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The apprenticeship guarantee

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Abstract
The UK has a poor record of providing opportunities to learn skills for the around half of young people that do not attend university. Over a third of 18-year-olds in England are not undertaking any education or training, significantly higher than in the major EU economies. Concerningly, recent trends have been in the wrong direction. The number of apprenticeship starts in England has significantly declined since the mid-2010s, when it hovered at around half a million.

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The Apprenticeship Guarantee

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Paying attention to the "other half" of young people

The UK has a poor record of providing opportunities to learn skills for the around half of young people that do not attend university. Over a third of 18-year-olds in England[1] are not undertaking any education or training, significantly higher than in the major EU economies[2]. Concerningly, recent trends have been in the wrong direction. The number of apprenticeship starts in England has significantly declined since the mid-2010s, when it hovered at around half a million[3] (see Figure 1). This is not due to a lack of demand: in the government's Find An Apprenticeship matching scheme, three times

Figure 1. Apprenticeship starts in England by level.
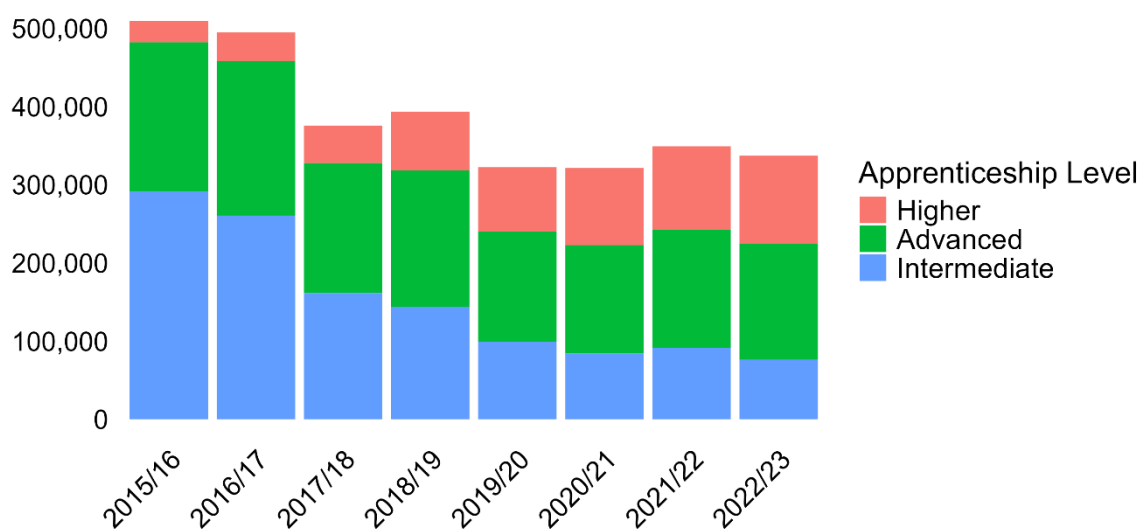
Source: Department for Education (DfE)

more young people apply than the number of places available[4]. The decline in

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[1] The devolved nature of education and training means that education statistics provided by the Department for Education are for England only.

[2] Department for Education data: Participation in education, training and employment age 16 to 18 estimates for England, 2022. https://explore-education-statistics.service.gov.uk/find-statistics/participation-in-education-and-training-and-employment.

[3] A small part of this may be explained by a mild shrinkage in the size of the 16-24 age cohort since the mid-2010s. There has also been an ongoing rise in university entry rates, but it is unclear how this impacts level 2 and 3 apprenticeships given there has been no corresponding increase in A-level achievement rates (especially for level 2, it is not typical for new starts to have achieved any A-levels, so they will not be from the same pool as university applicants). It is also worth noting that a significant part of the decline in level 2 starts in particular may have been the disappearance of low-quality apprenticeships with the shift from apprenticeship frameworks to more rigorous apprenticeship standards. Whilst this is in some ways desirable, the pool of potential level 2 apprentices are those most at risk of going through their careers with low skill and it is not desirable that they do no apprenticeship whatsoever.

[4] In the year 2020/2021,142,000 under 25s applied through for 47,000 places. Department for Education, Apprenticeship vacancies: demand and supply data, July 2021.

apprenticeship starts has also been associated with a shift in the composition of starts towards higher levels, older ages and those from less deprived backgrounds[5]. For young people in disadvantaged areas, it seems the pathway apprenticeships provide into a career is narrowing, with potentially large implications for their future work and wellbeing.

Increasing the supply of apprenticeships calls for government intervention. In 2009, Parliament passed the Apprenticeships, Skills, Children and Learning Act which obliged the government to ensure an apprenticeship place to all suitably qualified 16- to 18-year-olds. This guarantee was subsequently repealed. Recently, there has been interest in reviving the idea[6]. A similar proposal would be a target for every suitably qualified individual under 25 who wants to start an intermediate or advanced apprenticeship to receive at least one viable offer of a place[7]. Over the course of this Parliament, it seems reasonable to assume this would require a doubling of intermediate (level 2) and advanced (level 3) apprenticeship starts amongst under 25s – a little under 160,000 additional starts per year[8]. This would return us to the level of all apprenticeship starts from seven years ago.

What would be required to make this reality? Some of the work can be done through changes to the existing apprenticeship levy, which obliges large firms to put aside funds to pay for apprenticeship training[9]. Currently, a large share of levy funds is used to fund higher apprenticeships (level 4 and above[10]). These are a form of higher education predominantly taken by over 25s. The National Audit Office has supported the observation that the growth in higher apprenticeships partly represents the rebadging of professional development programmes that were being provided anyway to make them

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[5] Young individuals from disadvantaged backgrounds are very poorly represented in the highest levels of apprenticeship, which is where there has been significant growth. Those who were on free school meals at school are in fact more likely to start a university degree than to study for a level 6 or 7 ("degree") apprenticeship. Cavaglia, C., McNally, S. and Ventura, G., 2022. *The Recent Evolution of Apprenticeships: Participation and Pathways*. CVER Research Discussion Paper 039.

[6] Examples of recent proposals for an apprenticeship guarantee are: Layard, R., McNally, S. & Ventura, G., 2023. *Applying the Robbins Principle to Further Education and Apprenticeship*. The Economy 2030 Inquiry. & https://www.cipd.org/globalassets/media/knowledge/knowledge-hub/reports/2024-pdfs/8624-apprenticeship-levy-report.pdf

[7] Whether this should literally take the form of a guarantee is an open question. The disadvantage of a guarantee is it does not impose a hard limit on total cost of the policy (both due to the number of places being unbounded and because marginal costs may be much higher for creating the last apprenticeship place that is demanded). Furthermore, if demand for apprenticeships in a given sector was in large excess of possible places it would not be viable to guarantee a place for all applicants. We abstract from the details of legislation here and discuss the costs and benefits of increasing apprenticeship places generally.

[8] Adjusting for a 6% increase in the size of the 16-24 age cohort by 2028. This would take total level 2 and 3 starts amongst under 25s from 140,000 to just short of 300,000. We assume this increase preserves the current ratio of level 2 to level 3 starts.

[9] Employers with an annual pay bill over £3 million pay 0.5% on their pay bill over this threshold, which they can use to fund off-the-job apprenticeship training and assessment. Otherwise, these funds go to the exchequer – creating an incentive for the employer to provide apprenticeship training.

[10] Levels 6 and 7 are sometimes distinguished as degree apprenticeships.

eligible for use of levy funds[11]. Therefore, there is space to use existing levy funds more efficiently to increase the allocation of apprenticeship funding to young people. This is especially the case since, from September 2025, those doing training courses at levels 4 and above will be eligible to be funded through the Lifelong Learning Entitlement (a government loan of up to £37,000), which could support much of the higher apprenticeship training currently funded by the levy (in the same way that higher academic education is financed by the learner through taking out a student loan).

If one third of the apprenticeship levy was ringfenced for under 25s starting level 2 and level 3 apprenticeships, we estimate this would provide sufficient funds for paying for around double the current number of level 2 and 3 starts in levy-paying firms (an increase in starts of 66,000)[12]. Level 2 and 3 apprenticeships are key to addressing low skill since they are the type of apprenticeship someone leaving academic education between the ages of 16 and 18 is likely to take. Level 2 apprenticeships generally teach the basic skills for roles such as hair stylist or machine operative, whilst level 3 apprenticeships provide more specialised skills for roles such as senior hair stylist or engineering technician. Since the training is much cheaper than for higher level apprenticeships, reallocating levy funds to these levels can open up pathways for large numbers of young people to start careers. This should also help maximise the returns to apprenticeship training, which are higher for younger people[13]. This would not impose any additional cost on the government.

In SMEs, we argue the increase in starts should be proportionally larger since the decrease in level 2 and 3 starts in non-levy-paying firms has been far greater than in levy-paying firms, accounting for the large majority of the total decline. We suggest SMEs could account for 90,000 additional starts[14]. These starts are not covered by the levy and off-the-job training would have to be paid for by the government[15]. In addition, the government would need to encourage SMEs to take on more starts. We argue this

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[11] National Audit Office, *The apprenticeships programme*, 6 March 2019, p9. On this issue, see also: EDSK, *Runaway training*, January 2020, p2. This is one reason why a very large share of higher apprenticeships are in business and administration, and not well dispersed across the sectors in which many young people will work.

[12] This would make the number of under 25s starting level 2 and 3 apprenticeships in levy-paying firms around 140,000. We estimate this would require £840 million of levy funds, less than a third of the £3.6 billion raised by the levy (based on the off-the-job training cost estimates below, assuming levels 2 and 3 increase in line with their current proportions of under 25 starts and that completion rates remain the same). Ringfencing one third allows for the fact that employers do not use all of the funds in their levy accounts, and for the possibility that the increase in demand for training might push up costs.

[13] McIntosh, S. and Morris, D., 2018. *Labour Market Outcomes of Older Versus Younger Apprentices: A Comparison of Earnings Differentials*. CVER Discussion Paper No. 16.

[14] This would increase the number of under 25 level 2 and 3 starts in non-levy firms from 68,000 to 158,000 – more than double the current number. To reconcile with the total proposed increase in starts, this means the number of starts in levy firms slightly less than doubles and all of the increase in starts resulting from the increase in the size of the 16-24 cohort is accounted for by SMEs.

[15] The government pays 100% of these costs for apprentices under 21 and 95% for apprentices over 21. In both cases, this is up to a maximum based on the role. Since we envisage most additional level 2 and 3 starts would under 21, the government would pay close to 100% on average for each new place created in an SME under the policy.

can be achieved through a combination of two approaches. Firstly, setting up dedicated teams around the country to reduce administrative and information barriers to SMEs taking on apprentices and facilitate the flow of local young people into starts. Secondly, by providing SMEs in areas with a higher-than-average proportion of young people not in education, employment or training a financial incentive to take on more apprentices. We estimate the costs of this below and weigh them against the estimated benefits of providing more apprenticeship starts, factoring in the important role employment plays in shaping wellbeing beyond income. It is important to note that, since education is a devolved policy area, the numbers associated with the policy proposal relate to England[16]. However, it can be assumed that the same costs and benefits of an additional apprenticeship start apply in the other nations of the United Kingdom, so the cost-benefit calculations can be viewed as relating to the whole country.

The benefits of doing an apprenticeship

There are very good reasons a government concerned with wellbeing should invest in education. Educational qualifications are positive predictors of future wellbeing, even once income is accounted for[17]. Some of the effect of education on wellbeing may be direct (e.g., from a sense of fulfilment), but we view the main channel as its influence on an individual's experience of the labour market. It is well established in the economic literature that the economic returns to education and training can be very large over a lifetime[18]. In addition, by reducing the chance an individual suffers unemployment, it shields them from the associated psychological harms.

Previous research has produced credible evidence of large effects on employment and wages from doing an apprenticeship[19]. The Department for Education estimates[20] achieving a level 2 apprenticeship increases the probability of being in employment by 4 percentage points and the wage for those in employment by 12%. Taking a level 3 apprenticeship provides an additional 3 percentage point improvement in the probability of being in employment and 13% increase in the wage when compared to those with a level 2 apprenticeship.

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[16] The apprenticeship levy is a UK-wide policy and ringfencing it would impact apprenticeship supply in all of the four nations. It is also very possible that a coordinated system of incentives and support for SMEs could be set up that applied across the whole of the UK.

[17] Clark, A. et al. (2018). *The Origins of Happiness: The Science of Well-Being over the Life Course*, Princeton University Press.

[18] Chetty, R., Friedman, J. N., and Rockoff, J. E., 2014. Measuring the Impacts of Teachers II: Teacher Value-Added and Student Outcomes in Adulthood. *American Economic Review*, 104(9), 2633-2679. Psacharopoulos, G., and Patrinos, H. A., 2018. Returns to investment in education: a decennial review of the global literature. *Education Economics*, 26(5), 445–458.

[19] Cavaglia, C., McNally, S. and Ventura, G., 2020. *Do Apprenticeships Pay? Evidence for England*. *Oxford Bulletin of Economics and Statistics*, 82(5), pp.1094-1134. Department for Education (DfE), 2021. *Measuring the Net Present Value of Further Education in England 2018/19*.

[20] This uses the Bibby et al. (2014) method of comparing those who finish an apprenticeship with observably similar non-completers in a difference-in-differences set-up. Bibby, D., Buscha, F., Cerqua, A., Thomson, D. and Urwin, P. (2014). *Further education: comparing labour market economic benefits from qualifications gained*. Department for Business Innovation and Skills Research Paper No. 195.

We use these estimates as the basis for modelling the flow of benefits from taking an apprenticeship over a 10-year timeframe. Benefits are always expressed per start since the policy relates to increasing starts (nearly half of whom will not complete[21]). We aggregate across levels 2 and 3 when considering total benefits, which means the per start benefit is a weighed average across the two levels. We do this because expanding level 2 and level 3 apprenticeships are complementary policies and not competing. Level 2 is a path into level 3 and those starting different levels have different prior qualifications (they are not generally choosing between levels). It therefore makes sense to consider their expansion together, rather than as separate policies that are being combined.

To model the realisation of benefits, we start by characterising the pool of potential level 2 apprentices before applying the wage and employment premia from doing a level 2 and then level 3 apprenticeship. The pool of potential level 2 apprentices will tend to have limited academic achievement and we assume an average wage for this group of £9.5 pounds per hour, around the median wage for the relevant age group[22] and around £1 above National Minimum Wage for those aged 18-20. This gives a starting weekly gross income of £276 (based on a working week of 29 hours[23]). This is assumed to grow at a rate of 4% a year – 0.5% national growth in real wages[24] plus 3.5% growth from career progression experienced when young[25].

The level 2 wage premium is then applied to this wage in all of the years over which we estimate benefits, except the period during which the apprenticeship is being taken when we apply a 25% wage penalty[26] (this gives a starting wage of £7.1 an hour for a

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[21] In 2022/23, the achievement rate for level 2 was 53.9% and for level 3 was 54.7%. Whilst this is concerningly low, for this analysis we do not allow for any improvement in this figure. We (conservatively) do not account for any benefits to non-completers but do account for the partial costs they impose (see methodological annex 1). Department for Education, 2024. *Apprenticeship achievements: An update for the sector.*

[22] It lies between the non-apprentice median wage in 2023 of £8.09 for 16- to 17-year-olds and £10.45 for an 18-year-old (the ages at which the expansion of level 2 starts should be targeted). 2023 Annual Survey of Hours and Earnings (ASHE).

[23] The average paid hours per week for all employees is around 33. However, hours worked are negatively related to being in the 16-24 age group, so we adjust down to 29 hours per week to account for the likelihood that more young people will be in part time work (even once we take out those still in education).https://www.ons.gov.uk/economy/grossdomesticproductgdp/articles/averagehoursworkedandeconomicgrowth/2024-01-22

[24] Office for Budget Responsibility (OBR), Economic and fiscal outlook March 2024.

[25] This is a somewhat lower than for those attending university. Department for Business, Innovation & Skills, 2013. *The Impact of University Degrees on the Lifecycle of Earnings: Some Further Analysis.* Research Paper No. 112.

[26] For those aged 16-20, the median wage of an apprentice is ~75% of a non-apprentice (2023 Annual Survey of Hours and Earnings (ASHE)). The same proportional difference applies between the apprentice and non-apprentice minimum wage for someone aged 18-20. Completing an apprenticeship typically takes 12-18 months for level 2, and we take the mid-point of this range (15 months) when applying the wage penalty (https://www.ucas.com/apprenticeships/level-2-intermediate).

level 2 apprentice[27], slightly above the apprentice minimum wage of £6.40). In the first year, this gives a weekly gross (pre-tax) income for someone who has achieved a level 2 apprenticeship of £309[28] – £33 higher than someone without a level 2 apprenticeship (£1716 a year). To account for the fact that only part of the productivity gains from higher skill goes to the worker, we additionally factor in a productivity spillover of 35% of the gross wage premium[29].

For someone who has completed a level 3 apprenticeship, the level 3 wage premium is applied to the level 2 wage – an assumption that those taking level 3 will have already achieved skills equivalent to a level 2 apprenticeship[30]. This gives a weekly gross income on completion of £349 – £40 higher than for someone who has only completed a level 2 apprenticeship (£2080 a year). As with level 2, we apply a 25% wage penalty during the period in which the apprenticeship is being taken[31] and a productivity spillover in the years after completion of 35% of the gross wage premium.

After deducting tax (see methodological annex 2), the change in wages for those in employment translates into a per start flow of discounted[32] benefits of:

Table 1. Wage premium/penalty per start (net, discounted)

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
-£1,453	-£485	£671	£674	£676	£679	£681	£684	£686	£689	£3,502

[27] This lies in the middle of the median wage for a 16- to 17-year old apprentice of £6.34 and the median wage of an 18-year-old apprentice of £7.72. Given this is the most important age range for expanding level 2 starts, this seems appropriate. 2023 Annual Survey of Hours and Earnings (ASHE).

[28] Calculating the wage premium in the first year allows for comparison, but it is worth noting that when modelling we only use post-apprenticeship income from year two onwards (after the apprenticeship is completed).

[29] This figure comes from the Department for Education based on a general review of the literature on higher-level qualifications and productivity. The limited empirical literature on vocational training and productivity spillovers has tended to find larger spillovers from training – Dearden et al. (2005) find only half of the benefit is captured in higher wages – but we opt to follow the Department for Education in being conservative on this assumption. Department for Education (DfE), 2021. *Measuring the Net Present Value of Further Education in England 2018/19*. Dearden, L., Reed, H. and Van Reenen, J., 2005. *The Impact of Training on Productivity and Wages: Evidence from British Panel Data*. CEP Discussion Paper No 674, February 2005.

[30] Around a third of those who start level 3 have already taken a level 2 apprenticeship, whilst the others will tend to have significantly better academic qualifications than those starting level 2. Cavaglia, C., McNally, S. and Ventura, G., 2022. The Recent Evolution of Apprenticeships: Participation and Pathways. CVER Research Discussion Paper 039.

[31] This gives a starting wage of £8.0 for a level 3 apprentice. This falls in the middle of the median apprentice wage for an 18-year-old of £7.72 and the median apprentice wage for 19- to 20-year-olds in their first year of £8.29 (these are the ages we envisage the expansion of level 3 places should be targeted) (2023 Annual Survey of Hours and Earnings (ASHE)). Completing a level 3 apprenticeship typically takes 18-24 months, and we take the mid-point of this range (21 months) when applying the wage penalty. https://www.ucas.com/apprenticeships/england/level-3-advanced

[32] Discounting is at a rate of 3.5%, as given in the Treasury Green Book. This can be broken down into 0.5% time preference, 1% catastrophic risk and 2% from accounting for the effect of real income growth on the marginal utility of income in the future.

In addition to higher wages, we estimate the benefits from being more likely to be in work in the first place. This has two aspects: the increase in income relative to out-of-work benefits and the psychological benefit to the individual from avoiding unemployment. For the three to four percent for whom completing an apprenticeship saves from unemployment, the net income gains are very large since out-of-work benefit income tends to be small at young ages. Based on calculations of benefit eligibility (see methodological annex 3) and including avoiding unemployment whilst doing the apprenticeship[33], we estimate a discounted flow of benefits per start of:

Table 2. Income gained from reduced unemployment per start (net, discounted)

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
£470	£322	£253	£253	£252	£252	£226	£227	£207	£232	£2,695

An extensively replicated finding of the empirical literature on the determinants of wellbeing is that unemployment has a large, negative effect on life satisfaction after changes to income have been accounted for. Estimates range from a reduction of -0.3 to -1 on a 0 to 10 scale[34]. Estimates for the UK tend to be slightly lower than Germany, the other country on which this literature has focused, and we take a value of -0.5 to be the effect on life satisfaction of being out of work in the UK. We monetise this effect using the Treasury Green Book Supplementary Guidance valuation of an additional point of life satisfaction experienced over one year – a "wellby" – of £15,258 (in 2023 prices), which gives a further benefit to for those who avoid unemployment equivalent to £7,629[35]. Relating this benefit to the employment premium, we get a flow of discounted[36] benefits per start of:

Table 3. Psychological benefits of employment per start (discounted)

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
£313	£218	£136	£134	£132	£130	£128	£126	£124	£123	£1,565

Adding these three streams of benefits together, we get the cumulative total of benefits over ten years (see Table 4). By the end of the tenth year after a cohort of apprentices begin, cumulative benefits amount to over £10,000 per start.

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[33] The employment rate for a young person who does not have an apprenticeship is taken to be 90%. The unemployment rate for those aged 18-24 has fluctuated around ~10% since 2022 (ONS UNEM01 SA, based on the Labour Force Survey). We take the unemployment rate, rather than inactivity, since someone looking for an apprenticeship is economically active. One implication of this assumption is that nine out of every ten additional apprenticeship starts do not represent the creation of new jobs in aggregate but the hiring of those workers as apprentices rather than as workers who receive no training.

[34] A review of the evidence by this author can be found here: https://docs.google.com/spreadsheets/d/1_xhyAQenfbPQvJGKuHfI8KEdaKMCCgin3wNcqBMh8lY/edit?usp=sharing

[35] This also applied for the period during which the apprenticeship is being completed (for those who complete).

[36] For wellbeing, we discount the change in life satisfaction first at a rate of 1.5% then monetise. The discount rate for wellbeing is lower because changes in the marginal utility of income are not relevant, so it is only the sum of a time preference of 0.5% and a catastrophic risk of 1%.

Table 4. Total annual and cumulative benefits per start (discounted)

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Wage	-£1,453	-£485	£671	£674	£676	£679	£681	£684	£686	£689
Spillover	£0	£0	£346	£347	£348	£349	£351	£352	£353	£354
Employment	£470	£322	£253	£253	£252	£252	£226	£227	£207	£232
Psychological	£313	£218	£136	£134	£132	£130	£128	£126	£124	£123
Total	-£670	£56	£1,407	£1,408	£1,409	£1,410	£1,386	£1,388	£1,371	£1,397
Cumulative	-£670	-£614	£792	£2,200	£3,609	£5,019	£6,405	£7,793	£9,164	**£10,561**

The cost of increasing the supply of apprenticeships

Because the firm as well as the worker benefits from higher productivity, firms offer apprenticeship places without any inducement from the government. However, the market for training suffers from major market failures that cause apprenticeship places to be undersupplied. The most well-known of these is that the benefits of training which provides general skills transferable to other firms may be "stolen" by a firm that did not pay the costs of the training[37]. This is especially a problem in smaller firms where career progression opportunities are more limited, meaning the firm is less likely to attract and keep good quality apprentices. This means there is a strong case for the government to subsidise apprenticeship training.

Although the costs of off-the-job training for apprenticeships in SMEs are paid by the government, the costs of providing on-the-job training are met by the firm. These costs, mainly the time spent supervising the apprentice by more senior employees, are substantial. Based on Department for Business, Innovation and Skills figures, we estimate that employing an apprentice incurs an average associated cost to an SME of around £6,500[38]. This is only partially offset by the fact that the apprentice will accept a lower wage, which reduces the annual wage bill by £716 for level 2 and £802 for level

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[37] Becker, G.S., 1962. Investment in Human Capital: A Theoretical Analysis. *Journal of Political Economy*, 70(5), pp. 9-49. Acemoglu, D., and Pischke, J-S., 1998. Why Do Firms Train? Theory and Evidence. *The Quarterly Journal of Economics*, 113(1), pp. 79-119. Muehlemann, S. and Wolter, S.C., 2014. Return on investment of apprenticeship systems for enterprises: Evidence from cost-benefit analyses. *IZA Journal of Labor Policy*, 3(1).

[38] Hogarth, T., Gambin, L., Winterbotham, M., Baldauf, B., Briscoe, G., Gunstone, B., Hasluck, C., Koerbitz, C., & Taylor, C. (2012). *Employer investment in apprenticeships and workplace learning: The fifth net benefits of training to employers study*. BIS Research Paper, Department for Business, Innovation and Skills (67), 192. The figures in this paper come from a survey of firms in 2011 that identified associated costs per apprenticeship in different sectors for high- and low-cost cases. We come to an average cost by taking the mid-point of the high and low of supervision and admin costs for each sector and then averaging according to weights determined by the share of each sector in SME apprenticeship starts. This ignores costs such those associated with recruitment that would be incurred anyway (assuming the firm would hire a normal worker if it did not hire an apprentice). As costs relate to lost labour time they are updated in line with wage growth (nominal and real) based on the ONS Monthly Wages and Salaries Survey.

3[39]. We thus estimate hiring an apprentice costs an SME over £5,500 more than hiring a worker with equivalent prior skills and not training them.

A firm that is uncertain about the quality of the worker they are training or whether they will be able to keep them at the end of the apprenticeship may decline to pay these costs. Encouraging SMEs to take on more apprentices will therefore require the government to provide an additional incentive. Currently, the government offers a £1000 subsidy to firms for hiring an apprentice aged 16 to 18. This has not been sufficient to reverse the decline in apprenticeship starts in this age group that occurred in the second half of the 2010s (which is proportionally the largest of any age group). We therefore suggest a larger incentive is necessary to increase apprenticeship starts amongst under 25s. During the Covid-19 pandemic, the government offered firms £3000 per apprentice of any age to encourage employers to continue take on new apprentices[40]. This would account for around half of our estimate of the associated costs of training an apprentice (splitting the cost of on-the-job training roughly equally between firm and government). £3000 therefore seems a realistic figure to alter the calculation of costs and benefits a firm makes when hiring an apprentice.

In labour markets with low youth unemployment and a high proportion of young people in education, incentives would likely have a high degree of deadweight. We therefore argue that the provision of incentives should be focused on labour markets with a higher-than-average proportion of under 25s not in education, employment or training[41]. In these areas, existing starts would also have to be subsidised since there is no way to discriminate between firms that would take on an apprentice without the subsidy and those that would not. This means we expect half of the post-guarantee total of 158,000 under 25 level 2 and 3 starts in SMEs to be eligible for subsidy[42] – an additional cost to the government of £159 million.

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[39] Apprentices can be paid less both because the apprentice anticipates long-run returns to receiving training and because the minimum wage is set lower for apprentices. As before, we assume a wage reduction of 25% during the period of the apprenticeship relative to hiring someone with the same prior qualifications as a normal employee. We then account for the fact that the employer pays wages for the one day a week the apprentice spends on off-the-job training (which means they effectively work four days a week but are paid for five).

[40] This started in August 2020 as a £2,000 payment for 16- to 24-year-old apprentices and £1,500 for 25 and over. From 1 October 2021 to 31 January 2022, employers received £3,000 for all eligible apprentices. There is no causal evidence of the effect of this, but there was no decline in apprenticeship starts during this period – indeed, there was a slight uptick in starts in the year 2021/2022 – which might indicate it helped continue apprenticeship employment during the pandemic.

[41] We do not specify an exact allocation rule here since this is a question of policy design. Implementation would have to be a matter for local government, with central government putting an obligation to create places in exchange for additional funding. £3000 could also be considered an average, rather than a fixed rate, depending on the details of implementation.

[42] Since level 2 starts are commonly under 18, we assume this tops up the existing £1000 subsidy. We also assume the subsidy would be well-designed and follow the structure of the under 18 subsidy, with half paid after 90 days and half paid after 365 days. Around three quarters of level 2 and around two thirds of level 3 non-completers leave before one year (so the firm will only get the first half of the subsidy), and some of these will leave before 90 days (in which case the firm gets nothing). It therefore seems

There are also non-financial reasons why firms who would benefit from hiring an apprentice do not do so. Principally, administrative and information barriers. This is most relevant for SMEs who do not have a dedicated admin department and may lack the experience and resources to set up, recruit and manage apprenticeship places. The government will therefore need to invest in a system that supports SMEs in setting up places and locating suitable candidates. As part of the devolution of the management of apprenticeships under "City Deals", apprenticeship hubs have already been implemented on a limited scale in the Manchester and Leeds city regions[43]. A similar model could be rolled out nationally with apprenticeship teams set up in local authorities – in city regions this would be part of a city-wide apprenticeship strategy – to work on increasing the supply of apprenticeship places and filling them. This would include providing information to local firms on apprenticeships[44], supporting SMEs with the administrative side of taking on new starts, liaising with local schools and job centres to facilitate young people taking up opportunities, liaising with training providers to help SMEs set up training arrangements, and improving the interaction of firms with the National Apprenticeship Service. As a rough estimate of the number of staff required, we assume an average of 10 staff per local authority, giving a total of around 1,500 additional employees. At a cost per employee of £50,000[45], this would require central government to provide £76 million a year to local governments.

The costs of facilitating the expansion of apprenticeship places needs to be added to the additional cost that the government will incur from funding the off-the-job training of new apprentices in SMEs. Eligible training costs for an apprentice that completes their qualification are on average £6,900 for level 2 and £8,400 for level 3[46]. For those starts that do not complete the apprenticeship, we assume half of the costs of a full training course are paid[47]. This gives an estimate of the cost to the government of paying for training an additional 90,000 apprentices in SMEs of £543 million a year.

reasonable to assume only half the subsidy would need to be paid for non-completers. We do not include a further incentive to the training provider, unlike with the current under 18 subsidy, although firms can pass on part of their incentive on to the training provider in securing a place.

[43] In Leeds in particular, this initially focussed on engagement with SMEs in taking on new starts. OECD/ILO, 2017. *Engaging Employers in Apprenticeship Opportunities*.

[44] For example, SME awareness of government incentives to take on apprentices can be poor. Mansfield, I. and Hirst, T., 2023. *Reforming the Apprenticeship Levy*. Policy Exchange report.

[45] The typical wage for comparable public sector roles (e.g., a job centre employee) is £30,000, but we allow for significant overheads and the fact that running such a system will take the time of senior local and central government employees.

[46] This is composed of training costs of £5,371 for level 2 and £6,815 for level 3 plus an average of £1,554 for the end-point assessment (EPA). The Institute for Apprenticeships and Technical Education & Education and Skills Funding Agency (EFSA), 2020. *Cost of delivering apprenticeship standards*.

[47] We lack detailed information on when non-completers leave their apprenticeship, although we know a majority leave before one year. It is possible a large share of non-completers undertake minimal training. However, a significant part of training costs will need to be paid to the training provider up front. Therefore, 50% seems a reasonable assumption even if non-completers are more likely to leave early in the apprenticeship.

This makes the gross cost of doubling the total number (in both levy and non-levy firms) of under 25 level 2 and 3 starts £778 million[48]. However, over time, the benefits of providing new starts accrue to the government in the form of higher tax and reduced spending on welfare. This means net costs will fall. To calculate the change to tax revenue, we deduct income and employee national insurance from gross income to determine the split of gains between individual and government (see methodological annex 2 for full details). We then apply the employer national insurance contributions on top of this. Finally, we account for the change in VAT receipts[49] by multiplying the change in net income by a conversion factor based on the marginal propensity to consume and the proportion of household spending on which VAT is applied (see methodological annex 2). This gives a discounted[50] flow of taxation to the government of:

Table 5. Change to tax revenues (discounted, millions)

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
Income tax	-£62.1	-£21.3	£34.1	£34.5	£34.9	£35.3	£35.6	£36.0	£36.3	£36.7	£199.9
Employee NI	-£20.1	-£12.8	£20.5	£20.7	£20.9	£21.1	£21.4	£21.6	£21.8	£22.0	£137.0
Employer NI	£0.0	£0.0	£16.4	£16.6	£25.3	£25.5	£25.7	£25.9	£26.1	£26.3	£187.7
VAT	-£12.1	-£2.1	£10.3	£10.3	£10.3	£10.3	£9.8	£10.4	£9.9	£10.0	£67.1
Total	-£94.4	-£36.2	£81.3	£82.1	£91.4	£92.2	£92.5	£93.8	£94.1	£94.9	**£591.7**

For those whom completing an apprenticeship saves from unemployment, we calculate the saving to welfare spending based on eligibility rules and factoring in that young people are less likely to receive out-of-work benefits than older age groups (see methodological annex 3). This gives a discounted flow of savings of:

Table 6. Welfare savings (discounted, millions)

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
£5.90	£8.22	£5.02	£4.84	£4.68	£4.51	£8.38	£8.08	£10.90	£10.52	£71.06

Adding these changes to taxation and welfare to the gross cost of the policy, we get a net cost to the government after ten years of £115 million (see Table 7). Expressed per start, the cost of the policy falls from a gross cost of £4972 to a net cost at the end of the tenth year of £737.

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[48] For simplicity, we assume this cost occurs in the first year, although some of the training costs will be incurred in the second year of apprenticeship training.
[49] Including VAT receipts and not subtracting them from net income is not double counting since VAT is incorporated in the price that consumers pay for goods – including VAT therefore accounts for the fact that some of what consumers spend on goods goes to the government and does not add to their utility.
[50] As with monetary benefits, we discount at the Treasury Green Book rate of 3.5%.

Table 7. Total annual and cumulative net costs to government (discounted, millions)

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Gross cost	£778.0	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0
Tax	£94.4	£36.2	-£81.3	-£82.1	-£91.4	-£92.2	-£92.5	-£93.8	-£94.1	-£94.9
Welfare	-£5.9	-£8.2	-£5.0	-£4.8	-£4.7	-£4.5	-£8.4	-£8.1	-£10.9	-£10.5
Total	£866.6	£28.0	-£86.3	-£86.9	-£96.1	-£96.7	-£100.9	-£101.9	-£105.0	-£105.4
Cumulative	£866.6	£894.6	£808.2	£721.3	£625.2	£528.5	£427.6	£325.7	£220.7	**£115.3**

Conclusion: the benefit-cost ratio of increasing apprenticeship starts

Comparing the benefits and costs over a 10-year period reveals large net benefits to ensuring young people looking to start an apprentice get a place. Table 8 shows the evolution of the benefit-cost ratio over the 10 years after each additional start begins their apprenticeship.

Table 8. Benefit-cost ratio over time

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Cumulative benefit	-£670	-£614	£792	£2,200	£3,609	£5,019	£6,405	£7,793	£9,164	£10,561
Cumulative cost	£5,538	£5,717	£5,165	£4,610	£3,996	£3,378	£2,733	£2,082	£1,410	£737
Cumulative BCR	**N/A**	**N/A**	**0.15**	**0.48**	**0.90**	**1.49**	**2.34**	**3.74**	**6.50**	**14.34**

By the tenth year, the benefit-cost ratio of the policy is over 14. This suggests very high long-run returns on getting young people who have left academic education into hands-on vocational training. However, it takes time for benefits to accumulate – only by the sixth year do they exceed costs. This means a long-term view is required to justify the policy. Since the outcome is the future lives of young people, we argue ten years is the minimum timeframe over which we should consider this.

Note that, since the benefit-cost ratio applies per start, the analysis in this paper relates to any increase in apprenticeship starts amongst under 25s, whether formulated as a guarantee or not. The scale of that expansion is not assumed to influence the ratio of benefits to costs. However, with a large-scale expansion of the kind considered here, there will be a need to mitigate a trade-off between quantity and quality. Such a trade-off has been argued to characterise the expansion of apprenticeship places in the early 2010s[51]. There is a danger that offering incentives to SMEs could cause adverse selection of low-quality apprenticeships that are aimed at saving employment costs. In this respect, one key difference with the early 2010s is the replacement of apprenticeship frameworks with standards, which are more rigorous (for example, they require an external end-point assessment). There is also now a statutory 20 per cent minimum threshold for off-the-job training. In providing funding to subsidise new starts

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[51] Cavaglia, C., McNally, S. and Ventura, G., 2022. *The Recent Evolution of Apprenticeships: Participation and Pathways*. CVER Research Discussion Paper 039.

in SMEs, the government should direct local government to prioritise apprenticeships in sectors that have the greatest local skills shortages and where returns to apprenticeships have been shown to be high.

Apprenticeships are also not the end of the story for ending low skill. More broadly, vocational education can be improved in the UK. This includes increasing the availability of pre-apprenticeship courses in further education that equip young people with the necessary skills to start an apprenticeship[52]. Improvements in the quality of class-based vocational training offered to both apprentices and non-apprentices would also be valuable[53].

It is worth being clear that increasing apprenticeship starts is not a substitute for ensuring high quality academic education at all levels. Indeed, they are complements: one barrier to increasing apprenticeship starts is poor GCSE attainment. Increasing participation in academic education at later ages has been a generally welcome development over the past two decades. But arguably too much focus has gone on getting more young people into higher education. More can be done to expand opportunities for those whom vocational training offers a better option, far too many of whom stop any form of education and training by the age of 18.

Paying attention to the "other half" of young people can help stop inequalities developing, which are hard to fix in later life. By investing whilst their future in work is still malleable, the government can have a major positive effect on their wellbeing throughout their lives. At a time of serious fiscal pressure, this requires bravery to commit to significant upfront spending for benefits and savings that will flow in the future. We find that the case for making this investment is compelling.

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[52] This is especially relevant for those with a weak academic record, who suffer from a negative signalling effect and can struggle to get an apprenticeship due to being viewed as underqualified. Pre-apprenticeship courses would increase both the demand for apprenticeships and the supply of firms willing to take them. Since this would be a policy in its own right that would generate its own benefits and costs, we did not include it in our analysis here.

[53] Only 58% of training providers covered by inspections in 2017/18 were rated 'good' or 'outstanding' by Ofsted for apprenticeships. These providers tended to train higher numbers, but around a third of apprentices in that year were still trained by providers rated by Ofsted as 'inadequate' or 'requires improvement'. National Audit Office, *The apprenticeships programme*, 6 March 2019, p9.

Methodological Annexes

Annex 1 The benefits of apprenticeship training

We do not account for any benefits for those that begin an apprenticeship but do not complete it. Likely, those that do not complete still benefit from receiving training, which makes this assumption conservative. However, we do not have evidence on the benefits for non-completers and, therefore, do not have a basis on which to account for this effect. As we do not account for the benefits for non-completers and lack precise information about when they leave their apprenticeship, we also do not apply the wage penalty to them. Non-completers appear as a cost to the policy, without a corresponding benefit. This makes the benefit-cost ratio per start significantly below that per completer (since non-completion is part of the policy, we always express per start).

We also do not account for the opportunity value of taking an apprenticeship – the fact it opens the possibility of taking additional levels of apprenticeship. This may be significant, but in the absence of evidence on opportunity values we err on the side of caution and omit it. We also assume that apprenticeships do not "steal" from academic education, where returns can be higher than vocational education for candidates at the margin of choosing between them[54]. This is likely for intermediate apprenticeships, where starters typically have fewer GCSEs, but there is some possibility that advanced apprenticeships may compete with A levels. This should be considered in the policy design, as those well-placed to take their academic education further should be encouraged to do so.

Annex 2 Taxation

National insurance is deducted from gross income at 12% for the employee on labour income above £242 a week[55] and 13.8% for the employer on wages paid above £175 a week. For under 21s and those under 25 and doing an apprenticeship, the employer threshold is set at such a level we assume employers do not pay national insurance[56]. For calculating national insurance, we assume individuals work evenly across the year. Income tax is deducted at a rate of 20% on annual earnings above £12,570 a year[57].

We account for the change to VAT receipts by multiplying the change in post-tax income by a conversion factor based on the marginal propensity to consume and the proportion

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[54] Matthewes, S.H. and Ventura, G., 2022. *On Track to Success? Returns to Vocational Education Against Different Alternatives*. Centre for Vocational Educational Research Discussion Paper 038, November 2022. Pursuing general education may also make individuals more adaptable to technological change. Hanushek, E. A., Schwerdt, G., Woessmann, L., and Zhang, L., 2017. General Education, Vocational Education, and Labor-Market Outcomes over the Life-Cycle. *Journal of Human Resources*, 52(1), 48-87.

[55] On income above £967 per week, employees pay then 2% on earnings. Such earnings will be extremely rare for the workers considered here and are well above our modelled representative incomes.

[56] This is again set at £967, far above the range of the incomes considered here.

[57] The next threshold of £50,270, above which income is taxed at 40%, is not relevant to our modelling of representative incomes. Only a very small share of level 2 and 3 apprentices will earn above this amount in the first 9 years after completion.

of household spending on which VAT is applied. We take a high marginal propensity (MPC) to consume of 0.7. This is reasonable because the MPC is higher for those with lower-than-average incomes[58] and for young people[59] (both of which apply here). The change is also to permanent income, for which estimates of MPCs tend to be much higher than for one-off income shocks. An average of 50% of household consumption is taxed at a 20% VAT rate, 2.5% at 5% and the rest is untaxed[60]. This leads to an average rate of VAT on each unit of additional consumption of 10%. Thus, the change in VAT receipts to government from a £1 increase in net income is £0.07.

Annex 3 Welfare

To calculate benefit entitlements for those who would be out of work if they had not taken an apprenticeship, we assume a starting age for the apprenticeship of 17 for level 2 and 19 for level 3, which are typical starting ages[61]. Those under 18 are not eligible to claim Universal Credit. Based on the shares in the England and Wales Census 2021, we assume 11% of young adults aged under 24 and 54% of those aged over 25 will live as a couple[62] (for whom payments can be higher). To account for the fact that not all those who out of work are eligible for (this is dependent on household income and savings) or claim out-of-work benefits, we assume those young people still living with their parents will not claim benefits when unemployed. Living with parents does not make someone ineligible – although this is likely in household where both parents work – but it is relatively uncommon for individuals living at their parental home to be claiming Universal Credit. Based on the shares in the England and Wales Census 2021, we assume 56% of young adults aged under 24 and 25% of those aged over 25 live with their parents[63].

We assume those claiming are eligible for the standard allowance of Universal Credit[64]. For those who are single, this is £311.68 for under 25s and £393.45 for over 25s. For those who live with a partner, this is £489.23 for under 25s and £617.60 for over 25s. We assume partner income and savings does not impact eligibility. We also assume that

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[58] Jappelli, T. and Pistaferri, L., 2014. Fiscal Policy and MPC Heterogeneity. *American Economic Journal: Macroeconomics*, 6(4), pp.107–136. Available at: http://dx.doi.org/10.1257/mac.6.4.107.
Canbary, Z. and Grant, C., 2019. *The Marginal Propensity to Consume for Different Socio-economic Groups*. Working Paper No. 1916, Brunel Economics and Finance Working Paper Series.
[59] Dynan, K.E., Edelberg, W. and Palumbo, M.G., 2009. The Effects of Population Aging on the Relationship among Aggregate Consumption, Saving, and Income. *American Economic Review*, 99(2), pp.380-386.
[60] https://obr.uk/forecasts-in-depth/tax-by-tax-spend-by-spend/vat/
[61] Cavaglia, C., McNally, S. and Ventura, G., 2020. Do Apprenticeships Pay? Evidence for England. *Oxford Bulletin of Economics and Statistics*, 82 (5), pp.1094-1134.
[62] 10.5% of those aged 16-24 and 54.0% of those aged 25-34 lived with their partner in 2021. England and Wales Census 2021.
[63] 56.4% of those aged 18-24 and 24.7% of those aged 25-30 lived with their parents in 2021. England and Wales Census 2021.
[64] The new style Jobseeker's Allowance can be claimed at the same time as Universal Credit, although it is deducted from the Universal Credit payment and may not mean a person gets any extra money. New style JSA requires two full tax years of NI contributions prior, which we assume most young people looking for level 2 and 3 apprenticeships won't have. It also only lasts up to 182 days as standard. We therefore ignore this as a minor factor.

claiming of additional payments for limited capability for work and work-related activity does not change as a result of the policy, even though there is a connection between being out of work and the probability of subsequently reporting a health condition or disability. Clear causal evidence on the magnitude of this channel in the UK is lacking, so we opt to not account for this possibility. The value of benefit payments is assumed to remain constant over time in real terms.

One omission from this analysis is in-work benefits. On gaining work, an individual does not lose all entitlement to Universal Credit (this tapers off at a rate of 55p in the £ for earnings above a work allowance determined by living arrangements and housing costs). Accounting for this would significantly increase the complexity of modelling but make only a small difference to calculations. The additional income for those in work would not be very large. In any case, welfare savings to the government are relatively small when compared to changes in taxation. It will also not alter the net benefit of the policy since it will be added to the benefits and costs at the same time[65] (as a benefit to the individual and a cost to the government).

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[65] Note that, since the benefit-cost ratio is a non-linear operation, adding to the numerator and denominator at the same time will (except when they are the equal) change the benefit-cost ratio.