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Value of vocational qualifications in the Construction and Built Environment Sector

Final Report

March 2017

Study prepared by ICF Consulting from a commission by CITB.

The views expressed by research participants are their own and do not necessarily represent those of their employers.

The study should not be regarded as a policy statement by CITB.

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Introduction

The construction sector has historically experienced difficulties in recruiting new entrants. This, in part, reflects the cyclical nature of construction work. There are also concerns that the Construction and Built Environment (CBE) sector is not attracting a broad range of talent.

The recruitment and image strand of CITB's strategic plan aims to address these issues by presenting accurate information about sector occupations and the benefits of working in the sector. Potential new entrants and providers of careers advice and information at all levels need intelligence about earnings and progression. This helps people to make informed choices about occupations and choices of routes (academic/vocational) to jobs. Employers need intelligence to inform their decisions about investing in qualification training.

This research aims to provide information to employers, employees and potential new recruits (through the careers service) about the benefits of working in the construction sector and the value of achieving qualifications and providing training. To provide this information, this study has:

- Undertaken statistical analysis to estimate the impact of qualifications on labour market outcomes in the construction sector (earnings and the probability of employment);

- Carried out qualitative research with employers in the CBE sector, including a telephone survey of 500 employers and in-depth qualitative interviews with a further 40 employers. This collected the information about how employers viewed and used qualifications, and the impact qualifications have on their employees and their business; and

- Conducted an online survey with 202 CBE sector employees and in-depth qualitative interviews with 20 employees, to collect their experiences of completing qualifications and the effect they have had on their careers.

Impact of vocational qualifications on labour market outcomes

The effect of achieving a qualification on earnings was analysed for the CBE sector and for four sub-sectors: construction of buildings; civil engineering; specialised construction activity; and architecture and engineering[1]. The effect of achieving all qualifications (vocational and academic combined) and vocational qualifications was analysed. The effect of achieving a qualification in three comparator sectors was also analysed. These sectors were:

- All sectors in the economy excluding the CBE sector (all other workers);
- The manufacturing sector; and
- The retail sector.

The analysis examined the effect for qualifications (other than apprenticeships) grouped by level.

- The first comparator group is individuals who hold no qualifications. This presents the **total effect** of holding a qualification; and

[1] Based on Standard Industrial Classification (SIC) divisions

- The second comparator group is individuals with the next highest level of qualification. This presents the **marginal effect** of obtaining a qualification. This reflects the fact that generally individuals have to complete a qualification at a lower level in order to study for qualifications at a higher level.

The marginal effects of qualifications on earnings and employment were used to estimate the monetary value of having a qualification for individuals, employers and the Government. The benefit for individuals is shown as an increase in wages for individuals who would already have been employed, and the effect for an individual being more likely to be employed. The benefit for the employer is an increase in output, and the benefit to the Government is shown as increases in tax receipts and decreases in unemployment benefits.

Effect on earnings – vocational qualifications

The total effect of all qualifications and for vocational qualifications in the CBE sector are very similar. The exception to this are the returns to qualifications below level 2 which are much lower for vocational qualifications, though this effect is not statistically significant. The total returns to qualifications in the CBE sector are presented in Table ES1.1.

The total returns to different types of qualification for the CBE sector show that the total returns to NVQs and apprenticeships at level 3 (21% and 19% respectively) are higher than returns to BTEC and City and Guilds qualifications (13%). The total returns to qualifications at level 2 are similar for all types of qualification.

Table ES1.1 Effect of achieved vocational qualifications on earnings compared to no achievement, by construction subsector

Qualification	Construction sector overall	Construction of buildings	Civil engineering	Specialised construction activities	Architecture and engineering
Level 4+	25%***	9%**	38%***	22%***	35%***
Level 3	17%***	8%*	20%***	20%***	24%***
Level 2	11%***	9%*	16%**	14%***	7%
Below level 2	0%	-1%	-14%	-2%	-12%

*Source: ONS LFS data; ICF regression analysis. Note: *** p<0.01, ** p<0.05, * p<0.1. The percentages presented in this table were obtained through an exponential transformation of the original regression coefficients. They can be interpreted as an average percentage increase in earnings of a worker who achieved a given qualification compared to a worker with no qualification achievement.*

The marginal returns to level 4 and above vocational qualifications are generally lower than the returns for all level 4 and above qualifications. The civil engineering subsector is an exception where they are higher. The marginal returns to vocational qualifications at level 3 are higher than the marginal returns for all qualifications at level 3 in the CBE sector as a whole and all subsectors. The marginal returns to vocational qualifications in the CBE sector are presented in ES1.2.

The marginal returns to different types of qualification for the CBE sector show that the returns to apprenticeships at level 3 (18%) are higher than returns to NVQs (11%) and City and Guilds qualifications (4%). The returns to BTEC qualifications at level 3 and all qualifications at level two are not statistically significant.

Table ES1.2 Effect of achieved vocational qualifications on earnings compared to the next highest level of achievement, by construction subsector

Qualification	Construction sector overall	Construction of buildings	Civil engineering	Specialised construction activities	Architecture and engineering
Level 4+	14%***	14%***	19%***	9%***	8%***
Level 3	9%***	12%***	10%***	10%***	12%**
Level 2	12%***	9%	55%***	17%***	-5%
Below level 2	0%	-1%	-14%	-2%	-12%

*Source: ONS LFS data; ICF regression analysis. Note: *** p<0.01, ** p<0.05, * p<0.1. The percentages presented in this table were obtained through an exponential transformation of the original regression coefficients. They can be interpreted as an average percentage increase in earnings of a worker who achieved a given qualification compared to a worker with the next highest level of qualification achievement.*

Compared to the effects in the retail and manufacturing sectors, the effect of qualifications on earnings in the CBE sector (both total and marginal effects) are consistently higher than in the retail sector. The total effect of qualifications on earnings in the CBE sector is lower than in the manufacturing sector and all sectors excluding the CBE sector, but the marginal effects are similar at all qualification levels.

Effect on employment

In the CBE sector as a whole, individuals with a qualification at each level are more likely to be in employment than individuals who have no qualifications and individuals who have a qualification at the next highest level[2]. The size of the effect increases as the level of educational achievement increases.

Compared to the retail and manufacturing sectors, the total effects of qualifications on being in employment are higher in the CBE sector for all qualification levels, but the marginal effects of qualifications in the CBE sector are similar. However, the effects on employment in the CBE sector are lower than for all sectors excluding the CBE sector.

Monetary value of qualifications

The estimated monetary value of vocational qualifications in the CBE sector range from £12,800 (below level 2 vocational qualification) to £68,400 (level 4 qualifications and above) over a ten year period. The monetary value of the qualifications generally increases as the level of the qualification increases. Employers receive the largest proportion of the benefit of the qualification through increased output. The value of the qualification to individuals comes from increased wages and an increased probability of being employed. For most qualifications in the CBE sector, the effect of increased wages is higher than the effect of the increased probability of being employed (all qualifications except for those below level 2).

The estimated monetary value of vocational qualifications in the CBE sector at level 4 and above have a higher monetary value than in all sectors excluding the CBE sector, manufacturing and retail sectors. Vocational qualifications at all levels in the CBE sector are more valuable than in the retail sector, and at all levels except for below level 2 for all sectors excluding the CBE sector. The monetary value of vocational qualifications is presented in Table ES1.3.

[2] This relates to all qualifications (both academic and vocational) as the number of people who successfully completed qualifications but were unemployed was too small to allow for robust analysis disaggregated by construction subsector or type of qualification.

Table ES1.3 Monetary impact of achieving vocational qualifications, 10 year period

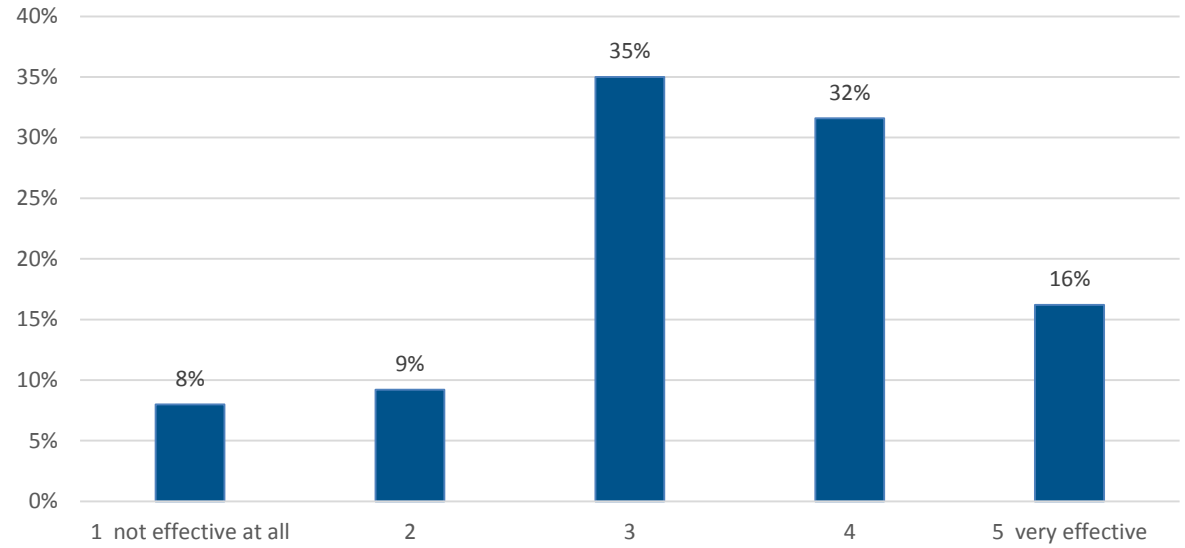
Level	Sector	Wages (£)	Employment (£)	Tax (£)	Unemployment (£)	Employer benefit (£)	Total (£)
Level 4 or above	CBE sector	23,000	4,500	6,300	600	33,900	68,400
	All other sectors	11,200	2,800	3,200	400	17,200	34,800
	Manufacturing	14,400	2,100	3,900	300	20,400	41,000
	Retail	3,300	-200	800	0	4,000	7,900
Level 3	CBE sector	12,000	3,300	3,400	700	18,700	38,100
	All other sectors	10,300	2,200	2,900	600	15,400	31,400
	Manufacturing	18,400	4,200	5,200	800	27,800	56,400
	Retail	4,900	1,900	1,500	700	8,300	17,300
Level 2	CBE sector	13,700	900	3,500	200	18,200	36,500
	All other sectors	7,900	2,100	2,300	700	12,200	25,200
	Manufacturing	3,600	1,900	1,200	500	6,600	13,700
	Retail	4,200	700	1,200	300	6,000	12,400
Below level 2	CBE sector	200	4,800	700	1,300	5,700	12,800
	All other sectors	2,000	4,000	1,100	1,400	7,100	15,500
	Manufacturing	4,900	2,900	1,600	800	9,400	19,700
	Retail	400	1,200	300	500	1,900	4,300
Trade apprenticeship	CBE sector	11,000	3,900	3,300	700	18,200	37,100
	All other sectors	5,200	2,600	1,700	600	9,400	19,500
	Manufacturing	14,200	4,400	4,100	900	22,700	46,300
	Retail	1,300	2,500	700	700	4,600	9,900

Source: ONS LFS data; ICF regression analysis; ICF calculations. Blue cells highlight the highest monetary value in each category and qualification level. All values rounded to nearest £100.

Employers' views of the value of vocational qualifications

Vocational qualifications are considered by most CBE employers to be effective in preparing individuals to work in the sector (see Figure ES1.10). Employers believe that higher level vocational qualifications prepare individuals more thoroughly for entry to the sector than lower level vocational qualifications.

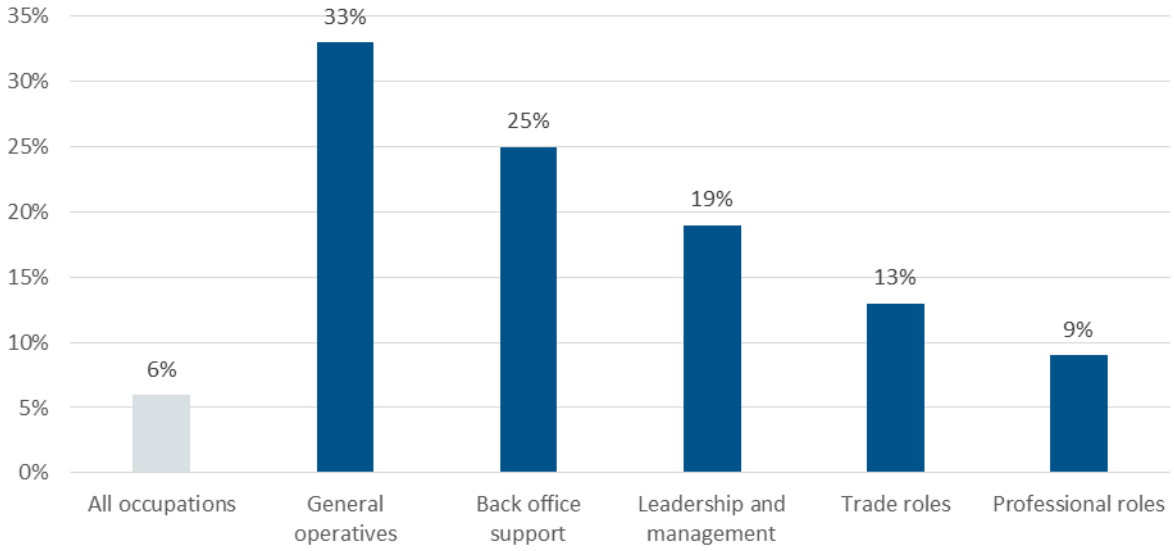
Figure ES1.1 To what extent do you believe that vocational qualifications provide an effective gauge of new entrants' motivation and ability to work in sector?



Source: Quantitative survey of employers; base 500

A small proportion (6%) of employers did not use qualifications as part of their recruitment for any job role. The proportion varied by the type of role they were recruiting for. While around one third of employers did not use qualifications in their recruitment process for general operative workers and around one quarter of employers did not use qualifications for the recruitment of back room staff, only around 10% did not use qualifications in recruiting for trade and professional roles (see Figure ES1.2).

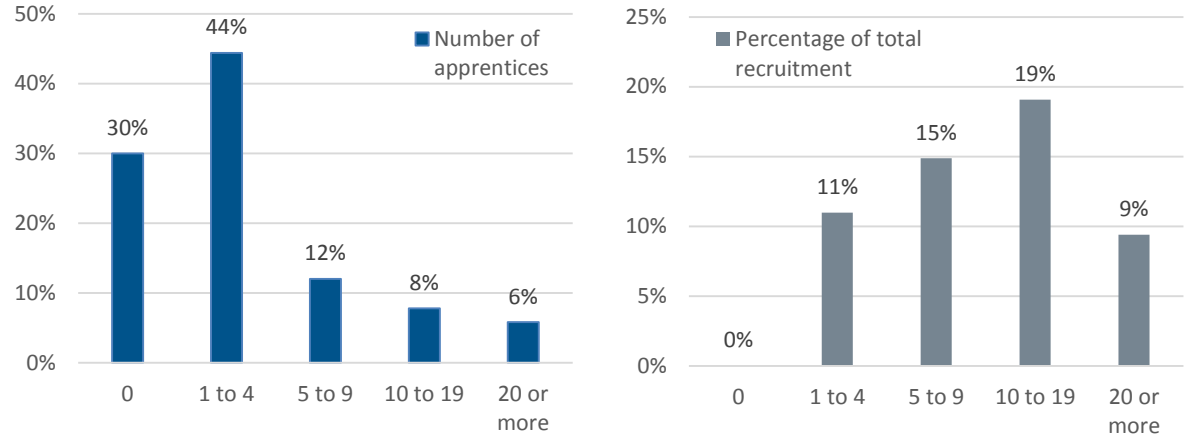
Figure ES1.2 Percentage of employers which do not use qualifications as part of their recruitment by job role



Source: Quantitative survey of employers; base 500

Over half of the employers surveyed had used apprenticeships in the past three years. Where employers use apprenticeships more frequently, apprenticeships are a higher proportion of their total recruits (see Figure ES1.3).

Figure ES1.3 How many apprentices have you taken on?



Source: Quantitative employer survey; base 500

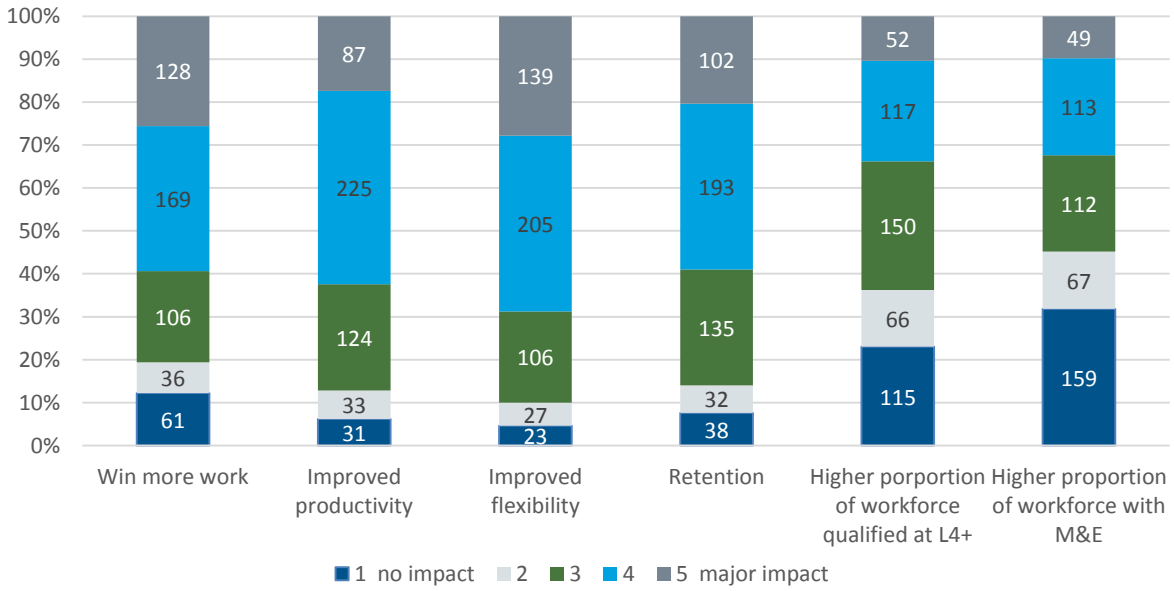
Most (93%) employers have supported individuals to obtain vocational qualifications in the past three years. Most commonly they said it was to help workers undertake their current role.

Employers who were interviewed confirmed that employees do not receive an automatic pay increase upon successfully completing a vocational qualification. Changes in pay are related to individuals earning more in the longer term, through promotions and taking on more responsibility. Apprentices though received an immediate increase in wages when taken on after successfully completing their apprenticeship.

Employers pay most of the costs for workers undertaking vocational qualifications. Over three quarters of employers (76%) pay all the costs for workers undertaking vocational qualifications, and 13% contribute more than half of the cost. A small minority of employers stated that they do not cover any of the costs of a vocational qualification (4%).

Employers have generally said that their business benefits from individuals completing vocational qualifications through improved productivity, efficiency and flexibility of workers, the ability to win more work, and increased employee retention (see Figure ES1.4).

FigureES1.4 What impact does your investment in training have on the following factors?



Source: Quantitative employer survey; base 500

A very small proportion of employers (3%) said that vocational qualifications had little or no benefit from employees completing vocational qualifications. Employers who had not supported any vocational qualifications in the past three years were more likely to report that training had little or no impact on their business than employers who had supported vocational training.

Nearly three quarters of employers (74%) felt that vocational qualifications offer good value for money. Few employers (5%) felt they offered poor value for money.

Employee views of the value of vocational qualifications

The most common reason employees provided for undertaking training was that it was often necessary for them to obtain the job they wanted. Career progression and increases in pay were less frequently reported as motivations for training.

> *"I think it's probably what got me the job because I could show I had experience".*

Employee satisfaction with the training and qualifications they received was very high. Around 90% of employees who responded to the survey agreed that their course was well taught and relevant to their role.

> *"It was amazing to be honest, all the lecturers and teachers had been electricians. The lecturers had a lot of onsite experience"*

Almost three quarters of employees (73%) felt that completing their qualification was essential or helpful to working in their current role. For many their qualification had helped them either by expanding their current role or gaining promotion. Over half of them had been promoted since completing their qualification. Of the individuals who had been promoted, nearly three quarters (74%) felt that they would not have been promoted without the vocational qualification or they had been promoted more rapidly due to the vocational qualification.

"I am better myself and at my job and there's more opportunities if you've got the qualification - it's worth doing it".

For most, having a qualification helped with their career progression and their retention in the construction sector.

Employees generally said that gaining the qualification had no direct immediate impact on their pay (53%). However, nearly two thirds (63%) had received a pay rise since they had completed their vocational qualification. Most (58%) of the individuals who had received a pay rise felt that their pay would not have increased by the same amount if they had not completed the qualification. This indicates that workers in the sector do recognise that qualifications have an effect on earnings, even if the effect is not immediate.

The employees surveyed had a positive attitude towards further training. About half of them were enthusiastic about undertaking further training. Nearly three quarters believed that undertaking further training would allow them to undertake other roles and over half that it would enable them to expand their current roles and increase their chances of promotion.

Key messages

Message for employers

Providing qualifications is beneficial for business because:

- Employers will have a monetary benefit of between £8,000 and £17,000 in the five years after the qualification is completed, and between £18,000 and £34,000 in the ten years after the qualification is completed. The benefit to employers over ten years is:

  £34,000 at level 4 and above;
  £19,000 at level 3;
  £18,000 at level 2; and
  £18,000 for an apprenticeship.

- This comes from workers being more flexible and productive (better at their job) and they can win more work.

- Employees completing vocational qualifications are less likely to leave their current role and use their qualifications to obtain promotion and expand their roles and flexibility in the business. This reduces recruitment and future training costs.

- Apprentices are beneficial to employers. Employers who use apprenticeships to recruit staff are generally very satisfied with the apprenticeship programme and use apprentices to recruit a higher proportion of their staff.

- All qualifications, even lower level qualifications, provide a good grounding in the construction sector.

Higher level vocational qualifications have a greater return than lower level qualifications because they provide a larger increase in worker productivity, which improves efficiency and allows businesses to win more work. This is reflected in the estimated value of qualifications:

- The value to the employer increases as the level of qualification increases. Vocational qualifications at level 2 and level 3 offer a higher return than academic qualifications at the same level.
- Level 4 vocational qualifications provide a larger benefit than qualifications at level 3 in the CBE sector, and in the civil engineering subsector the value of vocational qualifications at level 4 and above is higher than for academic qualifications.

- Apprenticeships at level 3 offer a greater return to employers than other types of vocational qualification at the same level.

Employees value the qualifications they have acquired and many would undergo higher level qualifications training to further their careers because:

- It would expand their expertise and responsibilities in their current role;

- They could take on new and more interesting roles or tasks or be promoted to more senior roles.

Messages for employees

Achieving qualifications is beneficial to future earnings, job security and employability because:

- Employees with higher levels of qualification can command a higher starting salary than those with lower level qualifications;

- Earnings for those achieving vocational qualifications increase between £7,000 and nearly £14,000 in the five years after completing a qualification, and £14,000 to £26,000 in the ten years after completing their qualification. The benefit to employers over ten years is:

    - £27,500 at level 4 and above;
    - £15,300 at level 3;
    - £14,600 at level 2; and
    - £14,900 for an apprenticeship.

- Although, the increase in pay may not materialise immediately upon completing a qualification, pay will increase as a result of achieving the qualification.

- Employees with higher levels of qualifications are more likely to be in employment than those with lower level qualifications, meaning individuals with higher levels of qualifications have more job security.

Most employees value qualifications because it has helped them to develop their career in the following ways:

- Provided them with the skills and knowledge to be recruited for and to carry out their current job role;

- Allowed them to take on more responsibility in their current job role;

- Supported them in achieving a promotion sooner than they would otherwise have achieved it;

- Achieved an increase in pay since they completed the qualification; and
- Made them enthusiastic about undertaking further training in the future.

Message for potential employees

The construction sector can provide a relatively rewarding career because:

- Earnings in the construction sector for individuals with vocational qualifications are higher than for individuals not in the construction sector;
- For those who complete higher level vocational qualifications the increase in earnings is greater than for those not in the construction sector;
- Qualified apprentices achieve higher rates of pay immediately.
- Employers in the sector express a high level of satisfaction with the vocational qualifications their employees have obtained.
- Employers in the construction sector frequently provide support for individuals to complete vocational qualifications.

Employers are supportive of employees gaining vocational qualifications because:

- Most employers cover all the costs of qualifications.
- Most employers expect candidates to have qualifications in their recruitment to higher positions.
- Many employers who recruit apprentices take on qualified apprentices to fill permanent roles.

1. Introduction

In this section we set out the reasons for the study, its aims and objectives and what research was carried out to meet these.

1.1. Context of the study

The construction sector has historically experienced difficulties in recruiting new entrants. This, in part, reflects the cyclical nature of construction work. Large infrastructure projects, such as Crossrail and the proposed Hinckley Point power station, create a high volume of new jobs for a limited time period. The physical nature of some jobs also results in a high proportion of workers leaving the sector after the age of 50.

The sector also attracts very few women and ethnic minorities which means that the sector is not making the most of the potential labour pool. Overall, 86% of the workforce is male and 95% regard themselves as white British. For some skilled trade occupations, men comprise nearly all (99%) of the workforce.

There are also concerns that the Construction and Built Environment (CBE) sector is not attracting a broad range of talent. Sector employers support individuals with low attainment to enter employment, through employability programmes and work with partners such as Jobcentre Plus. However, some sector stakeholders believe this has resulted in a perception that the sector is an employment route for less-able students. There is also concern that current careers information advice and guidance (IAG) provided by schools, colleges and parents does not adequately promote the higher-skilled entry and progression routes in the sector. As a consequence, the sector does not recruit a broader range of new entrants.

The recruitment and image strand of CITB's strategic plan aims to address these issues by presenting accurate information about sector occupations and the benefits of working in the sector. Central to this is Go Construct, which is an online resource for individuals, parents, educators and career advisors to access information on the construction sector, and for employers to access information to support their recruitment and access to skills provision. Potential new entrants and IAG providers at all levels need intelligence about earnings and progression if they are to make informed choices about occupations and choices of routes (academic/vocational). Employers need intelligence to inform their decisions about investing in qualification training.

1.2. Aims and objectives of the study

The aim of the study is to examine the benefits that vocational CBE qualifications bring individuals, employers and the economy of Great Britain. This includes exploring:

- Employer and employee perceptions of vocational qualifications;
- How vocational qualifications influence employer recruitment and promotion decisions;
- The extent to which employers' value vocational qualifications for staff professional development;
- The impact of vocational qualifications on employee earnings and career progression, and the speed and persistence of these impacts; and

- The impact that vocational qualifications bring businesses and the economy.

Where possible, the study is expected to disaggregate findings by level of qualifications, by type (e.g. by apprenticeships, type of vocational qualification and overall qualifications), and by sub-sectors of the CBE sector.

The CBE sector has been defined using Standard Industrial Classification (SIC) coding. The CBE sector covers four main subsectors in this coding system: construction of buildings; civil engineering; specialised construction activity and architecture and engineering. A complete list of subsectors and activities is provided in Annex 1.

1.3. Research undertaken

1.3.1. Quantitative research

Source of data and its adjustment

The study uses the Labour Force Survey (LFS) to examine the earnings and work conditions of individuals who have achieved CBE vocational qualifications at levels 2 and above. The LFS is a large survey that collects information from around 100,000 individuals every quarter from across the United Kingdom. Respondents are interviewed for five successive waves at three-monthly intervals and 20% of the sample is replaced every quarter. The number of individuals surveyed who identify as being in the CBE sector is around 4,000 to 5,000 a quarter.

The LFS includes data on:

- Individual characteristics (for example age, gender, ethnicity, region of residence);
- Employment (for example industry, occupation, length of time in job, earnings); and
- Education and training (for example type and level of qualifications held, qualifications currently being acquired, training received).

To ensure a sufficiently large data set of CBE workers for analysis, the study used LFS data for the last 11 years (2005-2015). To provide a like for like comparison with CBE workers we also established datasets for workers in the retail and manufacturing sectors and all sectors in the economy excluding the CBE sector (all other workers).

Estimation of economic impacts

The economic impacts used the average wages of individuals in the three sectors with vocational qualifications at certain levels.

We took the wage increase due to qualifications to be the difference in wages by level of learning (e.g. the difference in average wages between individuals with L2 qualifications and those with L1 qualifications), while accounting for all other factors. The data enabled successful modelling of the following labour market outcomes:

- The overall impact of all qualifications on earnings at each qualification level (level 4+, level 3, level 2 and trade apprenticeships) in the CBE sector;
- The overall impact of all qualifications on earnings at each qualification level in the comparator sectors;

- The overall impact of qualifications on earnings at each qualification level in each of the CBE industry sub-sectors (Construction of buildings; Civil Engineering; Specialised Construction activities and Architectural and engineering activities);

- The impact of different vocational qualifications in the CBE sector at different levels. We analysed the vocational qualifications with the highest number of individuals responding they had these qualifications as the highest qualification held. These qualifications were:

    - BTEC qualifications (including SCOTBEC and SCOTEC qualifications) at different qualification levels;
    - City and Guilds qualifications at different levels;
    - NVQ / GNVQ at different levels; and
    - Apprenticeships;

- The impact of qualifications on employment status at different qualification levels in the construction sector.

This analysis was repeated for three comparator sectors, using the same LFS data source. These sectors were the retail and manufacturing sectors, and all sectors excluding the CBE sector.

The effect of qualifications on earnings and employment were analysed using well-established methodologies This approach models earnings and employment status as a function of education (qualifications), experience (age) and other observable characteristics that could affect earnings (following the approaches used in for example BIS (2015[3] and 2011[4]), building on the work of Mincer (1958)[5]).

Once the LFS data was accessed several issues in the data which affected the analysis were discovered. These issues did not prevent any of the analysis from taking place. However, it does affect the sample sizes in some of the models, and therefore the robustness of some of the estimates. These issues were:

- A change in the availability of disaggregated employment data by industry sub-sector. For the years 2005-08, data was only available at an aggregated construction industry level. Therefore it was not possible to analyse sub-sector data. However, subsector analysis has been carried out for the period 2009 to 2015.

- A new apprenticeship question was introduced into the LFS in 2011. Previously, all trade apprenticeships had been grouped together in the qualifications question, but the introduction of the new question allows a comparison of apprenticeships at different levels to be made. However, sample sizes are low in this field, so although the impact on earnings has been modelled, the results are not as robust as for the other analysis.

- Although there were some responses for individuals who had completed vocational qualifications at higher levels (qualification levels 6, 7 and 8), there were very few, and not enough to conduct a statistical analysis.

[3] BIS (2015) Net Present Value of Further Education in England
[4] BIS (2011) The returns of intermediate and low level qualifications
[5] Mincer, J. (1958) “Investment in Human Capital and Personal Income Distribution

- For some vocational qualifications, there were very few responses in the data. Where this is the case, these observations have either been combined with the responses of individuals with other qualifications, or have been excluded from the analysis.

There were fewer responses than expected which provided earnings information. There were more responses which provided data on weekly earnings, which is the variable we preferred to use. However, we did not transform any of the data from hourly earnings into weekly earnings for responses where hourly earnings were provided but weekly earnings were not (therefore excluding a small number of entries from the analysis). This was due to differences between the weekly earnings presented in the data and an estimated weekly earnings value calculated (hours worked per week multiplied by hourly earnings) where both hourly and weekly earnings data was available. However, due to the small number of data entries excluded, this did not have a large impact on the analysis.

1.3.2. Qualitative research

Employers

A survey of 500 employers was used to corroborate and help to explain the findings from the LFS analysis. This also allowed us to disaggregate the survey findings to examine any differences because of size of business, area, and CBE sub-sector.

To carry out the survey, employer contacts were obtained from a variety of sources. Initially, data from the MINT database was used to contact employers. However, this data lacked named individuals at each employer, some contact details were missing and some information was out of date. This meant that the response rate using this dataset was much lower than anticipated. A second data source was purchased, which included named Human Resources (HR) managers and their contact details. The response rate to this dataset was much higher. However the overall response rate made it difficult to achieve the target sample so this was reduced to 500. The reduction in sample size has had a limited impact on the ability to disaggregate the survey results. Disaggregation has been possible by employer size, job group and for some types of qualification, but not for country as many respondents operated in multiple countries. The original target (600) and achieved sample (500) of employers is presented in **Table 1.1Error! Reference source not found.**.

Table 1.1 Sample size target and achievement for survey of employers

Country	Target	Achieved[6]	Employer size	Target	Achieved
England	375	449	250+ employees	30	35
Scotland	150	188	100-249 employees	70	59
Wales	75	180	30-99 employees	250	206
			Under 30 employees	250	200
Total	**600**	**817**	**Total**	**600**	**500**

The survey covered the following topics:

- Background information (size, country etc.);
- Recruitment patterns (number of people recruited, number of apprentices recruited, positions recruited);

[6] Many businesses who took part in the survey operated across multiple countries in the UK, therefore the sum of businesses by country is greater than the total number of businesses surveyed.

- Recognition of vocational qualifications (qualifications required for recruits to each role, approximate starting salaries by qualification level, perceptions of qualifications); use of and investment in vocational qualifications (types of qualifications used, reasons why the qualifications are used, costs of qualifications); and

- Benefits of vocational qualifications (benefits to employees, benefits to employers).

To complement the survey we carried out qualitative interviews over the telephone with 40 employers. These interviews examined in more detail than the survey the costs and impacts (both direct and indirect) of vocational qualifications, the value placed on vocational qualifications by employers and how the qualifications are used to inform decisions on recruitment and promotion.

Table 1.2 below sets out the planned and achieved quotas.

Table 1.2 Sample criteria and quotas for qualitative interviews with employers

Country	Target	Achieved	Employer size	Target	Achieved
England	28	28	250+ employees	6	6
Scotland	8	8	100-249 employees	6	6
Wales	4	4	30-99 employees	14	14
			Under 30 employees	14	14
Total	**40**	40	**Total**	40	40

Employees

Employers that participated in the telephone survey were asked to disseminate the survey to their employees. Through this approach, we obtained 202 responses. This survey covered experience of qualification training and its relevance for entry to the sector, doing the job, promotion and increasing pay. We have been able to disaggregate some of the findings by type of qualification obtained, but not by country or employee characteristics.

We also interviewed 20 employees over the telephone to understand in more detail why they decided to undertake the qualification, the extent to which it helped them gain employment, and how it supported them to work and progress in the sector. Employees were identified from the employer interviews. They included employees with level 2, level 3 and level 4 and above qualifications.

1.3.3. Extent that the research addresses the study's aims and objectives

The strength of this piece of research is that it combines quantitative and qualitative research to understand vocational qualifications in the CBE sector. Previous research has explored

either the quantitative or the qualitative impact of qualifications. By conducting both quantitative and qualitative research, this report is able to address how and why vocational qualifications impact on workers, businesses and the economy from employer and employee perspectives of vocational qualifications. What this also allows is the opportunity to identify to what extent the perceptions emerging from the qualitative research are in line with the statistical analysis of effects.

Because of the limited size of the sample drawn from the LFS and the large number of vocational qualifications available in the CBE sector, it was not possible to fully explore the impact of:

- All types of vocational qualification in different subsectors. Therefore, most of the time we present findings for all vocational qualifications at each qualification level;
- Level 4 and above qualifications because the number of people who have completed vocational qualifications at levels higher than level 4 is low. As a consequence we have aggregated these as level 4 and above in the analyses;
- All types of vocational qualifications on different groups of workers (for example the effect for males and females, different age groups or by employer size). However, these characteristics were included as variables in the models;
- All types of qualification on employment. It was not possible to estimate the impact of different qualifications on employment status, as the number of people who successfully completed qualifications but were unemployed was too small to allow for robust analysis disaggregated by construction subsector or type of qualification. Therefore only the impact for all qualifications at different levels has been modelled; and
- The speed and persistence of the impact of qualifications on earnings and employment, due to insufficient variables being available to assess this (duration between qualification achievement and survey, and repeat observations for the same individual).

1.4. Structure of the report

The remainder of this report is structured as follows:

- Section 2 details the findings from the statistical analysis of the returns to qualifications and the monetary value of qualifications achieved;
- Section **Error! Reference source not found.** provides the findings from the qualitative interviews with employers and the quantitative survey of employers, exploring views on qualifications, the use of vocational qualifications and the impacts on employers and employees;
- Section 4 presents the findings from the qualitative interviews with employees in the CBE sector who have recently completed vocational qualifications and a quantitative survey of employees in the sector, exploring the reasons why they completed qualifications and the impacts of the qualifications;
- Section 5 draws together all the information and provides conclusions from this piece of research; and
- A series of annexes, providing the technical details of the statistical modelling and the methodology used; the findings from the existing literature and the research tools used.

2. Returns to all Qualifications

This section presents the findings from the statistical analysis of LFS data. The effect of qualifications on the level of earnings and the probability of an individual being in employment are presented.

2.1. Effect of qualifications on earnings

2.1.1. The extent of the analysis

The effect of achieving a qualification on earnings was analysed for the CBE sector and for four construction subsectors: construction of buildings; civil engineering; specialised construction activity and architecture and engineering[7]. The analysis examined the effect for qualifications (other than apprenticeships) grouped by level. A separate analysis was performed for apprenticeships. This was because there was limited data available on apprenticeship achievement by level[8]. Apprenticeship results are presented for all apprenticeship achievement for the CBE sector and each subsector. Additionally, the limited data on apprenticeship achievement by level have been analysed for the CBE sector at level 2 and level 3.

The effect of each qualification on earnings has been analysed using two separate comparator groups.

- The first comparator group is individuals who hold no qualifications. This presents the total effect of holding a qualification; and

- The second comparator group is individuals with the next highest level of qualification. This presents the marginal effect of obtaining a qualification. This reflects the fact that generally individuals have to complete qualifications at a lower level in order to study for qualifications at a higher level.

The effect of all qualifications at each level (both vocational and academic) is presented first. Then, the results of an analysis limited to the population of individuals who have completed vocational qualifications as their highest level of qualification are presented. This is to measure the impact of vocational qualifications in the CBE sector.

A more detailed description of the method and comparator groups used for these estimate is presented in Annex 1.

2.1.2. Total effect of all qualifications

The total returns to all qualifications disaggregated by level, calculated using a comparator group of individuals with no qualifications are presented in Table 2.1. The analysis shows that workers who have achieved qualifications have significantly higher earnings than those who did not. The earnings premium increases as the level of qualification achieved goes up.

Workers who achieved a qualification at level 4 or above earn on average 25% more than workers without formal qualifications. Level 3 (16%) and level 2 (13%) qualifications result in significantly higher earnings compared to no achievement. This is a similar earnings

[7] Based on Standard Industrial Classification (SIC) divisions
[8] An analysis of the data available determined that most of the apprenticeship achievements in the dataset were most likely either at level 2 or 3.

premium to successfully completing a trade apprenticeship (14%)[9]. Finally, there is a smaller but still significant earnings increase (8%) resulting from achievement of qualifications below level 2.

The positive effect of qualification achievement on earnings is statistically significant (at a 10% significance level) in all construction subsectors, with three exceptions. Qualifications below level 2 do not significantly affect earnings in the building construction and specialised construction subsectors. Apprenticeship completion in building construction also does not significantly affect earnings.

The earnings premium is higher in civil engineering, architecture and engineering than in other construction subsectors. For example, workers with level 4 or above qualifications earn 42% more than workers without formal qualifications in civil engineering and 37% more in architecture and engineering.

Table 2.1 Effect of achieved qualifications on earnings compared to no achievement, by construction subsector

Qualification	Construction sector overall	Construction of buildings	Civil engineering	Specialised construction activities	Architecture and engineering
Level 4 or above	25%***	11%**	42%***	17%***	37%***
Level 3	16%***	9%**	23%***	18%***	23%***
Level 2	13%***	10%**	20%***	13%***	20%**
Below level 2	8%***	3%	8%***	4%	19%*
Trade apprenticeship	14%***	5%	13%***	10%**	28%*

*Source: ONS LFS data; ICF regression analysis. Note: *** p<0.01, ** p<0.05, * p<0.1. The percentages presented in this table were obtained through an exponential transformation of the original regression coefficients. They can be interpreted as an average percentage increase in earnings of a worker who achieved a given qualification compared to a worker with no qualification achievement.*

2.1.3. Marginal effect on all qualifications

The earnings of workers with each qualification level were also compared to individuals who had the next highest level of qualification. For example, the earnings of individuals with a level 3 qualification were compared to the earnings of those with a level 2 qualification. Table 2.2 presents the marginal returns to qualifications for the CBE sector and the four subsectors.

Workers who have achieved qualifications at each level have significantly higher earnings than individuals who have achieved the next highest level of qualification in the CBE sector. For example, workers who have achieved a qualification at level 4 or above earn on average 15% more than workers with a level 3 qualification. The range of marginal effects is lower than the range of the total effects of qualifications.
Fewer of the marginal effects of qualifications are statistically significant in the CBE subsectors than for the total effect of qualifications though in all but one case the marginal effect is positive. Table 2.2 shows that:

[9] This is not surprising, given that most apprenticeships are at level 2 or 3. Unfortunately, data disaggregating apprenticeship achievement by level are too sparse to allow disaggregating the earnings impact of achieved apprenticeships by level.

- The marginal effect of qualifications at level 4 and above and trade apprenticeships are statistically significant (at a 10% significance level) for **all** subsectors;

- The difference in average earnings between individuals with a level 4 qualification or above and individuals with a level 3 qualification is highest in the building construction subsector (15%);

- The marginal effect of a trade apprenticeship is highest in the architectural and engineering subsector.

Table 2.2 Effect of achieved qualifications on earnings compared to the next highest level of achievement, by construction subsector

Qualification	Construction sector overall	Construction of buildings	Civil engineering	Specialised construction activities	Architecture and engineering
Level 4 or above	15%***	15%***	8%***	9%***	10%***
Level 3	5%***	5%*	3%	7%***	6%*
Level 2	4%***	3%	11%***	7%***	-4%
Below level 2	8%***	3%	8%	4%	19%*
Trade apprenticeship	8%***	9%**	11%**	6%*	17%**

*Source: ONS LFS data; ICF regression analysis. Note: *** p<0.01, ** p<0.05, * p<0.1. The percentages presented in this table were obtained through an exponential transformation of the original regression coefficients. They can be interpreted as an average percentage increase in earnings of a worker who achieved a given qualification compared to a worker with the next highest level of qualification achievement.*

2.1.4. Total effect of vocational qualifications

With a smaller population (only individuals who have completed a vocational qualification as their highest level of qualification), fewer of the differences are statistically significant. Table 2.3 presents the total effect of vocational qualifications by CBE subsector. The results of the analysis are statistically significant (at a 10% level) for all qualifications at level 2 or above, with the exception of level 2 qualifications in the architectural and engineering subsector. None of the results for qualifications below level 2 are statistically significant.

The total effect of vocational qualifications follows a similar pattern to the effect of all qualifications. In general, the effect of vocational qualifications is slightly lower than for all qualifications, although the difference in most cases is small. However, the returns to vocational qualifications in the specialised construction activities subsector are higher than for all qualifications (for qualifications at levels 2, 3 and 4 and above).

Table 2.3 Effect of achieved vocational qualifications on earnings compared to no achievement, by construction subsector

Qualification	Construction sector overall	Construction of buildings	Civil engineering	Specialised construction activities	Architecture and engineering
Level 4 or above	25%***	9%**	38%***	22%***	35%***
Level 3	17%***	8%*	20%***	20%***	24%***
Level 2	11%***	9%*	16%**	14%***	7%

Qualification	Construction sector overall	Construction of buildings	Civil engineering	Specialised construction activities	Architecture and engineering
Below level 2	0%	-1%	-14%	-2%	-12%

*Source: ONS LFS data; ICF regression analysis. Note: *** p<0.01, ** p<0.05, * p<0.1. The percentages presented in this table were obtained through an exponential transformation of the original regression coefficients. They can be interpreted as an average percentage increase in earnings of a worker who achieved a given qualification compared to a worker with no qualification achievement.*

The effect of qualification achievement on earnings was analysed for several qualification types. This analysis was limited by data availability – only the BTEC, City & Guilds, NVQ and apprenticeship qualifications had sufficient number of achievements to allow for meaningful analysis. Qualifications below level 2 were excluded because of insufficient achievements for types of qualification. The analysis has only been carried out for the CBE sector as a whole.

Table 2.4 shows that qualification achievement significantly increases earnings regardless of qualification type. The size of the earnings premium is similar for BTEC, City & Guilds, and NVQ qualifications for each qualification level. The only exception is the NVQ level 3 qualification, whose achievement results in an earnings premium of 21%. There were statistically significant results for the achievement of an apprenticeship at level 3, with the effect on earnings being similar to the effect of an NVQ at level 3.

Table 2.4 Impact of achieved qualifications on earnings compared to no achievement, by type of qualification

Qualification	BTEC qualifications	City & Guilds Qualifications	NVQs	Apprenticeship
Level 4 or above	27%***	N/A	25%***	N/A
Level 3	13%***	13%***	21%***	19%***
Level 2	9%	9%**	11%***	3%

*Source: ONS LFS data; ICF regression analysis. Note: *** p<0.01, ** p<0.05, * p<0.1.*

2.1.5. Marginal effect of vocational qualifications

As with the total effect, fewer of the marginal effects are statistically significant. Table 2.5 presents the marginal effects of vocational qualifications by CBE subsector. All of the marginal effects of qualifications at level 3 and level 4 and above are statistically significant. The marginal effect of vocational qualifications at level 3 are higher than for all qualifications (presented in Table 2.2) in all CBE subsectors, and in the civil engineering subsector the marginal effect of vocational qualifications at level 4 and above is higher than for all qualifications. This suggests that the effect of vocational qualifications is greater than the effect of academic qualifications at level 3.
The results of the marginal effect of vocational qualifications at level 2 are statistically significant in two subsectors (civil engineering and specialised construction activities).

Table 2.5 Effect of achieved vocational qualifications on earnings compared to the next highest level of achievement, by construction subsector

Qualification	Construction sector overall	Construction of buildings	Civil engineering	Specialised construction activities	Architecture and engineering
Level 4 or above	14%***	14%***	19%***	9%***	8%***
Level 3	9%***	12%***	10%***	10%***	12%**

Level 2	12%***	9%	55%***	17%***	-5%
Below level 2	0%	-1%	-14%	-2%	-12%

*Source: ONS LFS data; ICF regression analysis. Note: *** p<0.01, ** p<0.05, * p<0.1. The percentages presented in this table were obtained through an exponential transformation of the original regression coefficients. They can be interpreted as an average percentage increase in earnings of a worker who achieved a given qualification compared to a worker with the next highest level of qualification achievement.*

Table 2.6 presents the marginal effects by type of vocational qualification. The largest marginal effects were for BTEC qualifications at level 4 and above, and apprenticeships at level 3. As with the total effects, the effect of NVQs at level 3 is higher than for other vocational qualifications.

Table 2.6 Impact of achieved qualifications on earnings compared to the next highest level of achievement, by type of qualification

Qualification	BTEC qualifications	City & Guilds Qualifications	NVQs	Apprenticeship
Level 4 or above	15%***	N/A	11%***	N/A
Level 3	3%	4%***	11%***	18%***
Level 2	-1%	2%	3%*	1%

*Source: ONS LFS data; ICF regression analysis. Note: *** p<0.01, ** p<0.05, * p<0.1. The percentages presented in this table were obtained through an exponential transformation of the original regression coefficients. They can be interpreted as an average percentage increase in earnings of a worker who achieved a given qualification compared to a worker with the next highest level of qualification achievement.*

2.2. Effect of qualification on employment

2.2.1. The extent of the analysis

The effect of qualification achievement on the probability of being employed was analysed only for the construction sector as a whole. This was because the number of people who successfully completed qualifications but were unemployed was too small to allow for robust analysis disaggregated by construction subsector. Similarly, the small number of unemployed/inactive workers achieving qualifications prevented analysis restricted to vocational qualifications or disaggregated by qualification type.

The effect of each qualification on the probability of being employed has been analysed using the same three comparator groups as in the analysis of the effect on earnings.

A more detailed description of the method and comparator groups used for these estimates can be found in Annex 1.

2.2.2. Total effect of qualifications on employment

The regression analysis found qualification achievement significantly increases the probability of being employed. All the results were statistically significant. The size of the effect increases as the level of qualification achieved goes up. Table 2.7 shows that:

- An individual who has achieved a level 3 or above qualification is on average 6.3 percentage points more likely to be in employment than an individual who achieved no qualifications;

- Achievement of a level 2 qualification results in an increase of 5.3 percentage points in likelihood of being employed. Completing an apprenticeship has a comparable positive effect to achieving a level 2 or level 3 qualification;

- Even achievement of a qualification below level 2 is shown to increase employment probability significantly, by 4.8 percentage points compared to no achievement.

Table 2.7 Effect of achieved qualifications on employment probability compared to no achievement, by construction sector

Qualification	Effect on employment probability
Level 4 or above	6.3 percentage points ***
Level 3	6.3 pp***
Level 2	5.3 pp***
Below level 2	4.8 pp***
Trade apprenticeship	5.8 pp***

*Source: ONS LFS data; ICF regression analysis. Note: *** p<0.01, ** p<0.05, * p<0.1. The percentage point effects presented in this table are the average marginal effects of qualification achievement, calculated in Stata using the margins command.*

2.2.3. Marginal effect of qualifications on employment

The regression analysis found statistically significant results for all qualification levels for the marginal effect of qualifications (see Table 2.8). The largest increase in the probability of an individual being employed was for individuals with a qualification below level 2 (compared to individuals with no qualification). Individuals with a trade apprenticeship were 2.4 percentage points more likely to be employed than an individual with a qualification below level 2. The lowest marginal effect for a qualification on employment was for level 2 qualifications (compared to individuals who hold a qualification below level 2).

Table2.8 Effect of achieved qualifications on employment probability compared to no achievement, by construction sector

Qualification	Effect on employment probability
Level 4 or above	1.9 pp ***
Level 3	2.2 pp***
Level 2	0.8 pp**
Below level 2	4.8 pp***
Trade apprenticeship	2.4 pp***

*Source: ONS LFS data; ICF regression analysis. Note: *** p<0.01, ** p<0.05, * p<0.1. The percentage point effects presented in this table are the average marginal effects of qualification achievement, calculated in Stata using the margins command.*

2.3. Monetary value of qualifications

2.3.1. Approach to the analysis

The marginal effects of qualifications on earnings and employment presented above are used to estimate the monetary value of having a qualification. This was done by setting a baseline level of employment and earnings for individuals in the comparator group (individuals with the next highest level of qualification), and applying the wage and employment premium to this.

The calculation of the monetary value of qualifications has been carried out for qualifications in the CBE sector as a whole, over a five and ten year period, first for all qualifications then for vocational qualifications (by level).

The benefit for individuals is shown as an increase in wages for individuals who would already have been employed, and the effect for an individual being more likely to be employed. The benefit to the Government is shown as increases in tax receipts and decreases in unemployment benefit payments.
The employer benefit has been estimated using the increase in wages experienced by learners using the standard multiplier of an increase in workers' wages representing half the total increase in productivity for employers – meaning employers benefit by double the amount an individual benefits from wages (minus the increase in wages)[10].

Monetary values in future years have been discounted at a standard rate of 3.5%. A more detailed description of the methodology can be found in Annex 1.

2.3.2. Monetary impact of all qualifications

Table 2.9 presents the estimated monetary impact of achieving all qualifications over a five year period. This shows that the largest benefit is estimated to be for employers through an increase in productivity. This is true for all qualification levels. The highest total value of qualifications is for level 4 and above (£37,300 over five years), with £15,000 of this being benefits to individuals, £3,800 of benefits to the Government and £18,500 to employers.

The monetary value of qualifications below level 2 is relatively high. This is due to the large marginal effect on earnings and employment.

Table 2.9 Monetary impact of achieving qualifications, five year period

Qualification	Increased wage (£)	Improved employment (£)	Tax receipts (£)	Unemployment (£)	Employer benefit (£)	Total (£)
Level 4 or above	12,600	2,400	3,500	300	18,500	37,300
Level 3	3,500	1,700	1,100	300	6,300	12,900
Level 2	2,200	500	600	100	3,300	6,700
Below level 2	3,100	2,300	1,100	700	6,400	13,500
Trade apprenticeship	5,600	2,000	1,700	400	9,200	18,800

Source: ONS LFS data; ICF regression analysis; ICF calculations. All values rounded to the nearest £100.

Table 2.10 presents the same analysis over a ten year period. This again shows that the largest monetary effect of achieving a qualification is for employers. The highest monetary value is again for qualifications at level 4 and above (nearly £72,000), followed by trade apprenticeships (over £37,000).

[10] Dearden et al (2006) The Impact of Training on Productivity and Wages: Evidence from British Panel Data

Table 2.10 Monetary impact of achieving qualifications, 10 year period

Qualification	Increased wage (£)	Improved employment (£)	Tax receipts (£)	Unemployment (£)	Employer benefit (£)	Total (£)
Level 4 or above	24,300	4,500	6,700	600	35,500	71,700
Level 3	6,800	3,300	2,100	700	12,300	25,300
Level 2	4,700	900	1,300	200	6,900	14,100
Below level 2	7,100	4,800	2,500	1,300	14,300	30,000
Trade apprenticeship	11,000	3,900	3,300	700	18,200	37,100

Source: ONS LFS data; ICF regression analysis; ICF calculations. All values rounded to the nearest £100.

2.3.3. Vocational qualifications

The analysis of the monetary value of qualifications was recreated using the earnings premiums calculated for vocational qualifications. The employment multipliers for all qualifications are used in this analysis, as it was not possible to calculate these for vocational qualifications (see 2.2.1). Table 2.11 presents the monetary values for a five year period and Table 2.12 presents the monetary values over a ten year period. Again, the largest benefits are experienced by employers. The tables show that the monetary values for vocational qualifications at level 4 and above are slightly lower than for all qualifications (£68,400 over ten years compared to £71,700).

However, the monetary values of vocational qualifications at levels 3 and 2 are estimated to be considerably higher than for all qualifications. For example a vocational qualification at level 2 has an estimated value of £36,500 over ten years compared to £14,100 for all qualifications.

Table 2.11 Monetary impact of achieving vocational qualifications, five year period

Qualification	Increased wage (£)	Improved employment (£)	Tax receipts (£)	Unemployment (£)	Employer benefit (£)	Total (£)
Level 4 or above	12,000	2,400	3,300	300	17,600	35,600
Level 3	6,100	1,700	1,700	300	9,500	19,400
Level 2	6,400	500	1,700	100	8,500	17,200
Below level 2	100	2,300	300	700	2,700	6,000
Trade apprenticeship	5,600	2,000	1,700	400	9,200	18,800

Source: ONS LFS data; ICF regression analysis; ICF calculations. All values rounded to the nearest £100.

Table 2.12 Monetary impact of achieving vocational qualifications, 10 year period

Qualification	Increased wage (£)	Improved employment (£)	Tax receipts (£)	Unemployment (£)	Employer benefit (£)	Total (£)
Level 4 or above	23,000	4,500	6,300	600	33,900	68,400
Level 3	12,000	3,300	3,400	700	18,700	38,100
Level 2	13,700	900	3,500	200	18,200	36,500
Below level 2	200	4,800	700	1,300	5,700	12,800
Trade apprenticeship	11,000	3,900	3,300	700	18,200	37,100

Source: ONS LFS data; ICF regression analysis; ICF calculations. All values rounded to the nearest £100.

2.4. Comparisons with other sectors

2.4.1. Results from the LFS analysis

This section draws on comparisons of the results for the CBE sector with three broad industrial groups using the same data from the LFS. The total earnings premium resulting from qualification achievement in construction at different qualification levels (compared to no qualification) is broadly comparable to premiums in manufacturing and retail sector, and all sectors excluding the CBE sector (Table 2.13). But there are some differences:

- In all sectors excluding the CBE sector, the achievement of a qualification results in slightly higher relative increases in earnings than in construction. The largest positive difference is for level 3 qualifications;
- In the manufacturing sector, qualification achievement results in higher increases in earnings than in construction. This is the case especially for qualifications at level 3 or above and apprenticeships, where the earnings premium is at least 7 percentage points higher than in construction;
- In the retail sector, achieving a qualification leads to smaller increases in earnings than in construction. For level 4 or above qualifications, the earnings premium is lower by 8 percentage points than in construction. The premium is smaller for all other qualifications as well, although the difference is smaller.

Table 2.13 Total effect of achieved qualifications on earnings compared to no achievement, by comparison sector

Qualification	CBE sector	Manufacturing sector	+/- CBE sector	Retail sector	+/- CBE sector	All other sectors	+/- CBE sector
Level 4 or above	25%***	32%***	+7 pp	17%***	-8 pp	26%***	+1pp
Level 3	16%***	25%***	+9 pp	12%***	-4 pp	21%***	+5pp
Level 2	13%***	13%***	+0 pp	8%***	-5 pp	14%***	+2pp
Below level 2	8%***	10%***	+2 pp	6%***	-2 pp	9%***	+2pp
Trade apprenticeship	14%***	21%***	+7 pp	9%**	-5 pp	16%***	+2pp

*Source: ONS LFS data; ICF regression analysis; Note: *** p<0.01, ** p<0.05, * p<0.1. All values rounded to nearest percentage*

The effect of qualification achievement on the likelihood of being in employment tends to be higher in construction than in the manufacturing and retail sectors (Table 2.14), but lower than all other sectors excluding construction. This applies particularly to lower level qualifications when comparing construction to retail and manufacturing (level 2 or below, excluding apprenticeships). The effect of achieving such qualifications on the likelihood of being in employment is often higher by 2 or more percentage points in construction than in manufacturing or retail sectors. For higher level qualifications (at and above level 4) the difference tends to be smaller, especially when compared to the manufacturing sector.

Table 2.14 Total effect of achieved qualifications on the likelihood of employment compared to no achievement, by comparison sector

Qualification	CBE sector	Manufacturing sector	+/- CBE sector	Retail sector	+/- CBE sector	All other sectors	+/- CBE sector
Level 4 or above	6.3 pp***	5.6 pp***	-0.7 pp	4.3 pp***	-2.0 pp	6.8pp***	0.5pp
Level 3	6.3 pp***	6.2 pp***	-0.1 pp	4.9 pp***	-1.4 pp	8.3pp***	2.0pp
Level 2	5.3 pp***	4.1 pp***	-1.2 pp	3.0 pp ***	-2.3 pp	6.8pp***	1.5pp
Below level 2	4.8 pp***	2.8 pp***	-2.0 pp	1.9 pp***	-2.9 pp	5.0pp***	0.2pp
Trade apprenticeship	5.8 pp***	5.8 pp***	+0 pp	4.1 pp***	-1.7 pp	7.2pp***	1.4pp

*Source: ONS LFS data; ICF regression analysis; Note: *** p<0.01, ** p<0.05, * p<0.1. All values rounded to one decimal place*

The marginal effects of qualification achievement in the manufacturing sector are closer to the marginal effect in the construction sector (see Table 2.15). The effect of qualifications on earnings in the construction sector is higher than those observed in all sectors excluding the construction sector. This holds for all qualifications except for those at level 2.

At level 3 the marginal effect is greater for construction than manufacturing. The marginal effects of qualifications on earnings in the retail sector are consistently lower than those in the construction and manufacturing sectors.

Table 2.15 Marginal effect of achieved qualifications on earnings compared to the next highest level of achievement, by comparison sector

Qualification	CBE sector	Manufacturing sector	+/- CBE sector	Retail sector	+/- CBE sector	All other sectors	+/- CBE sector
Level 4 or above	15%***	12%***	-2 pp	9%***	-6 pp	10%***	-5pp
Level 3	5%***	9%***	+4 pp	1%***	-4 pp	4%***	-1pp
Level 2	4%***	3%***	-1 pp	3%***	-1 pp	5%***	0pp
Below level 2	8%***	10%***	+2 pp	6%***	-1 pp	9%***	-2pp
Trade apprenticeship	8%***	11%***	+2 pp	2%**	-7 pp	5%***	-3pp

*Source: ONS LFS data; ICF regression analysis; Note: *** p<0.01, ** p<0.05, * p<0.1. All values rounded to nearest percentage*

Table 2.16 shows a statistically insignificant decrease in the probability of an individual being in employment with a level 4 qualification compared to an individual with a level 3 qualification in the retail sector. The marginal effect on employment in the construction

sector is higher than in all three comparator sectors for qualifications at level 4. The marginal effect on employment in all other sectors is higher in construction than in all sectors excluding construction at level 3 and for trade apprenticeships, but much lower for qualifications at level 2. The marginal effect in construction for qualifications at level 3 and 2 are lower than in the retail and manufacturing sectors.

Table 2.16 Marginal effect of achieved qualifications on employment probability compared to the next highest level of achievement, by construction sector

Qualification	CBE sector	Manufacturing sector	+/- CBE sector	Retail sector	+/- CBE sector	All other sectors	+/- CBE sector
Level 4 or above	1.3 pp ***	0.8 pp***	-0.5 pp	-0.1 pp	-1.4 pp	1.4pp***	-0.2pp
Level 3	2.2 pp***	2.7 pp***	+0.5 pp	2.4 pp***	+0.2 pp	2.0pp***	-0.1pp
Level 2	0.8 pp**	1.6 pp***	+0.8 pp	1.1 pp ***	+0.3pp	2.5pp***	1.7pp
Below level 2	4.8 pp***	2.8 pp***	-2.0 pp	1.9 pp***	-2.9 pp	5.0pp***	0.2pp
Trade apprenticeship	2.4 pp***	2.9 pp***	+0.5 pp	2.4 pp***	0.0 pp	2.1pp***	-0.3pp

*Source: ONS LFS data; ICF regression analysis; Note: *** p<0.01, ** p<0.05, * p<0.1. All values rounded to one decimal place*

Table 2.17 presents a comparison of the monetary value of achieving vocational qualifications in the comparator sectors over a ten year period. The values highlighted are the highest monetary values at each qualification level. This shows that the value of CBE qualifications at level 4 and above are more valuable than qualifications at this level in any of the comparator sectors. The value of qualifications in the CBE sector are higher than the value for all sectors excluding the CBE sector at all levels except for below level 2, and higher than the retail sector for all qualification levels. The monetary value of CBE qualifications are slightly lower than in the manufacturing sector at levels 3, below level 2 and trade apprenticeships.

Table 2.17 Monetary impact of achieving vocational qualifications, 10 year period

Level	Sector	Wages (£)	Employment (£)	Tax (£)	Unemployment (£)	Employer benefit (£)	Total (£)
Level 4 or above	CBE sector	23,000	4,500	6,300	600	33,900	68,400
	All other sectors	11,200	2,800	3,200	400	17,200	34,800
	Manufacturing	14,400	2,100	3,900	300	20,400	41,000
	Retail	3,300	-200	800	0	4,000	7,900
Level 3	CBE sector	12,000	3,300	3,400	700	18,700	38,100
	All other sectors	10,300	2,200	2,900	600	15,400	31,400
	Manufacturing	18,400	4,200	5,200	800	27,800	56,400
	Retail	4,900	1,900	1,500	700	8,300	17,300
Level 2	CBE sector	13,700	900	3,500	200	18,200	36,500
	All other sectors	7,900	2,100	2,300	700	12,200	25,200
	Manufacturing	3,600	1,900	1,200	500	6,600	13,700
	Retail	4,200	700	1,200	300	6,000	12,400
Below level 2	CBE sector	200	4,800	700	1,300	5,700	12,800
	All other sectors	2,000	4,000	1,100	1,400	7,100	15,500
	Manufacturing	4,900	2,900	1,600	800	9,400	19,700
	Retail	400	1,200	300	500	1,900	4,300
Trade apprenticeship	CBE sector	11,000	3,900	3,300	700	18,200	37,100
	All other sectors	5,200	2,600	1,700	600	9,400	19,500
	Manufacturing	14,200	4,400	4,100	900	22,700	46,300
	Retail	1,300	2,500	700	700	4,600	9,900

Source: ONS LFS data; ICF regression analysis; ICF calculations. Blue cells highlight the highest monetary value in each category and qualification level. All values rounded to nearest £100.

2.4.2. Results from other sector studies

There have been limited attempts to estimate the impact of qualifications in specific sectors. These studies have tended to use estimated impacts on employment and earnings from existing publications (which cover all sectors) to calculate the economic value of qualifications (rather than carrying out new statistical analysis). The results from these studies for the construction sector are presented in section 2.5. Other sectoral studies have estimated the value of qualifications in terms of a Return on Investment (ROI) compared to the cost of training by employers, rather than estimating the labour market outcomes.

Examples of sector specific estimates of the value of qualifications include:

- The Centre for Economics and Business research (CEBR, 2015) study into the value of qualifications in the engineering sector. This used multipliers for earnings from a previous study by the Department for Business, Innovation and Skills[11]. The value of a

[11] BIS (2013) A Disaggregated Analysis of the Long Run Impact of Vocational Qualifications: BIS Research Paper 106

level 3 apprenticeship in the engineering sector for a comparable ten year period was estimated to be just over £32,000. This is similar to the ten year value in the construction sector for a trade apprenticeship; and

- The Institute of the Motor Industry (IMI) estimated that apprentices generate an ROI of between 150%-300%

There is more research which examines the impact of qualifications across multiple sectors. This includes large scale research with statistical modelling using secondary data sets, and studies which use this information to estimate the monetary value of qualifications in different sectors.

The research which models the labour market outcomes of qualifications across sectors consistently show that the effect of qualifications in the construction sector are higher than average returns (for example McIntosh, 2007 and 2016; BIS, 2013, NAO, 2012) and are among the highest of any sector.

Another piece of research by the CEBR (2016)[12] presents the lifetime value on earnings from obtaining an apprenticeship at level 2 and level 4 across multiple sectors. This uses the same approach as in the previous CEBR research. The value of these qualifications is calculated over a longer period than the results presented in Table 2.9 to Table 2.12, and they show significant increases in earnings in most sectors.

A selection of the results from the CEBR analysis is presented in Table 2.18. This shows that qualifications in the construction sector are among the highest of all sectors.

Table 2.18 Comparator sectors from previous research

Sector	Level 2 apprenticeship (£)	Level 4 apprenticeship (£)
Construction, Planning And Built Environment	£89,300	£109,400
Engineering And Manufacturing Technologies	£66,200	£88,300
Science And Mathematics	£31,400	£67,500
Retail And Commercial Enterprise	£63,000	£85,000
Agriculture, Horticulture And Animal Care	£29,300	£240,000
Health, Public Services And Care	£88,300	£112,800
Business, Administration And Law	£61,600	£71,900
Arts, Media And Publishing	£3,800	£129,200
Languages, Literature And Culture	£5,800	£91,700
Social Sciences	£30,700	£120,400
Information And Communication Technology	£34,900	£143,300
Average	£69,300	£94,400

Source: CEBR (2016) Productivity and Lifetime Earnings of Apprentices and Graduates

2.5. Comparisons to previous studies of the construction sector

Table 2.19 presents the evidence from the research literature on the effects on earnings of qualifications in the CBE sector, alongside the estimates from this research. The returns to qualifications in this research tend to be lower than the estimates in previous studies. There could be several factors explaining this, including:

[12] CEBR (2016) Productivity and Lifetime Earnings of Apprentices and Graduates

- The estimates in this research include more up to date data, which includes data on qualifications and earnings since the recession began in 2008 and the value of earnings fell. All of the previous studies which are presented in 0Table 2.19 use data which has a significant time lag included;

- The inclusion of different variables in the research and different approaches to forming comparator groups. Depending on the data source used in the analysis, the variables included in the model differ. For example, research using the Individualised Learner Records (ILR) data does not include any workplace characteristics (occupation, industry, employer size etc.) which research using the LFS does. The research using the ILR dataset also uses a different approach to forming a comparator group – individuals who started but failed to complete a qualification are used as the comparator group. In this research paper and in analysis using the LFS individuals with the next highest level of qualification are used as the comparator group. The BIS (2013) research uses ILR data and a different comparator group to the rest of the studies mentioned in the table; and

- A different definition of the construction sector - for example previous studies which have examined the effects of qualifications in the construction sector have used the SIC F division (Construction), which does not include the architecture and engineering subsector. The NAO (2012), BIS (2011) and Greenwood et al (2007) paper use this definition of construction. Other studies (BIS (2013)) use the vocational framework studied (for example a construction qualification) and assume that these individuals work in the construction sector.

Table 2.19 Marginal effect of qualifications on earnings in the construction sector[13]

Qualification	This research	BIS 2013[14]	NAO 2012[15]	BIS 2011[16]	Greenwood et al 2007[17]
Level 4 and above qualifications	15%***				
Level 4 and above vocational qualifications	14%***				
NVQ Level 4 and above	14%***				
BTEC level 4 and above	11%***				
Level 3 qualifications	5%***				
Level 3 vocational qualifications	9%***	20% in year one; 21% in year seven			
Level 3 NVQ	10%***			16%	28%
Level 3 BTEC	3%			18%	23%
OCD/OND level 3					34%
City and Guilds level 3	4%***				24%
Advanced apprenticeship			11%		
Intermediate apprenticeship			13%		
Apprenticeship level 3	18%***				21%
Trade apprenticeship	8%***				
Level 2 qualifications	4%***				
Level 2 vocational qualifications	13%***	15% in year one; 13% in year seven.			
Level 2 NVQs	3%*			3%	
Level 2 BTEC	-1%			34%	
Level 2 City and Guilds	2%				
Apprenticeship level 2	1%				

2.6. Summary: key points

The key findings from the statistical analysis are[18]:

Effect on earnings – all qualifications

- The total effect of qualifications (compared to individuals who hold no qualifications) on earnings in the CBE sector increases as the level of qualification increases. This would be expected. On average, individuals with qualifications earn more than those without

[13] There are additional studies which have provided estimates of the value of qualifications, and discussed these results by sector. However, they do not provide exact figures of the value of qualifications in the construction sector, and have not been included in the comparator table because of this.
[14] This research uses a different approach to forming a comparator group, different variables in the model and uses individuals completing construction based qualifications as the construction sector.
[15] This research uses a slightly different definition of the construction sector.
[16] Ibid.
[17] Ibid.
[18] All differences are statistically significant unless otherwise stated

qualifications, and the increase in individuals' earnings is larger for those with qualifications at a higher level.

- The total returns to qualifications are higher in the civil engineering and architecture and engineering subsectors.

- The marginal effect of qualifications (compared to individuals who hold the next highest level of qualification) in the CBE sector are positive for all qualification levels. The largest marginal effects are for qualifications at level 4 and above.

- Some of the estimates of marginal effects at a subsector level are not statistically significant, particularly for lower level qualifications (at level 2 and below level 2). The largest marginal effects at a subsector level are seen for level 4 and above qualifications in the construction of buildings subsector (15%), and for trade apprenticeships in the architecture and engineering subsector (17%).

Effect on earnings – vocational qualifications

- When the analysis is limited to those individuals who hold vocational qualifications as their highest level of qualification, the total effect of qualifications is similar to the total effects for all qualifications. The exception to this are the returns to qualifications below level 2 which are much lower for vocational qualifications, though this is not statistically significant.

- The total returns to different types of qualifications show that the total returns to NVQs and apprenticeships at level 3 are higher than returns to BTEC and City and Guilds qualifications. The total returns to qualifications at level 2 are similar for all types of qualification.

- The marginal returns to level 4 and above vocational qualifications are generally lower than the returns for all level 4 and above qualifications. The civil engineering subsector is an exception where they are higher.

- The marginal returns to vocational qualifications at level 3 are higher than the marginal returns for all qualifications at level 3 in the CBE sector as a whole and all subsectors.

Effect on earnings - comparator sectors

- Compared to the effects in the retail and manufacturing sectors, the effect of qualifications on earnings in the CBE sector (both total and marginal effects) are consistently higher than in the retail sector. The total effect of qualifications on earnings in the CBE sector is lower than in the manufacturing sector, but the marginal effects are similar at all qualification levels.

Effect on employment

- In the sector as a whole, individuals with a qualification at each level are more likely to be in employment than individuals who have no qualifications and individuals who have a qualification at the next highest level. The size of the effect increases as the level of educational achievement increases.

Effect on employment – comparator sectors

- Compared to the retail and manufacturing sectors, the total effects of qualifications on being in employment are higher in the CBE sector for all qualification levels, but the marginal effects of qualifications in the CBE sector are similar. However, the effects on employment in the CBE sector are lower than for all sectors excluding the CBE sector.

Monetary value of qualifications

- The estimated monetary value of vocational qualifications in the CBE sector range from £12,800 (below level 2 vocational qualification) to £68,400 (level 4 qualifications and above). The monetary value of the qualifications generally increases as the level of the qualification increases. Employers receive the largest proportion of the benefit of the qualification through increased output. The value of the qualification to individuals comes from increased wages and an increased probability of being employed. For most qualifications in the CBE sector, the effect of increased wages is higher than the effect of the increased probability of being employed (all qualifications except for those below level 2).

Monetary value of qualifications – comparator sectors

- The estimated monetary value of vocational qualifications in the CBE sector at level 4 and above have a higher monetary value than in all sectors excluding the CBE sector, manufacturing and retail sectors. Vocational qualifications at all levels in the CBE sector are more valuable than in the retail sector, and at all levels except for below level 2 for all sectors excluding the CBE sector.

3. Value of qualifications for to employers

In this section we draw upon a survey of 500 CBE employers and qualitative interviews of 40 employers to explore their perceptions of:

- The quality and value of vocational qualifications;
- The recognition of vocational qualifications in recruitment and promotion;
- The value of vocational qualifications for professional development;
- The cost of qualifications;
- The effects of vocational qualifications on pay and progression.

3.1. Quality and value of qualifications for work readiness/entry to sector

Almost all the employers interviewed felt that vocational qualifications (apprenticeships and classroom-based courses) prepared people for work in the construction sector. The only exception to this rule was a few employers with under 30 staff who had few new entrants and very little engagement with the qualifications market.

The employers interviewed generally believed that apprenticeships provided a valuable and accessible pathway to the sector. The qualifications were generally perceived to provide a good framework to enable individuals to acquire the skills they need to progress in the sector. One employer noted how essential they felt apprenticeships were: *"Well I can't become an electrician without the vocational bit. I've seen people who just go to college courses come here and they have not got the experience and knowledge of how to do it and what's needed – it's essential"*

Almost all employers with experience of apprentices said that apprentices gain new knowledge, technical expertise and better understand the theoretical underpinnings of their work as a result of undertaking their training. Moreover, the apprenticeship allowed their learning to be tailored to the employer's work practices. This view was consistent across all occupational areas/sub-sectors and across employers of all sizes. The large employers were generally well-engaged with the changes to apprenticeships. A few employers believe that the grading helps to raise standards and enables them to identify those individuals who can perform well in the workplace.

Other vocational qualifications which included a classroom and work-based element were less well-regarded by the employers interviewed compared to apprenticeships. Around half of employers had negative experiences of the work readiness of learners with classroom-based trade qualifications. This was attributed to a number of factors:

- The status of vocational qualifications. A few employers felt that schools and colleges frequently signpost low-attaining learners to CBE courses because it is perceived to be a relatively easy route into employment. Some of these learners often had multiple barriers (such as alcohol and drug abuse problems) which meant they were not ready to enter the sector.
- There is a perception that some of these qualifications, especially NVQs, do not test learners' ability nor do they match up to employers' needs. A few are believed to be too easy and have high pass rates. A few employers also reported that completing the qualification may not accurately reflect learners' abilities because they believe that some may have received significant help from their tutors when completing their portfolio.

- There was a perceived lag between trade and classroom practice with some college based elements teaching out of date practice (examples given in roofing).This meant that new entrants had to be retrained once they started work and that some of the techniques were not relevant to the workplace.

- A few employers reported that some classroom based level 2 and level 3 qualifications did not provide simulated work environments that replicated working on-site. As one employer stated: *"In our line of work you are constantly encountering problems that you have to solve. You can't replicate that in the classroom".* '*Learning by example on-site is often much more effective than learning new skills in a training course, where information learned is often out of context from a real construction site".*

- The variable quality of training providers they have found.

- Conversely a small number of employers felt that some requirements were too high. For example in some courses the literacy requirements were seen as more demanding than were necessary to successfully fulfil an entry level job role.

However, many saw them as providing a foundation for the workplace.

> *"We feel that vocational qualifications as they are very, very helpful, it helps us to ensure they get the correct training and assess them over a broad spectrum. They can guarantee the skills needed. An NVQ gives you better insight into what they are like as an employee because it's been done over a longer period of time."* Medium-sized employer (England)

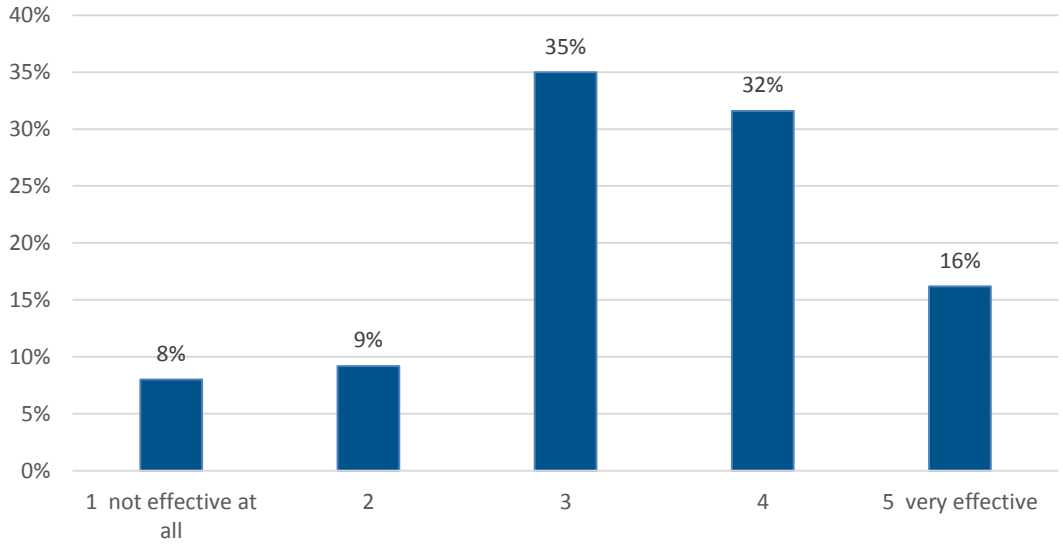
And many employers also acknowledged that classroom-based vocational qualifications provided a good overview of the range of roles and responsibilities of individuals working on-site and that they were more relevant to industry than academic qualifications particularly for lower level roles like operatives.

There were also positive perceptions about higher level qualifications among employers that had experience of them. Some employers, particularly in Scotland, believed that higher level vocational qualifications were important for individuals expecting to progress to management roles.

Many employers believed that having vocational qualifications that are a requirement of employment in the industry is helpful but felt that this was currently inconsistent – required for gas safe and electrical work but not others – or treated as tick box exercises. This was generally noted for managers who completed NVQ's to receive their black CSCS card.

Employer survey respondents reinforce these points. Most of the employers felt that vocational qualifications were effective (239, 48% of employers scoring the effectiveness of vocational qualifications as four or five out of five). Fewer than one sixth of employers (86, 17%) felt that vocational qualifications were not an accurate gauge of an individual's readiness and ability to work in the construction sector (see Figure 3.1). As with the qualitative findings, smaller employers (under 30 employees) were slightly more likely than average to report that vocational qualifications were ineffective.

Figure 3.1 To what extent do you believe that vocational qualifications provide an effective gauge of new entrants' motivation and ability to work in the sector?



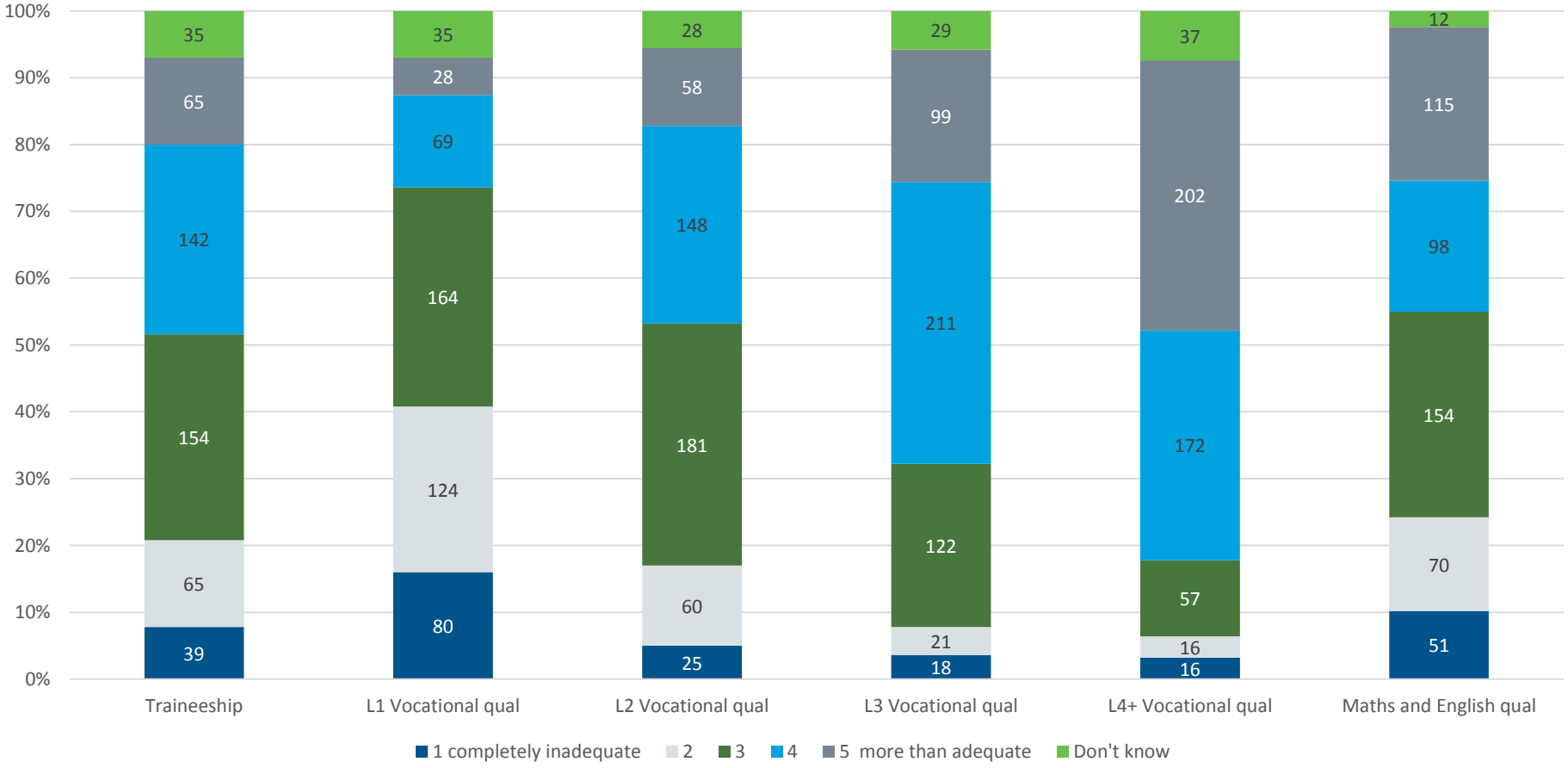
Source: Quantitative survey of employers; base 500

Most employers felt that vocational qualifications provided a good grounding for workers in the sector. In general, as the level of vocational qualification increased, the level of employer satisfaction with the qualification also increased. For example, for a level 4 vocational qualification, 372 employers (74%) responded that the qualification was at least adequate[19], for a level 3 vocational qualification 310 employers (62%) thought the qualifications were at least adequate and for level 2 vocational qualifications 206 employers (41%) thought the qualifications were at least adequate (see Figure 3.2).

The exception to this pattern was for vocational qualifications at level 1, where more employers (204 employers, 41%) thought that the qualifications were inadequate than thought the qualifications were adequate (107 employers, 21%). This corresponds with the findings from the statistical analysis presented in section 2, which showed that vocational qualifications below level 2 have little positive impact.

[19] Scoring four or five out of five.

Figure 3.2 To what extent do you believe the following qualifications provide sufficient grounding for individuals to working in the sector?



Source: Quantitative survey of employers; base 500

3.2. Use of qualifications for recruitment and promotion

3.2.1. Recruitment

There is considerable variation in the recognition of vocational qualifications for recruitment. To some degree this reflects regulations – for plumbers and electricians, the gas safe and registered competent electrician standards require individuals to hold certain qualifications. In these areas qualifications are necessary at the point of entry. Qualifications are also mandatory for some roles. For example, some employers expected prospective project managers to have an HNC qualification in Construction Management or an NVQ.
But it can also reflect:

- The availability of qualifications. In some areas, such as fabrication or land surveying, there are fewer courses;

- The ways in which employers obtain new work. Large value tenders generally require evidence of the skills levels of the workforce at all levels which are best evidenced by qualifications; and

- Variable knowledge about the course content or quality of qualifications. This was often admitted by smaller employers. A few Scottish employers found it difficult when faced with candidates with both NVQs and SVQs.

In general though the smaller the employer the less importance is placed on vocational qualifications at entry level. There were some exceptions to this but this may reflect the recruiting practices of smaller businesses which more commonly are by word of mouth. Although there were no differences between employers England, Wales and Scotland, employers in rural areas said they did not expect entry level staff to have qualifications because the pool of labour in their area is limited.

At entry level many employers of all sizes said that:

- Vocational trade qualifications were often less important than effective work skills, such as punctuality and the ability to meet deadlines/work quickly. New entrants with good work skills could then be trained on-the-job. Around a third of employers suggested entrants with these skills were rare and so they prioritise applications with good work skills over those with qualifications. This was seen to be particularly important for entry level positions.

> *"Skills can be developed if somebody doesn't have them, but it is much more difficult to change an individual's work ethic or their attitude. Even if they have the right qualifications, they may not be suitable for a working environment."*

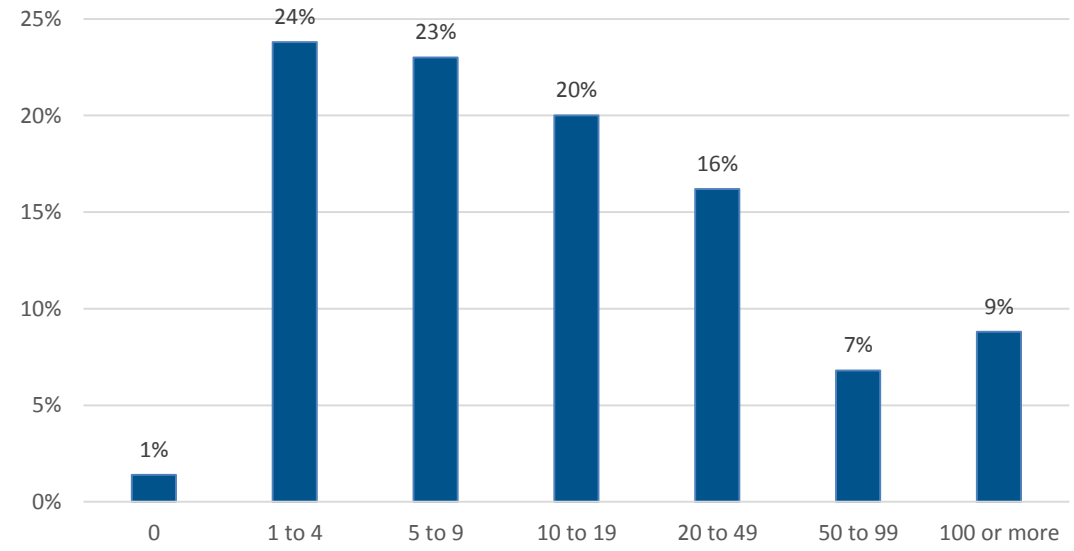
- Work experience had a higher value than qualification achievement. A few employers said that they required new entrants to undertake work experience prior to joining. Around a third reported that they use probationary periods to test the work skills of candidates irrespective of qualification level.

- Many employers provided induction and work place learning as a matter of course. This was provided for both employees with qualifications and those without them. This process is seen as vital to bring new employees up to speed with the particular practices within an employer which employers judged not to be taught during vocational qualification training.

Even so many employers felt that holding a vocational qualification gave them an indication of candidates' work ethic. One employer said that having a NVQ shows them that individuals have an *'ongoing commitment to learning and study' and* a desire to work.

The employers responding to the survey had considerable experience of recruitment. In total, over 28,000 individuals had been recruited by the firms surveyed in the past three years. Figure 3.3 shows the level of recruitment. All but seven employers had recruited at least one individual in the past three years (99% of employers). Most firms had recruited fewer than ten individuals (234, 47% of employers had recruited between one and ten individuals). .

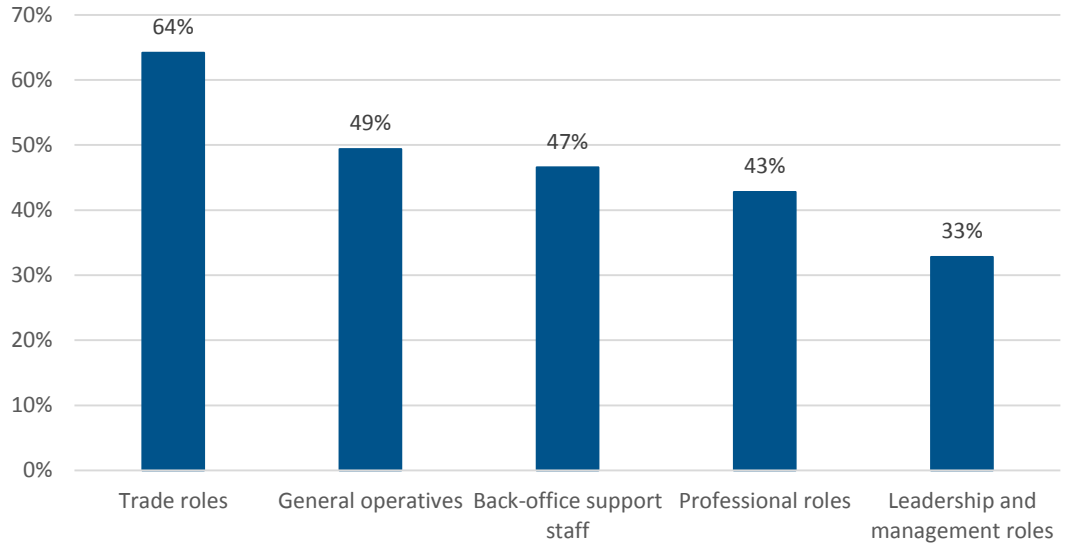
Figure 3.3 How many new staff have you taken on in the last three years?



Source: Quantitative survey of employers; base 500

Figure 3.4 presents the number of employers who have recruited individuals into different occupational groups. Individuals were most commonly recruited into trade roles (64%). Employers were least likely to recruit individuals into leadership and management positions (164, 33%), which is expected as there are fewer leadership and management positions.

Figure 3.4 What roles were new staff recruited onto?



Source: Quantitative survey of employers; base 500

Table 3.1 presents the qualifications employers require, by the type of role an individual is recruited into[20]. This shows that a significant percentage of employers do not require any formal qualifications for each job role. For example, for general operative roles, one third of employers said they did not require any formal qualifications, and one quarter of employers did not require any formal qualifications for back office support roles. A lower percentage of employers did not require any qualifications for trade and professional roles. When examining across all job roles, 6% of employers do not use any qualifications for any job role.

Table 3.1 also shows the types of qualifications employers require. Vocational qualifications were more likely to be required than general education and degree level qualifications in trade and general operative roles. Higher level qualifications, such as vocational qualifications at level four or above and degree level qualifications were most likely to be required in professional and leadership and management roles. However, as firms are less likely to recruit into these roles than the other occupational groups (see Figure 3.4), these levels of qualifications are less likely to be required for roles in the CBE sector.

A large proportion of employers responded that other qualifications were required for individuals they recruited. This was the case for all occupational groups. These other qualifications were most likely to be skills or safety qualifications which allow individuals to work on a construction site (health and safety qualifications, CSCS card or trade specific skills cards). Some employers mentioned a requirement for more advanced academic qualifications, such as postgraduate qualifications.

[20] Employers could respond to more than one qualification type for each type of role, therefore different categories should not be summed.

Table 3.1 Qualifications required by type of role (Percentage of employers)

Qualification required	Trade roles	General operatives	Back office support	Professional roles	Leadership and Management
No quals required for any position[21]	*13%*	*33%*	*25%*	*9%*	*19%*
No qual but sector experience	20%	32%	30%	17%	27%
No qual.	7%	20%	8%	1%	2%
L2 Maths & English	7%	8%	11%	6%	5%
L2 General education	11%	12%	21%	8%	7%
L3 General education	2%	4%	15%	10%	7%
L2 Vocational qual	29%	19%	11%	6%	7%
L3 Vocational qual	25%	7%	11%	12%	12%
L4+ Vocational qual	8%	4%	7%	17%	16%
Degree level	0%	2%	9%	35%	23%
Other[22]	34%	28%	24%	30%	28%

Source: Quantitative employer survey; base 500

3.2.2. Apprentices

While not all employers had experience of apprentices, those that did more often using apprenticeships as the main entry route into the sector. Employers adopted varied approaches to selecting potential apprentices:
A few employers reported requiring learners to hold GCSE maths and English at C or above. This was because they believed maths and English were key underpinning skills for working in the sector. One employer also reported that it meant learners would have to spend less time off-the-job when undertaking their apprenticeships;

A few employers who believed that maths and English were key skills assessed the quality of spelling, grammar and punctuation in the application forms and/or tested candidates;
A few employers also used previous academic achievement (e.g. GCSEs) to select candidates, generally for higher level entry;

None of the employers interviewed reported using previous vocational qualification achievements to select apprentices. Employers believed that they did not add significant value as learners will learn the basics they require to work in the sector during their apprenticeship.

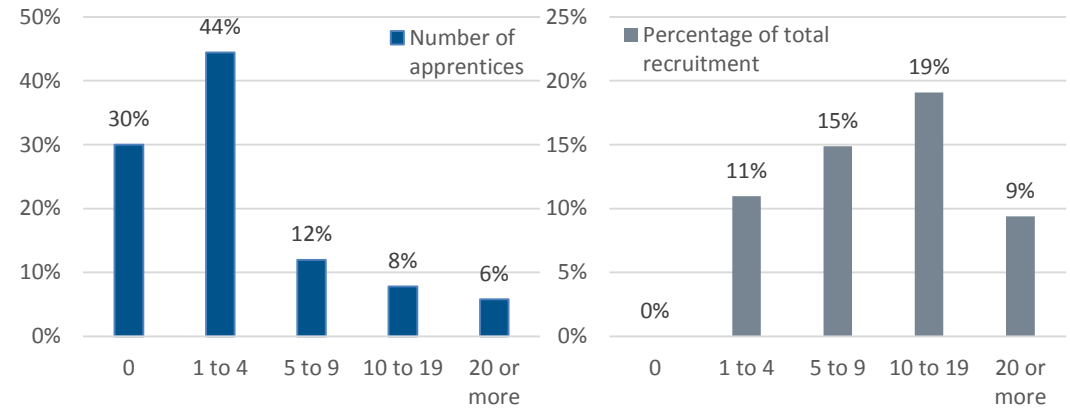
[21] Employers could respond to more than one qualification type for each type of role, and some responded that they did not require qualifications and that they did require a qualification for a role type. This column examined all the responses and provides the percentage of employers who stated they did not require any of the individual qualifications, but did state that they required no qualifications or that they required no qualifications but sector experience.
[22] "Other qualifications" were provided by survey respondents. These varied by role, but included: CSCS or skills card, health and safety course, qualifications from other countries, and core skills

Some employers required apprentices to undertake an internship before they are selected for the programme. This was used to test attitudes to work and whether the sector met learner expectations.

Figure 3.5 shows the number of apprentices recruited by employers who responded to the survey, and the proportion of total recruitment this represents. This shows that 350 employers (70%) had taken on at least one apprentice in the last three years. Of the employers that had taken on apprentices, most (222, 44% of all employers and 63% of employers that had taken on an apprentice) had recruited fewer than five apprentices.

The number of apprentices recruited as a percentage of total recruitment increased as the number of apprentices recruited increased. This reinforces the qualitative finding that employers who recruited more apprentices also used apprenticeships to recruit workers more frequently. This suggests that the more employers use apprenticeships, the happier they are to use them for a larger proportion of their recruitment. This is less the case for employers recruiting more than 20 apprentices, which were generally large employers recruiting a large number of individuals.

Figure 3.5 How many apprentices have you taken on?



Source: Quantitative employer survey; base 500

3.2.3. Promotion

Almost all employers stated that qualifications indicated employees' suitability for promotion but that promotion was based on an individual's ability to meet the requirement of the job role.

In general the larger the employer the more importance is placed on vocational qualifications for promotion. The reasons are similar to those for recruitment: assurance of knowledge skills and competences, skills needing to be demonstrated in tenders for work, greater understanding of qualifications and the learning provided. For example, some employers expected all their managers to achieve a HNC or HND in order to perform their roles, or a level 4 qualification in construction management.

3.3. Value and use of qualifications for professional development

Among most of the employers interviewed there was a strong ethos of training staff to aid their professional development. Nearly all employers stated that they invested in vocational qualifications as part of this though investing more in non-qualification training. The exceptions tended to be small employers with relatively unchanging workforces.

In most employers, training is targeted at enabling individuals' to progress in the organisation as well as to improve their performance in the job they are doing. The majority of employers indicated that the training offered was in response to individuals' agreed training needs and the individuals' enthusiasm and ability to participate in qualification training.

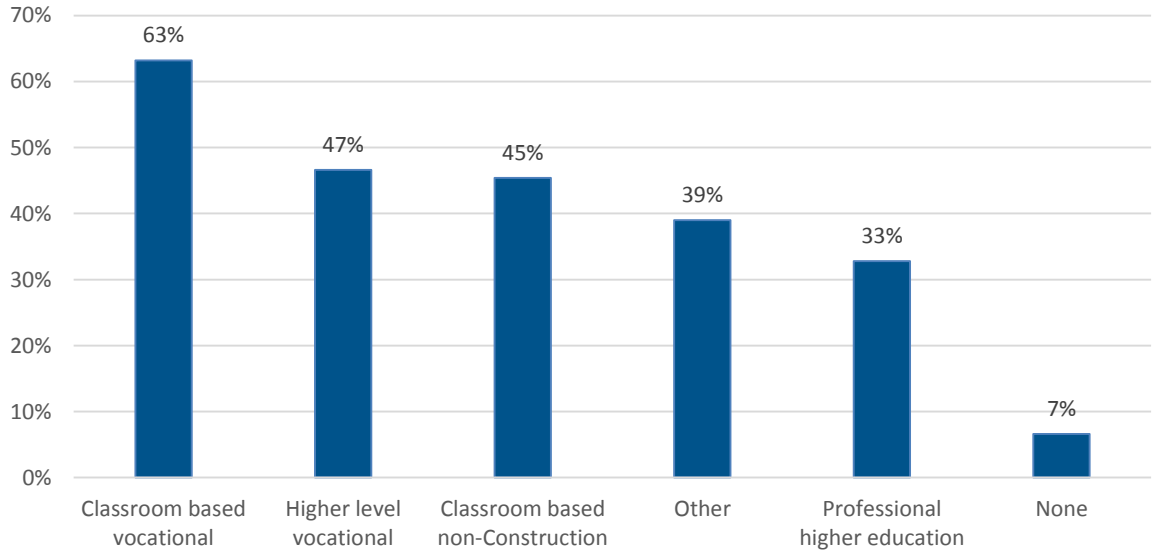
Qualification training was most often targeted at:

- Employees who were required to achieve a qualification for promotion (including both intermediate and higher level qualifications, such as HNCs and HNDs);
- Employees in entry level positions who were being supported to gain a level 2 or 3 qualification in the relevant trade (bricklaying, scaffolding etc.).

These findings were also apparent in the survey of employers Over 77% of employers (383 employers) had provided either classroom based or higher level vocational training in the past three years. Employers were most likely to have used classroom based vocational training (316, 63% of employers), and few (33, 7% of employers) had not supported any qualifications (see Figure 3.6).

As with the qualitative findings, smaller employers (under 30 employees) were less likely than average to have supported qualifications for all types of qualifications, but particularly for higher level vocational qualifications (where only 29% of small employers had supported training compared to an average of 47%).

Figure 3.6 Which of the following qualifications have you supported your staff to obtain in the last three years?



Source: Quantitative survey of employers; base 500

The survey explored why employers support different types of qualifications (see Table 3.2). The most common reason provided for supporting qualifications was to enable workers to undertake their current role. This was lowest for "other" qualifications. The main differences between the reasons for supporting qualifications were:

- Classroom based non-construction and "other" qualifications are more likely to have been used to prepare individuals for promotion than other types of qualification; and

- Higher level qualifications and classroom based vocational qualifications were more likely to be required by clients or by law than other qualifications.

Table 3.2 Why did you support staff to achieve these qualifications?

Reason	Classroom based vocational	Higher level vocational	Classroom based non-construction	Other	Professional higher education
Prepare for promotion	20%	21%	46%	38%	23%
Undertake current role	70%	67%	65%	49%	58%
Required by law	32%	42%	19%	13%	37%
Required by clients	38%	32%	23%	16%	40%
Improve morale / retention	37%	40%	37%	34%	34%
Other	37%	40%	34%	31%	52%

Source: Quantitative survey of employers; base 500

3.4. Cost of qualifications

The financial contribution that employers make to training is significant even with government funding.

Employers made reference to subsidies from the government towards the costs of qualifications at all levels. Most employers however, reported that they fully subsidise the course costs (pay the difference), which can range from round £3,000 from HNCs to over £9,000 for apprenticeships. On average, this is £600- 700 per NVQ level 2 with the cost increasing for higher level qualifications from £900- £2400 for some supervisor level qualifications.

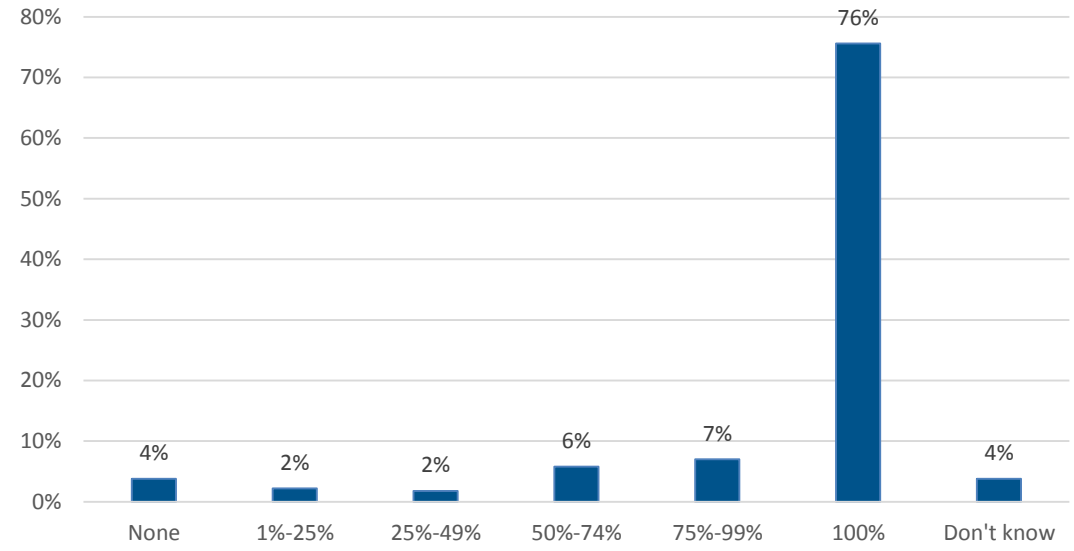
Most employers stated they often pay individuals while they are studying. For apprenticeships, there are also supervisor costs. One employer commissioned research which estimated the cost of an apprenticeship to the company was approximately £40,000. Another company estimated that supervisors spend about 100 hours a year in staff time which would cost about £1,500 per apprentice per year on top of lost productivity. However, all types and sizes of employer did not feel that their in-kind contribution to training staff was burdensome but necessary to have a competent workforce.

The employer survey highlighted the point that employers pay individuals while studying. Around five out of six employers (422 employers, 84%) stated that they provide paid time off for individuals to study for qualifications.

Most employers (286 employers, 57%) said that they incurred costs additional to staff time in order for workers to study towards qualifications. The most common additional costs employers said that they incurred were transport, accommodation and subsistence costs, buying equipment for training courses, paying workers to cover the time missed by people on training and the cost of employing a training department.

Figure 3.7 presents the proportion of training costs employers stated that they cover. This shows that about three quarters (378, 76% of employers) cover all the costs of training. Few employers (19 employers, 4%) did not cover any cost or under half of the total cost (20 employers, 4%).

Figure3.7 What proportion of the training costs do you cover?



Source: Quantitative survey of employers; base 500

3.5. Impact/benefits of qualifications on pay and progression

3.5.1. Employees' earnings and employment

Employers interviewed generally said that qualification achievements did not significantly influence new entrants' starting salaries. In general applicants were hired at the same salary whether they had a qualification or not. But that having a vocational qualification might help staff move up more quickly within an organisation if they proved to be more capable and productive.

The main exception to this is with individuals achieving an apprenticeship. Employers who recruited individuals on completion of their apprenticeship gave them a significant pay increase. In some cases, employers increased apprentices pay when they completed each year of their framework.

Employers identified a number of key benefits they perceived for their employees as a result of their investment in vocational qualifications:

- Almost all employers suggested that gaining a qualification in itself did not guarantee promotion but that in the majority of cases undertaking a relevant vocational qualification helps people worker to move up faster. This was true at all levels from operatives through to management roles.

- For those individuals who are promoted their pay will be increased in line with their promotion. A few employers said that staff sometimes expected there to be a direct relationship between their qualification and their pay grade but that *"people get paid for the job they do".* This is not dependent on their level of qualification be instead on their ability (which could be enhanced as a result of undertaking a vocational qualification).

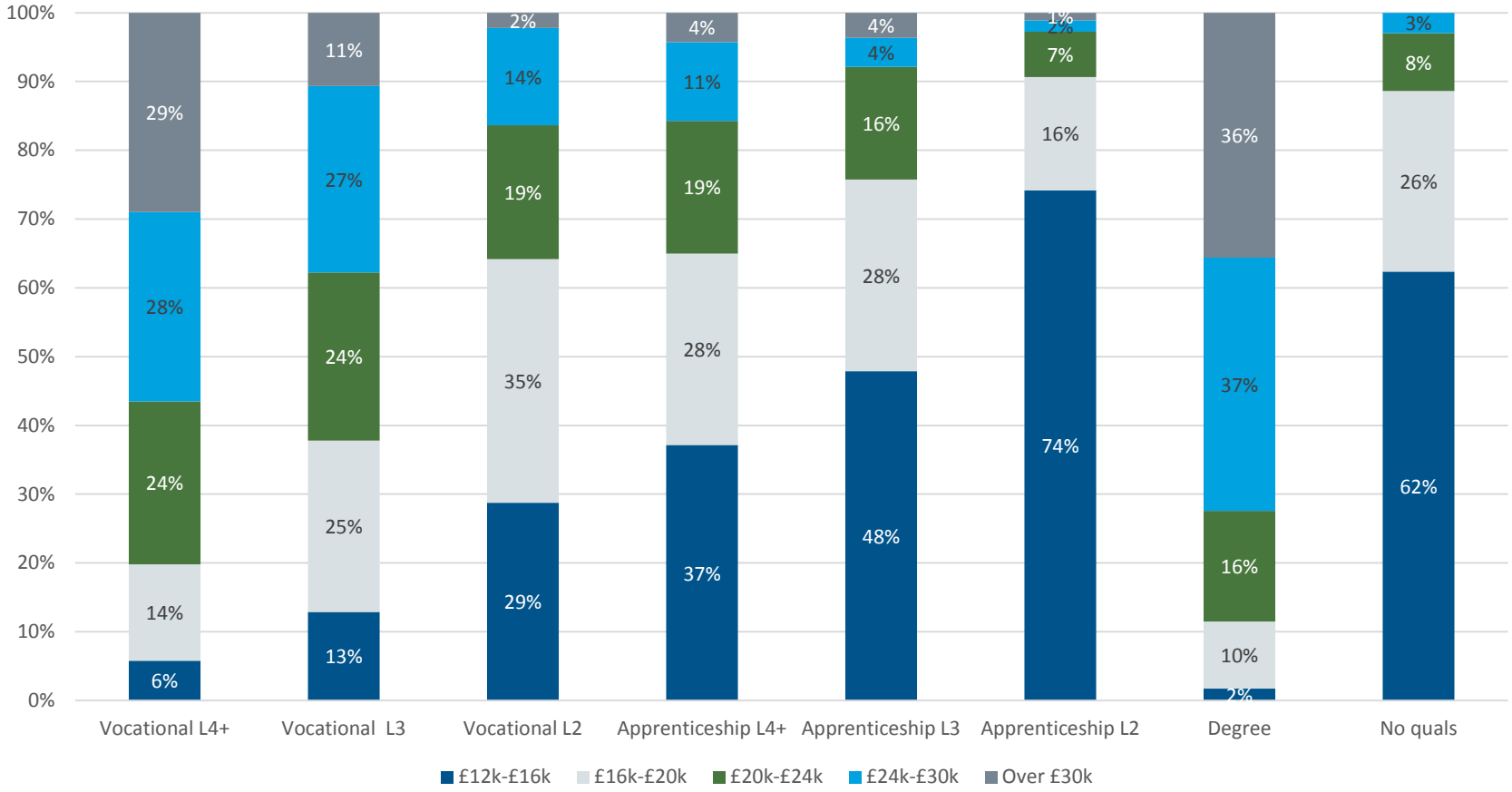
- About a third of employers interviewed suggested that they receive feedback from staff that investing in vocational qualifications makes them feel more valued in the workplace. *"They can see we are investing in them and that can only be a good thing".* When this was investigated further a few employers felt that this had a direct impact on employees' productivity. This was both because of increased motivation but also because employees were able to utilise their new skills in the workplace.

- A few employers highlighted that they see a noticeable difference in the confidence levels of staff who have undergone vocational qualifications. This was seen to be particularly the case with apprenticeships and level 2/3 qualifications where in some cases employees were still relatively new to the industry.

The survey of employers explored the starting wages of individuals with different qualification levels. This did not account for the different roles individuals with different qualifications had been recruited into. Figure 3.8 shows the estimated starting salary by qualification level. This shows that individuals with degree level qualifications are more likely to start on a salary of over £24,000 than individuals with any other qualification level.

As would be expected, the starting salary generally increases as the individual holds a higher level of qualification (for example individuals with a vocational qualification at level 3 are more likely to earn a higher salary than individuals with a vocational qualification at level 2). Additionally, the starting salary for apprentices is lower than the starting salary for individuals with the same level of qualification but with a vocational qualification estimated starting salary by type of qualification

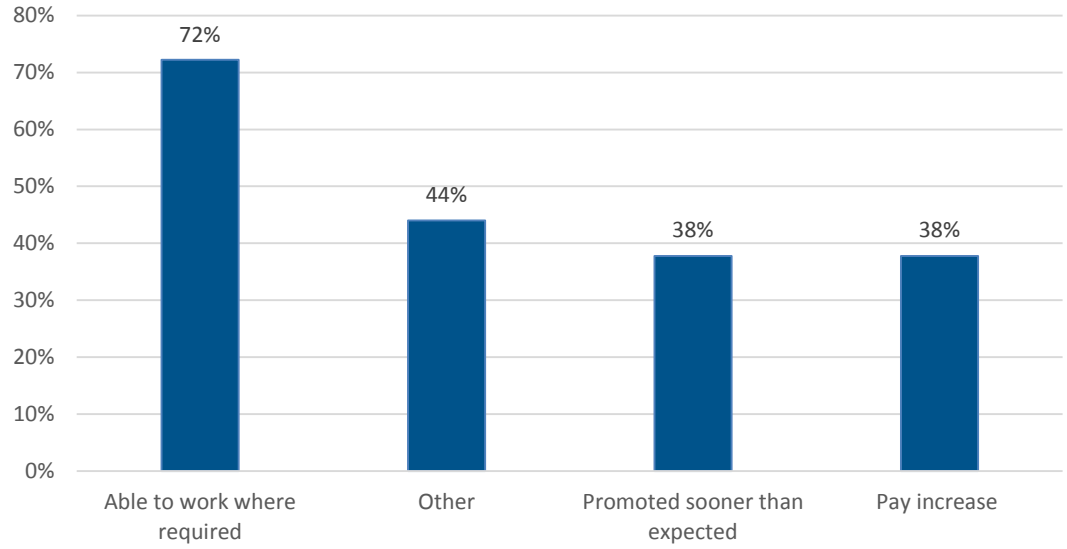
Figure 3.8 Estimated starting salary by type of qualification



Source: Quantitative employer survey; base 207 for vocational L4+; 225 for vocational L3; 226 for vocational L2; 140 for apprenticeship L4+; 165 for apprenticeship L3; 182 for apprenticeship L2; 174 for degree; and 202 for no qualifications.

The benefits for workers from obtaining vocational qualifications are presented in Figure 3.9. This shows that the most common benefit is that individuals are able to work where they are required in order to complete their job (flexibility). Fewer than half of employers (189, 38%) stated that qualifications improve promotion prospects or increase pay. The most common responses to the "other" types of benefit were improving workforce morale and employee well-being or self-worth, making employees more employable in their future career (if they decide to leave the business) and career progression (which may not include promotion).

Figure 3.9 What has been the benefit for individuals for achieving these qualifications?



Source: Quantitative survey of employers; base 500

3.5.2. Employers

Employers explained that there are numerous benefits to investing in vocational qualifications. Those reported by many employers include:

- Ensuring quality. Around half of employers indicated that vocational qualifications help to ensure the quality and consistency of their work because they can ensure standards are maintained between jobs. '*Qualifications provide continuity, it means I continue to give a quality service to our customers'.* Investing in younger staff ensures quality is maintained. *"The company is an old company and we have learnt that it works better to have younger people coming through to take on major roles, so we can train them as we want to do things– brings a much better standard and quality to the installation".*

- Increased capacity and efficiency. Most employers suggested that staff gained new knowledge and technical skills which translated into more efficient working as it allows staff to be fully utilised. Staff who have increased their skills in roofing, for example, are able to work more quickly and rely less on other experienced staff which increases efficiency. One employer said that investment in vocational qualifications *"strengthens workforce capability".* This could particularly be seen where investment was made at a managerial level.

- Building business development opportunities. This can be because having qualified staff increases an organisation's reputation and ability to compete for higher value public contracts (which increasingly require bidders to have a certain number of staff with specific levels of qualification). One employer explained *'the qualifications allow us to prove their competency to clients - added value because we can do that we win contracts*'.

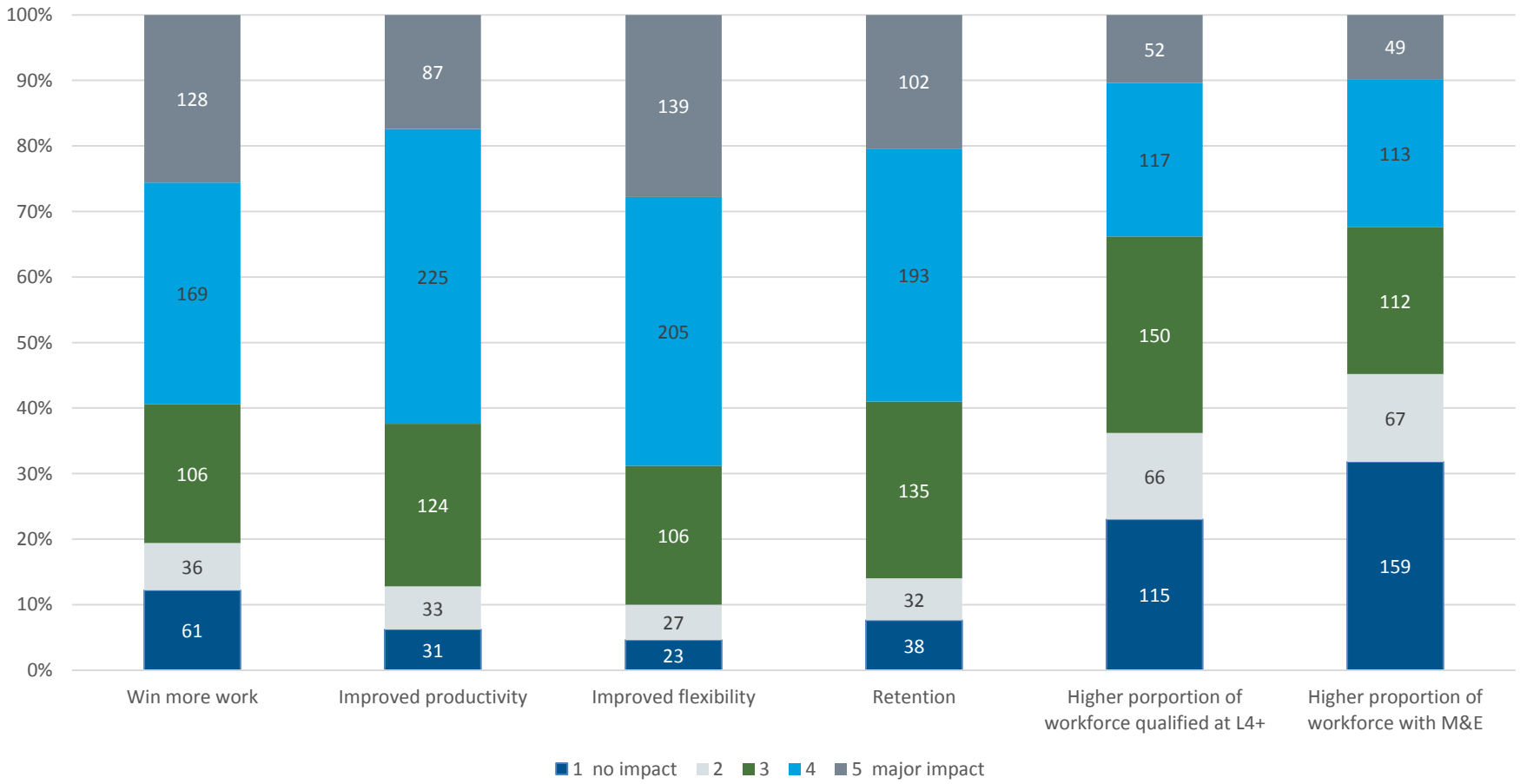
A few employers felt that by investing in their workforce they improved their retention rates. However, there were mixed perceptions about what the impact was on retention overall. Some of these employers believed that in the current economic climate staff could move more freely than previously and this meant that investing in training often wasn't enough to keep staff.

Some smaller employers did not feel that vocational qualifications impacted on their business development because of how they obtain new work and their scale of activity.

Figure 3.10 presents the results from the employer survey of business benefits from vocational qualifications. This reinforces the benefits described above. Improving the flexibility and productivity of the workforce had the largest impact for businesses (over 60% of businesses stating it had an impact, scoring four or higher out of five). The ability to win more work and retaining staff were the next most significant impacts for businesses. Employers who had not supported vocational qualifications in the last three years were more likely to state that the training had little or no impact on the business than employers who had supported qualifications.

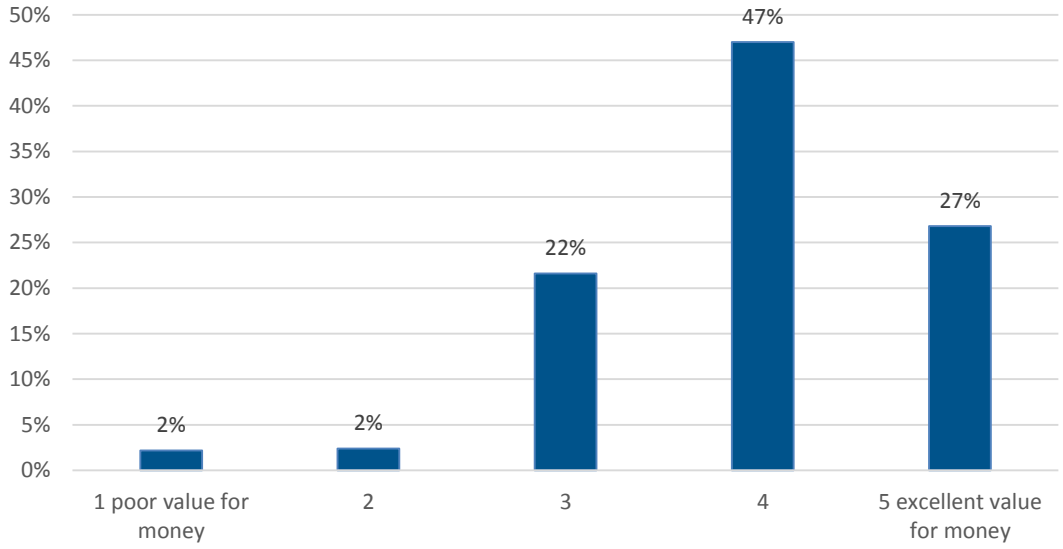
Figure 3.11**Error! Reference source not found.** presents employers' views on whether vocational qualifications offer value for money. This shows that nearly three quarters of employers felt that vocational qualifications offer good value for money (369 employers, 74%). Few employers (23 employers, 5%) felt they offered poor value for money.

Figure 3.10 What impact does your investment in training have on the following factors?



Source: Quantitative survey of employers; base 500

Figure3.11 In the last three years, to what extent do you believe the amount you have invested in vocational training has been value for money for your organisation?



Source: Quantitative survey of employers; base 500

3.6. Summary: key points

The qualitative and quantitative research with employers helps to reinforce some of the findings from the statistical analysis presented in section 2 and helps to explain some of the impacts. The key findings from the research are:

- Vocational qualifications are considered by most CBE employers to be effective in preparing individuals to work in the sector. Employers believe that higher level vocational qualifications prepare individuals more thoroughly for entry to the sector than lower level vocational qualifications. This reinforces the findings from the statistical analysis that higher level qualifications have a higher impact than lower level qualifications.

- Where vocational qualifications are used in recruitment, they are often used by employers because completing vocational qualifications indicates a strong work ethic though they are often used because in some trade sectors they are required by law to do the job.

- Employers said they place less value on vocational qualifications below level 2.

- A small proportion (6%) of employers did not use qualifications as part of their recruitment for any job role. The proportion varied by the type of role they were recruiting for. While around one third of employers did not use qualifications in their recruitment process for general operative workers and around one quarter of employers did not use qualifications for the recruitment of back room staff, only around 10% did not use qualifications in recruiting for trade and professional roles.

- Over half of the employers surveyed had used apprenticeships in the past three years. Where employers use apprenticeships more frequently, apprenticeships are a higher proportion of their total recruits.

- Most (93%) employers have supported individuals to obtain vocational qualifications in the past three years. Most commonly they said it was to help workers undertake their current role.

- Employers tend to provide higher starting salaries for workers with higher levels of qualification. This reinforces the findings from the statistical analysis. Employees with vocational qualifications start with a higher average salary than apprentices at the same qualification level.

- Employers who were interviewed confirmed that employees do not receive an automatic pay increase upon successfully completing a vocational qualification. Changes in pay are related to individuals earning more in the longer term, through promotions and taking on more responsibility. Apprentices though received an immediate increase in wages when taken on.

- Employers pay most of the costs for workers undertaking vocational qualifications. Over three quarters of employers (76%) pay all the costs for workers undertaking vocational qualifications, and 13% contribute more than half of the cost. A small minority of employers stated that they do not cover any of the costs of a vocational qualification (4%).

- Employers have generally said that their business benefits from individuals completing vocational qualifications through improved productivity, efficiency and flexibility of workers, the ability to win more work, and increased employee retention. These factors are captured in the monetary value of qualifications to employers in section 2.

- A very small proportion of employers (3%) said that vocational qualifications had little or no benefit from employers completing vocational qualifications. Employers who had not supported any vocational qualifications in the past three years were more likely to report that training had little or no impact on their business than employers who had supported vocational training.

- Most employers (nearly three quarters of employers, 74%) felt that vocational qualifications offer good value for money. Few employers (23 employers, 5%) felt they offered poor value for money.

4 Value of qualifications to employees

In this section we explore the perceptions of employees investigating:

- Their reasons for enrolling on vocational qualifications;
- The quality of the training received;
- How the qualification has affected their recruitment and progression
- What they see as their future interest in vocational qualifications.

This draws upon 20 qualitative interviews with employees in the CBE sector to explore their experience of vocational qualifications alongside 202 employees responding to an e-survey.

4.1 Participation in vocational qualification training

Both the employee survey and interviews found that the primary reason for undertaking the qualification training was that it was essential for working in the job they wanted and the secondary reason was earnings and progression. This did not vary much across countries or qualification type. See Table 4.1 below.

Interviewees said that:

- It was mandatory for their role: This applied to occupations with regulated standards (such as plumbing and electricals) and jobs which required a CSCS 'black' card (needing an NQQ level 4) as well as occupations in which their employers expected staff to have a specific qualification. Most employees recognised that it was important for their role and necessary though a few saw it as a means to an end. One such employee reported *"it was what it was – I only studied for it because it was the qualification that was needed to get the job I needed. All I wanted from it was the qualification and the certificate – wasn't really looking to get anything else out of it."*

- It provided the basis for their career development: this was the most common response and related to perceiving that this would improve their career prospects by either enabling to expand their expertise in their current role or by working towards promotion.

- It provided personal growth: around half of the interviewees believed developing their skills was a significant reason though only a few put it forward as the primary reason for undertaking their qualification. "*It's just good to know how to do things a bit more formally but mainly it's for my own self development, self-worth really, I am someone who wants to keep learning".*

- It facilitated entry into the sector: individuals who had completed apprenticeships put this forward as their main reason. Most had done this either because of their particular interest in a trade or because they were offered an opportunity to do so by their employer.

Higher potential earnings did not emerge as a common reason in the interviews though it did from the survey.

Table 4.1 Employees reasons for undertaking their qualification

Reason for undertaking a qualification	Ranking
I felt it was essential to enter my area of work/job role	1
I believed the qualification would enable me to earn more	2
It was essential for progressing in my company	3
Employer put me on the course	4
I though the qualification topic was very interesting	5
Careers advisors/parents felt the qualification would help me gain a good job	6

Source: Survey of employees; base 202

4.2 Course quality

Almost all interviewees said that they were satisfied with the overall quality of their training, including the quality of teaching and assessment and the relevance of the course content. *"It was amazing to be honest, all the lecturers and teachers had been electricians. The lecturers had a lot of onsite experience"* Employee

Generally nine out of 10 employees responding to the survey either agreed or strongly agreed that the courses were well taught, relevant to their job, the right length and had highly experienced teaching staff. This is broadly in line with most surveys of employees about training. Only with relevance did more than 10% disagree or strongly disagree (14%). See Table 4.2 below.

Table 4.2 Quality of training received

	Strongly agree	Agree	Disagree	Strongly disagree
The course was well-taught	36%	56%	7%	1%
The course content was very relevant to my job role	41%	47%	11%	2%
The length the qualification was broadly right	27%	67%	5%	1%
My tutor(s) were highly experienced in the subject area	45%	48%	7%	1%

Source: Survey of employees; base 202

Those who had undertaken an apprenticeship were less likely to disagree or strongly disagree about the quality and relevance of the training than others. For example 95% of apprentices strongly agreed or agreed that their course content was very relevant to their job compared to 85% of those who did not undertake an apprenticeship.

A few respondents reported that it was difficult to provide an overall view about the quality of the courses they undertook:

"I think that's a difficult one, the courses themselves are assignment based; they are fast paced, they are more of an overview of building services but a lot of your detailed learning will take place in the work place, engineering and construction are so specific (to the site they are on) that any course you do will be an overview"

A few employees who were interviewed highlighted a few frustrations with the quality of qualifications undertaken. These included:

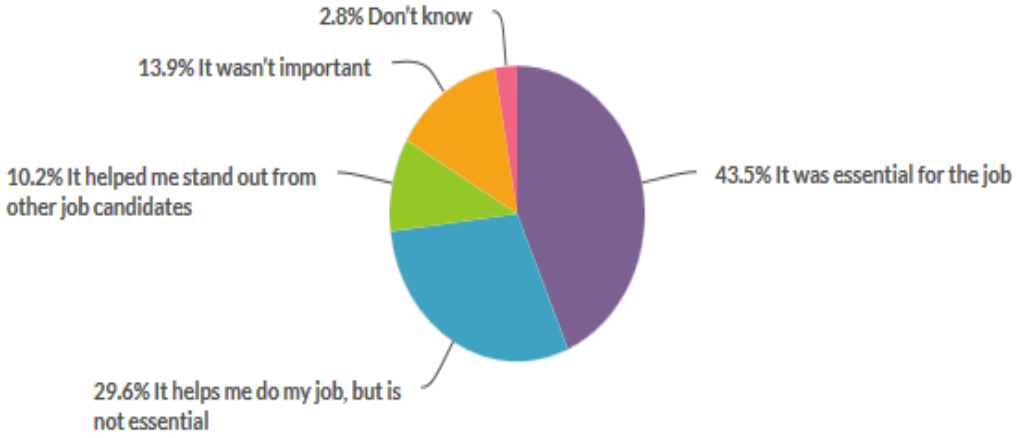
- Too much emphasis on theory which meant they found it hard to engage with the learning;
- Experience of unengaged assessors or poor teaching because they found that staff did not have relevant industry expertise and found assessors input minimal;
- Not gaining enough new skills from their qualification because there had been a lack of new material in the course content. These individuals tended to be more experienced members of staff who felt that they had undertaken a qualification primarily as proof of skills that they already had.

4.3 Use of qualifications for gaining a job and being work ready

Most of the interviewees said they had already secured a role in the sector before undertaking their qualification; a few said that their NVQ was essential to securing a role in the sector.

The survey shows that 44% believed it was essential for the job and 30% considered their qualification helped them to do their job. Fourteen percent said it was not important (Figure 4.1).

Figure 4.1 To what extent do you believe your qualification helped you gain your current job?



Source: Survey of employees; base 202

Apprentices were a little more likely than others to say that their qualification helped them with their job but was not essential (23 respondents without apprenticeships and 9 respondents with apprenticeships) but that it helped them stand out from other candidates (22% vs 9%). The differences in views among the interviewees suggest that those who were

earlier in their careers were more likely to say that their qualification was essential for their job and/or critical in enabling them to enter the sector.

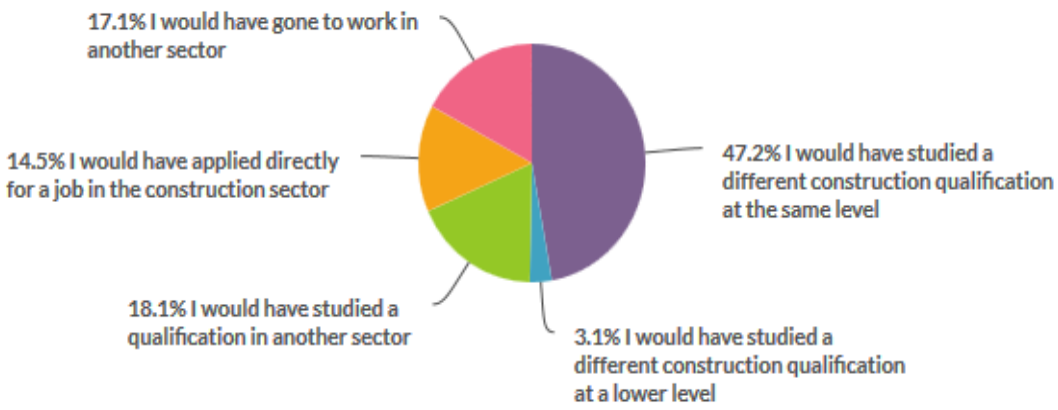
> "*I think my apprenticeship will always have a role in whatever I do. I got experience on site and I've built things myself, so I know how things work."*

A few employees felt that they had undertaken qualifications as *"something of a tick box exercise"* and had not learnt any new skills as a result of the process.

> *"The qualification was just a ticket into the sector. After that, it isn't really of any relevance to my career going forward."*

Figure 4.2 shows that around 76% of employees would have stayed in the sector if they had not completed their qualification, but the rest wold have gone to another sector. This suggests that qualifications help to engage employees in the sector.

Figure 4.2 What would you have done if you hadn't completed your vocational qualification?



Source: Survey of employees; base 202

A few interviewees said how important it was for entering and staying in the sector. *"I think it's probably what got me the job because I could show I had experience".*

4.4 Progression and promotion

Most of the employees interviewed felt that their qualification had helped them progress with their career either by expanding their current role of through promotion. At least half reported they had been promoted or moved into a different role since their qualification though not all attributed this solely to having the qualification.

> *"I am better myself and at my job and there's more opportunities if you've got the qualification - it's worth doing it".*

And many provided examples of the wider benefits. The apprenticeship "*opened my eyes to the construction industry really when it first started because I'd never really left my local area and basically the college".* Others said they felt more confident in their role or expanded their

knowledge base which meant that they found it easier to understand elements of the business that they are less directly involved with day to day.

It is clear though from interviewees' experience that the added value of vocational qualifications is dependent on their level of experience, career aspirations, occupational area and local labour market.

Survey respondents generally support these views (Table 4.3).

Table 4.3 Promotion and progression

Respondents who had…	Percentage
taken on new responsibilities since finishing their qualification	47%
been promoted since completing their qualification	57%
Judged their qualification to have helped them develop their career	76% (very useful or quite useful)
who had been promoted and reported that would have been promoted but it would have taken longer without the qualification	54%

Source: Survey of employees; base 202

Virtually all said that qualifications had not had any negative effect on their career.

Over half of the individuals had been promoted since completing their qualification. Of the individuals who had been promoted, nearly three quarters (74%) felt that they would not have been promoted without the vocational qualification or they had been promoted more rapidly due to the vocational qualification.

A higher percentage of Welsh respondents reported being promoted (67%, 29 respondents) compared to Scotland (43%, 14 respondents) and England (59%, 69 respondents). This translated into higher percentages of Welsh respondents reporting pay rises since gaining their qualification (73%, 8 respondents).

Most interviewees, apart from apprentices, reported that once they gained their qualification there was no immediate effect on pay. Changes to pay largely occurred as a result of promotion and experience. In the survey, 53% of respondents indicated that there had been no impact on their pay at the start (compared to other employees without a qualification).

Despite this, nearly two thirds of individuals who responded (63%) had received a pay rise since they had completed their vocational qualification. Most of the individuals who had received a pay increase (58%) felt that their pay would not have increased by the same amount if they had not completed the qualification. This indicates that workers in the sector do recognise that qualifications have an effect on earnings, even if the effect is not immediate.

4.5 Future interests in training

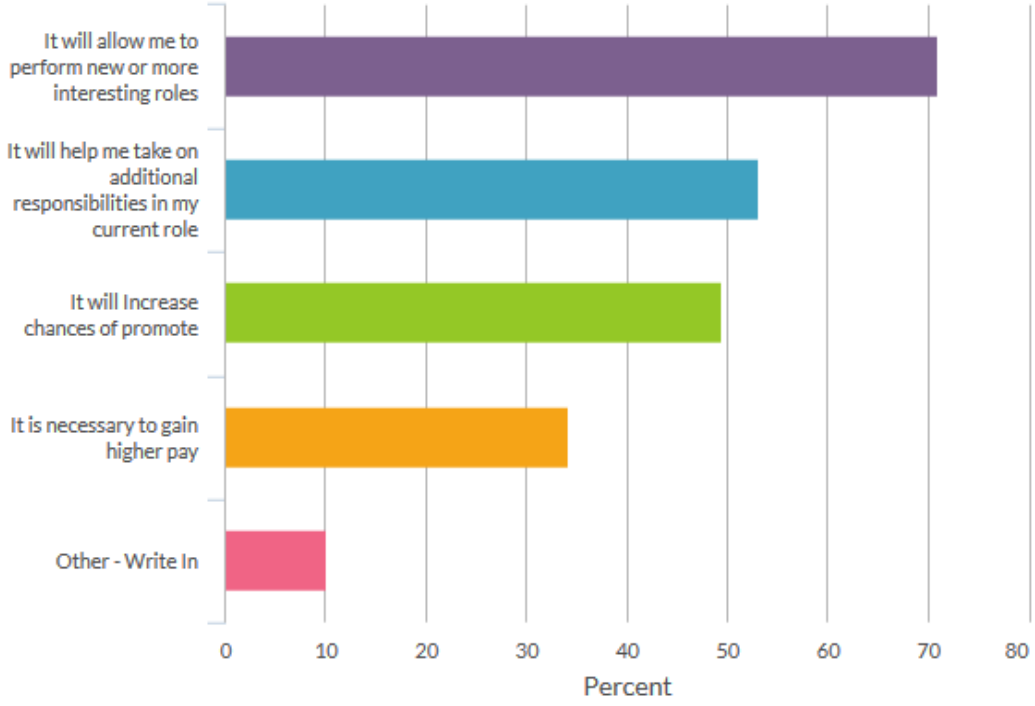
Around half of the interviewees had clear career aspirations for the next five years which included expanding their expertise in their current role or being promoted to more senior

roles. Those with longer experience, such as project managers, saw their employment prospects as more set.

About half of the employees interviewed also expressed an interest in and enthusiasm for undertaking further training. A further third indicated that they would undertake further qualifications only if they were offered by their employer but were not proactively seeking additional training.

Among those surveyed, 39% had plans to undertake further training in the next five years. Figure 4.3 shows that nearly three quarters believed it would allow them to undertake other roles and over half that it would enable them to expand their current roles and increase their chances of promotion.

Figure 4.3 Why do you plan to gain this qualification?



Source: Survey of employees; base 202

A few interviewees suggested that management qualifications were particularly desirable alongside qualifications expanding technical expertise relevant to their current profession.

4.6 Summary: key points

The qualitative research undertaken with employees who have recently completed qualifications (both qualitative interviews and survey respondents) provide context to the findings from the statistical analysis. The key points from the research with employees are:

- The most common reason employees provided for undertaking training was that it was often necessary for them to complete the job they wanted. Career progression and increases in pay were less frequently reported as motivations for training by employees.

- The level of employee satisfaction with the training and qualifications received was very high. Around 90% of employees who responded to the survey agreed that their course was well taught and relevant to their role.
- Almost three quarters of employees (73%) felt that completing their qualification was essential or helpful to working in their current role. For many their qualification had helped them either by expanding their current role or gaining promotion. Nearly half (47%) of the survey respondents had taken on more responsibility since completing the qualification. Of the employees who had been promoted, half felt the qualification had helped with this.

- For most, just over three quarters of employees completing the survey (76%), having a qualification helped with their career progression and their retention in the construction sector.

- Employees generally said that gaining the qualification had no direct immediate impact on their pay (53%). However, nearly two thirds of individuals (63%) had received a pay rise since they had completed their vocational qualification. Most (58%) of the individuals who had received a pay rise felt that their pay would not have increased by the same amount if they had not completed the qualification. This indicates that workers in the sector do recognise that qualifications have an effect on earnings, even if the effect is not immediate.

- The employees surveyed had a positive attitude towards further training. About half of them were enthusiastic about undertaking further training. Nearly three quarters believed that undertaking further training would allow them to undertake other roles and over half that it would enable them to expand their current roles and increase their chances of promotion.

- Those who had undertaken an apprenticeship were more positive about the quality and relevance of the training than individuals who had undertaken other qualifications. 95% of apprentices strongly agreed or agreed that their course content was very relevant to their job compared to 85% of those who undertook other qualifications.

- Over half of the individuals had been promoted since completing their qualification (57%). Of the individuals who had been promoted, nearly three quarters (74%) felt that they would not have been promoted without the vocational qualification or they had been promoted more rapidly due to the vocational qualification.

5 Conclusions

In this section the conclusions from the research are presented. This includes the key answers to the five main research aims and some provisional suggested action for CITB in the light of these findings. This will be considered further as the report is revised.

5.1 Key findings

5.1.1 Employer and employee perceptions

Employers were generally satisfied with vocational qualifications. Employers feel that vocational qualifications are effective in preparing individuals to work in the CBE sector. The results from the employer survey suggest that as the level of vocational qualifications increases the grounding to work in the sector also increases. Vocational qualifications were also thought to offer good value for money for employers.

The majority of employees were happy with the qualifications they had taken. Employees agreed or strongly agreed that the courses were well taught, relevant to their job, the right length and had highly experienced teaching staff. The level of satisfaction among individuals who had completed apprenticeships was slightly higher than for individuals who had completed other courses.

5.1.2 Employer recruitment and promotion decisions

Where vocational qualifications are used in recruitment, the main reasons provided were that completing vocational qualifications indicated a strong work ethic or that vocational qualifications were required by legislation (for example in certain trade sectors). If vocational qualifications were required by legislation, higher level vocational qualifications (level 3 and above) were most likely to be needed. Employers said they did not place much value on vocational qualifications below level 2.

A significant number of employers did not use qualifications as part of their recruitment. The proportion of employers who did not use qualifications for recruitment varied by the type of role they were recruiting for. However, for general operative workers one third of employers did not use qualifications to recruit workers and for back room support one quarter of employers did not use qualifications for recruitment. For trade and professional roles the proportion of employers who did not use qualifications in recruitment was lower (closer to 10%).

Although employers did acknowledge that completing qualifications could benefit employees through promotion, this was not the primary reason for providing vocational qualifications. The most common reason employers gave for supporting training was to help workers undertake their current role.

The majority of employees who responded to the research said that they already had a job prior to studying for a vocational qualification. This suggests that vocational qualifications are not a key factor in recruitment decisions, as individuals can complete courses after they are appointed. Most of the employees interviewed felt that their qualification had helped them progress with their career either by expanding their current role of through promotion.

5.1.3 Value of vocational qualifications for staff development

Employers felt that providing vocational qualifications to employees gave them the skills to undertake their current role. This was the most common response from employers. However, some qualifications had a value in that they were required by law or by clients. This was a more likely response for vocational qualifications than other types of qualification. Non-construction and "other" qualifications were more likely to be used to prepare individuals for promotion than vocational qualifications.

Most employees felt that the qualification they had achieved was either essential or helpful in undertaking their current role. Additionally, most employees felt that achieving the qualification had helped them to develop their career, and nearly half of individuals felt that they had taken on new responsibilities since completing their qualification.

5.1.4 Impact of qualifications on earnings and progression

The most common benefit of qualifications provided by employers was that individuals are able to work where they are required in order to complete their job. Fewer than half of employers stated that qualifications improve promotion prospects or increase pay. Other types of benefit stated by employers were improving workforce morale and employee well-being or self-worth, making employees more employable in their future career (if they decide to leave the business) and career progression (which may not include promotion).

Most employees, apart from apprentices, reported that once they gained their qualification there was no immediate effect on pay. Changes to pay largely occurred as a result of promotion and experience. However, over half of employees who took part in the research said they had been promoted since they completed their qualification, and of those who had been promoted half reported that the promotion happened at a faster rate as a result of the qualification.

The impact of qualifications on earnings was analysed using statistical modelling. The effect of achieving a qualification on earnings was positive for all vocational qualification levels in the CBE sector. Vocational qualifications at levels 2 and 3 had higher returns than for all qualifications at these levels, suggesting that vocational qualifications at level 2 and 3 are more valuable than general education qualifications in the CBE sector. This could be due to certain trade professions requiring vocational qualifications by law, which can have a positive impact on the returns to vocational qualifications at these levels.

Evidence of employees earning more as a result of the qualification they hold was also found in the survey of employers. Employees with higher level vocational qualifications had higher average starting salaries than employees with lower level or no qualifications. Individuals completing apprenticeships had a lower starting salary than individuals with a vocational qualification at the same level.

The impact of qualifications on earnings in the CBE sector are higher than those seen in the retail sector, and more comparable with the returns to qualifications in the manufacturing sector.

5.1.5 Impact of vocational qualifications to businesses and the economy

Employees achieving qualifications had a positive effect on businesses and the economy as a whole, as well as benefits for the individual. The reasons why employers benefit from

individuals undertaking vocational qualifications are improved productivity, efficiency and flexibility of workers, the ability to win more work and increased employee retention. These factors all contribute to the positive monetary value to employers as a result of individuals completing qualifications.

The benefit to employers of achieving qualifications will be partially offset by the cost of allowing employees to access qualifications. Three quarters of employers said that they incur all the costs of an employee achieving a qualification. These costs include providing time off work to study, travel, accommodation and subsistence, and buying equipment. There are benefits to the whole economy and the government from individuals achieving qualifications. As employees earn higher wages, the Government receives higher tax receipts.

Additionally, individuals with higher levels of qualifications are less likely to be unemployed and claiming benefits. This has a benefit to the Government, as it reduces the amount of unemployment benefit it has to pay[23].

5.2 CITB actions

This section discusses which of the key findings are most relevant to different groups, so that CITB can target their dissemination of the findings.

One important overarching message is that the research relating to the effects of vocational qualifications are based on a robust statistical modelling approach. Therefore, employers, employees and potential workers in the CBE sector can have confidence in the figures presented.

The key messages to employers in the CBE sector are the benefits that come from individuals completing vocational qualifications, particularly higher level vocational qualifications. If individuals in the CBE sector are supported to complete vocational qualifications, then employers will have a monetary benefit of between £8,000 and £17,000 in the five years after the qualification is completed, and between £18,000 and £32,000 in the ten years after the qualification is completed. The value to the employer increases as the level of qualification increases, which gives an incentive to continue to train workers to higher levels. Vocational qualifications at level 3 also offer a higher return than other types of level 3 qualifications.

These monetary benefits will be generated as the worker is more flexible and productive (better at their job) and they can win more work. An additional benefit of supporting employees to complete vocational qualifications is that they are less likely to leave their current role. This reduces recruitment and future training costs.

These two messages focus on encouraging employers to upskill workers. However, in some roles a significant number of employers do not use qualifications in their recruitment process. The findings from this research suggests that vocational qualifications provide a good grounding in the construction sector, particularly higher level (level 3 and above) qualifications. Therefore it may be beneficial to employers to use qualifications in their recruitment decisions, to ensure the workers they employ are sufficiently prepared to work in the sector.

[23] It is assumed that through higher levels of productivity and pay as a result of individuals achieving qualifications that there will be new jobs available in the economy for previously unemployed individuals to take.

The key messages to employees and potential employees relate to pay, job security and career progression. The results from the statistical modelling show that if workers in the sector complete vocational qualifications they will on average earn higher wages and be less likely to be unemployed. This will provide them with a monetary benefit of between £7,000 and nearly £14,000 in the five years after completing a qualification, and £14,000 to £26,000 in the ten years after completing their qualification. The value will depend on the level of qualification completed. This will encourage employees and potential employees to complete vocational training in the CBE sector.

The findings from the research could also be used to target potential employees that work in other sectors. For example, employees who complete qualifications in the CBE sector have larger increases in earnings and the probability that they will be in employment than employees in the retail sector. These findings could be used to recruit workers from the retail sector into the CBE sector.

ANNEXES

Annex 1 Technical annex

The technical annex describes in more detail the data used to assess the earnings/employment effects of qualification achievement and the methodology applied to estimate these effects. It is structured into four sections:

- Section 1 describes data used in this study;
- Section 2 describes work undertaken to prepare this data for analysis;
- Section 3 provides detail on the approach taken to analyse the data; and
- Section 4 discusses the methodology used to calculate the monetary value of the impact of qualifications.

A1.1 Data used to assess the effect of qualification achievement

This study used the Labour Force Survey (LFS) data to examine the impact of qualification achievement on earnings and employment status. The LFS data for the years 2005-2015 was used to ensure a sufficiently large data set of workers for analysis.

The study used LFS data from construction and related sectors (manufacturing, retail). This data was selected from the general LFS file using SIC codes, captured by the LFS variable INDC07M – Industry class in main job. More specifically, the study covered:

- The construction sector consisting of:
    - Construction of buildings (SIC code 41)
    - Civil engineering (SIC code 42)
    - Specialised construction activities (SIC code 43)
    - Architectural and engineering activities (SIC code 71)
    - Specific research activities related to natural sciences and engineering (SIC code 7219)
- The manufacturing sector (SIC codes 10 to 33)
- The retail sector (SIC codes 45 to 47)

The study also used LFS data covering people who previously worked in the above sectors, but were unemployed or inactive at the time of the survey. The industry of last job was identified by using the LFS variable IN9207SL – Industry section in last job.

The principal impact variables, i.e. variables which were used to measure the impacts of achieving a qualification, were defined as follows:

- Earnings: gross weekly earnings in pounds according to the GRSSWK variable from the LFS;
- Employment status: employment status according to the LFS variable ILODEFR - Basic economic activity (ILO definition). This variable indicates whether the LFS respondent was in employment, unemployed or inactive on the labour market.

The highest level of qualification achieved was defined according to the LFS variable LEVQUL - Level of highest qualification held. More detail on specific type of qualification achieved was provided by the LFS variable HIQUAL - Highest qualification/trade

apprenticeship. This variable distinguishes about 80 different types of qualification achievements based on qualification level and type (degree, diploma, apprenticeship, etc.).[24]

We also used a range of control variables, i.e. variables describing factors that can affect individuals' earnings and employment prospects other than qualification achievement. These variables were used in order to separate the effect of qualification achievement on earnings and employment prospects from other influences (see section A1.3). Finally, several LFS variables were used to track individual's earnings and employment situation over time.

The complete list of LFS variables used in this study is detailed in the table below.

Table A1.1 List of relevant LFS variables by their use

LFS variable	Variable definition	Use of variable
GRSSWK	Gross weekly earnings in £	Measure impact of qual achievement
ILODEFR	Basic economic activity (ILO definition)	Measure impact of qual achievement
LEVQUL	Level of highest qualification held	Identify level of qual achievement
HIQUAL	Highest qualification/apprenticeship	Identify type of qual achieved
IN9207SL	Industry section in last job	Define industry of interest
INDC07M	Industry class in main job	Define industry of interest
REFWKY	Reference year of the survey	Control influence on earnings/employment
SEX	Gender	Control influence on earnings/employment
CRY	Country of Birth	Control influence on earnings/employment
AGE	Age	Control influence on earnings/employment
SC10MMJ	Major occupation group	Control influence on earnings/employment
SUMHRS	Total actual hours worked	Control influence on earnings/employment
ETH	Ethnicity	Control influence on earnings/employment
MARSTA	Marital status	Control influence on earnings/employment
FDPCH19	Number of dependent children under19	Control influence on earnings/employment
MPNR02	Number of employees at workplace	Control influence on earnings/employment
HEAL	Type of health problem	Control influence on earnings/employment
GORWKR	Region of place of work	Control influence on earnings/employment
CASENO	Individual identifier	Track earning and employment over time
THISWV	Identifier of survey wave	Track earning and employment over time

A1.2 Preparation of data for analysis

The preparation of data for analysis consisted of three principal steps:

1. Merging yearly LFS data sets into a comprehensive dataset covering years 2005 to 2015
2. Cleaning the comprehensive dataset to remove irrelevant responses
3. Preparing individual variables for regression analysis

A1.2.1 Creating a comprehensive 2005-2015 LFS dataset

In order to merge yearly LFS data files into a single dataset spanning the whole period of 2005 to 2015, we tracked changes in the LFS design over time to check data comparability. We identified several changes in LFS variable definitions over time, resulting from changes in the list of possible answers to some LFS questions –

[24] Note that HIQUAL does not disaggregate apprenticeship achievement by level. We considered using the APPRLEV - Completed apprenticeships variable to determine level of completed apprenticeships, but this was too poorly populated to allow for meaningful analysis.

there were no large changes in question focus or structure. The list of identified variable changes is presented in the table below.

The changes in LFS variable definitions required grouping of certain answers together to make responses comparable across years. For example, diploma achievements were not disaggregated by level in older LFS surveys, so in order to ensure consistency we grouped them together in the newer LFS surveys as well. A new variable was created that grouped diploma achievement under a single category in each of the yearly LFS data sets. This variable was then used when merging the yearly LFS datasets into an aggregate 2005-2015 dataset.

Table A1.2 Changes in LFS variables over time

LFS variable	Type of change	Year of change
ETH - Ethnicity	Minor change in categories for different ethnicities	2011
CRY – Country of Birth	Minor changes in categories for certain countries of birth	2006, 2012
SC10MMJ – Major occupation group	Minor change in the occupation groups used	2011
HIQUAL - Highest qualification/apprenticeship	Changes in the list of possible qualifications held	2014, 2011, 2008

A1.2.2 Removing irrelevant responses

The comprehensive LFS dataset for 2005-2015 was cleaned in the following ways to remove responses irrelevant for this study:

- Remove respondents who are/were working in Northern Ireland – this study focuses only on the impact of qualification achievements in England, Wales and Scotland;
- Remove responses that have no information about earnings and employment status;
- Keep only responses from people aged 18 to 75, as these are likely to be regularly involved in the labour market and thus most relevant for this study;
- In cases where an individual responded to LFS multiple times over the period 2005 to 2015, keep only the most recent responses with information on earnings and/or employment status.

A1.2.3 Preparing variable for regression analysis

The following table details the work undertaken to prepare LFS variables for regression analysis.

Table A1.3 Work undertaken to prepare variables for regression analysis, by variable

Variable	Preparation of variable for analysis
Gross weekly earnings in £	No preparation needed, take directly from LFS
Basic economic activity (ILO definition)	Construct a dummy variable that indicates whether an individual is in employment (value 1) or whether he is unemployed or inactive (value 0)
Level of highest qualification held	Construct a dummy variable for each qualification level that indicates whether an individual has achieved a given qualification (value 1) or not (value 0)
Highest qualification/apprenticeship	Construct a dummy variable for each qualification type that indicates whether an individual has achieved a given qualification (value 1) or not (value 0)

Reference year of the survey	Construct a dummy variable for each year
Gender	No preparation needed, take directly from LFS
Country of Birth	Construct a dummy variable for each country of birth
Age	No preparation needed, take directly from LFS
Major occupation group	Construct a dummy variable for each occupation group
Total actual hours worked	No preparation needed, take directly from LFS
Ethnicity	Construct a dummy variable for each ethnicity
Marital status	Construct a dummy variable for marital status
Number of dependent children under19	No preparation needed, take directly from LFS
Number of employees at workplace	Construct dummy variables that indicate whether the employer has 25 or less; 25 to 500; or more than 500 employees
Type of health problem	Construct a dummy variable that indicates whether an individual has a self-reported health problem (value 1) or not (value 0)
Region of place of work	Construct a dummy variable for each Government Office Region

A1.3 Approach to data analysis

The data analysis consisted of regression analysis in specialised statistical software (STATA), undertaken to quantify the effect of qualification achievement on earnings and employment status. To estimate this effect, the study used regression models consisting of:

- An explained variable, i.e. variable whose value was predicted by the model. This was either earnings or employment probability.
- Explanatory variables, which predicted the value of the explained variable. The explanatory variable included:
    - Qualification achievement described highest qualification achievement. The predicted effect this variable had on explained variables are reported throughout the main body of this report (Section **Error! Reference source not found.**).
    - Control variables such as age, gender, employer size etc. (see **Error! Reference source not found.** for full list). These variables captured other factors that possibly influenced the predicted value of explained variables. They are called control variables because they 'control' for factors other than qualification achievement that influence value of explained variables, thus clearly separating the effect of qualification achievement from other factors.

The effects of qualification achievement were measured compared to no qualification achievement. For example, the earnings effect of achieving a level 3 qualification was obtained by estimating earnings of people who achieved a level 3 qualification and comparing them to estimated earnings of people who achieved no formal qualifications. Separate regression models were estimated to predict effect of qualification achievement on explained variables for different (see Table A1.4 for full details of models estimated):

- Qualification levels and types; and
- Sectors or subsectors of economic activity

The study used two type of regression models to estimate the effect of qualification achievement on explained variables:

- Ordinary least square (OLS) regression was used to estimate the effect of qualification achievement on earnings;
- Logit regression was used to estimate the effect of qualification achievement on employment probability.

More details on the specification of OLS and logit models is provided in separate subsections below.

Table A1.4 Summary of regressions models estimated

Model features	Models by highest qualification level achieved	Models by qualification type
Explained variable: Earnings Model type: OLS regression Each of the models run separately for: – Construction sector – Construction subsectors – Retail sector – Manufacturing sector	Model 1: Qualification level 4 or above compared to no achievement	• Model 1.1: BTEC • Model 1.2: NVQs • Model 1.3: all vocational qualifications
	Model 2: Qualification level 3 compared to no achievement	• Model 2.1: BTEC • Model 2.2: NVQs • Model 2.3 City & Guilds • Model 2.4: Apprenticeship at L3 • Model 2.5: all vocational qualifications
	Model 3: Qualification level 2 compared to no achievement	• Model 3.1: BTEC • Model 3.2: NVQs • Model 3.3 City & Guilds • Model 3.4: Apprenticeships at L2 • Model 3.5: all vocational qualifications
	Model 4: Qualification below level 2 compared to no achievement	• Model 4.1: all vocational qualifications
	Model 5: Trade apprenticeship compared to no achievement	• No further disaggregation due to small data sample
	Model 6: Qualification level 4 or above compared to achievement at level 3	• Model 6.1: BTEC • Model 6.2: NVQs • Model 6.3: all vocational qualifications
	Model 7: Qualification level 3 compared to achievement at level 2	• Model 7.1: BTEC • Model 7.2: NVQs • Model 7.3 City & Guilds • Model 7.4: Apprenticeship at L3 • Model 7.5: all vocational qualifications
	Model 8: Qualification level 2 compared achievement below level 2	• Model 8.1: BTEC • Model 8.2: NVQs • Model 8.3 City & Guilds • Model 8.4: Apprenticeships at L2 • Model 8.5: all vocational qualifications
	Model 9: Trade apprenticeship compared to achievement below level 2	• No further disaggregation due to small data sample
Explained variable: Employment probability Model type: Logit regression Each of the models run separately for: ○ Construction sector ○ Construction subsectors ○ Retail sector ○ Manufacturing sector	Model 10: Qualification level 4 or above compared to no achievement	• No further disaggregation due to small data sample
	Model 11: Qualification level 3 compared to no achievement	• No further disaggregation due to small data sample
	Model 12: Qualification level 2 compared to no achievement	• No further disaggregation due to small data sample
	Model 13: Qualification below level 2 compared to no achievement	• No further disaggregation due to small data sample
	Model 14: Trade apprenticeship compared to no achievement	• No further disaggregation due to small data sample
	Model 15: Qualification level 4 or above compared to achievement at level 3	• No further disaggregation due to small data sample
	Model 16: Qualification level 3 compared to achievement at level 2	• No further disaggregation due to small data sample

Model features	Models by highest qualification level achieved	Models by qualification type
	Model 17: Qualification level 2 compared to achievement below level 2	• No further disaggregation due to small data sample
	Model 18: Trade apprenticeship compared to achievement below level 2	• No further disaggregation due to small data sample

A1.3.2 OLS regression to estimate the earning effects

The OLS regression model is commonly used to estimate the effect of explanatory variables on an explained variable that can take on many values, such as earnings. The model uses a linear function of a set of explanatory variables to predict values of an explained variable in a way that minimizes the squared differences between the predicted and actual values of the explained variable. This is illustrated in the graphic below, which shows earnings predicted by the model (the red line in the graphic) compared to actual earnings recorded in the LFS data. Note that the slope of the line is chosen in a way that minimizes the squared differences between the predicted (i.e. on the line) and actual (i.e. the dots in the figure) earnings.

In this study, the OLS model is used to estimate the effect of qualification achievement on earnings using a range of control variables. For a given level and type of qualification, the model estimates the difference between earnings of individuals who achieved this qualification and those who achieved no formal qualification. The model can be described by the following formula:

$$ln(Earn_i) = \beta_0 + \beta_1 * QA_i \ + \beta_2 * \ x_{1,i} + \cdots + \beta_{n+1} * \ x_{n,i} + \varepsilon_i$$

- $\ln(Earn_i)$ is the logarithm of actual earnings of an individual i recorded in the LFS data. The logarithm of earnings is used so that the effect of qualification achievement on earnings can be measured as a percentage;
- QA_i indicates the qualification achievement of an individual i. Its value is 1 if an individual achieved a given qualification, and 0 if an individual achieved no formal qualification;
- x captures the values of the control variables such as age or employer size;
- β values estimate the size of the effect of a given explanatory variable on the logarithm o earnings, i.e. β_1 estimates the effect of qualification achievement on $\log(Earn_i)$; and
- ε_i indicates the difference between earnings predicted by the model and earnings recorded in the LFS data.

The key value of interest is β_1, which estimates the effect of qualification achievement on logarithm of earnings. The exponential transformation of β_1 indicates the percentage change in earnings associated with a specific level of qualification achievement. For example, where QA_i stands for achievement of a level 4 or above qualification, $\exp(\beta_1)$ predicts the percentage increase in earnings associated with achieving a level 4 or above qualification compared to no qualification achievement.

A1.3.3 Logit regression to estimate the employment probability effect

Logit regression is commonly used to estimate the effect of explanatory variables on a categorical explained variable, i.e. a variable that only attains a few values that describe a limited range of outcomes. It is therefore suitable to estimate the effect of qualification achievement on employment status, defined as either being in employment (denoted by value 1) or being unemployed/inactive (denoted by value 0).

The logit regression predicts the effect of explanatory variables on the probability of achieving a certain value of the explained variable. This is an important difference from the OLS regression, which predicts the effect of explanatory variables directly on the values of explained variable.

In this study, the logit regression is used to predict the effect of qualification achievement on the probability of being in employment using a range of control variables, such as sex or age. The probability of being in employment attains values from 0 to 1, where 0 stands for no probability of employment and 1 for certain employment.

The logit model is formally described in the formula below:

$$logit(E[Emp_i|QA_i, x_{1,i}, \dots, x_{n,i}]) = \beta_0 + \beta_1 * QA_i + \beta_2 * x_{1,i} + \cdots + \beta_{n+1} * x_{n,1}$$

- $E[Emp_i|QA_i, x_{1,i}, \dots, x_{n,i}]$ is the probability of being in employment conditional on qualification achievement and values of control variables such as sex and age;
- Logit() is the function used to transform probability of being employment;
- QA_i indicates the qualification achievement of an individual i;
- x captures the values of the control variables such as age or employer size;
- β values estimate the size of the effect of a given explanatory variable on the logit transformation of employment probability, i.e. β_1 estimates the effect of qualification achievement on $logit(E[Emp_i|QA_i, x_{1,i}, \dots, x_{n,i}])$

The key value of interest is β_1, which estimates the effect of qualification achievement on the logit transformation of employment probability. This value was transformed using the 'margins' command in STATA to indicate the percentage point change in employment probability associated with a specific level of qualification achievement. For example, where QAi stands for achievement of a level 4 or above qualification, the transformed value of β_1 predicts the percentage point increase in employment probability associated with achieving a level 4 or above qualification compared to no qualification achievement.

A1.3.4 Monetary value of qualifications

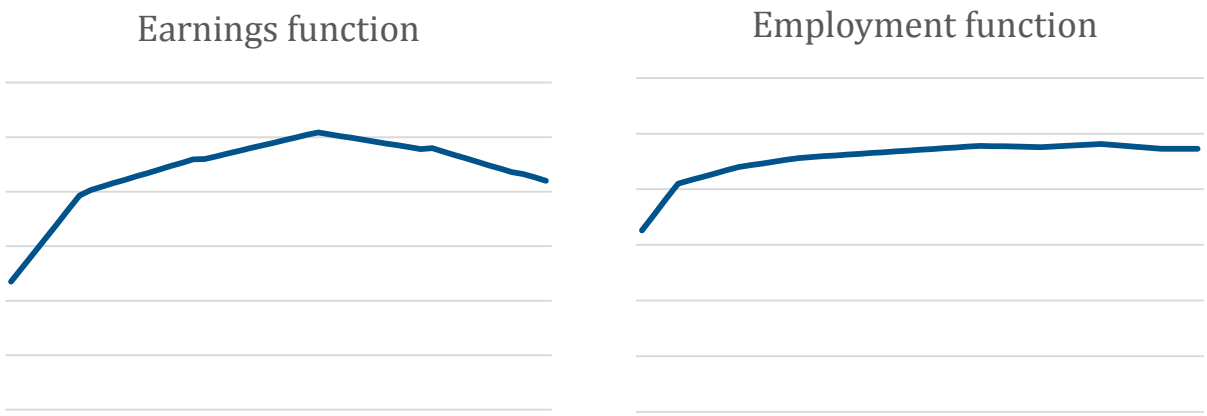
The monetary value of qualifications have been calculated using the marginal effects of qualifications on earnings and employment.

The first stage of monetising the effect of qualifications was to estimate a baseline monetary value – namely the value to the individual, Government and employers if the qualification was not achieved.

The baseline assumes that there will be changes in the probability an individual will be employed and the level of earnings over time. For example, younger workers are

less likely to be employed and earn less than older workers. These effects were modelled using information on employment and earnings by age taken from the Annual Survey for Hours and Earnings (ASHE) and the level of employment by age and qualification level from the Annual Population survey (APS).

Figure A1.1 Example earnings and



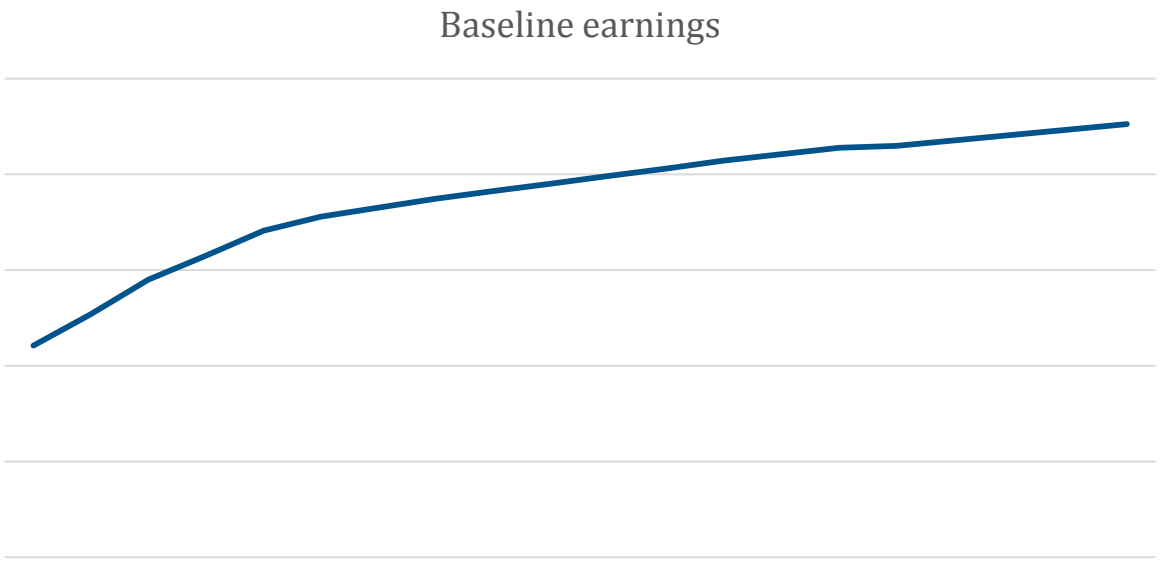
employment function over time

The baseline earnings for an individual has been calculated using the formula below:

$$BE_{t,q} = \left(Emp_{t,q} * Earn_{t,q}\right) + \left(\left(1 - Emp_{t,q}\right) * Unemp_t\right)$$

- BEt, q is base earnings in each time period for each qualification level;
- $Emp_{t,q}$ is the employment rate for a given qualification level in each time period;
- $Earn_{t,q}$ is the average wage for a given qualification level in each time period;
- $Unemp_t$ is the value of unemployment benefits (taken from the DWP) in each time period.

Figure A1.2 Example baseline earnings for 20 years



The additional effect of qualifications were calculated by using the qualification premiums calculated in A1.3.2 and A1.3.3 and applying these to the baseline case.

In the baseline level of employment and earnings, the level of employment and earnings progress over time based on an individual's age (for example an individual aged 35 is more likely to be employed and earns a higher wage than an individual aged 19, for all qualification levels). The age each individual is assumed to complete a qualification is assumed to vary by age:

- Qualifications below level 2 are assumed to be completed at age 19;
- Qualifications at level 2 are assumed to be completed at age 20;
- Qualifications at level 3 are assumed to be completed at age 22;
- Qualifications at level 4 and above are assumed to be completed at age 25; and
- Trade apprenticeships are assumed to be completed at age 22.

The employment and wage premiums are then used with the baseline measures of income and employment to estimate the monetary value of achieving a qualification to different groups. The benefits to individuals is generated through increased earnings if the individual was already in employment and increased earnings through the increased probability that the individual is in employment. The benefits to the Government are increased tax receipts due to individual's higher earnings and a reduction in unemployment payments. The benefit to employers is estimated to be the same as the total increase in wages[25], which includes the increase in tax receipts.

The monetary values are calculated as an average per individual, therefore the increase in earnings for an individual who was previously employed is multiplied by the probability that they were employed prior to achieving the qualification. Likewise, the increase in earnings for individuals who were previously unemployed is multiplied by the probability that they were previously unemployed.

The equations used in the calculation of the additional effect of qualifications:

$$AE_{t,q+1} = Emp_{t,q} * \beta_{1earn} * 80\%$$

$$ATR_{t,q+1} = Emp_{t,q} * \beta_{1earn} * 20\%$$

$$Aemp_{t,q+1} = \beta_{1emp} * (Earn_{t,q+1} - Unemp_t) * 90\%$$

$$ATemp_{t,q+1} = \beta_{1emp} * (Earn_{t,q+1} - Unemp_t) * 10\%$$

$$Runemp_{t,q+1} = \beta_{1emp} * Unemp_t$$

$$Employer_{t,q+1} = AE_{t,q+1} + ATE_{t,q+1} + Aemp_{t,q+1} + ATemp_{t,q+1}$$

$$Total_{t,q+1} = AE_{t,q+1} + ATE_{t,q+1} + Aemp_{t,q+1} + ATemp_{t,q+1} + Runemp_{t,q+1} + Employer_{t,q+1}$$

- $AE_{t,q+1}$ is the average additional earnings of an individual who has achieved the higher qualification level in each time period assuming they were previously in employment;

[25] Dearden et al (2006) The Impact of Training on Productivity and Wages: Evidence from British Panel Data

- $Emp_{t,q}$ is the employment rate for the individual in each time period prior to achieving the qualification;
- β_{1earn} is the estimated increase in earnings as a result of achieving the qualification;
- $ATE_{t,q+1}$ is the additional tax receipts generated by an individual who has achieved the higher qualification level in each time period[26];
- $Aemp_{t,q+1}$ is the additional earnings received by an individual who has achieved the higher qualification level assuming they were unemployed;
- β_{1emp} is the estimated increase in the probability of an individual being in employment after completing the higher qualification level;
- $Earn_{t,q+1}$ is the average earnings of an individual at the qualification level they have achieved;
- $Unemp_t$ is the value of unemployment payments made to people who are out of work[27];
- $ATemp_{t,q+1}$ is the additional tax receipts from individual in each time period assuming they were previously unemployed[28];
- $Runemp_{t,q+1}$is the reduction in unemployment benefit payments as a result of increased employment from achieving the higher level of qualification;
- $Employer_{t,q+1}$ is the estimated benefit to employers; and
- $Total_{t,q+1}$ is the total benefit from a qualification.

[26] It is assumed that all additional earnings fall within the 20% taxation bracket (between £11,000 and £32,000), and therefore the additional tax generated is 20% of the additional earnings.
[27] It is assumed that the out of work individuals modelled here are actively seeking employment, and claiming Job Seekers Allowance (JSA).
[28] As the individuals were previously unemployed, it is assumed that half of the increase in earnings falls into the tax free earnings bracket (it is assumed they had zero previous income other than benefit payments) and half falls into the 20% taxation bracket, meaning that this income is taxed at 10%.

Annex 2 Documents reviewed

A2.1 Bibliography

- Centre for Economics and Business Research (CEBR); (2015) Productivity and lifetime earnings impacts of engineering education and training
- Department for Business, Innovation and Skills; (2011a) BIS Research Paper Number 53: Returns to Intermediate and Low Level Vocational Qualifications
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A2.2 Summary of documents

Table A2.1 CEBR (2015) Productivity and lifetime earnings impacts of engineering education & training

Category	Information
Title	Productivity and lifetime earnings impacts of engineering education & training
Author	CEBR
Year published	2015
Institution	Engineering UK
Study aims	The study aimed to: • Assess the productivity impact of engineering apprenticeships • Assess the economic outcomes for the individual of engineering apprenticeships vs engineering graduates • Estimate the impact of apprenticeships on GVA and employment at the sub-sector level (specific areas of engineering)
Region	UK
Sectors covered	Engineering and manufacturing technologies (EMT)
Qualifications covered	Apprenticeships
Study design	Type of methodology used: • Quantitative • Uses the 'BIS model' to calculate the productivity impact of apprentices, mostly using the same figures gathered for BIS research paper 67 but with wages data taken from elsewhere • Uses estimates from two BIS research papers on gains resulting from apprenticeships and degrees to assess differences between the two[29] • GVA and employment data taken from Cebr's GVA estimates and employment data from the Annual Business Survey and Business Register and Employment Survey
Data used (for quant study)	• Apprenticeship Pay Survey (for apprentices' wages) • Annual Survey of Hours and Earnings (for non-apprentices' wages) • BIS employer survey • Cebr GVA data
Data time period	BIS research paper 67 survey data is from 2012, Annual Business Survey and Business Register and Employment Survey 2013, all other data from 2014
Study results	**Productivity** • EMT apprentices need to stay as an employee for an average of seven years for their employer to break even, with regards to their investment in the apprentice's training. After this, their increased productivity starts to generate a net benefit. • After 10 years, they have generated a net productivity benefit of £32,200. • Assuming productivity has remained constant across all cohorts, the 10 cohorts of 371,000 EMT apprentices who completed their courses between 2005-2014 have made a productive contribution of £12 billion. **Earnings** • The premium for an EMT level 3 apprenticeship is £119k (compared to an engineering degree, where the premium is £151k)
Review of methodology	• Data has largely been analysed by another study and is reported in this paper without further analysis, beyond comparison with other secondary data.

[29] BIS Research Papers 53 and 106.

Table A2.2 BIS (2011a) BIS Research Paper Number 53: Returns to Intermediate and Low Level Vocational Qualifications

Category	Information
Title	BIS Research Paper Number 53: Returns to Intermediate and Low Level Vocational Qualifications
Author	London Economics
Year published	2011
Institution	BIS
Study aims	The study aimed to: • Assess impact of qualifications on earnings • Assess impact of qualifications on probability of being employed
Region	UK (except outcomes from apprenticeships, which only covers England)
Sectors covered	Whole economy, although includes an analysis by sector which looks specifically at: • Agriculture and fishing; • Energy and water; • Manufacturing; • **Construction**; • Distribution hotels and restaurants; • Transport and communication; • Banking, finance and insurance; and • Public administration, education and health.
Qualifications covered	Levels 1, 2 and 3 – BTEC, City & Guilds, GNVQ/GSVQ, RSA
Study design	Type of methodology used: • Quantitative • Used an OLS linear regression model, dependent variable of hourly earnings, to examine impact of qualifications on earnings • Used a probit model to estimate the likelihood of different qualification holders being in employment or not • Uses those with different levels of qualification achieves as counterfactuals for other groups (e.g. for those in possession of a level 2 qualification, the counterfactual group is those in possession of a level 1 qualification)
Data used (for quant study)	• Uses data from the British Cohort Survey and from the Labour Force Survey
Data time period	• The British cohort survey is for the 1970 cohort, using data mostly from 1996, 2000 and 2004. • The LFS data is from 1996-2007.
Study results	• Huge amounts of numbers in this report, of mixed statistical significance. Have put an asterisk next to all the statistically significant results. **Wage gaps** • There is a wage gap for most vocational qualifications • **Level 3**: 20% gain for a BTEC*, 16% for RSA*, and 10% for NVQ* (compared to similar individuals qualified to level 2) • **Level 2**: 12% gain for a BTEC level 2*, 16% for RSA*, and 1% for NVQ* (compared to similar individuals qualified to level 1) • **Apprenticeship**: 22% for a level 3 apprenticeship*, 12% for level 2 apprenticeship*. This amounts to a lifetime earnings gap of £48,000-74,000 for a level 2 apprenticeship*, and £77,000-117,000 for a level 3 apprenticeship* **Chances of employment** • All qualifications are associated with increased likelihood of being in employment • Those with an NVQ level 3 are 15 percentage points more likely to be in employment* and NVQ level 2 are 13 percentage points more likely than those with lower qualifications*

Category	Information
	Construction sector • Construction sector has the highest returns on NVQs at both levels: 16% for a level 3*, 3% for a level 2. • Good returns on BTECs: 18% at level 3* and 34* at level 2 • Low or negative returns on RSAs at both levels In general the report does not describe what might be causing of any of these trends. Appears to be no difference in returns on NVQs between those achieved through the workplace and those achieved through school or college. Those training through government programmes generally earn less than those without qualifications – probably because people have to be long-term unemployed to qualify for those programmes. Returns are higher when qualification is gained before the age of 25 (across all qualifications and levels), likely simply because younger people have more working time left to accrue benefits. The lower overall returns on NVQs may therefore reflect the fact that a large amount of NVQs are taken by over 30s.
Review of methodology	• Robust methodology. National-level datasets, robust analysis with the sort of controls, assumptions etc. expected. • Only weakness is that it's unable to say anything about whether or not there's a causative relationship • No evidence of bias.

Table A2.3 BIS (2011c) Research Paper 47 - The Long Term Effect of Vocational Qualifications on Labour Market Outcomes

Category	Information
Title	Research Paper 47 - The Long Term Effect of Vocational Qualifications on Labour Market Outcomes
Author	Conlon, G. and Patrignani, P. (London Economics)
Year published	2011
Institution	BIS
Study aims	The study aimed to: • Assess the effect vocational education has on employment • Assess the effect vocational education has on earnings • Assess the effect vocational education has on benefit dependency
Region	England *(it doesn't say this anywhere, but this is most likely given the use of ILR)*
Sectors covered	Whole economy
Qualifications covered	NVQ/GNVQ (levels 2-3), BTEC (levels 2-3), C&G (levels 2-3), Skills for Life (pre-entry to level 2). Also looks at academic quails at level 2-3 and all level 4 qualifications in aggregate.
Study design	Type of methodology used: • Quantitative • It gives a formula used for modelling (pg 29) but doesn't state what type of statistical model this is • Counterfactual for any group are those enrolling on the same qualification but failing to achieve it • *This looks **very** similar to their 2013 study, also for BIS (reviewed as BIS 2013a). Same data, same method, same focus – the two differences I can see are that this one: looks at benefits; and doesn't do any analysis of differences between sectors.*
Data used (for quant study)	ILR learner attainment data, HMRC data on earnings and employment, DWP data on benefit receipt
Data time period	ILR data (2002-2006), HMRC earnings (2003-2010) and employment (1999-2010), DWP (1999-2010)
Study results	**Course completion**

Category	Information
	• Women are more likely to complete learning aims at all levels: from 1.7 percentage points more likely at level 1 to approx. 4 percentage points more likely at levels 2 and 3 • In general, BME learners are less likely to complete at all levels and types of qualification (there are some exceptions for specific qualifications and ethnic groups) • Learners funded by the Learning and Skills Council are less likely to complete at all levels. The difference is 4 percentage points at levels 1 and 2, 7 percentage points at level 3. **Wages** • Achieving a level 1 adds approx. 3% per annum to earnings during the first 7 years post-completion • At level 2 the premium is approximately 0 for the first three years, but rises to 6% by 7 years. This varies by qualification – an NVQ Level 2 is associated with 5% gains immediately after attainment, rising to 14% after 7 years. • At level 3: negative returns in the first four years post-attainment, although this is down to the inclusion of A Level completes in the analysis (as these people are more likely to move on to higher education and thus remain low earners for a number of years). • Looking at specific level 3 qualifications: C&G level 3 is associated with a 5-7% wage premium per annum; NVQ level 3 is similar to A Level in showing negative returns in the first three years, although returns rise in the fourth year and reach 14% by the seventh year. **Apprenticeships** • Apprenticeships have highest premiums. Advanced apprenticeships have a wage premium of 25.3% over the first seven years. • There is a difference between men and women: men have a 31.9% premium from advanced apprenticeships, compared to women's 14.3% premium. All of this is statistically significant.
Review of methodology	• Methodology looks fine, reasonable amount of controls, robust method of matching the HMRC data to ILR records • Same weakness as usual – no comment on correlation • No evidence of bias

Table A2.4 BIS (2012) Research Paper 67 - Employer Investment in Apprenticeships and Workplace Learning: The Fifth Net Benefits of Training to Employers Study

Category	Information
Title	Research Paper 67 - Employer Investment in Apprenticeships and Workplace Learning: The Fifth Net Benefits of Training to Employers Study
Author	Hogarth et al (University of Warwick Institute for Employment Research and IFF Research Ltd)
Year published	2012
Institution	BIS
Study aims	The study aimed to: • Identify the cost and benefits to employers derive from apprenticeships • Identify the cost and benefits to employers of workplace learning which leads to a qualification at the same level as an apprenticeship
Region	Not explicitly stated, but the sample was largely drawn from NESS employers (who are all in England)
Sectors covered	• Engineering • Construction • Retailing • Hospitality • Transport and logistics • Financial services • Business administration (mostly in local govt.)

Category	Information
	• Health and social care
Qualifications covered	Apprenticeships and WPL qualifications equivalent level to an apprenticeship (no specific qualifications)
Study design	Type of methodology used: • Case study • Employers were interviewed about their training structures, habits and factors influencing their training decisions • Costs of training were calculated using info such as the salary of workers, trainees and managers, direct cost of training provision, and who funded the training
Data used (for quant study)	National Employer Skills Survey and Employer Perspectives Survey data used to identify a sample. No datasets used for analysis.
Data time period	2009 (NESS) and 2010 (EPS)
Study results	**Construction** • Construction firms generally take on apprentices as a means of bringing younger workers into the industry, to ensure future skills needs are met and skills impacts of an ageing workforce are hedged against • For many companies apprenticeships are their main method of recruiting and training staff • Hiring through apprenticeships has helped improve retention rates • It is cheaper than taking on pre-trained staff, and provides staff not 'set in their ways' who can be shaped to the exact requirements of the recruiting firm • Apprentices generally come with a net cost to the employer of £26,074 over their first 3.5 years (actual cost of £69,351, productivity of £45,418) Given the sample size none of these results are statistically significant.
Review of methodology	• Use of case studies is methodologically robust • The findings are based on case studies of 79 employers, 22 of whom were asked about WPL and 57 about apprenticeships. There are around 10 case studies per sector. Results are indicative but this paper cannot claim the findings are representative.

Table A2.5 BIS (2013a) Research Paper 106 - A Disaggregated Analysis Of The Long Run Impact Of Vocational Qualifications

Category	Information
Title	Research Paper 106 - A Disaggregated Analysis Of The Long Run Impact Of Vocational Qualifications
Author	Conlon, G. and Patrignani, P. (London Economics)
Year published	2013
Institution	BIS
Study aims	The study aimed to: • Assess the long-term effect vocational education has on labour market outcomes
Region	England *(paper doesn't actually say what its geographic focus is, but given ILR is only for England then this seems most likely)*
Sectors covered	Whole economy. Does a small amount of analysis by subject studied, looking at: • Health and public services • Construction and planning • Retail and commercial • Arts and media • Engineering and manufacturing • ICT • Travel and tourism • Business administration
Qualifications covered	All level 4 grouped together, NVQ/GNVQ (levels 2-3), BTEC (levels 2-3), City and Guilds (levels 2-3), 'academic' (levels 2-3), Skills for Life (entry level and levels 1-2), apprenticeships (foundation and advanced)
Study design	Type of methodology used:

Category	Information
	• Quantitative • It gives a formula used for modelling (pg 21) but doesn't state what type of statistical model this is – however it is the same model as the other models reviewed • The counterfactual group for qualification achievers is those who enrolled on the same course but did not complete
Data used (for quant study)	• Uses data on learner attainment from the Individual Learner Record and HM Revenue and Customs data on employment and earnings (P45 and P14 data)
Data time period	• The ILR data is from 2002-2006, earnings data is from 2003-2010, employment data is from 1998-2010
Study results	It looks at outcomes across a 7 year period following attainment of qualification, given impacts/gains for each of those 7 years **Earning outcomes** • Level 1: 4% gain in first year, remaining fairly steady but dropping down to 3.3% gain by 7th year • Level 2: 4.3%, rising to 5% (within this, NVQ remains constant from 11.6% to 12% between years 1 and 7, with BTEC and C&G lower (2.2% to 5.3%, and 7.7% to 5.2% respectively) • Level 3: no gain in first year, rising to 6.5% (within this, NVQ and BTEC earnings rise to a 15% gain by year 7, while C&G and other rise to 5.9% and 2.7% respectively) • Level **4**: 3.9%, rising to 11.9% **Employment outcomes** • Level 1: 2.4% more likely to be in employment in year 1, rising to 3.7% in year 7 • Level 2: 3% more likely to be in employment in year 1, rising to 4.5% in year 7 • Level 3: 2.2% more likely to be in employment in year 1, rising to 5.1% in year 7 • Level 4: 2.9% more likely to be in employment in year 1, rising to 5.6% in year 7 • As with earnings the big difference between qualifications-related employment gains is seen at level 3 – employment outcomes for NVQ and BTEC are 3.5% rising to 8.2% and 5.6% rising to 9%, compared to C&G where they are 4.8% rising to 5.2%) **Outcomes by subject** • Level 3: highest earnings gains are for construction and planning – 20% in the first year, dipping down to 14% before rising back up to 20.8% by the 7th year (other subjects start at around 3-8%, rising to anywhere between 5-16%. • Level 2: construction and planning shows highest immediate gains, at 14.9% in first year. However, drops a bit to be at 13.3% by the 7th year. In contrast, health public services shows a gain of 13.8% in year one, rising to 15.3% by year seven. **Outcomes by age** • Those earning a level 2 or 3 qualification aged 19-24 experience great wage gains than those who complete these qualifications aged 25+. • At level 1, younger people initially experience a greater gain but this then levels out to nothing, whereas old people experience consistent wage gains. • Employment outcomes do not appear affected significantly by age, at any level. The vast majority of results are statistically significant to 99% certainty.
Review of methodology	• Methodology looks robust, reasonable amount of controls, robust method of matching the HMRC data to ILR records • Same weakness as usual – no comment on correlation • No evidence of bias

Table A2.6 BIS (2013b) Research Paper 104 - The Impact of Further Education Learning

Category	Information
Title	Research Paper 104 - The Impact of Further Education Learning
Author	London Economics and Ipsos MORI
Year published	2013
Institution	BIS
Study aims	The study aimed to: • Identify the benefits associated with FE and skills, in particular its economic impact and any qualitative benefits • Quantify the extent to which these impacts are observable among the UK's workforce
Region	Not specified – the survey was conducted in the UK, but the location of respondents is not mentioned
Sectors covered	Whole economy
Qualifications covered	All qualifications and levels, although analysis of survey findings looks at all respondents in aggregate without breaking them down by qualifications
Study design	Type of methodology used: • Mixed methods – literature review and telephone survey • The phone survey was used to quantify the extent to which impacts identified during the literature review can be observed • Survey questions are mostly qualitative and perception based, although respondents were also asked about income, cost of training and financial gains • Respondents were sampled and results weighted according to ILR demographic and qualification statistics • A completer/non-completer counterfactual was used for some questions, but for the majority there was no counterfactual
Data used (for quant study)	ILR data was used to ensure the phone survey sample was representative
Data time period	2010-11
Study results	The vast majority of learners were positive about their courses: 90% of men and 87% of women were either 'very satisfied' or 'fairly satisfied' with their courses. **Benefits that might be associated with obtaining their qualification** • 31% (35% of men and 29% of women) said they had got a better job since obtaining their qualification • 15% (18% of men and 12% of women) had got a promotion • 58% (58% of men and women) were getting more job satisfaction • 47% (50% of men and 45% of women) said their pay/promotion prospects were improved **Wages** • Overall, earnings decreased from £14,965 to £14,456 upon achievement of qualification, but this is affected by an increase in the number of people moving from being non-earners to earners, and earning relatively low amounts • When only people who were in employment both pre and post completion of their training are taken into account, average earnings rose from £15,485 to £15,911. • 22% of these individuals saw an increase in salaries, 66% saw no change, and 11% saw a reduction • It is not clear whether respondents were asked questions that framed these outcomes as being the result of their qualification or not, but an explicit cause-and-effect link between respondents' qualifications and outcomes is not made by the paper **Other benefits:** • Lists other benefits from qualifications, based on literature review and survey of learners. These include:

Category	Information
	– Better career prospects – Increased job satisfaction – Helping to get a better job – Reductions in crim – Improvements in social cohesion
Review of methodology	• Balanced sample, methodology for conducting the survey appears sound • The survey only uses a counterfactual for a small number of questions - there is no baseline against which to compare any of the results included in this article review

Table A2.7 DfE (2014) The economic value of key intermediate qualifications: estimating the returns and lifetime productivity gains to GCSEs, A levels and apprenticeships

Category	Information
Title	The economic value of key intermediate qualifications: estimating the returns and lifetime productivity gains to GCSEs, A levels and apprenticeships
Author	Hayward, H., Hunt, E., Lord, A.
Year published	2014
Institution	DfE
Study aims	The study aimed to: • Assess the impact of GCSEs, A Levels and apprenticeships on individuals' earnings and chances of being employed • Also assesses their impact on productivity (economic output)
Region	England
Sectors covered	Whole economy, no analysis of differences between different sectors
Qualifications covered	Apprenticeships, at level 2 and 3, GCSEs and A Levels
Study design	Type of methodology used: • Quantitative • Use the Mincer wage specification to determine wage returns (OLS regression model) • Uses a probit model to estimate employment returns • Same comparison groups as other studies – compares those holding a qualification with those holding a qualification one level below (e.g. apprenticeship level 3 to people holding a level 2 qualification)
Data used (for quant study)	• Uses data from the Labour Force Survey
Data time period	• The LFS data is from 2006-2013 (distinguishes itself from all the other LFS studies in that its data spans pre- and post-recession)
Study results	A lot of the paper focuses on GCSEs and A Levels (which are more novel for this kind of analysis) but the results for apprenticeships are: • Those taking apprenticeships have significantly higher lifetime productivity than those who don't • Men with level 2 apprenticeships have a lifetime productivity gain of £139k compared to those with a level 1 or 2 qualification, and £175k for a level 3 apprenticeship. For women, the gain is £67k at level 2 and £78k at level 3 Productivity is calculated by working out the total cost of hiring the person annually (including national insurance, admin costs etc.). It is then assumed that their productivity is this value. • Marginal wage returns for apprenticeships are high for me – 15% at level 2 and 19% at level 3. Marginal returns for women are much lower – 2% at level 2 and 5% at level 3 *(it says the number of women with level 3 apprenticeships was too small for a statistically significant calculation)*

Category	Information
	• The wage gain for level 3 apprenticeships is £175k for men and £78k for women • Employment returns are higher for women than men, but wage returns are higher for men • Employment returns to apprenticeships are generally high for both sexes – possibly at least partly due to the fact they're work-based qualifications Employment returns (increased probability of being in employment): • Level 2 apprenticeship: 5% for men, 13% for women • Level **3 apprenticeship:** 8% for men, 12% for women
Review of methodology	• Standard methodology, looks robust, controlled for all variables • Same as all the other LFS-based analyses – robust but unable to explain any of the patterns observed • No evidence of bias

Table A2.8 Greenwood et al (2007) The Returns to Qualifications in England: Updating the Evidence Base on Level 2 and Level 3 Vocational Qualifications

Category	Information
Title	The Returns to Qualifications in England: Updating the Evidence Base on Level 2 and Level 3 Vocational Qualifications
Author	Greenwood, C., Jenkins, A. and Vignoles, A.
Year published	2007
Institution	Centre for the Economics of Education, LSE
Study aims	The study aimed to: • Assess impact of qualifications on earnings • Assess the impact of qualifications on moving from unemployment into employment
Region	England
Sectors covered	Whole economy, although includes some analysis by sector which looks specifically at: • Agriculture and fishing; • Energy and water; • Manufacturing; • **Construction**; • Distribution hotels and restaurants; • Transport and communication; • Banking, finance and insurance; and • Public administration, education and health.
Qualifications covered	All levels – from level 2 and 3 NVQs, BTECs and C&G, also ONC and OND, up to PGCE and higher and vocational degrees (although looks at academic qualifications separately to vocational ones). Also looks at apprenticeships.
Study design	Type of methodology used: • Quantitative • Uses an OLS regression model, dependent variable of hourly earnings, to examine impact of qualifications on wage earnings • Uses a probit model to estimate the likelihood of different qualification holders being in employment or not • Conducts counterfactuals by possession/non-possession of a particular qualification, and also by possession across different occupations and sectors
Data used (for quant study)	• Uses data from the Labour Force Survey.
Data time period	The LFS data is from 1997-2006.
Study results	Only really talks about statistical significance in the stream of tables included as a data annex. Roughly the same statistical significance as the BIS paper that used LFS data – largely significant, although in some cases where something very specific is looked at (e.g. women getting NVQ level 2) it loses its statistical significance

Category	Information
	Notes that prevalence of qualifications among LFS respondents has increased over time (although can't say if this means their take up has increased across the population as a whole or not). For example, incidences of NVQ level 2 are up from 1.2% to 3.0%. **Wage gaps** • Level 2: there is no evidence of a wage premium for level 2 NVQs or C&G, but there is for BTEC. RSA level 2 yields a premium for women only, of 5%. • The return for those who hold a level 2 as their highest qualification is significant for most level 2 quails, but there is less of an impact (often almost none) for people who hold other and higher qualifications as well as the level 2. • Women see bigger returns on an NVQ level 2 than men: 3% more than lower qualified women and 5% more than unqualified women, whereas the return for men is nil. • Level 3: the marginal gains for NVQs are 13% for men and 10% for women, for BTEC it's 16%:17%, ONC/OND it's 14%:26%, RSA yields 19% for women. Regional **variation** • Many, such as NVQ and BTEC, have higher average and marginal returns in areas such as the N East, Yorkshire and Humberside, and lower in London and the S East. Paper makes a link to the former areas have big manufacturing bases, although also says they think regional variations in the structure of industries also play a role. **Construction sector** • In their analysis, marginal yields on a level 3 qualification are highest for people working in construction across almost all types of qualification – apprenticeship (20.56%), BTEC (23.00%), C&G (23.74%), ONC/OND (34.04%), NVQ (27.51%) • Only ones where it's not highest is for RSA and GNVQ (both are still high – 27.12% and 11.29%), just not the highest • Construction data based on 9,205 individuals. In general it steers clear of theorizing about what might be causing of any of these trends, same as the BIS paper.
Review of methodology	• Robust methodology. National-level datasets, robust analysis with the sort of controls, assumptions etc. expected. • Only weakness is that does not prove a causal relationship • No evidence of bias.

Table A2.9 London Economics; DfE; (2015) The earnings and employment returns to A levels

Category	Information
Title	The earnings and employment returns to A levels
Author	Conlon, G. and Patrignani, P. (London Economics)
Year published	2015
Institution	London Economics; DfE
Study aims	The study aimed to: • Assess the impact of A Levels on individuals' earnings and chances of being employed
Region	UK
Sectors covered	Whole economy, no analysis of differences between different sectors
Qualifications covered	A levels
Study design	Type of methodology used: • Quantitative • Use the Mincer wage specification to determine wage returns • Uses a probit model to estimate employment returns • Same comparison groups as other studies – compares those holding a qualification with those holding a qualification one level below (e.g. apprenticeship level 3 to people

Category	Information
	holding a level 2 qualification)
Data used (for quant study)	• Uses data from the British Cohort Study
Data time period	• BCS70 sweeps at the ages of 29, 34, 38 and 42 (1999, 2004, 2008 and 2012).
Study results	A lot of the paper focuses on A Levels (which are less well researched): • the returns to 2 or more STEM A levels stand at 17.8%, compared to returns of 20.3% for 1 STEM A level and 5.3% for non-STEM A levels, relative to those with GCSEs/O levels as their highest qualifications • Earnings premiums are higher for women than for men • there are no statistically significant employment effects associated with A levels relative to GCSEs/O levels
Review of methodology	• Standard methodology, looks robust, controlled for all variables possible • Does not explain any of the patterns observed beyond speculating • No evidence of bias

Table A2.10 McIntosh (2007) A Cost-Benefit Analysis of Apprenticeships and Other Vocational Qualifications

Category	Information
Title	A Cost-Benefit Analysis of Apprenticeships and Other Vocational Qualifications
Author	McIntosh, S.
Year published	2007
Institution	University of Sheffield
Study aims	The study aimed to: • Assess impact of government-funded apprenticeships (it calls them Modern Apprenticeships) on earnings
Region	UK
Sectors covered	Whole economy, although includes some analysis by sector which looks at 23 different sectors, including construction (others include food manufacture, printing, chemicals, real estate, computer activities, education – wide range)
Qualifications covered	Apprenticeships, at level 2 and 3. Uses other qualifications for baselines but only analyses the impact of apprenticeships
Study design	Type of methodology used: • Quantitative • Uses an OLS regression model, dependent variable of hourly earnings, to examine impact of qualifications on wage earnings • In general the apprenticeships are level 3 and the control group is therefore anyone whose highest qualification is level 2. In some cases they look at level 2 apprenticeships, so for these people the control group is those whose highest qualification is level 1.
Data used (for quant study)	• Uses data from the Labour Force Survey.
Data time period	• The LFS data is mostly from 2004-2005, although some analysis of change over time is conducted using data from 1996-2005. • Data from quarterly surveys is pooled to produce one single set of data for each year
Study results	• Finds wage returns of 18% for a level 3 apprenticeship and 16% for a level 2 apprenticeship • Women get returns of 14% for an apprenticeship • Wage returns are rising (looking at the time period 1996-2005) • Wage returns on apprenticeships are considerably higher than for other types of vocational qualification, such as NVQ, BTEC or C&G • Estimates a net present value (NPV) of benefits over costs for apprenticeships: £105k for

Category	Information
	a level 3, £73k for a level 2 • Says that the value of these per pound of state funding used for apprenticeships is therefore £17 and £16 • • There is big variation by sector – returns of 32% for a level 3 apprentice working in construction (highest of any sector), whereas in retail there is no observed impact whatsoever (i.e. it increases someone's wage by 32%) • NPV is by far the highest in construction: £156,523 • Value per pound of government funding is £27.41 Does also say apprenticeships and vocational qualifications are associated with greater likelihood of being in employment, although much more hesitant about suggesting a causal relationship (particularly as those taking these qualifications are more likely to be in employment in the first place) Notes that the demand for these apprenticeships exceeds supply, so employers may be able to choose the most able people. If this is happening then the wage difference could be partially due to ability differences, rather than the apprenticeship itself
Review of methodology	• Standard methodology, looks fine, controlled for everything they can • Same as all the other LFS-based analyses – robust but unable to explain any of the patterns observed beyond speculating • No evidence of bias.

Table A2.11 National Audit Office (2012) Adult Apprenticeships

Category	Information
Title	Adult Apprenticeships
Author	BIS, SFA, National Apprenticeship Service
Year published	2012
Institution	NAO
Study aims	The study aimed to: • Assess the VfM on the Apprenticeship Programme, focusing primarily on adults (those aged 19+) • It looked at the quality of the programme, economic benefits, and effectiveness of programme management
Region	England
Sectors covered	Whole economy, with a small amount of analysis by sector that looks at: • Energy and water • Distribution, hotels and restaurants • Public admin, education and health • Manufacturing • Construction • Transport and communication • Other services • Banking, finance and insurance • Agriculture and fishing
Qualifications covered	Adult apprenticeships
Study design	Type of methodology used: • Quantitative • Used OLS linear regression to calculate the wage returns on adult apprenticeships • Used a probit model for employment returns • Compared those holding advanced apprenticeships against a control group of those holding (any) Level 2 qualification as their highest qualification. The control group for intermediate apprenticeships was those holding a Level 1 or 2 qualification.

Category	Information
	• Used Cambridge Econometrics' BIS model to calculate the NPV to the economy of adult apprenticeships • • NPV calculations used the estimates on wage and employment premiums produced by this paper, along with data on apprenticeship starts, gender split, retirement ages and wage levels (source for the latter sets of data not identified)
Data used (for quant study)	• LFS (for wage and employment premiums)
Data time period	2004-2010 (LFS)
Study results	**Income** • Completing an advanced apprenticeship is associated with wages that are 18% higher • Completing an intermediate apprenticeship is associated with wages that are 11% higher **Employment** • Men with an advanced apprenticeship are 4.9 percentage points more likely to be employed than those with a level 2 qualification; women are 0.9 percentage points likely. • Overall, advanced apprenticeship takers are 3.6 percentage points more likely to be in employment • (results for men and overall are statistically significant to 1% confidence, result for women is not significant) • Intermediate apprenticeship: 1.6 percentage points more likely to be in employment than level 1-2 holder (2.4 for men and 3.0 for women) • (intermediate results are significant to 5% confidence for all apprentices and men, 10% confidence for women) **Returns** • Advanced and intermediate apprenticeships are estimated to give returns of £21 and £16 per £1 of government funding • In calculating these figures it's assumed that all funding for these apprenticeships is additional • The amount of adult apprentices successfully completing their training has risen from 47% in 2005-06 to 75% in 2009/10
Review of methodology	• Analysis of wage and employment returns is pretty standard, has the usual controls in terms of weighting

Table A2.12 OECD (2014) Education at a glance 2014

Category	Information
Title	Education at a glance 2014
Author	OECD
Year published	2014
Institution	OECD
Study aims	The study is a compendium of OECDs educational statistics, which includes: • Assessing the performance of national education systems; • Providing data for the outputs of education systems, and a commentary the circumstances which shape the outputs; and • Discuss policy issues relating to education.
Region	All OECD countries
Sectors covered	Whole economy
Qualifications covered	Qualifications assessed by level of qualification - International Standard Classification of Education (ISCED) levels 1 to 6
Study design	Type of methodology used: • Literature review

Category	Information
	• Quantitative surveys conducted by the OECD • Analysing the relationship between earnings and highest qualification • No statistical modelling to control for any variables other than education attainment
Data used (for quant study)	• OECDs own surveys Programme for International Student Assessment (PISA), Programme for the International Assessment of Adult Competencies (PIAAC), Teaching and Learning International Survey (TALIS); • OECD LSO (Labour Market and Social Outcomes of Learning) Network data
Data time period	2010; 2012
Study results	**Earnings** • In most OECD countries, earnings increase with higher levels of educational attainment • Across OECD countries, a man who invests in upper secondary or post-secondary non-tertiary education can expect a net gain of around USD 100 000 during his working life compared to a man who has attained below upper secondary education • In all countries, men with an upper secondary or post-secondary non-tertiary education enjoy a significant earnings premium over those who have not attained that level of education. The value of reduced risk of unemployment can also be large • Men generally enjoy better financial returns than women after attaining upper secondary or post-secondary non-tertiary education
Review of methodology	• The methodology compares aggregate level data for individuals with different qualifications levels. It does not attempt to control for other variables. Therefore findings lack robustness.

Table A2.13 The Sutton Trust; Kirby, P.; (2015) Levels of Success: The potential of UK apprenticeships

Category	Information
Title	Levels of Success: The potential of UK apprenticeships
Author	Kirby
Year published	2015
Institution	The Sutton Trust
Study aims	The study aimed to: • Assess the income gains that can be made by taking apprenticeships • Identify inequalities within the apprenticeship system • Assess popular opinion of apprenticeships
Region	UK
Sectors covered	Whole economy
Qualifications covered	Apprenticeships
Study design	Type of methodology used: • Literature review • The main body of the report uses findings from a quantitative analysis and two surveys (all secondary sources) • Combines findings from these reports/pieces of research with some other datasets on apprenticeships to take a broader look at the impact of obtaining an apprenticeship vs a degree • The paper observes the data and findings without conducting its own analysis
Data used (for quant study)	• Findings of a ComRes online survey of 16-18 year olds' perceptions of apprenticeships • A survey by Oliver Wyman of apprentices and their employers • Various DfE datasets, incl. data on apprenticeships (not specified which) • A study by the Boston Consulting Group modelling the lifetime earnings of holders of different qualifications
Data time period	2015 (ComRes and Oliver Wyman), others not specified

Category	Information
Study results	**Income** • Lifetime earnings for degree holders are £1.44 million, compared to £1.29m for apprenticeship level 3 and above, £0.97m those with A Levels and £0.7m for those with no qualifications • However, there is variation with the groups of 'degree' and 'apprenticeship' – a non-Russell group degree holder will on average earn slightly less than a higher apprenticeship (level 5) holder (£1.39m vs £1.44m), and only slightly more than a higher apprenticeship (level 4) holder (£1.38m). Russell Group degree holders have a higher average (£1.6m), level 3 apprenticeship holders lower (£1.02m) • Lifetime earnings for those getting a degree from a non-Russel Group university and those taking higher level apprenticeships are roughly similar • • There is a gender divide, with apprenticeships in areas such as engineering and construction dominated by men (more than 95% of apprenticeships), while apprenticeships in areas such as beauty therapy and nursing are similarly dominated by women (also more than 95%). As the female-dominated industries are generally lower paid, this means female apprenticeships on average earn more than £1 an hour less than male apprentices • • The Wyman research suggests that those enrolling on the top apprenticeship schemes tend to have disproportionately come from schools which have higher levels of progression to Russell Group universities and lower levels of students receiving free school meals The ComRes survey had a sample size of 1,017, so the aggregate young people's views on apprenticeships are statistically significant. The Oliver Wyman survey spoke to 118 apprentices and employers total, so this isn't significant.
Review of methodology	• Use of data mixed with case studies/quali survey results is informative, although they're all drawn from different sources so the methodology/sample group isn't consistent across the different sources of information used • Methodologies for the individual pieces of research examined for this report are not covered in detail

Table A2.14 UKCES (2010) The Value of Skills: An Evidence Review

Category	Information
Title	The Value of Skills: An Evidence Review
Author	Garrett, R. and Campbell, M. (UKCES), Mason, G. (NIESR)
Year published	2010
Institution	UKCES
Study aims	The study aimed to: • Assess the impact of skills on earnings • Assess the impact of skills on employment outcomes • Assess the impact of skills on companies' productivity
Region	UK as a whole, international
Sectors covered	Whole economy. One section looks at specific sectors, using all the UK sectors for which there is an SSC.
Qualifications covered	The study mostly looks at 'skills' without detailing how 'skills' have been defined or measured. However, there are some findings which look at NVQs (level 2-3) and apprenticeships.
Study design	Type of methodology used: • Literature review
Data used (for quant study)	None. Datasets used by the studies identified during the review are not generally stated.
Data time period	Varied.

Category	Information
Study results	Specific qualifications are looked at in relation to the individual learner, while apprenticeships are looked at in relation to both learners and organisations. **Apprenticeships** The section on apprenticeships presents quali outlines of the findings of various pieces of research. It's unclear what methods/data they used to arrive at those conclusions, but the main ones are as follows: • Offering apprenticeships can send a signal that a company is committed to training and local employment, and that if values its workforce, which can aid recruitment and staff retention • Apprentices are more motivated, improving their performance. They are also more likely to stick with their firm upon completion, reducing employee turnover *(it doesn't say who they are more motivated than – most likely is that it means the average apprentice is more motivated than the average employee)* • Increased retention reduces recruitment costs of hiring new people **NVQs** NVQ level 2 qualifications are held by 6% of the UK's working age population, NVQ level 3 by 5% of the working age pop. • On average, NVQ Level 3 gives the holder a 32% and 38% increase in earnings over a 7 year period for men and women respectively. • NVQ **Level 2** offers returns between -6% and 3% for men, and between -5% and 3% for women. **Construction** • Returns on an NVQ level 2 are a little higher in construction that in many/most other sectors, depending on the analysis you look at. Most are not statistically significant though. • Apprenticeships and NVQ level 3 are not really compared by sector. **Impact on businesses** • Change in productivity higher than change in earnings. • Range of studies estimate this, effect between 2 times higher and 5 times higher than the effect on earnings • No sector specific results for this analysis
Review of methodology	• No methodology is included in the report, so the robustness and neutrality cannot be verified • The findings for the relationship between training and qualifications and business productivity show a relationship, but do not prove causality

Study prepared by ICF Consulting Services Ltd from a commission by CITB.

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