those at the same age 10 year before. As such, we can bring these compositional and wage returns effects together to summarise their respective roles in explaining cohort-on-cohort real wage changes across the life course. The results are shown in Figure 20.

Figure 20: **'Compositional' and 'wage returns' effects on pay growth between cohorts and those at the same age 10 years before: UK, 2007-2015 compared to 1997-2005**

Change in real mean weekly pay for all employees (CPIH-adjusted)



Notes: Compositional effect estimated using a regression model to determine the average wage return to different characteristics over the entire period, returns are then multiplied by the changing share of successive cohorts with each characteristic to determine the compositional effect, and the wage returns effect is the difference between that and overall pay growth (see Annex 1 for full details). The 1946-50 cohort is omitted due to volatile effects. See Box 1 for details on the measure of inflation used.

Source: RF analysis of ONS, *Quarterly Labour Force Survey*

In keeping with our discussion of overall earnings trends across five-year cohorts in Section 1, we find that overall pay changes between cohorts at a given age and those at the same age a decade before rise with age (i.e. cohort-on-cohort improvements have been stronger in recent decades for older cohorts). Within this overall effect, our analysis points to three groups:

- The youngest two cohorts we have data for – **the millennials born in the 1980s** (Group 1 in Figure 20) – whose recent pay has been lower than cohorts 10 years before them at the same age, driven by **a negligible compositional effect or compositional drag, and a negative wage returns effect**.
- **The two cohorts born in the 1970s** – the younger two-thirds of generation X (Group 2) – whose wage improvements in their 30s on the cohorts 10 years prior have been driven by **a strong compositional boost, only partially offset by falling wage returns**.
- The **four cohorts born in the 1950s and 1960s** – the youngest three-quarters of baby boomers and oldest cohort in generation X (Group 3) – whose recent wage

improvements on cohorts at the same age 10 years before them have been driven by **a substantial compositional boost (although generally slightly smaller than that for the previous group born in the 1970s) in addition to a positive wage returns effect**.

This section has presented a range of information about the characteristics of cohorts at a given age and how they and the wage returns associated with each of them have changed over time. This has given us a complex, but rich picture of why earnings have differed between cohorts at a given age – what we might term a 'static' description of the trends underlying overall cohort earnings outcomes discussed in the introduction. In the following section we turn to a 'dynamic' analysis of how these changes have come about, by disaggregating the different routes to individual (which can be aggregated to cohort) wage progression over the course of a year.

Section 3

The drivers of slower cohort earnings progression

Following on from the analysis in the previous section of changing cohort characteristics and the changing wage returns associated with these, this section switches focus onto the mechanisms via which individuals' and cohorts' wages change from one year to the next.

We describe cohort wages as a function of two things: the starting pay rates individuals receive when first entering the labour market, and progression rates thereafter. We then explore the major transitions via which individuals' earnings change – changing firms, building tenure with an employer, or exiting and entering the jobs market – in order to understand why progression rates have slowed. Our findings show that lower pay rises associated with building tenure with a firm – particularly at longer tenures – are the dominant factor in explaining the overall cohort progression slowdown across age groups. Falling job moves and declining pay rises associated with them have added to the slowdown for some younger cohorts.

We conclude by showing that while all cohorts have suffered a big pay hit, younger ones are further from where they might have been in the absence of the worsening of starting pay levels and progression rates over the past two decades.

Cohort wage outcomes are a function of starting wages and progression rates

The focus of this section is on the mechanisms that drive individual and cohort earnings changes over careers. To start with, we can imagine a highly-simplified model in which an employee's[37] wage at any given age is a function of:

- The pay he or she receives when first entering the labour market – the **starting wage**; and
- The pay rises he or she is awarded each year thereafter – his or her **progression rate** at each age.

Taking the second of these and extrapolating from the individual employee to everyone else born in the same year, we can further disaggregate average progression rates for cohorts as a function of:

- The **frequency with which employees move from one job to another** and the **average pay increase** associated with such moves;
- The **likelihood of an employee staying with their employer** from one year to the next and the **average pay rise** such tenure gains bring;[38] and

37 Because this section is focused on pay progression and the Labour Force Survey data we use contains no earnings information for the self-employed, the focus is on outcomes and transition rates for employees only.

38 Ideally we would separate this category into tenure gains in the same job and within-firm promotions. However this is not possible in the data available.

- The **likelihood of employees within the cohort entering or exiting the employee workforce** from/to spells of worklessness[39] over a year and the **difference between the wages** of those who enter and those who exit.

Exploiting the longitudinal element of the Labour Force Survey, which tracks individuals over the course of a year and since 1998 has captured pay levels at the start and end of that year (see Box 2 in the previous section for further details), this is exactly the analysis we undertake in this section. We do this to understand which of the starting wages and these various progression transitions dominate in explaining where different cohorts' wages have ended up, and how the impact across cohorts has been felt over the past two decades.

To begin, we briefly describe trends in starting wages and in the likelihood of and returns to the different transitions outlined above.

Starting wages have fallen markedly for cohorts born in the 1990s

One of the ways in which we've come to expect each successive cohort to improve on the real earnings of previous ones at the same age is via a higher starting wage upon entering work for the first time. Figure 2 in Section 1 showed that this has generally been the case in recent decades, but that it doesn't hold true for all cohorts. For example, the 1986-90 cohort started (at age 22) with a wage below the starting pay at that age for those in the 1976-80 and 1981-85 cohorts.

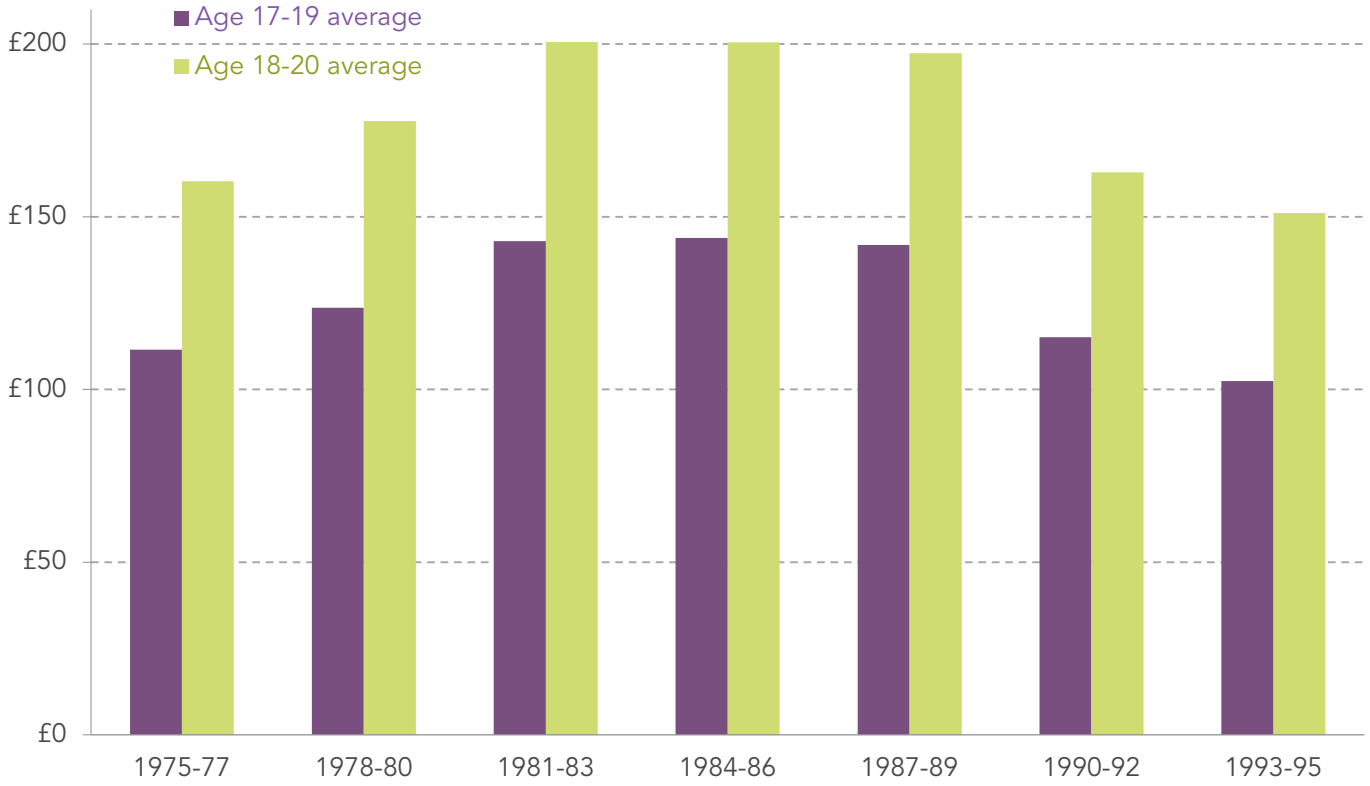
Figure 21 zooms in, by looking at trends in starting wages for successive three-year cohorts at ages 17-19 and 18-20.[40] It shows rising starting wages through the late-1970s, consistent starting wages throughout the 1980s, and substantial falls in starting wages for the two three-year cohorts born in the 1990s. As a result, the 1993-95 cohort records a lower starting point than the 1975-77 cohort (whichever age range we focus on), and a starting wage 25-30 per cent (or £40-£50 per week) lower than that of the cohort nine years before them.

39 Or self-employment.

40 With ever-rising numbers participating in higher education, selecting age 16 or 17 as the starting point for cohorts becomes increasingly volatile, with fewer and fewer participating in the labour market in successive cohorts, and those who do participate increasingly likely to be doing student jobs that are fairly independent of future prospects. On the basis of current trends, ages up to 20 seem a sensible cut-off point for measuring starting wages.

Figure 21: **Median pay for employees in selected three-year birth cohorts: UK, 1992-2015**

Median real weekly pay (CPIH-adjusted to 2016 prices)



Notes: Cohorts are only included if all three birth years are present in the data. Data smoothed using a three-year rolling average over the age range. Estimates based on Great Britain only pre-1995. See Box 1 for details on the measure of inflation used.

Source: RF analysis of ONS, *Quarterly Labour Force Survey*

It's worth noting that the two 1990s cohorts reached the age ranges covered here (i.e. 17-20) over the period 2007-2015, pointing very clearly to a marked hit to starting pay rates associated with the financial crisis and subsequent pay squeeze.

At the end of this section we consider how these changes to starting wage levels for the youngest cohorts have combined with progression trends to determine pay outcomes. Moving on from the pay level at which a cohort enters the jobs market for now, we next consider trends in the major 'transitions' an employee can make over the course of a year.

Job mobility and labour market entry and exit rates have fallen, with a corresponding increase in job tenure

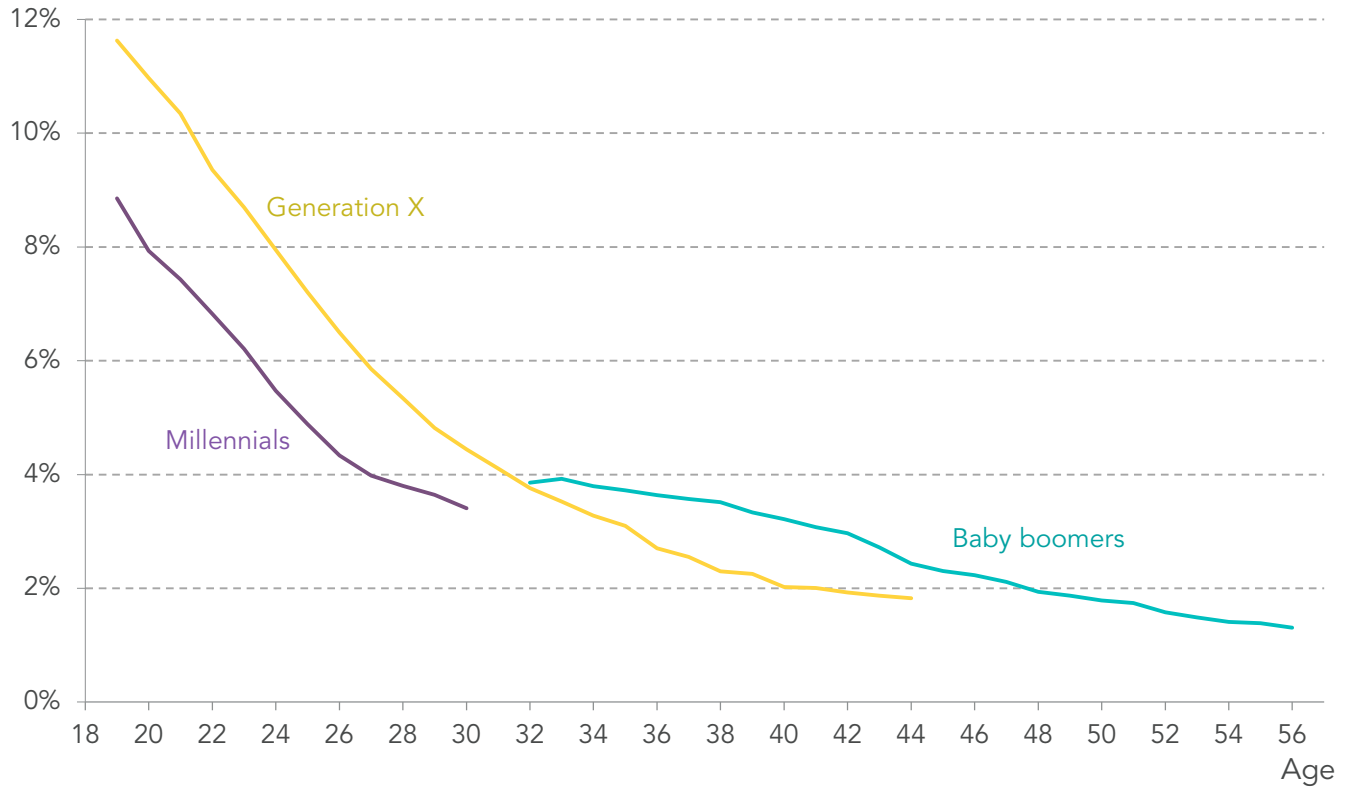
The first of these is the likelihood of moving from one job to another, which previous Resolution Foundation research shows has fallen since the early 2000s and is particularly far from its peak (relative to the overall strength of the labour market) for younger workers.[41]

41 L Gardiner, *RF Earnings Outlook: Q4 2015*, Resolution Foundation, April 2016

Figure 22 (which shows our preferred job-to-jobs moves measure from the quarterly Labour Force Survey data – the 'voluntary' move rate following a resignation – rather than the measure from the longitudinal data we use later on) confirms this long-running decline in the move rate from a generational perspective. It shows, for example, that millennials are so far an average of 2 percentage points below the mobility rate recorded by generation X at the same age, while generation X is so far an average of 0.8 percentage points below the move rate of baby boomers at the same age.

Figure 22: **Job-to-job moves by age for each generation: UK, 1992-2016**

Proportion of employees voluntarily moving from one job to another each year



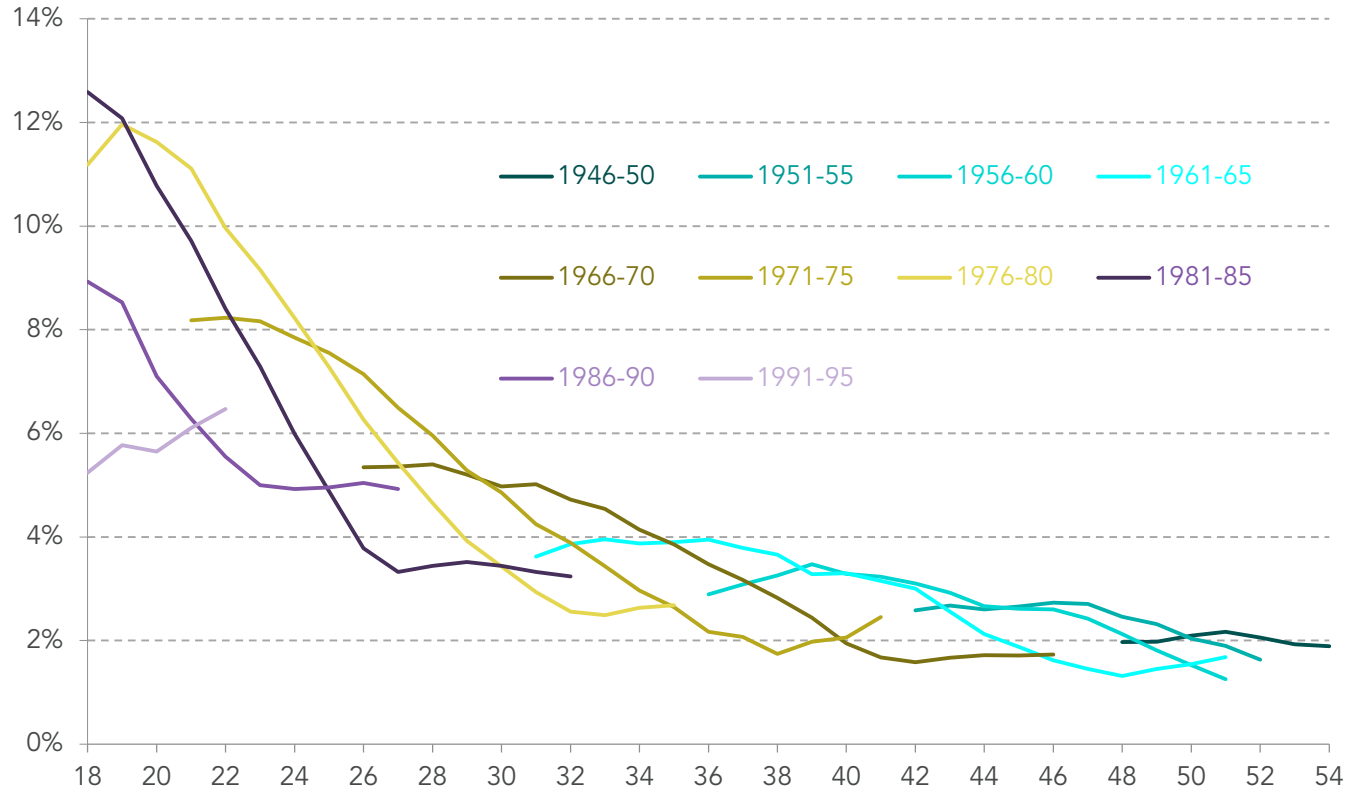
Notes: Generations are only included if at least five birth years are present in the data. Data smoothed using a three-year rolling average over the age range. Estimates based on Great Britain only pre-1995.

Source: RF analysis of ONS, *Quarterly Labour Force Survey*

Figure 23 gives a more detailed perspective, showing job mobility rates for three-year cohorts. It confirms the decline in mobility rates for successive cohorts at the same age that Figure 22 highlighted, but also (because of the much more narrowly-defined cohorts) shows that mobility appears to have picked up somewhat in recent years for younger cohorts – reflecting the aggregate trend mentioned above.

Figure 23: **Job-to-job moves by age for selected three-year birth cohorts: UK, 1992-2016**

Proportion of employees voluntarily moving from one job to another each year



Notes: Cohorts are only included if all three birth years are present in the data. Data smoothed using a three-year rolling average over the age range. Estimates based on Great Britain only pre-1995.

Source: RF analysis of ONS, *Quarterly Labour Force Survey*

While overall mobility rates are relatively low even when performing strongly (one-in-ten members of generation X moved job at age 21 for instance, and just 1-in-25 baby boomers at age 34), there are reasons to believe they have significance beyond those individuals who move jobs in any given year.

For example, previous Resolution Foundation research has suggested that, because they tend to occur above the bottom rungs of pay ladders, job moves often create chains of vacancies in their wake and draw people up from existing jobs into new opportunities, therefore having something of a compound effect.[42] In addition, on the basis that the job-to-job move rate tends to be a strong leading indicator of overall wage trends, we have speculated that employees voluntarily leaving jobs may have ripple effects into pay

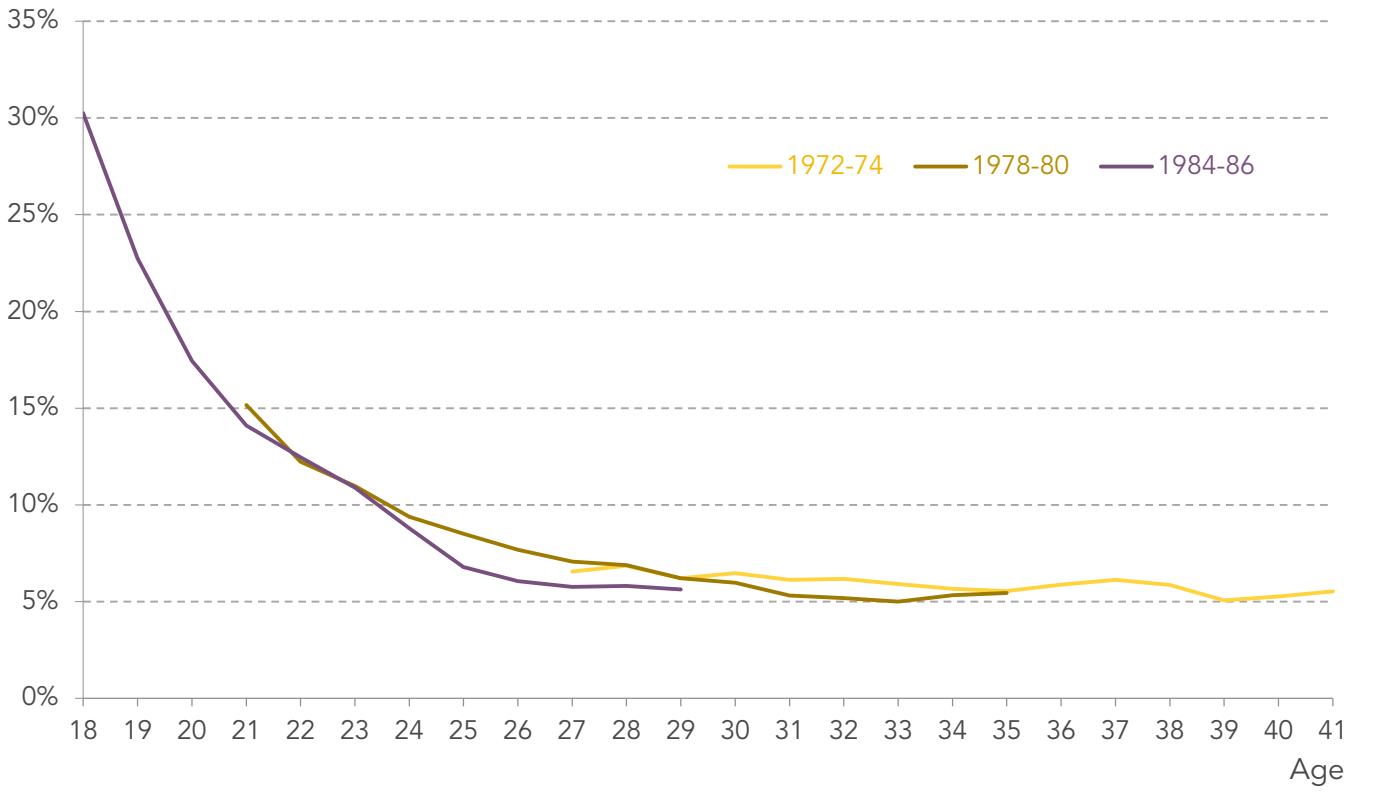
42 P Gregg & L Gardiner, *A steady job? The UK's record on labour market security and stability since the millennium*, Resolution Foundation, July 2015

for other workers, for example spooking the firm that they leave into boosting pay for existing staff so as not to lose more people.[43] The wider significance of job mobility rates to progression outcomes is a topic to which we return later in this section.

Alongside declining job mobility across cohorts (with some evidence of a partial reversal for younger cohorts in the latest data), Figure 24 shows that there has been a very small decline in the average entry/exit rate for recent three-year cohorts.

Figure 24: **Employee job entry/exit rate for selected three-year birth cohorts: UK, 1998-2016**

Average of entries and exits over a year, as a proportion of the average number of employees in that year



Notes: Aside from for the youngest and oldest workers, entry and exit rates tend to be roughly equal at a given age in a given period, therefore averaging the two is felt to be a reasonable approach. Cohorts are only included if all three birth years are present in the data. Data smoothed using a three-year rolling average over the age range.

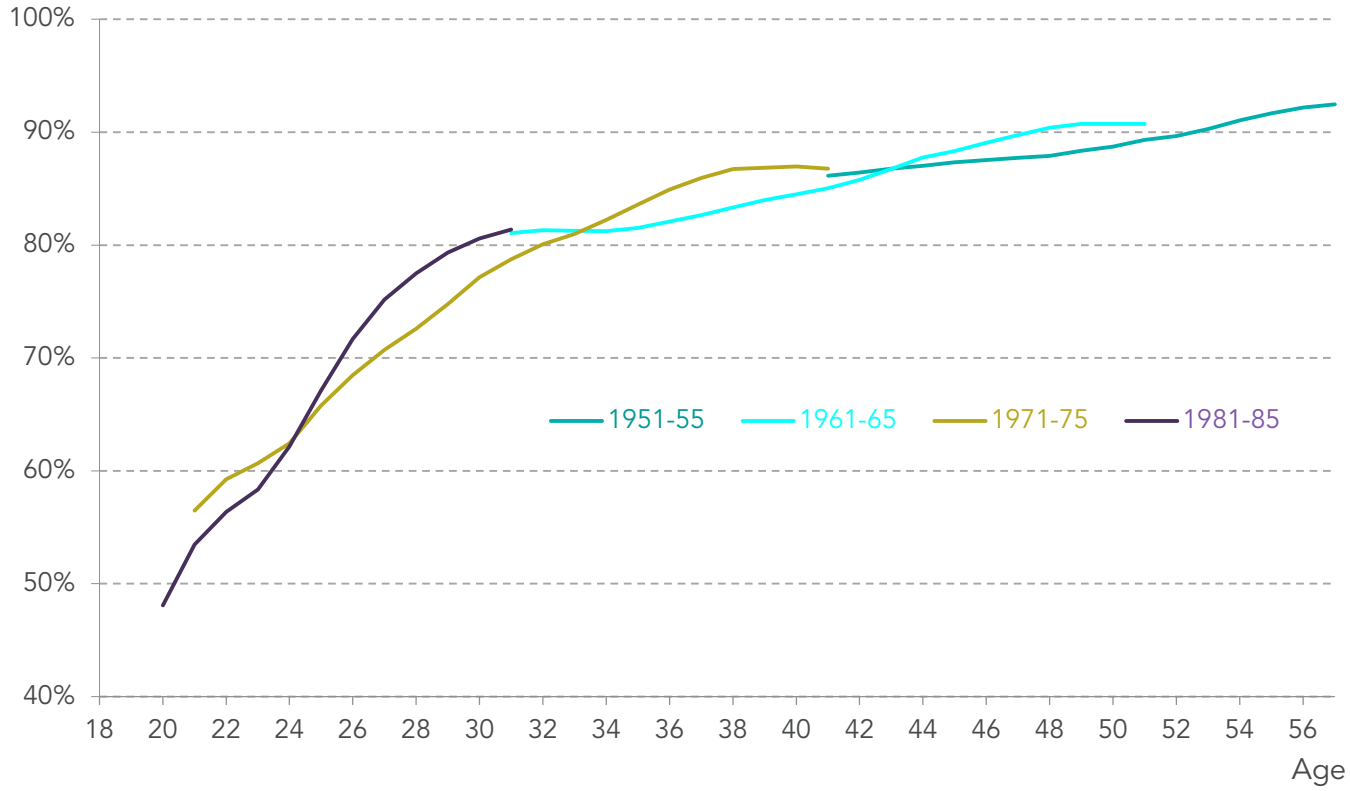
Source: RF analysis of ONS, *Five-quarter longitudinal Labour Force Survey*

The result of falling job mobility rates and marginal declines in employee entry/exit rates has been small but noticeable increases in employment tenure across cohorts, as shown in relation to tenure of two years or more with a given firm in Figure 25. For longer tenure (explored later in this section) the increases can be even starker. For example at the age of 30, 43 per cent of the 1971-75 cohort had been with their employer for five years or longer; a figure that had risen to 47 per cent for the 1981-85 cohort.

43 L Gardiner, *RF Earnings Outlook: Q4 2015*, Resolution Foundation, April 2016

Figure 25: **Two-year employment tenure by age for selected five-year birth cohorts: UK, 1992-2016**

Proportion of employees who have been with their employer for two years or more



Notes: Cohorts are only included if all five birth years are present in the data. Data smoothed using a three-year rolling average over the age range. Estimates based on Great Britain only pre-1995.

Source: RF analysis of ONS, *Quarterly Labour Force Survey*

While these year-on-year increases in tenure gains appear quite marginal, they can build up to large changes over time. For example, previous Resolution Foundation research has shown that median tenure across the workforce as a whole increased from 50 to 65 months between 2002 and 2014 (which will of course be driven by broad shifts around maternity and working later into old age, as well as cohort-upon-cohort changes).[44]

The wage returns to different forms of labour market transitions show signs of slowing

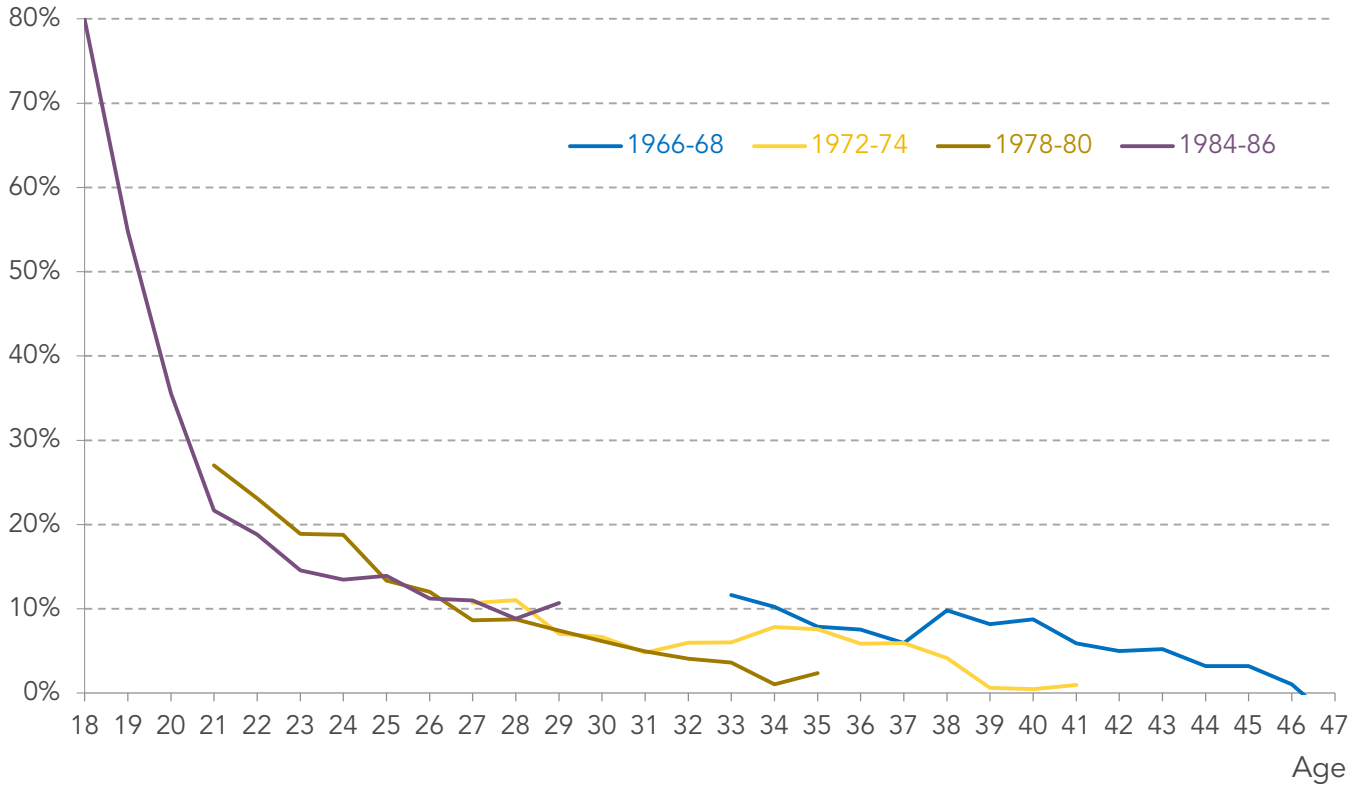
To get a full picture of how different labour market transitions feed through to cohort progression rates, we need to understand the wage increases they typically bring as well as their likelihood of occurring. For example (necessarily using a broader and less

44 P Gregg & L Gardiner, *A steady job? The UK's record on labour market security and stability since the millennium*, Resolution Foundation, July 2015

precise measure of job-to-job moves to our preferred measure discussed above[45]) Figure 26 presents the typical real pay change a job move attracts for different three-year cohorts at different ages.

Figure 26: **Median pay change by age for employees who change job over the course of a year for selected three-year birth cohorts: UK, 1998-2016**

Median real change in weekly pay (CPIH-adjusted)



Notes: Cohorts are only included if all three birth years are present in the data. Data smoothed using a three-year rolling average over the age range. See Box 1 for details on the measure of inflation used.

Source: RF analysis of ONS, *Five-quarter longitudinal Labour Force Survey*

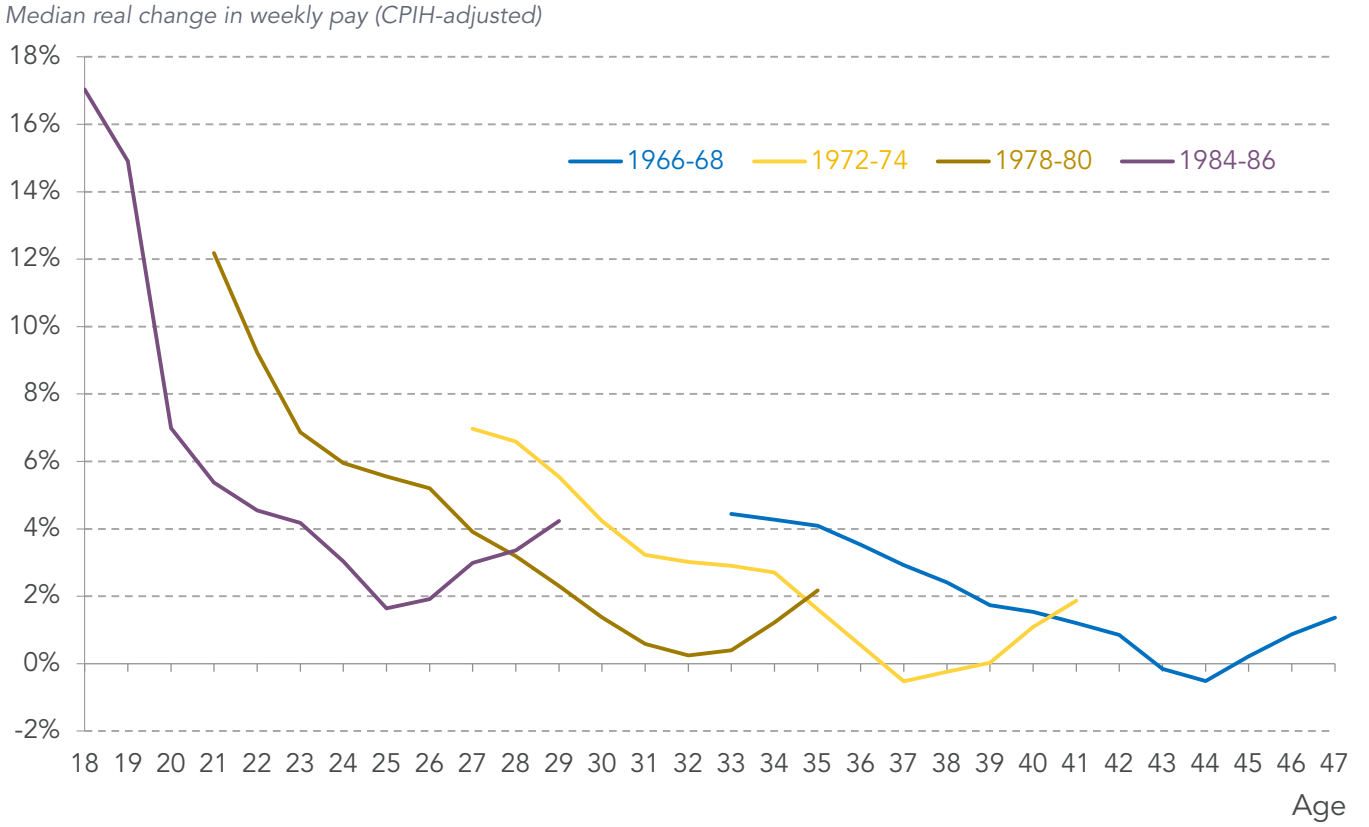
Overall – and fitting with the trend of faster cohort wage progression when young – the wage return associated with moving from one job to another declines with age. And there is also a suggestion that, at least in some periods, the returns to job moves have fallen very slightly for more recent cohorts at equivalent ages.

Figure 27, which shows the same picture but for typical wage changes for those who stay with their employer over the course of a year rather than move jobs, similarly shows

45 This broader definition captures job moves that are not limited to those following a resignation. This broader definition is necessary to capture wage returns from job-to-job moves in the longitudinal Labour Force Survey data. While differing from our preferred measure, trends in frequencies on this broader measure closely mirror the trends discussed above.

declining wage returns as cohorts age, this time with both a more marked reduction for more recent cohorts at equivalent ages, but also a pick-up in returns to tenure in the latest data.

Figure 27: **Median pay change by age for employees who remain with their employer over the course of a year for selected three-year birth cohorts: UK, 1998-2016**



Notes: Cohorts are only included if all three birth years are present in the data. Data smoothed using a three-year rolling average over the age range. See Box 1 for details on the measure of inflation used.

Source: RF analysis of ONS, *Five-quarter longitudinal Labour Force Survey*

The slowing of cohort-on-cohort pay progression is dominated by reductions in the returns to labour market transitions

We said at the beginning of this section that overall trends in cohort pay can be described as a combination of the frequency of labour market 'transitions' and their average wage returns. In this sub-section we formalise that position.

Specifically, using the longitudinal Labour Force Survey data, we find a very close match between actual year-on-year changes in mean pay[46] for three-year birth cohorts (as measured in the cross-sectional data) and the sum of the product of the frequencies and returns to each of the labour market transitions we have discussed. Figure 28 sets out this calculation in detail.

Figure 28: **A formula for approximating year-on-year increases in cohort pay as a function of the frequency of and return to different labour market transitions**

Year-on-year increase in mean pay for cohort	≈	Frequency (likelihood) of job moves among members of cohort	*	Median pay rise for job movers
		+		
		Frequency (likelihood) of staying with employer among members of cohort	*	Median pay rise for those staying with employers
		+		
		Average frequency (likelihood) of employment entry/exit for members of cohort	*	Difference between mean pay of those entering and exiting

Using this approach, decomposing cohort pay changes into the frequency of and returns to these different transitions can therefore tell us the mechanisms by which pay progression has slowed between different cohorts at the same age in recent decades (see Annex 1 for further details on our method). Table 1 presents the results of this decomposition for selected cohorts at selected ages, comparing a cohort that was that age during 1998-2004 ('cohort 1') to a cohort that was that age during 2010-2016 ('cohort 2').

46 We use the mean here as a better pay measure for decomposing a statistic into its drivers but, as we set out in Section 1 and show in Annex 2, trends at the mean and the median are almost identical.

Table 1: **Decompositions of annual progression rates in mean cohort pay as a function of the frequency of and returns to different labour market transitions: UK, 2010-2016 compared to 1998-2004**

Changes in real mean weekly pay between cohorts at the same age (CPIH-adjusted)

	Cohort 1		Cohort 2		Δ Freq * avge return	Δ Return * avge freq	Total change
	Frequency	*Returns*	*Frequency*	*Returns*			
	1975-77 cohort, age 24-26		*1987-89 cohort, age 24-26*				
Job mover	18.1%	14.6%	15.1%	13.8%	-0.4 ppts	-0.1 ppts	-0.5 ppts
1-2 years' tenure	19.7%	9.0%	18.1%	3.5%	-0.1 ppts	-1.0 ppts	-1.1 ppts
2-5 years' tenure	33.7%	6.9%	33.2%	3.9%	0.0 ppts	-1.0 ppts	-1.0 ppts
5+ years' tenure	20.5%	5.5%	24.3%	1.5%	0.1 ppts	-0.9 ppts	-0.8 ppts
Employee job entry or exit	8.0%	13.1%	9.4%	1.5%	0.1 ppts	-1.0 ppts	-0.9 ppts
Overall	*100.0%*	*8.9%*	*100.0%*	*4.5%*	*0.0 ppts*	*-4.4 ppts*	*-4.4 ppts*
	1963-65 cohort, age 36-38		*1975-77 cohort, age 36-38*				
Job mover	9.7%	6.7%	6.8%	1.2%	-0.1 ppts	-0.5 ppts	-0.6 ppts
1-2 years' tenure	11.5%	7.4%	10.2%	3.3%	-0.1 ppts	-0.4 ppts	-0.5 ppts
2-5 years' tenure	22.4%	4.9%	21.2%	1.9%	0.0 ppts	-0.6 ppts	-0.7 ppts
5+ years' tenure	51.1%	4.0%	56.2%	1.3%	0.1 ppts	-1.5 ppts	-1.3 ppts
Employee job entry or exit	5.4%	-18.6%	5.6%	-11.7%	0.0 ppts	0.4 ppts	0.3 ppts
Overall	*100.0%*	*3.6%*	*100.0%*	*0.9%*	*0.0 ppts*	*-2.7 ppts*	*-2.7 ppts*
	1951-53 cohort, age 48-50		*1963-65 cohort, age 48-50*				
Job mover	7.3%	3.6%	5.4%	3.8%	-0.1 ppts	0.0 ppts	-0.1 ppts
1-2 years' tenure	7.7%	4.7%	6.4%	0.8%	0.0 ppts	-0.3 ppts	-0.3 ppts
2-5 years' tenure	16.4%	4.5%	14.6%	0.5%	0.0 ppts	-0.6 ppts	-0.7 ppts
5+ years' tenure	64.0%	3.7%	69.0%	0.1%	0.1 ppts	-2.4 ppts	-2.3 ppts
Employee job entry or exit	4.6%	-23.6%	4.6%	-5.9%	0.0 ppts	0.8 ppts	0.8 ppts
Overall	*100.0%*	*2.7%*	*100.0%*	*0.1%*	*0.0 ppts*	*-2.6 ppts*	*-2.6 ppts*

Notes: Data smoothed using a three-year rolling average over the age range. Returns to job moves and tenure are derived from the median individual pay change for employees in that position; returns to entry or exit are estimated as the difference between the mean entry wage and the mean exit wage. See Box 1 for details on the measure of inflation used.

Source: RF analysis of ONS, *Five-quarter longitudinal Labour Force Survey*

The first and third columns (the 'frequency' results for each cohort) detail how the cohort divides between the different labour market transitions discussed above at that age (in this analysis we further sub-divide employment tenure into three different tenure lengths, in order to explore whether changing returns have had different effects over the course of a spell with an employer).

The second and fourth columns (the 'returns' results for each cohort) show the average annual real pay growth associated with each of these transitions.[47] The 'overall' return for each cohort is the sum of the product of these frequencies and returns – the value

47 This is calculated as the median individual pay change for job moves and tenure, and the difference between the mean entry wage and the mean exit wage for employee job entry or exit.

that closely approximates to the average year-on-year pay change for the cohort at that age, the very thing this report has focused on unpacking (shown in Figure 2 and in the additional figures in Annex 2).

Focusing just on these results, a number of patterns over time (comparing 'cohort 1' to 'cohort 2') and across the age range (moving down the table) are apparent:

On the **frequency of different transitions**:

- As we saw earlier in this section, **job-to-job moves become less common with age** and longer tenures with an employer more common.
- **Job-to-job moves have also become less common over the time period** we look at. At each age, cohort 2 has a lower move rate than cohort 1.
- There has been a **corresponding increase in frequency in longer tenures** (five years plus) **over the time period**. These are noticeably higher for each cohort 2 than they are for each cohort 1.

Turning to **wage returns** to these different transitions:

- **Job-to-job moves attract the highest typical pay change over a year, and staying with an employer at longer tenures the lowest**. (The 'returns' to entry and exit are quite volatile as a result of the different method it is necessary to use to calculate these (see Annex 1) – we don't focus on them here).
- As we saw above, the **wage returns to job moves and tenure (of all lengths) are all higher when young**. This is true for both cohort 1 at the start of the time period and cohort 2 at the end of the time period. At the extreme, we can see that during 1998-2004 a job move in one's mid-20s typically meant a 15 per cent pay rise.
- As well as declining as people age, **wage returns to job moves and tenure have fallen over the time period** (between cohort 1 and cohort 2).

The combination of these changes – declining returns across the board and a shift to longer tenures that attract lower returns – mean that the 'overall' return for each cohort (which approximates to the annual change in mean cohort pay within that age band) has fallen over time (and fitting the story we have told of stronger progression at the start of careers, it also consistently falls with age).

The final three columns of Table 1 use a standard decomposition method to formally estimate the trends we have described in broad terms above. Specifically, they attribute the overall percentage point change in returns from the first to the second cohort to the changes in the frequency of and returns to different transitions. They show that it is changing wage returns to different transitions, rather than their incidence, that explain most of the reduced overall cohort pay growth for each of the second cohorts (although falling job-to-job moves are more important for the youngest cohorts). And falling returns to tenure, particularly longer tenures, plays the biggest role.

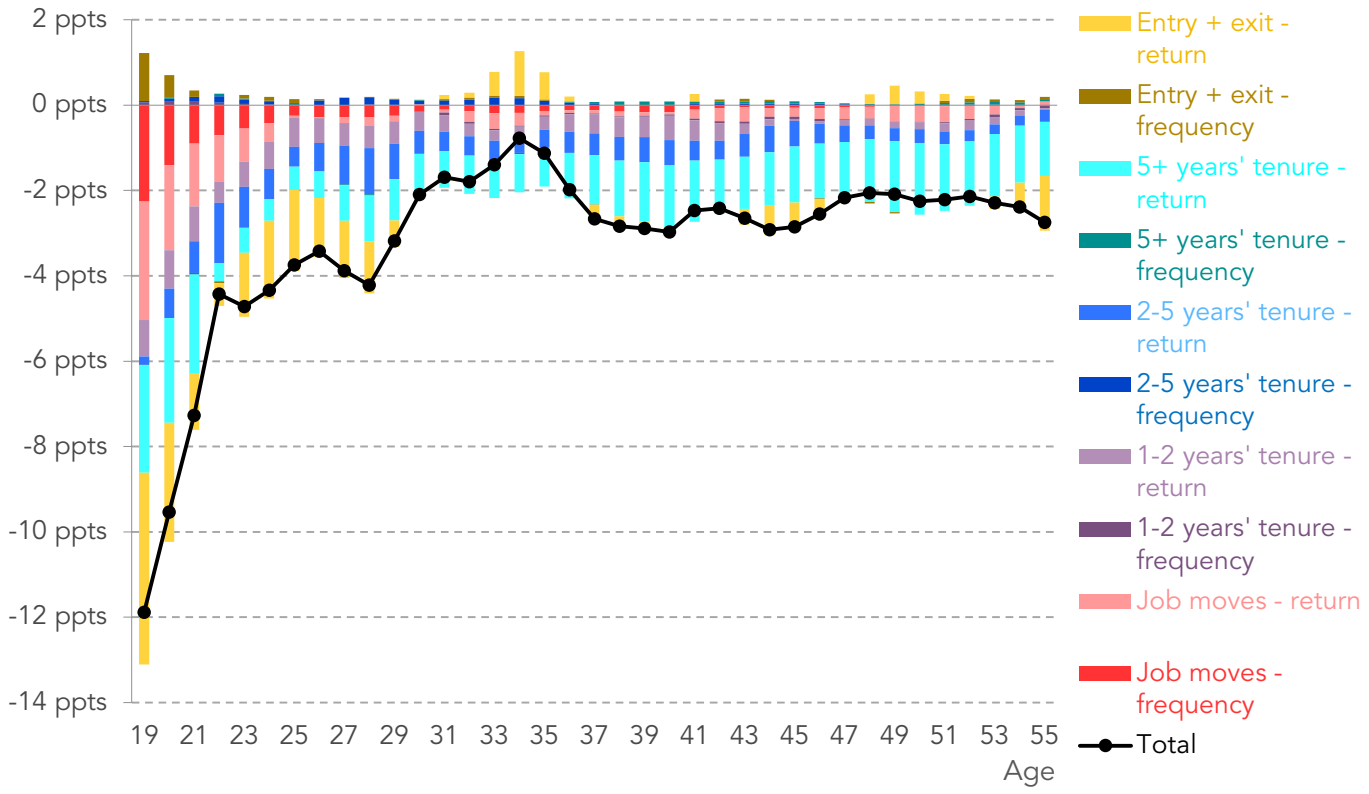
Cohorts born between the late-1970s and late-1980s have experienced the largest slowdown in annual progression rates

These findings for selected cohorts are stark and illuminating: lower pay rises when staying with an employer, particularly beyond the five year mark, appear to be the biggest driver of the overall slowdown in cohort pay progression which has affected all cohorts but younger ones most strongly. To confirm whether these selective results hold across the board, the following figures summarise the same results over the entire age range and for all cohorts. We divide our data into three periods: 1998-2004, 2004-2010 and 2010-2016.

Figure 29 looks first at 2004-2010 compared to 1998-2004 across the age range. We find that falling returns to tenure are indeed the dominant factor (as suggested above) and pretty even in their impact across the age range – on average the falling tenure return explains about four-fifths of the overall progression slowdown. Specifically, the returns to longer tenures (five years or more) are playing the biggest role, explaining about half of the overall slowdown on average.

Figure 29: **Changes in annual progression rates in mean cohort pay at different ages, as a function of the changing frequency of and returns to different labour market transitions: UK, 2004-2010 compared to 1998-2004**

Change in annual growth rate for real mean weekly pay (CPIH-adjusted)



Notes: Data smoothed using a three-year rolling average over the age range. See Box 1 for details on the measure of inflation used.

Source: RF analysis of ONS, *Five-quarter longitudinal Labour Force Survey*

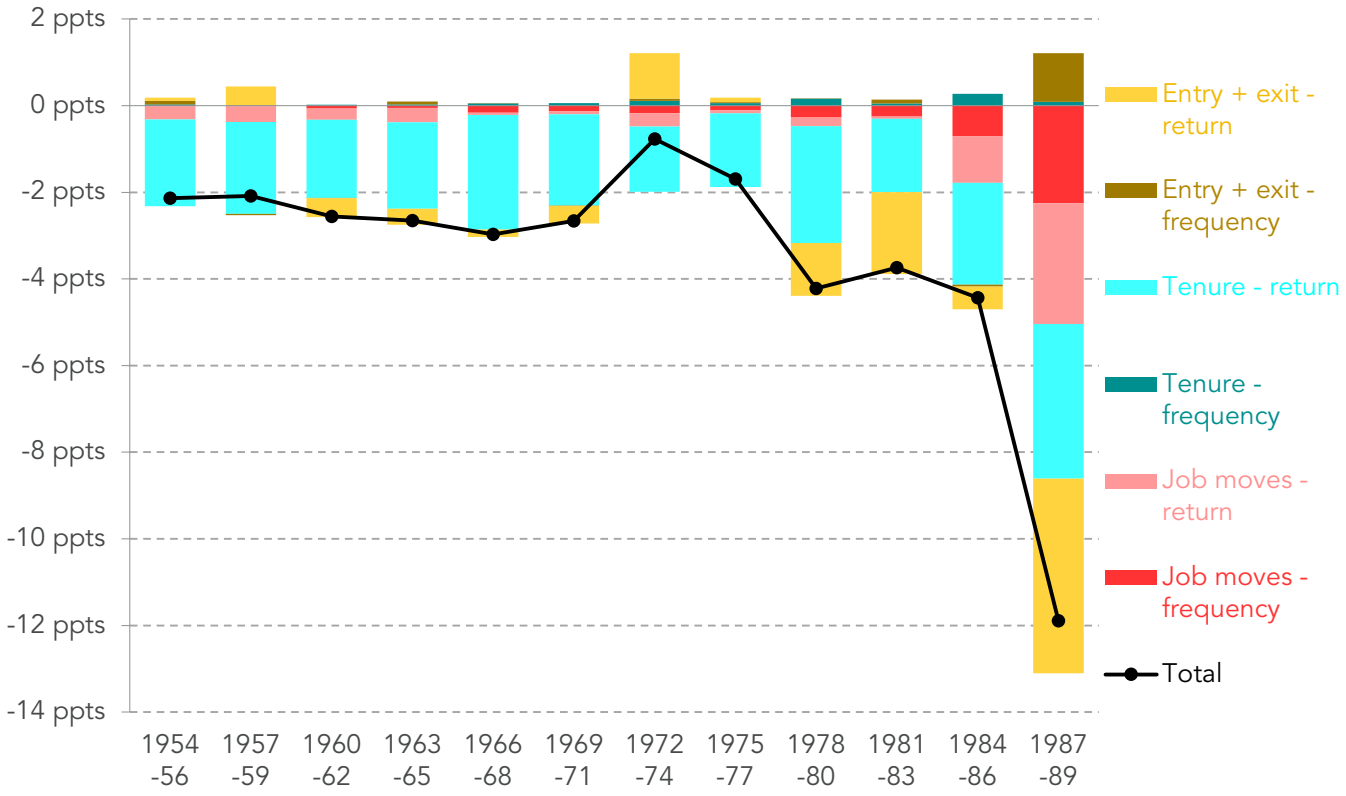
However, there is an additional effect concentrated on the young, from the declining frequency of and returns to job moves. At age 25-and-under, these combined explain around one third of the overall change in the growth rate, with falling returns to tenure explaining around half at this age.

It's worth returning to the wider significance of job moves here, and therefore the importance of the reduction in their incidence for younger workers. We said earlier in this section that job moves may, for example, have ripple effects onto other staff if they prompt employers to improve pay to prevent poaching behaviours. It's also the case that they (along with labour market entry and exit) essentially 'reset' an employee's tenure clock and, as we saw in Table 1, the returns to shorter tenures are much larger than when employees have been with firms for a long period. All these transitions interact and offset one another in terms of their incidence of course, but it's worth thinking of job mobility as a catalyst among them, driving wage returns not only for the individual moving but for others around them, and having an effect on returns for that individual not only in that year but (by resetting the tenure clock towards shorter and more lucrative tenures) in years to come.

Figure 30 converts the age-based picture in Figure 29 to a cohort picture. It shows exactly the same data but for the range of three-year birth cohorts in the labour market in that period. In addition, here (and throughout the rest of this section) we don't present tenure results split out into the different time periods (although the underlying results continue to be calculated using this more detailed breakdown), in order to show a clearer picture. However the findings set out above continue to hold true, with the falling returns to longer tenures having a relatively larger effect.

Figure 30: **Changes in annual progression rates in mean cohort pay for different cohorts, as a function of the changing frequency of and returns to different labour market transitions: UK, 2004-2010 compared to 1998-2004**

Change in annual growth rate for real mean weekly pay (CPIH-adjusted)



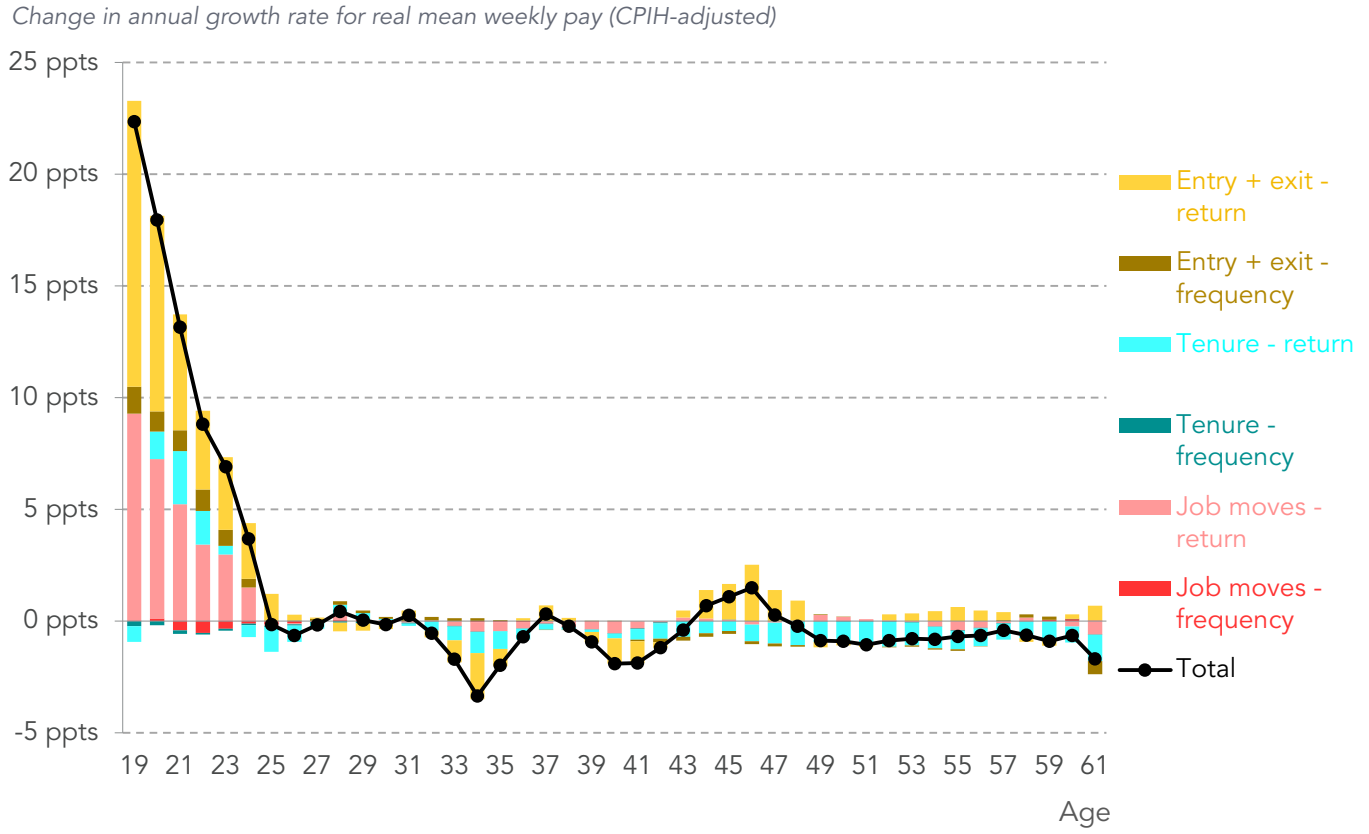
Notes: Data smoothed using a three-year rolling average over the age range. Separate frequency and return effects for three different tenure lengths are calculated separately and then summed in this figure. See Box 1 for details on the measure of inflation used.

Source: RF analysis of ONS, *Five-quarter longitudinal Labour Force Survey*

The additional effect from the falling incidence of and returns to job moves at younger ages drives a greater overall slowdown in progression rates for cohorts born since 1978, and particularly for the 1987-89 cohort.

Figure 31 returns to the age range (rather than cohorts) but considers change over a more recent period, comparing 2010-2016 to 2004-2010. It shows a different picture, with big improvements in cohort progression rates for the youngest workers and relatively little change on the 2004-2010 picture for those over the age of around 25. The implication is that the changes on the earlier 1998-2004 period shown in Figure 29 have more-or-less held over the age range. In particular, there has been little improvement in returns to tenure following the big declines between 2004-2010 and 1998-2004. The positive-looking picture for the youngest implies that the bigger drop for the young in Figure 29 was to some extent a one-off cyclical effect, but the damage that has done to the wage levels of cohorts who are now no longer the youngest is likely to be permanent.

Figure 31: **Changes in annual progression rates in mean cohort pay at different ages, as a function of the changing frequency of and returns to different labour market transitions: UK, 2010-2016 compared to 2004-2010**



Notes: Data smoothed using a three-year rolling average over the age range; separate frequency and return effects for three different tenure lengths are calculated separately and then summed in this figure. See Box 1 for details on the measure of inflation used.

Source: RF analysis of ONS, *Five-quarter longitudinal Labour Force Survey*

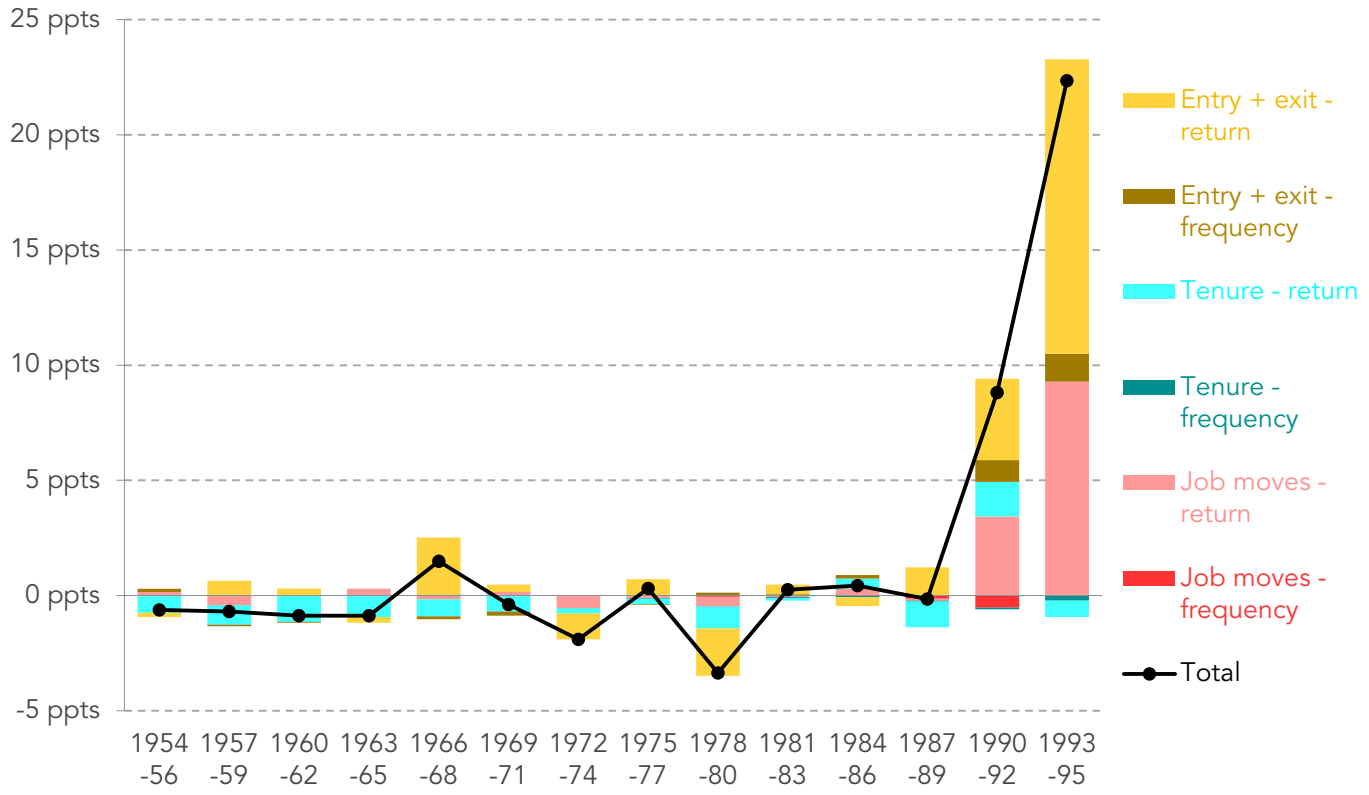
For those aged 25 and under, the improvement in cohort progression rates in this more recent period compared to the middle period of 2004-2010 has been driven by improving returns to job moves, and an increase in the entry and exit return (which implies that younger employees returning to the labour market or entering for the first time are attracting higher starting wages than younger employees were before). These results closely reflect recent Resolution Foundation analysis, which showed that wages for new entrants to the labour market and those who've recently changed jobs have been performing more strongly than overall wage growth.[48]

Again, Figure 32 converts this same data to focus on cohorts rather than the age range, showing that it is the cohorts born in the 1990s feeling the benefits of this pick-up in progression rates for the young.

48 L Gardiner, *RF Earnings Outlook: Q1 2016*, Resolution Foundation, July 2016

Figure 32: **Changes in annual progression rates in mean cohort pay for different cohorts, as a function of the changing frequency of and returns to different labour market transitions: UK, 2010-2016 compared to 2004-2010**

Change in annual growth rate for real mean weekly pay (CPIH-adjusted)

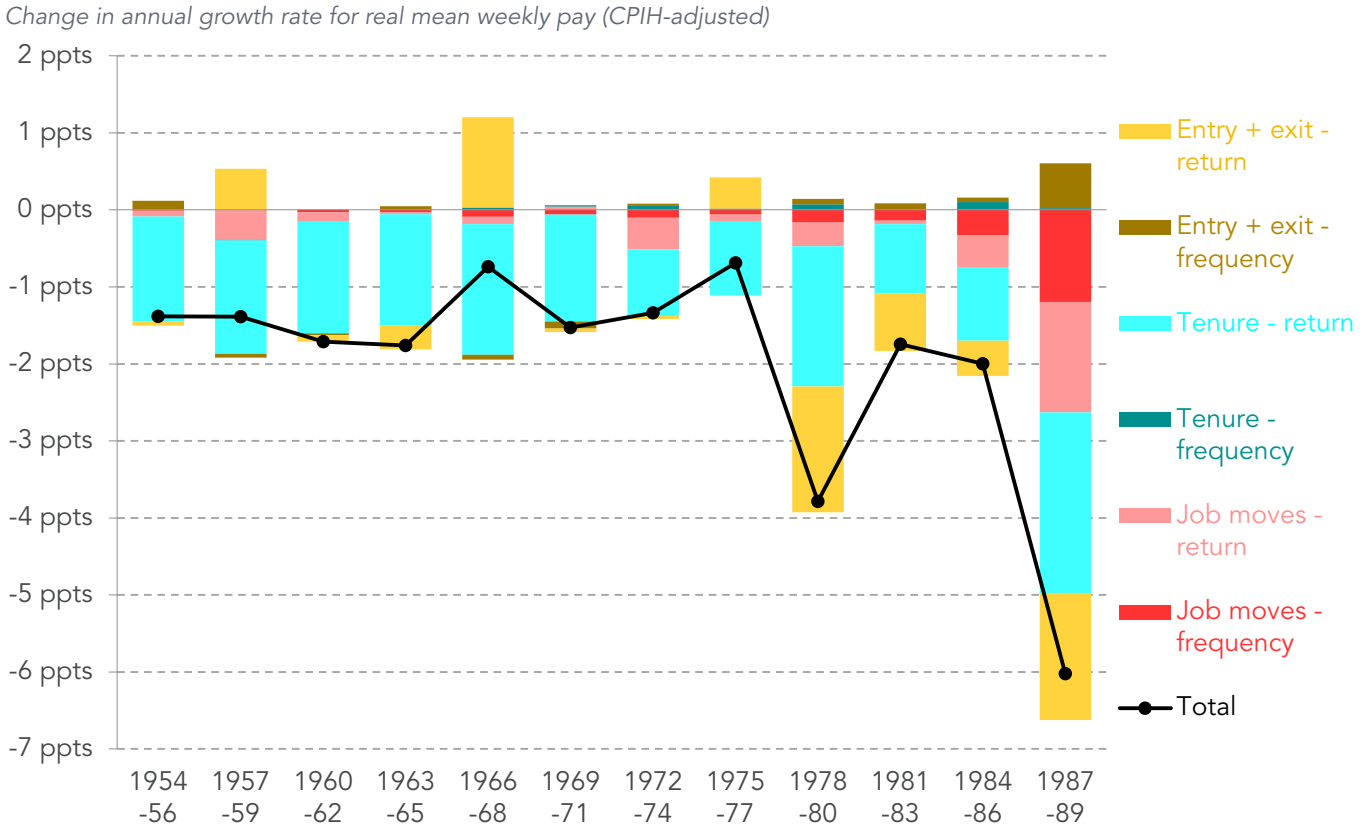


Notes: Data smoothed using a three-year rolling average over the age range. Separate frequency and return effects for three different tenure lengths are calculated separately and then summed in this figure. See Box 1 for details on the measure of inflation used.

Source: RF analysis of ONS, *Five-quarter longitudinal Labour Force Survey*

Finally, Figure 33 brings the cohort pictures in Figure 30 and Figure 32 together for those cohorts in the labour market over the whole period (born in the 1980s and before, so by definition missing the 1990s cohorts that have benefited from the recent pick-up in progression rates for the young). The larger reduction in progression rates in the early period and the relatively even effects across these cohorts in the later period mean that cohorts born from 1978 onwards have had a slightly larger overall slowdown in progression rates since the turn of the millennium, with the largest effect on the cohort born in the late 1980s.

Figure 33: **Changes in annual progression rates in mean cohort pay for different cohorts, as a function of the changing frequency of and returns to different labour market transitions: UK, 2010-2016 compared to 1998-2004**



Notes: Data smoothed using a three-year rolling average over the age range; separate frequency and return effects for three different tenure lengths are calculated separately and then summed in this figure. See Box 1 for details on the measure of inflation used.

Source: RF analysis of ONS, *Five-quarter longitudinal Labour Force Survey*

In summary, our decomposition of the drivers of cohort progression rates year-on-year has shown that a decline in the pay rises associated with staying with an employer over a year, particularly at longer tenures, is the dominant factor in explaining the slowdown in cohort progression across the age range and for different cohorts. Declining tenure returns account for around four fifths of the reduction in annual cohort progression rates between 2010-2016 and 1998-2004.

For younger employees only, the falling frequency of job moves and a reduction in the pay increases associated with them have increased their slowdown in progression rates. And this fall in the job move rate may be having wider effects – keeping employees at longer tenures where annual pay rises are lower (and slowing faster), or preventing 'knock-on' wage effects on other staff across the age range as a result of departing employees prompting firms to rethink their pay offer.

From a cohort perspective, the differential impacts across the age range mean that the cohorts born between the late 1970s and late 1980s, and particularly the 1987-89 cohort, have experienced a larger slowdown in annual progression rates than older cohorts born before this. For the period they are in the data, however, cohorts born in the early

1990s (who avoided the initial slowdown) have experienced healthy improvements in progression rates (as a result of rising returns to job moves and higher entry wages) on those at the same age around eight years before them.

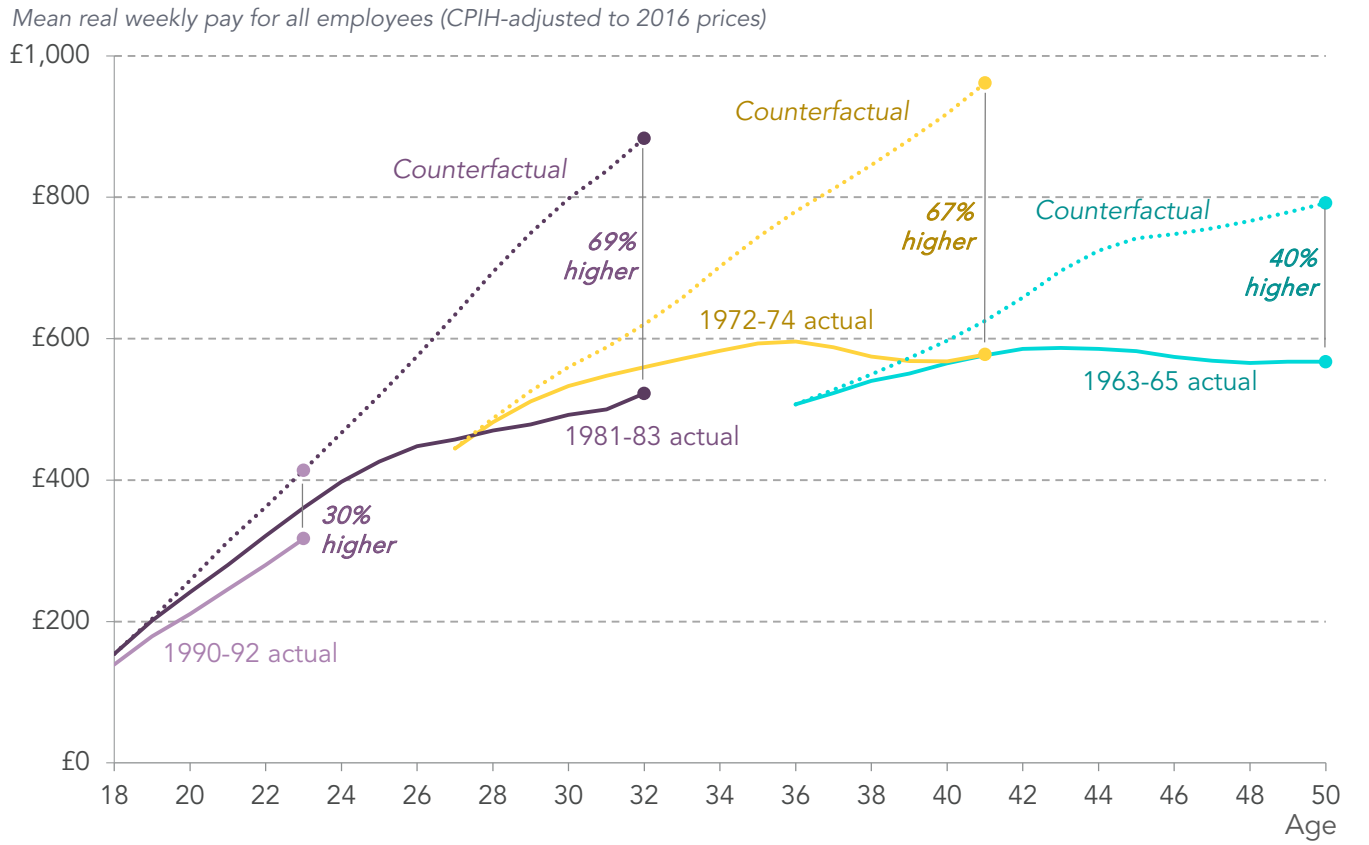
To characterise this, we can say that the pay slowdown and then pay squeeze over the last ten to 15 years has affected different millennials differently. Older millennials (those born in the 1980s) felt the worst effects of slowing year-on-year wage progression due to falling job moves, and lower pay rises associated with both job moves and gaining tenure. Younger millennials (those born in the 1990s) have so far done better on progression rates, but as we discussed earlier in this section these cohorts entered the labour market on much lower salaries than those before them, and so are building from a lower base.

What if the slowdown in cohort progression rates hadn't happened?

In this section we have explored the mechanisms by which cohort's wages improve as they age. In particular, we have established how the slowdown of recent years – associated with the wedge that opened up between productivity and pay growth in the mid-2000s, the wage squeeze that followed the financial crisis and the relatively weak recovery in pay growth since – came about.

To conclude, we consider as a thought experiment where cohorts might be today if none of this had happened. In other words, where would cohorts be now if the cohort progression rates people experienced at each age at the turn of the millennium had continued to apply consistently as cohorts progressed up the age range over the following 15 years? Figure 34 shows our results.

Figure 34: **Actual mean pay by age for selected five-year birth cohorts, and hypothetical scenarios if cohort progression rates at each age during 1998-2004 had been maintained: UK, 1998-2016**



Notes: Data smoothed using a three-year rolling average over the age range. As well as hypothetical progression rates, the 1990-92 cohort has the starting salary of the 1981-83 cohort in the counterfactual scenario. See Box 1 for details on the measure of inflation used.

Source: RF analysis of ONS, *Quarterly Labour Force Survey*

We find that all cohorts are a long way from where they'd be in this rather extreme hypothetical scenario in which none of the events of the past 15 years in the labour market had taken place. But while the pay levels in the hypothetical scenarios might seem far-fetched, what this thought experiment makes clear is that younger cohorts are further below where they'd be in the absence of the progression slowdown than older ones are. For example, the 1981-83 cohort would have a wage at age 32 some 69 per cent higher than it does; whereas pay in the 1963-65 cohort would be 40 per cent above where it is today.

For the 1990-92 cohort, we can imagine both that they had the progression rates of old, and that their starting wage had not fallen off. Taking this approach – giving them the same starting wage and progression rates of the 1981-83 cohort – their pay would today be 30 per cent higher than it is (a smaller percentage than recorded among the 1981-83 cohort because these effects accrue over a shorter period).

Our examination of the slowdown in cohort progression rates over the past two decades in this section has provided a range of granular detail on the dynamics of the changing cohort pay experiences we described at the beginning of this report. It suggests that falling returns to tenure across the board, and an additional hit to both the frequency and

returns to job moves for younger cohorts, are the mechanisms by which year-on-year growth in average cohort wages has slowed. This has meant that the millennials born in the 1980s have experienced the biggest decline in progression rates relative to those that prevailed around the turn of the millennium. Younger millennials – born in the 1990s – are the group most affected by the recent reduction in cohorts' starting wage. These effects have profoundly shifted the wages of younger cohorts from where they might have been absent the collapse in starting wages and sustained progression slowdown.

Our modelling is illustrative rather than conclusive, and many questions and areas for further analysis remain. But what has clearly been uncovered by this analysis is some profound shifts in the way our labour market changes year-on-year, and it's possible that some of these may be enduring beyond the financial crisis and its aftermath. In the following section, the conclusion, we very briefly consider such current and future prospects.

Section 4

Conclusion

This paper – the fifth report for the Intergenerational Commission – has explored in detail the factors that underpin the striking finding that millennials who have entered work so far have made no earnings progress on generation X before them. It has examined the population and jobs market changes that underpin faltering cohort-on-cohort earnings improvements, and the mechanisms via which year-on-year increases in cohorts' pay have slowed down.

We find that all cohorts have been affected by stagnating then falling pay in the 21st Century, but younger ones have fallen back most.

In examining the fact that there has been little or no pay growth (and even some pay falls) between cohorts and those at the same age 10 years before, we find that compositional effects have played an important role. Higher qualification levels and a shift towards higher-paying occupations have provided a compositional boost to pay for older cohorts in the recent period compared to those who came previously, but for cohorts born in the 1980s the compositional effect is zero or even negative. This is driven by much smaller boosts from rising educational attainment than older cohorts have experienced, combined with shifts towards part-time working and lower-paying occupations.

In examining the slowdown in year-on-year earnings progression within cohorts at a given age, we find that lower pay rises when people remain with firms, particularly for longer tenures, have played a dominant role across the age range. A decline in both the rate of job moves and the pay increases they bring has accentuated the slowdown for cohorts born in the 1980s. For cohorts born in the 1990s, the main effect so far has been a collapse in starting pay rates.

Many of the changes we describe will be connected to the financial crisis and the pay squeeze that followed it. But as our analysis sets out, a broad range of factors – including growth rates in educational attainment, the impact of changing occupational structures, the rise of atypical working, a structural decline in job mobility, and the enduring impact of lower pay rises when employees stay with firms for long periods – have contributed to stagnating pay growth between cohorts and slower progression rates within them. Some of these factors are of course linked to the crisis, but they clearly have broader and more structural elements too.

On this basis, far from putting cohorts' recent pay experiences entirely down to the bad luck of experiencing a large pay squeeze in the formative stage of careers, there is plenty to consider in terms of how these outcomes can be prevented and unwound in future. To this end, the Intergenerational Commission will continue to develop its understanding of different cohorts' experience in the labour market and consider what interventions might be warranted as part of a renewal of the intergenerational social contract.

Annex 1

Methodology

Decomposing pay differences between cohorts at the same age (Section 2)

We conduct a series of 'decompositions' of the role that changes in multiple and overlapping characteristics, and the returns to these, have played in cohort-on-cohort wage changes.

The first set of decompositions calculates the 'compositional' effect – the pay growth rate between two cohorts at the same age that can be ascribed to changes in their characteristics alone. Via a regression model with real weekly pay as the dependent variable and various sets of individual and job characteristics as independent indicator variables, we calculate the wage mark-ups on each characteristic across the whole time period for individuals in the age range selected.

We then calculate the effects of compositional changes in the workforce by applying the estimated coefficients to the profile of employee characteristics in each cohort. This gives us a predicted wage for each cohort overall, and a wage level ascribed to each set of characteristics. The change in these predicted values between two cohorts is the compositional component of the pay change.

As well as our overall model, we conduct separate analyses for characteristics relating to individuals and characteristics relating to jobs.

The second set of decompositions calculates the 'wage returns' effect, which is by definition the difference between the compositional effect and the overall real wage change between two cohorts.

We use the same regression model described above, but calculated separately for each cohort within the age range selected. We then calculate wage return effects by applying the estimated coefficients for each cohort separately to the average profile of employee characteristics across all cohorts. This gives us a predicted wage for each cohort overall, and a wage level ascribed to each set of characteristics and to the cohort as a whole (based on the constant from each regression model). The change in these predicted values between two cohorts is the wage returns component of the pay change.

Decomposing changing year-on-year progression rates within cohorts at a given age (Section 3)

Our objective is to disaggregate average year-on-year growth rates in mean cohort pay as a cohort ages as a function of:

- The **frequency with which employees move from one job to another** and the **average pay increase** associated with such moves;
- The **likelihood of an employee staying with their employer** from one year to the next and the **average pay rise** such tenure gains bring; and
- The **likelihood of employees within the cohort entering or exiting the employee workforce** from/to spells of worklessness (or self-employment) over a year and the **difference between the wages** of those who enter and those who exit.

The first two of these are directly observable in the longitudinal Labour Force Survey data, which captures pay for the same individuals at the beginning and end of a year-long period. We use median pay increases following a job move or tenure gain, as the means are too skewed and so distort our results.

For the likelihood of employees in a cohort entering or exiting work, we take the average of entries and exits in that year as a proportion of the average number of employees in that year. And for the difference between the wages of those who enter and those who exit we calculate the mean difference between the wages in the final period of those who enter, and the wages in the initial period of those who exit.

We use these statistics in the formula set out in Figure 35, running separate calculations for each cohort at each point in the age range.

Figure 35: **A formula for approximating year-on-year increases in cohort pay as a function of the frequency of and return to different labour market transitions**

Year-on-year increase in mean pay for cohort	≈	Frequency (likelihood) of job moves among members of cohort	*	Median pay rise for job movers
			+	
		Frequency (likelihood) of staying with employer among members of cohort	*	Median pay rise for those staying with employers
			+	
		Average frequency (likelihood) of employment entry/exit for members of cohort	*	Difference between mean pay of those entering and exiting

We find a very close match between actual year-on-year changes in mean pay for three-year birth cohorts (as measured in the cross-sectional data) and the estimates produced by this calculation. The spreads of actual and estimated cohort pay changes across cohorts and ages have a correlation statistic of 96 per cent, and the sum of the differences between the two is 0. On this basis we are confident that our decomposition method fits well to actual outcomes.

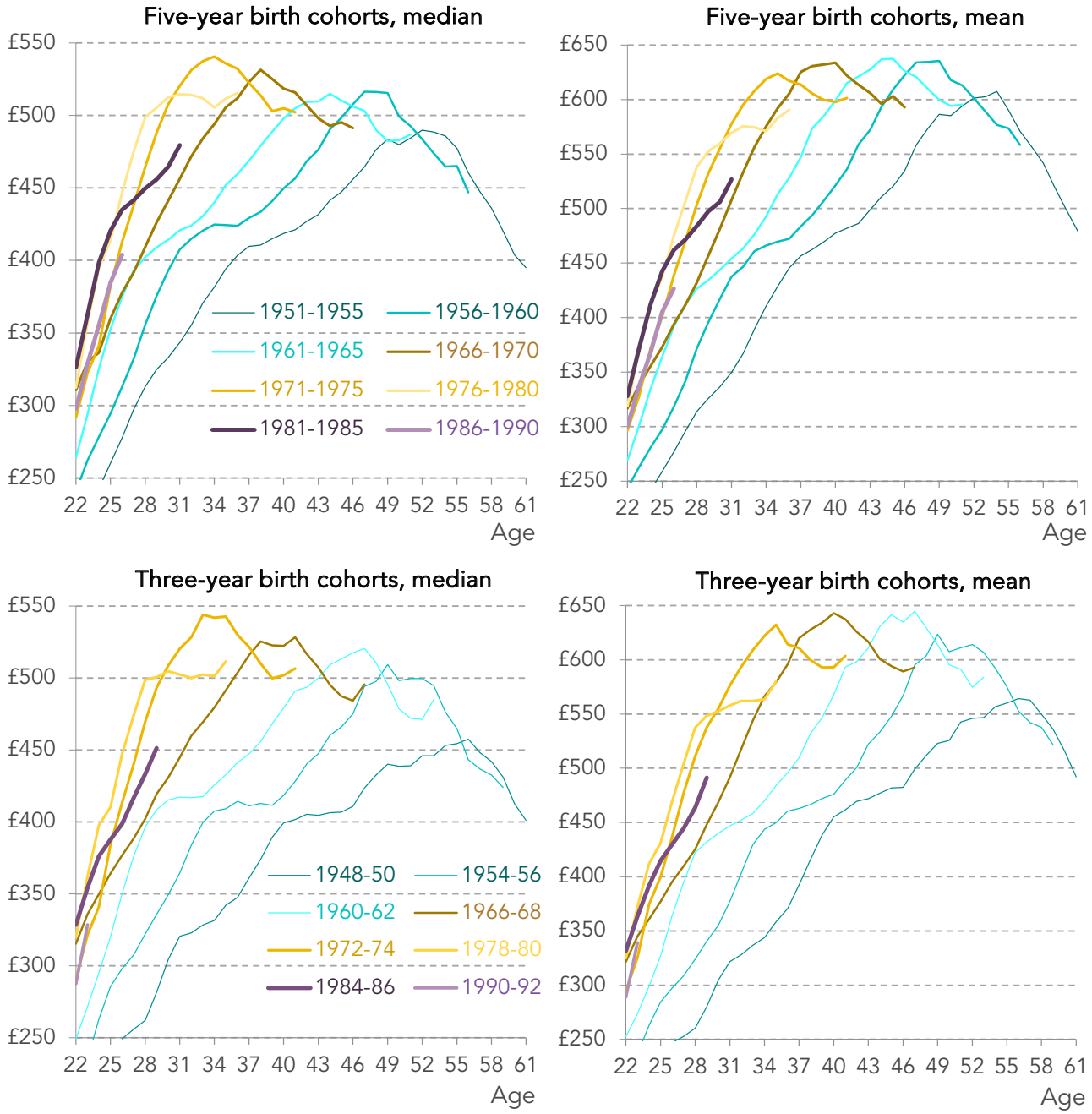
To understand the role of the changing frequency of each of our three transitions in explaining the difference in progression rates between two cohorts at a given age, we calculate the change in each frequency (likelihood of a job move, tenure gain, or entry/exit) between cohort 1 and cohort 2, multiplied by the average return to that transition across cohorts 1 and 2. To understand the role of changing wage returns to each of our three transitions in explaining the difference in progression rates between two cohorts at a given age, we calculate the changing returns to each transition between cohorts 1 and 2, multiplied by the average frequency (likelihood) of that transition across cohorts 1 and 2. These calculations are summarised in the final columns of Table 1 in Section 3.

Annex 2

Additional descriptive charts

Figure 36: **Mean and median pay by age for five- and three-year birth cohorts: UK, 1975-2016**

Real weekly pay for all employees (CPIH-adjusted to 2016 prices)

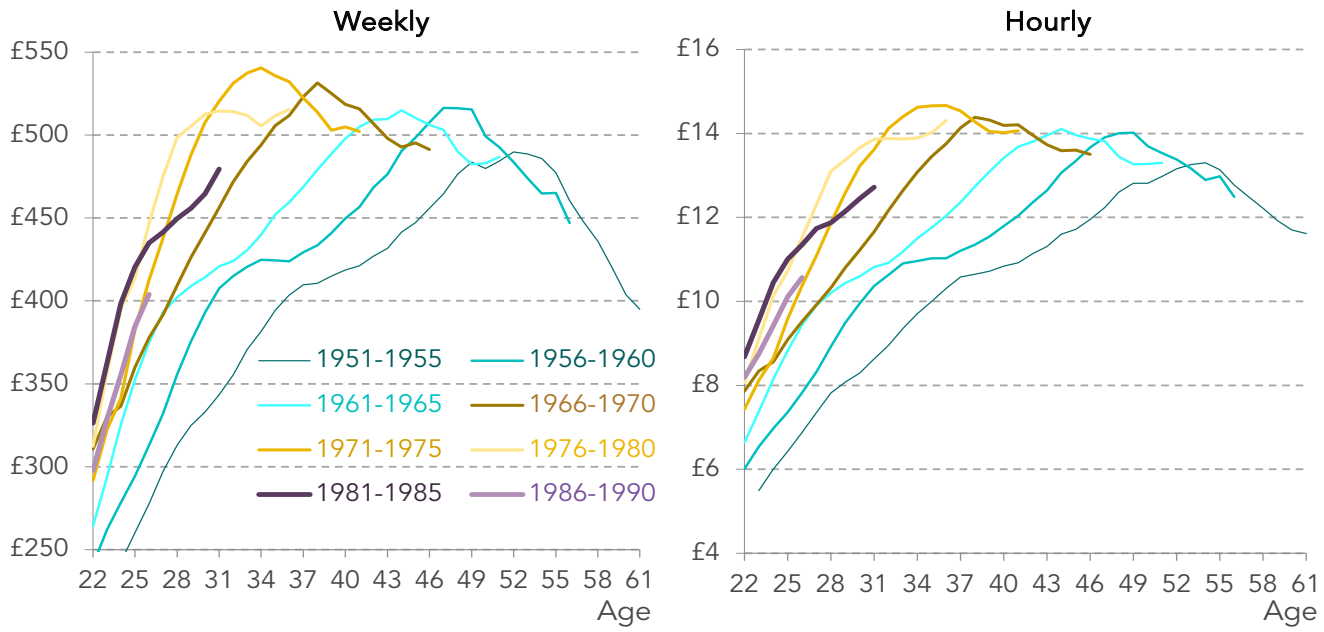


Notes: Figures for each cohort are derived from a weighted average of estimates by single year of age for each single-year birth cohort; cohorts are only included if all birth years are present in the data. For the years in which it is available, published Annual Survey of Hours and Earnings pay estimates (which cover the UK as a whole, as opposed to the microdata which only covers Great Britain) are used as control totals, and the results from each individual dataset are indexed to those from the Annual Survey of Hours and Earnings to create a consistent series over time. See Box 1 for details on the measure of inflation used.

Source: RF analysis of ONS, *Quarterly Labour Force Survey*; ONS, *Annual Survey of Hours and Earnings*; ONS, *New Earnings Survey Panel Dataset*

Figure 37: **Hourly and weekly median pay by age for five-year birth cohorts: UK, 1975-2016**

Median real pay for all employees (CPIH-adjusted to 2016 prices)



Notes: Figures for each cohort are derived from a weighted average of estimates by single year of age for each single-year birth cohort; cohorts are only included if all five birth years are present in the data. For the years in which it is available, published Annual Survey of Hours and Earnings pay estimates (which cover the UK as a whole, as opposed to the microdata which only covers Great Britain) are used as control totals, and the results from each individual dataset are indexed to those from the Annual Survey of Hours and Earnings to create a consistent series over time. See Box 1 for details on the measure of inflation used.

Source: RF analysis of ONS, *Quarterly Labour Force Survey*; ONS, *Annual Survey of Hours and Earnings*; ONS, *New Earnings Survey Panel Dataset*

Resolution Foundation

Intergenerational Commission

Resolution Foundation is an independent research and policy organisation. Our goal is to improve the lives of people with low to middle incomes by delivering change in areas where they are currently disadvantaged. We do this by:

undertaking research and economic analysis to understand the challenges facing people on a low to middle income;

developing practical and effective policy proposals; and

engaging with policy makers and stakeholders to influence decision-making and bring about change.

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