

# The puzzle of graduate wages

IFS Briefing Note BN185

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## 1. Introduction

The UK higher education sector has expanded remarkably over the past three decades. In 1993, 13% of 25- to 29-year-olds had first degrees or higher degrees. By 2015, this had roughly tripled to 41%. Naturally, one may wonder whether the big expansion has reduced the economic returns to having a first degree. We have all heard stories about graduate unemployment and graduates employed in low-wage jobs. But what do the data show and what can we learn from history?

This briefing note will document the historical trends of rising graduate numbers and their relative wages, and provide economic intuition for what is driving these trends. Understanding the past will be helpful in thinking about the future: if the proportion of graduates continues to increase (which is rather likely given current policies), will it lower graduate earnings?

Throughout, we will use the word ‘graduate’ to refer to anyone with first degrees or higher-level qualifications and ‘school-leavers’ for those with at least GCSEs grade C or equivalent qualifications and without degree-level qualifications.<sup>2</sup> The interested reader can find some summary statistics on graduates and school-leavers in Table 1 at the end of this briefing note.

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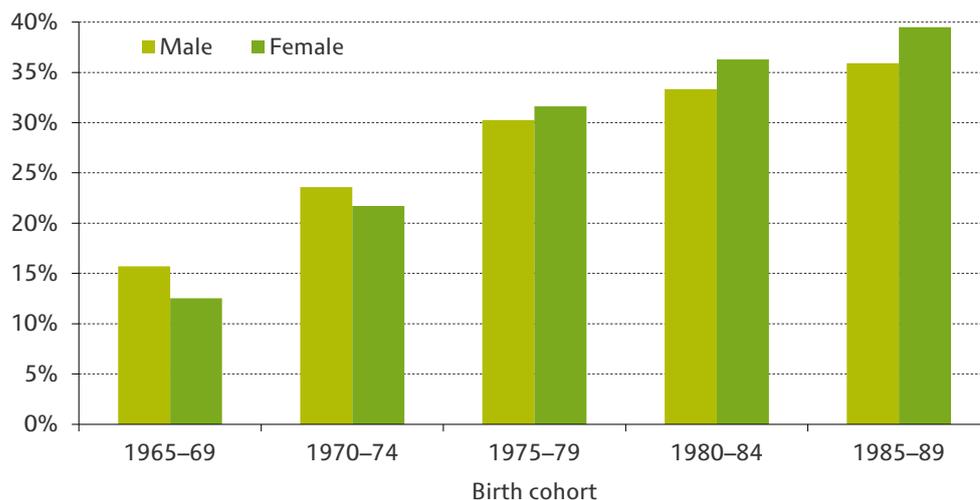
<sup>2</sup> According to chart 7 in the Bank of England Quarterly Bulletin 2016Q1, the graduate wage premium relative to those without qualifications has fallen substantially over the past 20 years. The main difference between their approach and ours is that we focus on

## 2. The puzzle

- Fact 1: The UK has seen a rapid increase in the proportion of young people with degrees over the past three decades. Comparing across birth cohorts, the sharpest increase in the graduate proportion occurred between those born in the late 1960s and those born in the late 1970s.

Between 1993 and 2015, the proportion of graduates among 25- to 29-year-olds has increased from 13% to 41%, while the proportion of people without GCSE or equivalent qualifications has dropped by more than half. Another way to view the rise in graduates is by birth cohort. Figure 1 presents the proportion of young men and women with first degrees by five-year birth cohort.

**Figure 1. Percentage of 25- to 29-year-olds with first degrees or above, by birth cohort and gender**



Source: Authors' calculations from Labour Force Survey 1992–2015.

The proportion of graduates has been increasing in successive birth cohorts, with the fastest growth occurring between the 1965–69 and

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the difference between “graduates” and “school-leavers” (those with GCSEs at grade C or above, including A-levels and below-degree-level higher education qualifications); whereas they compared graduates to the “no-qualification” group. There is also a technical difference in our methodologies. The Bank report uses wage regressions conditioning on a range of job characteristics, whereas we show the raw data as they are. For example, higher education increases the probability of a higher-paid occupation, therefore conditioning on occupation appears to reduce the return to higher education. The interested reader should email [wenchao\\_j@ifs.org.uk](mailto:wenchao_j@ifs.org.uk) for more details.

1975–79 cohorts. Among those born between 1965 and 1969 (who turned 18 before 1988), 16% of men held degrees in their late 20s. For the birth cohort born just one decade later (who turned 18 after 1993), this proportion had nearly doubled to 30%. The increase was even greater for women. In fact, 1975–79 was the first birth cohort where women had a higher graduate proportion than men. Some of the dramatic change between the 1965–69 and 1975–79 cohorts was related to the 1992 reform that gave polytechnics university status in 1992, but polytechnics awarded degrees before 1992 and there was also a rapid increase in student numbers throughout the period from 1988 to 1994. The expansion slowed down in 1994, when the maximum student number control (which limited the number of full-time undergraduates each university could admit) was introduced.

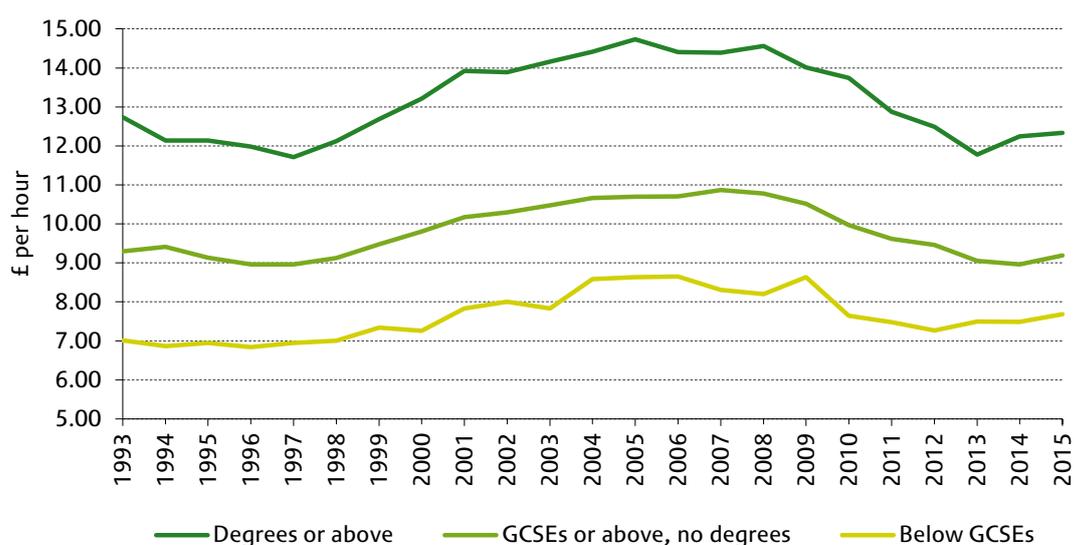
- Fact 2: Despite the recent fall in the average graduate real wage, their wage relative to school-leavers' has remained relatively unchanged. Indeed, at any given age, the wage differential between graduates and school-leavers has stayed essentially unchanged across birth cohorts.

One way to see how the army of graduates have fared in recent years is to look at their average wage relative to the Consumer Price Index. Figure 2 reveals that between 2008 and 2013, the real median hourly wage of 25- to 29-year-old graduates fell by nearly 20%. The level in 2015 is about 15% below the 2008 peak and roughly the same as the level in the mid 1990s. However gloomy this picture may be, it cannot be taken as direct evidence of a substantial negative impact from the increasing supply of graduates lowering their wages. The real median wage among school-leavers also fell by 15% between 2008 and 2015. In fact, the median wage differential between graduates and school-leavers has essentially stayed flat at around 35% over the past two decades for 25- to 29-year-olds. Meanwhile, the median wage differential between those with GCSEs and those without (the ratio between the second and third series in figure 2) has fallen from a bit over 1.3 in the early 90s to 1.2 in 2015.<sup>3</sup>

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<sup>3</sup> This trend is interesting and it partly explains the difference between our findings and the conclusion in the Bank of England 2016Q1 report about the fall in graduate wage premium. Note too that the proportion with post-graduate education, although small, has increased in recent years together with an increase in the return to post-graduate degrees.

**Figure 2. Median real hourly wage of 25- to 29-year-olds, by education**



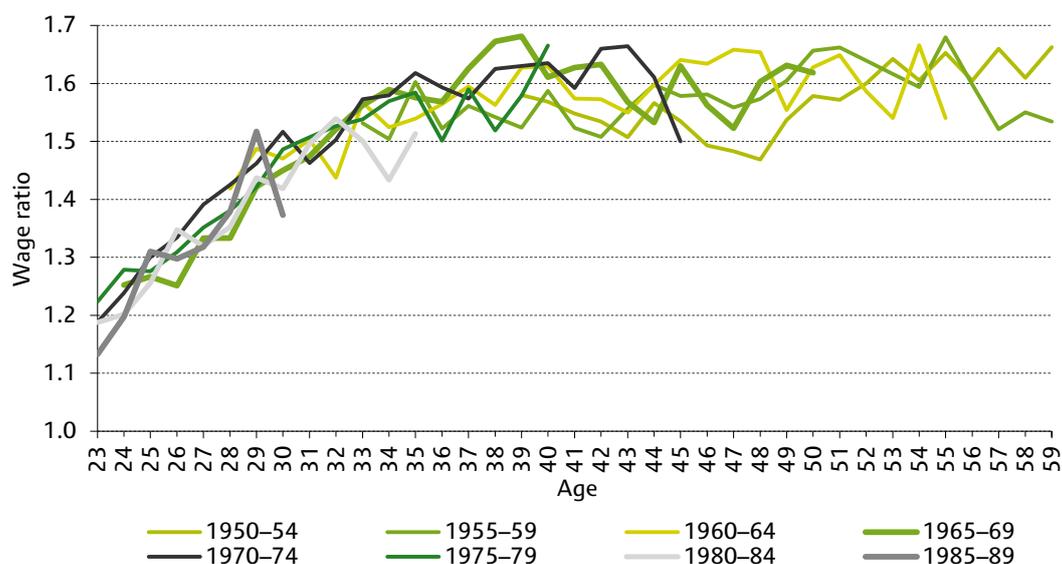
Source: Authors' calculations from Labour Force Survey 1992–2015. The deflator is the Consumer Price Index, ONS series D7BT.

The wage data are more striking when arranged by birth cohorts. In Figure 3, each curve plots, for a particular birth cohort, the ratio of the median wage of graduates to the median wage of school-leavers against age. It is a picture of curves literally on top of each other. At any given age, there is no obvious shift across cohorts in the wage differential. For illustration, let us zoom in on the 1965–69 and 1975–79 birth cohorts, which differed in the graduate proportion by more than 10 percentage points. At age 25, the wage differential between graduates and school-leavers is 25% for the 1965–69 cohort and 28% for the 1975–79 cohort. These rise to 45% and 48% for the two cohorts respectively at age 30, and to 58% for both at age 35. Thus, the 1975–79 cohort, which had double the proportion of graduates that the 1965–69 cohort had, had the same or a slightly higher relative graduate wage.

At first sight, there is something surprising about Figures 1 and 3. The supply of graduates has increased enormously. One would normally expect that to result in a reduction in their relative wage. This has not happened. This puzzle is the subject of an IFS working paper published last month.<sup>4</sup>

R. Blundell, D. Green and W. Jin, 'The UK wage premium puzzle: how did a large increase in university graduates leave the education premium unchanged?', IFS Working Paper W16/01, <http://www.ifs.org.uk/publications/8322>.

**Figure 3. Ratio of graduate median hourly wage to that of school-leavers, by birth cohort**



Note: The sample contains 23- to 59-year-olds. Each data point is based on two education groups, both of which have at least 50 wage observations.

Source: Authors' calculations from Labour Force Survey 1992–2015.

Understanding this historical puzzle is important if one is interested in extrapolating into the future. Given that the major expansion of graduates happened without a fall in their relative wages, should we expect this to occur again with a new expansion? Our answer would be no.

### 3. The explanations

The working paper mentioned above examines differences in graduate proportions and wage ratios by subgroups. For example, the proportion of graduates among immigrants is higher than that among natives and the share of immigrants in the UK workforce has increased considerably over time, but whether or not we include immigrants in the data does not change the story qualitatively. Among the natives, the graduate proportion increased significantly across cohorts while the wage ratio was constant. The same basic patterns are observed if we exclude postgraduates or the public sector or look at each gender separately. In other words, none of those observed characteristics of individuals can explain the puzzle.

It is possible that some unobserved characteristics of graduates (such as innate ability) are also changing. The large and rapid expansion of higher education may draw students from lower down the ability distribution. The quality of education provided may also deteriorate given the fall in

funding per student. To the extent that graduates of more recent cohorts have lower productivity than those from previous cohorts, we should expect a negative impact on the observed wages of graduates. And this would be in addition to the standard negative effect of a supply increase on prices. Thus, the idea that the quality of graduates has declined does not, by itself, help to explain the lack of reduction in their relative wages. But it may have contributed to a fall in their absolute wage level.

Meanwhile, the quality composition of school-leavers might have deteriorated as well. The 'best' of them in the past would now become graduates. To explain the puzzle, we would need the quality of the average school-leaver to decline more than that of the average graduate. The IFS working paper estimates the size of quality changes that would be needed to rationalise the data patterns. It finds not only that the magnitude seems implausibly large, but also that the 'quality' of the new graduates would have to vary substantially by year and age group, and in just such a way that it perfectly balanced out other forces, to leave the wage differential unchanged at each point in time. While we cannot rule out this possibility, we find it highly implausible. Instead, we emphasise an explanation in which the flat wage differential arises from the functioning of the economy.

As explained in the working paper, firms can respond to changes in the supply of skills by changing how they organise and manage the workforce. Specifically, UK firms have become less hierarchical over time: instead of having a few skilled managers to dictate how a larger number of unskilled workers should work, now more managerial decisions are decentralised and made by skilled workers. In a series of influential papers,<sup>5</sup> Professor John Van Reenen and co-authors have shown that British and French firms have been transitioning towards more decentralised decision-making in recent decades and that there is synergy between having a high proportion of educated workers and having a decentralised management structure.

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<sup>5</sup> E. Caroli and J. Van Reenen, 'Skill-biased organizational change? Evidence from a panel of British and French establishments', *Quarterly Journal of Economics*, 2001, 116(4), 1449–92.

N. Bloom, R. Sadun and J. Van Reenen, 'Americans do IT better: US multinationals and the productivity miracle', *American Economic Review*, 2012, 102(1), 167–201.

The IFS working paper proposes an economic model in which firms choose between two organisational forms: the old, centralised form and the newer, decentralised one. Here, we think of the choice of organisational form as a choice of ‘technology’, just like IT is a kind of technology. The decentralised organisational form is more profitable if and only if the supply of graduates is sufficiently high. When the economy starts with a very low proportion of graduates, the traditional organisational form will dominate. As the relative supply of graduates increases, the relative wage will fall and, once it reaches a critical threshold, firms will begin to adopt the newer decentralised form of organisation. The relative wage will stay at that critical level until all the firms have switched to the new form. After that, the relative wage should fall if the supply of graduates continues to rise. Thus, there exists a transitional period when the relative wage of graduates is invariant to supply changes.

We argue that this is how the UK avoided any obvious decline in the wage differential between graduates and school-leavers during the 1990s and the 2000s, when the proportion of graduates increased substantially. That was the transitional period when more and more firms switched to the decentralised organisational form. This theory is supported by some evidence from the Workplace Employment Relations Survey. The proportion of employees who report having a lot of influence about ‘the range of tasks you do in your job’ or ‘how you work’ has increased substantially between the 1998 survey and the 2011 one. Moreover, employees in areas with a higher graduate proportion are significantly more likely to report that than those in areas with a lower graduate proportion.

#### **4. The future**

So, what does this theory imply for the future? It suggests that, after all firms have adopted the new organisational form – that is, after the transitional phase – any further increase in the graduate proportion should have a negative impact on graduates’ relative wage. The IFS working paper suggests that the UK economy has probably moved out of the transitional phase recently and there is already some sign of a relative wage decline in the private sector in the last couple of years. For example, the median graduate-to-school-leaver wage ratio among 30- to 34-year-

olds in the private sector has fallen from an average of 1.63 in the 2000s to 1.55 in the 2010s.

Hence, we believe future increases in the proportion of graduates in the UK will tend to reduce graduates' relative wages, unless some other skill-biased technology becomes available. And that technology has to be sufficiently general to be applicable in all sectors (like how the IT revolution and decentralised organisational form spread across the economy). But we do not expect a future UK higher education expansion to automatically generate such a new general technology. The decentralised organisational form was first implemented by US firms and US multinationals before it was adopted by UK firms. Now that the UK is surpassing the US in terms of the proportion of graduates, there is not another readily-available general technology that the UK can adopt from the US.

To summarise, we have investigated how the historical rise of graduate proportion occurred without a substantial decline in graduates' relative wages. To be clear, what we have done is to explain historical wage trends for different education groups, rather than estimating the true causal impact of degrees on individuals' wages. Thus, neither the flat relative wage movements in the past nor our conclusion about future wage trends implies that getting a degree will not be worth it any more. In addition to higher wages, a degree may bring the individual other benefits such as a lower risk of unemployment or access to some interesting careers. Similarly, the findings do not allow us to say whether the UK is producing too many or too few graduates. The social returns to higher education could be very different from the private returns, as one person getting a degree could affect other graduates and non-graduates in many positive and negative ways.

**Table 1. Summary statistics in 2015**

	<b>Aged 25–29</b>		<b>Aged 30–59</b>	
% graduates	41%		32%	
% school-leavers	49%		54%	
	<b>Among graduates</b>	<b>Among school-leavers</b>	<b>Among graduates</b>	<b>Among school-leavers</b>
Employment rate	88.3%	78.7%	89.4%	83.2%
<i>Hourly wages</i>				
10 <sup>th</sup> percentile	£7.05	£6.25	£8.45	£6.53
Median	£12.36	£9.21	£17.31	£11.33
90 <sup>th</sup> percentile	£23.08	£15.93	£34.63	£22.13

Note: “graduates” are those with first degrees or higher qualifications. “School-leavers” refers to those with at least GCSE grade C or equivalent qualifications and without first degrees. “School-leavers” include those with just A-levels or below-degree-level higher education qualifications.

Source: Authors’ calculations from quarterly Labour Force Survey 2015Q1–Q4.