Sector-based work academies

A quantitative impact assessment

March 2016

Research Report No 918

A report of research carried out by the Department for Work and Pensions

Summary

This report presents the results of analysis on the net impact of sector-based work academies participation on work and benefit outcomes, and a cost-benefit analysis based on these findings.

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Executive summary

Background

This report presents an impact assessment and accompanying cost-benefit analysis of the sector-based work academy (sbwa) programme, which was introduced in 2011 in England and in 2012 in Scotland.

Sector-based work academies offer pre-employment training, work experience placements and a guaranteed job interview for recipients of Jobseeker's Allowance (JSA), Universal Credit (all work-related requirements group) or Employment and Support Allowance (Work-Related Activity Group) (ESA(WRAG)). From April 2014, sector-based work academies have also been available to lone parents aged 18 to 24 years who are receiving Income Support (IS) solely on the basis of being a single parent (and whose youngest child is aged 4). Sector-based work academies are developed in partnership with employers and run in sectors with high volumes of current local vacancies. They are designed to help unemployed benefit claimants gain the relevant skills and work experience required to work in a specific sector, give claimants the guarantee of a job interview in a specific vacancy, and also allow employers to fill existing vacancies with suitable applicants.

Methodology

The impact assessment explores the effect of sector-based work academies on subsequent labour market outcomes for two cohorts of 19-24 year-old JSA claimants who started the programme in 2011/12 and 2012/13 respectively. Outcomes for those who started a placement are compared with a matched comparison group of non-participants to provide an estimate of the impact of participation.

The matching approach used in this analysis has been designed to account for self-selection bias introduced by the voluntary nature of many Department for Work and Pensions (DWP) labour market programmes. The methodology is well-established and is considered a plausible means of estimating the impact of interventions of this type. The limitations of the approach are discussed in detail in section 3.3.

This study is the first quantitative assessment of the sector-based work academy programme and uses a methodology consistent with the work experience impact assessment published in March 2016. In particular, this study evaluates sector-based work academies funded through Get Britain Working and the Youth Contract, in order to investigate whether sector-based work academies are an effective programme at getting young claimants into employment. The cost benefit analysis follows the *DWP Social Cost-Benefit Analysis Framework* (Fujiwara, 2010) methodology, in line with the approach used in similar published analysis of the *Future Jobs Fund* (Marlow, Hillmore and Ainsworth, 2012).

Key findings

- This report provides evidence that taking part in sector-based work academies reduces the time 19 to 24 year old JSA claimants spend on benefit and increases the time they spend in employment.

- Using a cohort of participants across 2012/13, we estimate that individuals who participate in sector-based work academies on average spent 50 days more in employment and 29 days less on benefit across the year and a half after starting the scheme.

- Across both cohorts, the increased time participants subsequently spent in employment is substantially greater than the reduction in time spent on benefit. This reflects that JSA claimants in this age group frequently leave benefit without finding employment. Those who participate in sector-based work academies are less likely to make this transition, instead becoming more likely to move into work when they end their benefit.

- Results suggest that the impact extends beyond the 18-month tracking period used for the 2012/13 cohort.

- The positive impact of sector-based work academies is common to all subgroups analysed in this study. The increased likelihood of being in employment was similar across males and females. Claimants who had been claiming JSA for longer at the point of starting their sector-based work academy experienced a greater impact than those who started their placement having claimed JSA for less than three months.

- We estimate that participants who undertake all three elements of the sector-based work academy on average spent 66 days more in employment and 38 days less on benefit across the 18-month tracking period after starting than non-participants.

- The results from the cost-benefit analysis suggest that each sector-based work academy placement has a net benefit to the Exchequer of £100, and an estimated benefit to each participant of £1,950.

1   Introduction

1.1   What is a sector-based work academy?

The sector-based work academies scheme was introduced to help unemployed benefit claimants gain the relevant skills and work experience required to work in a specific sector, give claimants the guarantee of a job interview in a specific vacancy, and also allow employers to fill existing vacancies with suitable applicants.

Sector-based work academies offer pre-employment training, work experience placements and a guaranteed job interview up to a maximum total duration of six weeks. Those undertaking a placement continue to receive their benefit and are required to continue their job search activities.

1.2   Purpose of this analysis

The analysis presented in this report aims to provide a quantitative assessment of the impact of the sector-based work academy scheme on participants' subsequent benefit receipt and movement into employment. This study evaluates sector-based work academies funded through Get Britain Working and the Youth Contract, to investigate whether sector-based work academies are an effective programme at getting young claimants into employment. Therefore the analysis focuses on the impact on participants aged 19 to 24 who were claiming Jobseeker's Allowance (JSA) at the point when they started a placement.

Accompanying cost benefit analysis to estimate the overall cost-effectiveness of the scheme is presented in section 5.

This report is the first quantitative assessment of the sector-based work academy programme and follows a similar evaluation of the work experience (WE) scheme, published in March 2016 (Haigh and Woods, 2016). Both reports are supplemented by a quantitative survey of the experiences of people who have received support from the Youth Contract, published in 2014 (Coleman, McGinigal and Hingley, 2014).

2 The sector-based work academy policy

2.1 Policy background

Sector-based work academies were introduced in August 2011 in England and January 2012 in Scotland. The programme does not run in Wales. Instead, claimants in Wales have access to pre-employment training funded by the Welsh Government.

The programme is demand-led and run in industries with high volumes of local vacancies, therefore spanning a broad spectrum of sectors: teaching; retail; hospitality; transport and logistics; food; care; manufacturing and engineering; agriculture; and administration are examples of sectors the programme has operated in. Sector-based work academies are delivered in partnership between Jobcentre Plus, employers and training providers. The pre-employment training and work experience placement are tailored to employers' needs to help fill vacancies more efficiently, whilst helping participants into employment in a demand sector.

2.2 Policy design

A sector-based work academy usually consists of three elements:

• Sector-specific pre-employment training (PET) of up to 30 hours a week;

• A work experience placement (WEP) with an employer; and

• A guaranteed job interview (GJI) linked to a genuine vacancy.

The three elements can be run in any order as long as the guaranteed job interview does not take place before the pre-employment training. It is expected that all three elements are available to the participant. The guaranteed job interview must form part of the placement unless there are exceptional circumstances such as where the employer's recruitment policy means that they are unable to offer one. The combination of all three elements should not exceed six weeks in duration.

There is no standard approach to designing a sector-based work academy. Jobcentres are free to deliver flexible placements to meet the needs of employers, claimants and training providers. The Department for Work and Pensions (DWP's) National Employer and Partnership Team negotiate with national employers to secure suitable job vacancies. Opportunities may also arise via a direct approach from local employers, colleges, training providers or local business partnerships. Jobcentres engage with employers and training providers early in the process to ensure they are able to offer suitable training, work experience and guaranteed job interviews and that there are vacancies for participants to apply for. These vacancies can be for jobs or apprenticeships. Jobcentres offer a co-ordinator or single point of contact for training providers and host employers once the programme is underway.

Sector-based work academies are designed to support claimants of Jobseeker's Allowance (JSA), Universal Credit (all work-related requirements group) or Employment and Support Allowance (Work-Related Activity Group) (ESA(WRAG)), aged 18 years or over. From April 2014, sector-based work academies have been open to lone parents aged 18 to 24 years who are receiving Income Support (IS) solely on the basis of being a single parent (and whose youngest child is aged 4).

All ages are eligible to participate in sector-based work academies although the performance of 18 to 24 year old participants is measured against the Government's public commitments on tackling youth unemployment. The Youth Contract, which ran from April 2012 to March 2015, provided funding for 250,000 sector-based work academy or work experience places for claimants aged 18 to 24 years. Funding for a further 100,000 sector-based work academies or work experience opportunities a year has allowed this support to continue. Placements for claimants aged 25 years or over are funded from Jobcentre District core budgets. The Department for Business, Innovation and Skills (BIS) fund the pre-employment training (PET) aspect in England through the Adult Skills Budget (ASB). In Scotland the pre-employment training is funded by the Scottish Government through Skills Development Scotland. In some cases, where there are gaps in provision, Jobcentre Plus can procure and fund the PET with local providers through the Flexible Support Fund (FSF). Employers cover the costs of the work experience placement and guaranteed job interview.

Referring claimants to sector-based work academies is discretionary on the part of the jobcentre advisors. DWP guidance suggests that those referred should be close to the labour market, but would benefit from a short training intervention and a work experience placement to support them in finding work in a demand sector. Referred individuals should show an interest in a role in the sector.

JSA and Universal Credit claimants who agree to participate are required to complete the PET and guaranteed job interview (where offered). The work experience placement is voluntary, but claimants are required to maintain basic standards of good behaviour during the placement. From the introduction of the policy until March 2012 the work experience element was mandatory for JSA claimants. This will have relevance for our results as the 2011/12 cohort – except for April 2012 starters – were under a different policy regime. For ESA (WRAG) claimants and IS lone parents who agree to participate, all three elements of the sector-based work academy are on a voluntary basis. Claimants should receive a notification letter making them fully aware of the mandatory elements.

During participation in the sector-based work academy, the participant remains on benefit and can receive additional support with travel and childcare costs by Jobcentre Plus through DWP's FSF. In accordance with continuing to receive benefits, JSA claimant participants are required to continue to attend jobsearch reviews and are required to be actively seeking work and available for work, providing training does not exceed 16 hours per week. Where training is between 16 and 30 hours JSA claimants are not required to be actively seeking work or available for work. However, they are still required to undertake jobsearch reviews.

There is a difference between the work experience placement element of a sector-based work academy and the work experience programme introduced in January 2011. The work experience programme is intended to last 2 to 8 weeks and provides an insight into the world of work for claimants further away from the labour market. In contrast, a sector-based work academy placement is aimed at claimants close to the labour market and used in preparation for a particular vacancy. Indeed, in a survey of Youth Contract customer experiences, work

experience programme participants tended to have spent longer out of the workforce.[1] The sector-based work academy place includes PET followed by a guaranteed job interview for successful completers.

2.3   Take up of sector-based work academies

From the initial roll-out of sector-based work academies in August 2011 to the end of May 2015, official statistics show there were 199,380 programme starts depicted in Figure 2.1. The majority of these starts – 189,600 of the 199,380 – have occurred since the introduction of the Youth Contract in April 2012. During this Youth Contract period, approximately 52 per cent of starts were by 18 to 24 year-olds which is in line with the policy design, whereby sector-based work academies are not targeted at any particular age group.

Figure 2.1   Sector-based work academy starts since the launch of the programme in August 2011 up to May 2015
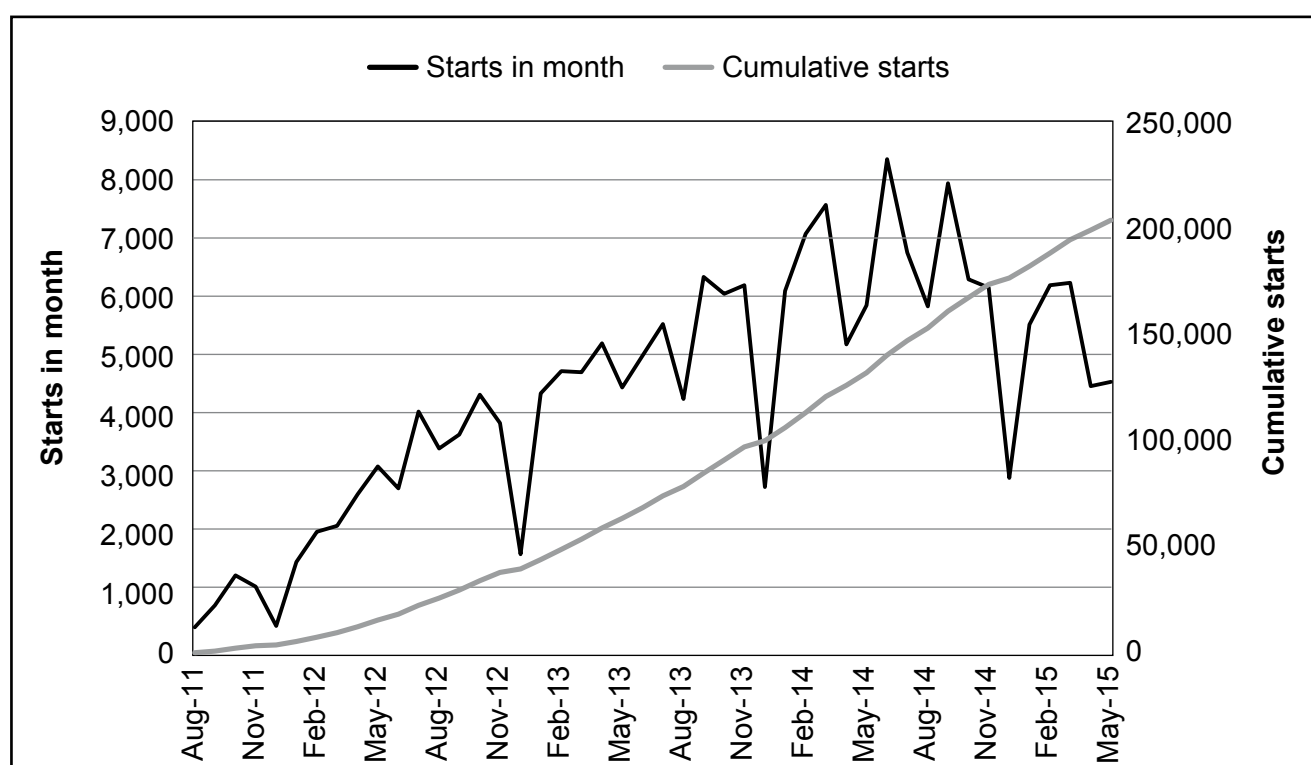
The majority of sector-based work academy starts across the report period relate to JSA claimants. This report focuses on exploring the impact of sector-based work academy participants for JSA claimants, and does not include those who started a placement whilst claiming ESA, Universal Credit or IS.

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[1]   See Customers' experiences of the Youth Contract (Coleman, McGinigal and Hingley, 2014).

Table 2.1   Sector-based work academy placement starts between August 2011 and May 2015 made by JSA claimants, split by age group and time spent on JSA prior to sector-based work academy start date

Age group	Time on JSA prior to sbwa start				Row total	Row % of grand total
	Under 3 months		3 months or over			
	Frequency	% of total	Frequency	% of total		
Under 18	40	0%	20	0%	60	0%
18–24 years	42,980	25%	45,570	27%	88,560	52%
25 and over	28,200	17%	54,010	32%	82,210	48%
Total	71,230	42%	99,600	58%	170,830	100%

Figures are rounded to the nearest 10.

Table 2.1 gives a breakdown of those JSA claimants who started a sector-based work academy by age group and the length of time they had spent on JSA prior to commencing the sector-based work academy. Consistent with the policy design, participants do not appear to be targeted from a particular age group.

Sector-based work academies are available from day one of an individual's claim with referral to the scheme being at the discretion of the Jobcentre advisor. Table 2.1 shows that 58 per cent of sector-based work academy participants had been claiming JSA for over three months at the point they started the scheme. Again this appears compatible with the policy design.

In February 2014, DWP published a quantitative survey exploring the experiences of claimants who took part in Youth Contract employment programmes (Coleman, McGinigal and Hingley, 2014). This research was based on interviews conducted from a survey sample of 3,333 individuals who were recorded as starting the PET element in February or March 2013.

Findings from the research relevant to sector-based work academies are:

• Placements in shops were the most common (21 per cent), followed by placements in an office (13 per cent), a warehouse (11 per cent), a care/residential home (nine per cent), outdoors (nine per cent) or in a restaurant, bar or cafe (nine per cent).

• 87 per cent had a positive experience overall, including 47 per cent 'very positive'.

• Nine in ten thought the different elements of the sector-based work academy worked well together. The same proportion, nine in 10, were satisfied with the overall quality of the training.

• 76 per cent reported having an increased confidence.

• 80 per cent reported developing new skills.

• Where the sector-based work academy included a work placement, 42 per cent of participants were offered a job upon completion. Nine in ten job offers were accepted.

3   Analytical approach

3.1   Overview of the methodology used

This evaluation examines the impact of sector-based work academy participation on subsequent labour market outcomes for two cohorts of participants who started a sector-based work academy placement between August 2011 and April 2012, and August 2012 and April 2013 respectively.

For each cohort we monitored the proportion of the participant group in employment and on benefit in each week over a period of between 18 months and two years following a sector-based work academy start. These proportions were compared with the same figures for a matched comparison group of non-participants selected using a statistical technique called propensity score matching (PSM), in order to determine the impact of the programme on these outcomes, i.e. its additionality.

Additionality is defined as '*the outcomes that occurred under the sector-based work academy programme*' minus '*the outcomes that would have occurred anyway*'. The first part of this equation is straightforward to calculate, as the outcomes of those who participated in the programme can be directly observed. However, the second figure, commonly referred to as the 'counterfactual', is more difficult to determine because it is impossible to know what the outcomes **would have been** for the participant group in the absence of the programme.

The purpose of propensity score matching is to construct a comparison group from the wider group of claimants who did not participate in sector-based work academies, but who are as similar to the participant group as possible in all other respects. The outcomes for this group are then used to estimate the counterfactual outcomes for the participant group. A full description of propensity score matching and how it was implemented in this study can be found in Appendix A.

The difference between the actual observed outcomes and the estimated counterfactual outcomes gives the true impact of the programme if the only **relevant difference** between the participant and comparison groups is that the participant group took part in sector-based work academies. A relevant difference is one which affects outcomes. This impact is known as the **average treatment effect on the treated** (ATT).

Once the comparison group had been constructed and used to estimate the counterfactual outcomes, a 'difference-in-difference' approach was then applied to calculate the impact of the programme. This additional step controls for any remaining differences between the participant and comparison groups that are constant over time, regardless of whether these differences can be detected using the available data.

The end result of applying this methodology is a quantitative estimate of the impact of the intervention on each outcome of interest. These impact estimates can be expressed in terms of the average additional days each participant spent in work or on benefit as a result of undertaking a sector-based work academy; or alternatively, as a change in the likelihood of participants being in work or on benefit at a specific point following the intervention.

This approach is broadly consistent with a number of previous Department for Work and Pensions (DWP) impact assessments of labour market initiatives, including the 'Early Impacts of Work Experience' study published in 2012 (Ainsworth, Hillmore, Marlow and Prince, 2012). These studies have been extensively peer-reviewed both within DWP and externally by the National Institute of Economic and Social Research (NIESR), with the conclusion that the methodology offers a robust means of estimating the impact of interventions of this type.

In line with 'Work experience: A quantitative impact assessment' (Haigh and Woods, 2016) this analysis introduces some minor refinements to the methodology used in earlier studies in terms of the variables employed to create the propensity score for each individual. The new variables have been added to the matching in response to NIESR feedback and as a result of new data becoming available, with the aim of improving the accuracy of the matching. A full list of the variables used in both studies is provided in Appendix A.

3.2 Cohort selection

The analysis in this report explores the impact of sector-based work academies on two cohorts of participants who were aged 19 to 24 and were claiming Jobseeker's Allowance (JSA) at the point when they started a placement. Table 3.1 provides further detail on the cohorts used.

Table 3.1   Details of the cohorts studied in this evaluation

Cohort name	Period covered*	Number of participants in cohort
Cohort 1	August 2011 – April 2012	5,263
Cohort 2	August 2012 – April 2013	14,689

*The time period refers to the date that participants started a sbwa placement.

The periods chosen reflect the fact that sector-based work academies were introduced in England in August 2011. Therefore the starting date for cohort 1 is the earliest period in which data is available following the roll-out of the policy. Cohorts covering the same period in subsequent years were selected as the basis of the extension analysis so that there is no potential for the measured impact of the policy over time to be distorted by seasonal changes in the labour market. It should be noted that as a consequence, we have not explored whether the impact of sector-based work academies varies throughout the year as a result of these seasonal changes: it is possible that the impact of the programme for participants who begin a placement later in the year could differ from our estimates.

Although the aim of this analysis is to determine the impact of sector-based work academies on 18 to 24 year-olds, individuals who were 18 when they began a placement are not included in the participant cohorts. This is because for this group, we are unlikely to hold a full year of benefit and employment history since these individuals have only very recently entered the labour market. This means that the propensity score matching for this group would be based on incomplete data. In interpreting the results of this analysis we assume that the impact of the policy for 18 year-olds would be similar to that measured for 19 to 24 year-olds.

Appendix B provides details of how non-participant samples were constructed alongside each of these cohorts of sector-based work academy participants. These were combined with the participant samples to provide the input to the propensity score matching process described in section 3.1 and in more detail in Appendix A.

3.3   Limitations of this methodology

As discussed in Appendix A, the success of the propensity score matching is dependent on the 'conditional independence assumption' being met, i.e. the assumption that the matching has controlled for all relevant differences between the treatment and comparison populations. One limitation with the PSM approach is that there is no way of testing this assumption for unobserved characteristics of the two populations.

In this analysis we have made use of detailed information on benefit and employment history which has been shown to be an effective proxy for important but unobserved attributes such as motivation (Caliendo, Mahlstedt and Mitnik, 2014). However, it is impossible to prove that the available data is sufficient to account for all the relevant variation between the participant and comparison groups.

Education is a key area not covered by the available data, including both past participation/ qualification levels and future intentions to undertake further study. This issue is particularly relevant for the age group covered in this study, for whom qualification levels might be expected to have a substantial impact on future outcomes.

The employment data used in this evaluation also has some known weaknesses. This data is taken from the Work and Pensions Longitudinal Study (WPLS), which captures details of employment start and end dates taken from P45 and P46 forms submitted by employers. The quality of the data is known to be limited, since historically Her Majesty's Revenue and Customs (HMRC) did not require P45 and P46 forms to be completed for people whose earnings were below the Lower Earnings Limit, and employment start and end dates were often approximate or missing. In addition, the dataset does not capture any information on people who are self-employed.

Beginning in April 2013, the P45/P46 reporting system was phased out in favour of the Real Time Information (RTI) system, which requires employers to submit information to HMRC each time an employee is paid. This system has now reached full deployment. RTI offers substantial improvements to the P45/P46 system in terms of data coverage, since employers must now provide information on all their employees if even one employee of the company is paid above the Lower Earnings Limit. This improvement has filtered through into the WPLS dataset used in this study, which is now populated using information extracted from the RTI system.

These changes only affect the tail end of the post-participation tracking period used in this study. The issue with start and end dates remains however, and self-employment is still not captured.

The issues outlined above are common to evaluations of this type, including the previous DWP impact assessments of labour market programmes which have adopted a similar methodology. The approach we have adopted has been extensively peer-reviewed both internally and externally, and we consider it the best methodology available given constraints around data capture and policy design. We believe this method offers a plausible means of estimating the impact of interventions of this type, however, it is impossible to be absolutely confident that we have fully controlled for selection bias.

4 Impact assessment findings

4.1 Outcomes of propensity score matching

This section explores the results of the propensity score matching to determine the success of this methodology in creating a suitable comparison group, i.e. one whose outcomes provide a valid estimate of the counterfactual outcomes for the relevant participant cohort.

The first aspect examined is the extent to which the non-participant sample provided common support for individuals in the participant cohort. For a participant to be 'on support', there must be at least one individual in the non-participant group with a propensity score within the matching bandwidth of the participant's score (see Appendix A for more detail on the matching approach). For propensity score matching to be successful, it is important that the vast majority of participants in the sample are on support following the matching, since the impact estimates generated by comparing the matched groups will only be valid for those participants for whom common support is available.

Table 4.1 shows the number of individuals in the participant and non-participant groups before and after matching, and the resulting proportion of the participant group for whom common support was found. These results show that for both cohorts, the proportion of participants on support was greater than 98 per cent, indicating that this aspect of the matching has been successful.

Table 4.1   Participant and comparison group sample sizes before and after matching, and the proportion of participants on support

Cohort	Comparison group (pre-matching)	Participant group (pre-matching)	Participant group (post-matching)*	Participants not on support	% of participants on support
2011/12	445,183	5,263	5,235	28	99.5%
2012/13	424,696	14,689	14,530	159	98.9%

*Note: The comparison group sample size is identical to the participant group sample size after matching by definition, since matched observations are weighted to ensure this is the case.

The second aspect of testing examines how successful the matching has been in creating a comparison group which looks similar to the participant group in terms of observed characteristics. A t-test was carried out on each of the variables that contributed to the determination of the propensity score in turn to identify any remaining statistically significant differences between the participant and comparison groups following matching. The results of this are shown in Appendix B.

A chi-squared test was then performed to determine whether there is a statistically significant difference between the participant and comparison groups for each cohort, taking into account the distribution of the groups across all matching variables. Table 4.2 gives specification statistics for the matching of the participant and non-participant groups. The chi-squared test shows that prior to the match, there was an approximately zero probability that the participant and non-participant samples had the same set of characteristics. After matching there is statistically no difference between the matched groups in terms of observed variables at the five per cent level.

Table 4.2   Specification statistics for the group matching

Cohort	Sample	Pseudo R²	LR chi²	P > chi²
2011/12	Matched	0.002	33	1.000
	Unmatched	0.123	7019	0.000
2012/13	Matched	0.001	59	1.000
	Unmatched	0.157	20182	0.000

Overall, we found the propensity score matching approach to be highly effective in constructing matched treatment and comparison groups that have sufficient coverage of the original participant sample, and that are well balanced in terms of their observed characteristics.

4.2   Findings from full-cohort impact analysis

For each of the participant and comparison groups across the two cohorts, we examined the proportions of the group in four mutually exclusive outcome states in each week after the start/pseudo start date for the duration of the tracking period. The four outcome states, between them covering all possible destinations for individuals in each group, are as follows:

1.   Claiming benefit and **not** in employment;

2.   Claiming benefit **and** in employment;

3.   In employment and **not** claiming benefit;

4.   **Neither** claiming benefit **nor** in employment.

Here, 'claiming benefit' refers to being in receipt of Jobseeker's Allowance (JSA), Income Support (IS) or Employment and Support Allowance (ESA)/Incapacity Benefit (IB) at some point during the relevant week. 'In employment' refers to having an employment spell recorded in the cleaned P45 data during the week. These four states are exclusive in that each individual can only be in one of the four in any given week, although individuals can move between states from one week to the next.

This approach is consistent with the recent impact assessment of work experience (Haigh and Woods, 2016) but differs slightly to that used in earlier studies such as the Early Impacts study (Ainsworth *et al.*, 2012). The earlier studies focused on two outcome states: 'in employment' and 'on benefit'. These states were not exclusive – it was possible for an individual to be in both states in a given week[2]. This format of results can be recreated from the impact results generated in this study by simply adding together the impact for the relevant mutually exclusive outcome states. For example, the sum of the impact on time spent in outcome states (1) and (2) in the list above reflects the impact of the labour market programme participation on time spent on benefit, as presented in earlier impact assessments. The results tables in Appendix D have been designed so that the 'total' rows and columns in bold present the impact estimates in a format consistent with previous studies.

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[2]   Some of the overlap between these states will be due to quality issues with the employment data, specifically missing/incorrect start and end dates for employment spells. However, there are also situations in which the overlap between benefit and employment spells may be genuine. For example, a person claiming JSA is allowed to work up to 16 hours per week without affecting their entitlement to benefit.

We believe that the approach we have adopted in this study provides maximum transparency regarding the impact of sector-based work academies on subsequent outcomes, whilst still allowing the new results to be compared with those from earlier analysis. The inclusion of 'neither claiming benefit nor in employment' as an outcome measure is in line with recommendations made by the National Institute of Economic and Social Research (NIESR).

The proportions of the participant and comparison groups in each outcome state were compared to determine the impact of sector-based work academies on the likelihood of being in a given state for each week in the tracking period. Figure 4.1 shows the proportion of each participant and comparison group who were in receipt of benefit and not in employment in each week for the 52 weeks prior to each individual's start/pseudo start date (shown as week zero), and in each week of the tracking period subsequent to this. The dotted lines show the comparison group proportions, while the solid lines represent the participant groups. For the weeks prior to the start/pseudo-start date, the difference between the participant and comparison group for each cohort should be small, since the propensity score matching process should ensure that the benefit history of the two groups is similar. After the start date, the groups will diverge if the sector-based work academy intervention has had an impact on the outcome measure in question.

Figure 4.1   Proportion of each group (post-matching) in receipt of benefit and not employment in each week following a sbwa start/pseudo start date
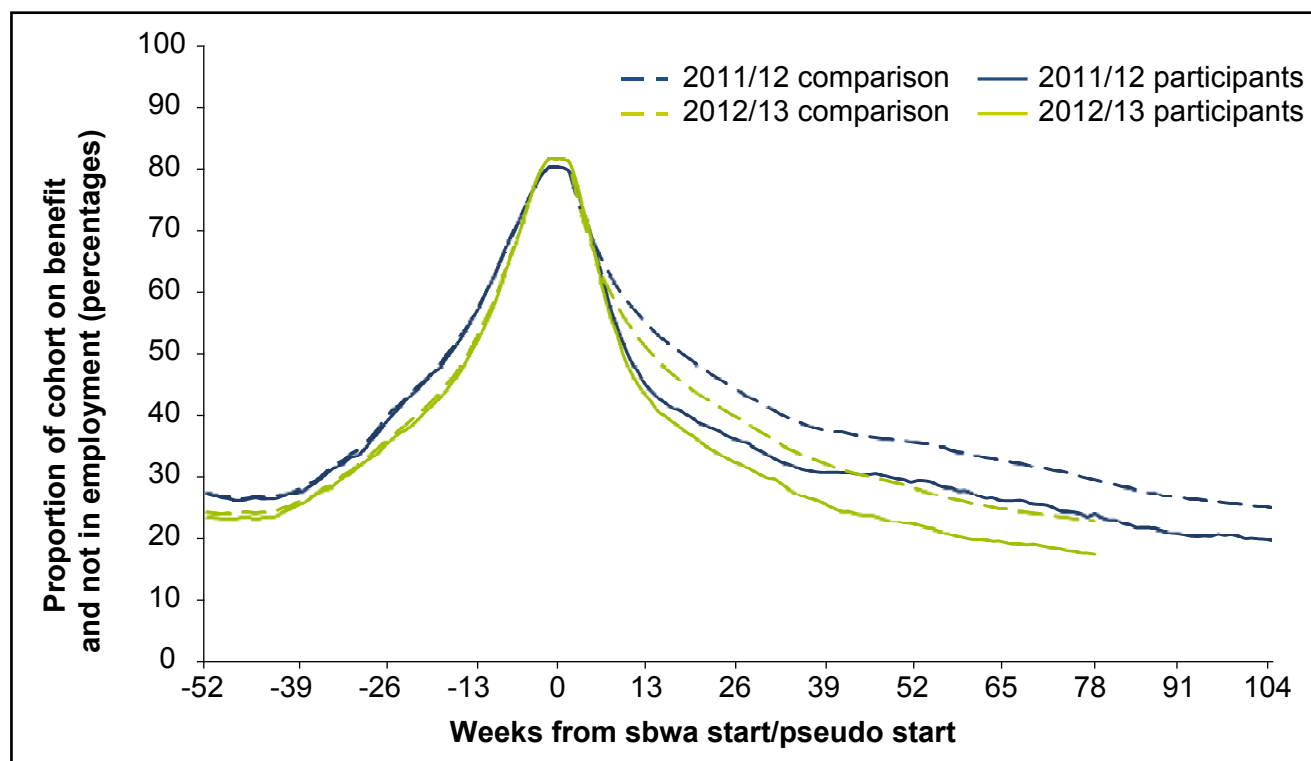
Figure 4.2 shows the result of applying a difference-in-difference calculation to the participant and comparison group proportions shown in Figure 4.1, as discussed in section 3.1. The difference between the two groups' outcomes 52 weeks before the sector-based work academy start was subtracted from the difference in these outcomes in each week subsequent to the intervention. The result provides an estimate of the impact of sector-based work academy participation on the likelihood of being in receipt of benefit but not in employment in each week following a placement start.

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Figure 4.2 includes confidence intervals to show the uncertainty around the impact estimate in each week. This uncertainty reflects the size of the samples used to produce the impact estimate for each cohort. The uncertainty estimates were constructed using a Linear Probability Model approach applied to the sample post-matching. This is the same methodology used in the recent work experience impact assessment (Haigh and Woods, 2016).

Figure 4.2   Impact of sbwa participation on the likelihood of being in receipt of benefit and not in employment in each week following a sbwa start/ pseudo start
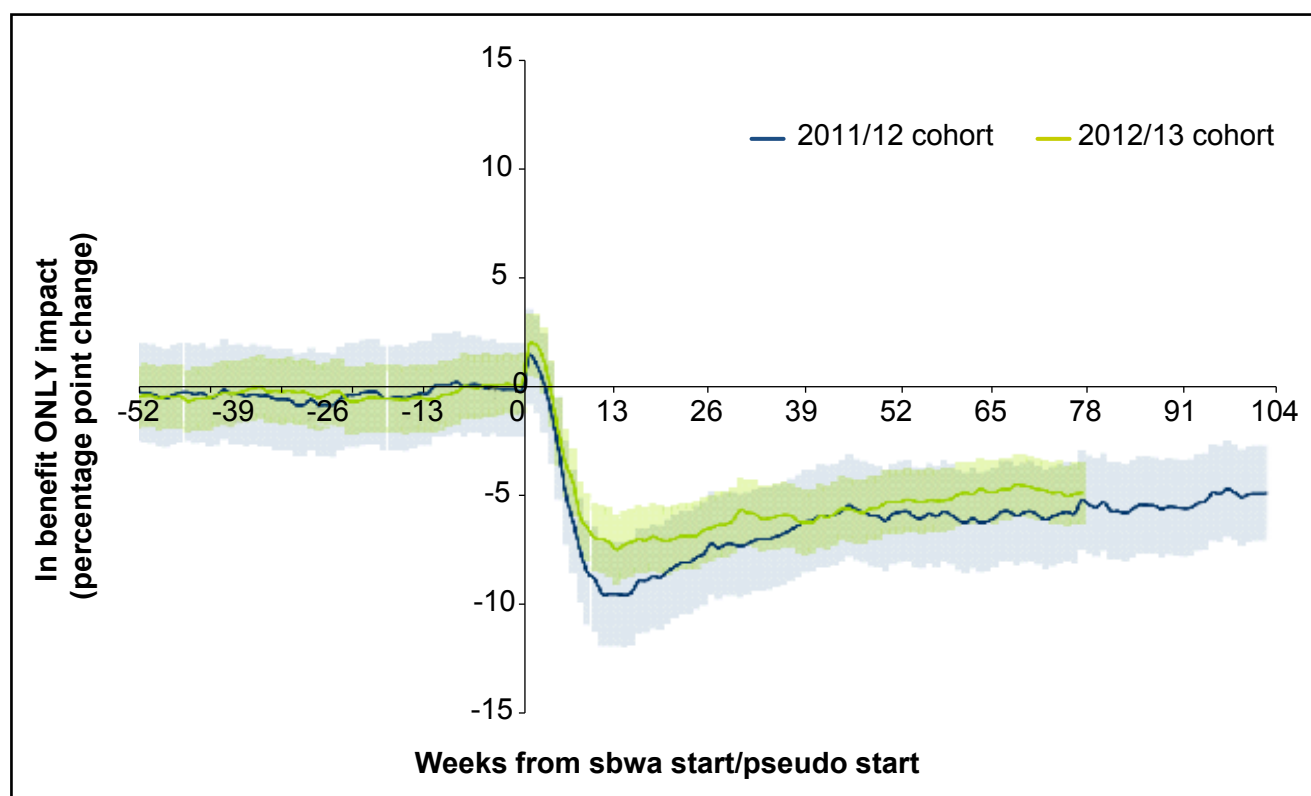
The data shown in Figure 4.2 provides point-in-time estimates of the impact of sector-based work academies on the likelihood of being in a given outcome state at a specific point following participation. For example, we can say that at 78 weeks after a sector-based work academy start, individuals in the 2012/13 cohort were five percentage points less likely to be on benefit and not in employment than the matched comparison group. A summary of the results for each cohort expressed in this format can be found in Table D.1 in Appendix D.

These results can also be aggregated to provide estimates of the impact of sector-based work academies on the overall time individuals spent in each outcome state following participation. The additional number of days that participants spent in a given outcome state in a given week is calculated simply by multiplying the point-in-time percentage point impact for that week by seven (i.e. the number of days in a week). Summing this across all weeks in the tracking period gives an estimate of the total additional number of days that participants spent in the outcome state under consideration. A summary of results expressed in the format 'additional days in outcome state X by week Y' can be found in Table D.2 in Appendix D.

1. Effect of sector-based work academy participation on 'claiming benefit and not in employment' outcome state (see Figures 4.1 and 4.2):

• Participants of sector-based work academies initially experienced a benefit 'lock-in' in the initial 5 to 6 weeks after starting the programme. This reflects the average duration of a placement consisting of 2 to 3 weeks PET and 2 to 3 weeks work experience placement. During this period, lock-in is likely because participants have less availability for job search activity and so are less likely to leave benefit during this period (the work experience placement itself does not count as time spent in employment). Some claimants are also more likely to remain on benefit for longer than they would have done in the absence of the programme in order to complete their participation in the programme.

• Following this lock-in, participants were then significantly less likely to be in receipt of benefit and not in employment across the remainder of the tracking period. This is consistent across both cohorts.

• For the 2012/13 cohort, participants spent on average 29 days less in this particular outcome state during the year and a half after their sector-based work academy start. The impact was greater for the 2011/12 cohort where participants spent on average 44 days less in this state during the two years following a start. Appendix D shows the overall impact on time spent claiming benefit and not in employment across a series of tracking periods for both cohorts.

• Looking at the trajectory of the impact chart in 4.2, there is evidence to suggest the impact of sector-based work academies extended beyond the tracking period. Whilst there is a diminishing trend at the end of the tracking period, given the slope we expect the impact to only gradually revert back to zero.

We will now examine the effect of sector-based work academy participation on the subsequent likelihood of being in each of three further outcome states listed in section 4.2 (claiming benefit and in employment, in employment and not claiming benefit, neither claiming benefit nor in employment).

2. Effect of sector-based work academy participation on 'claiming benefit and in employment' outcome state (see Figures 4.3 and 4.4):

• Figures 4.3 and 4.4 indicate that sector-based work academies had no apparent impact on the likelihood of being both in receipt of benefit and in employment. Across the tracking period for both cohorts, the estimated impact was not significantly different from zero.

• This finding is reassuring, since some of the estimated overlap between individuals' benefit and employment spells is likely to be due to start and end date errors in the employment data (see section 3.3 for more detail), so a detected impact here could indicate a difference in data quality between the participant and comparison groups.

Figure 4.3   Proportion of each group (post-matching) both in employment and in receipt of benefit in each week following a sbwa start/pseudo start date
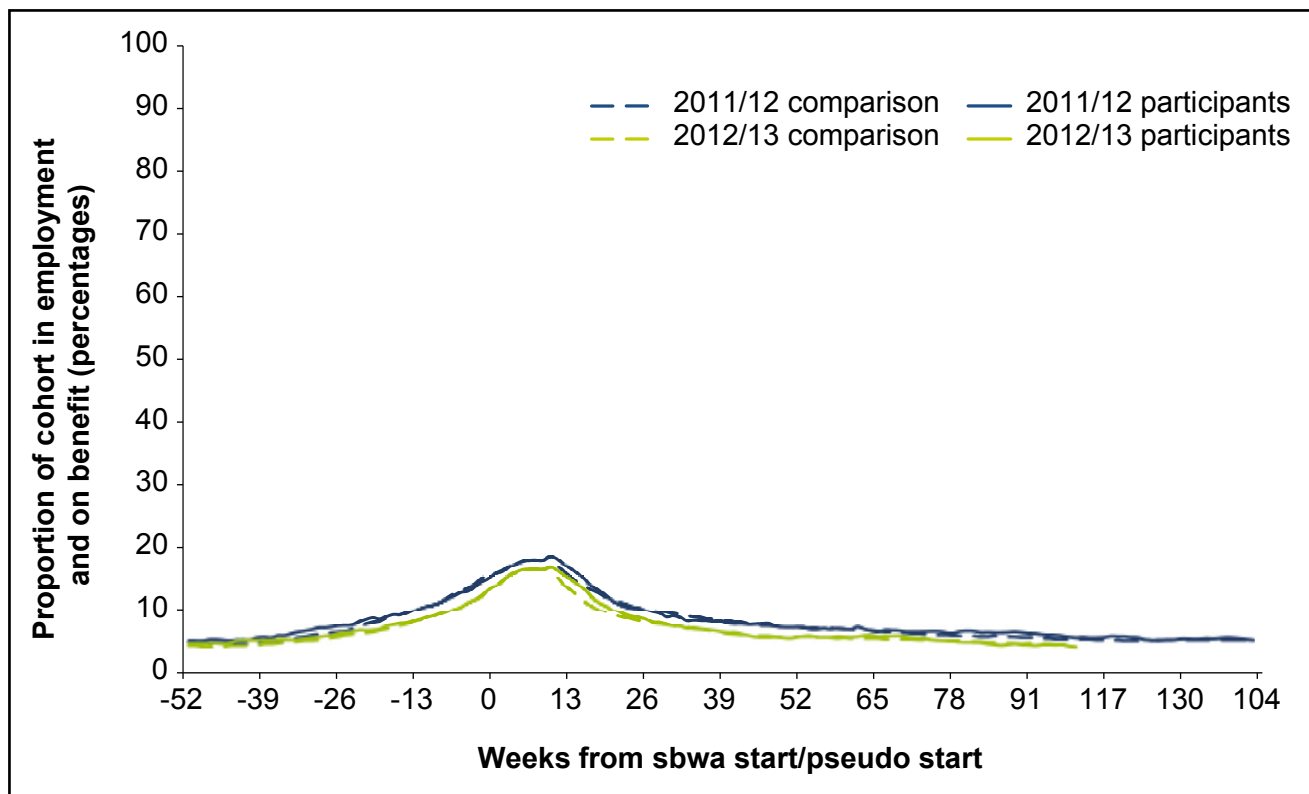
Figure 4.4   Impact of sbwa participation on the likelihood of being both in employment and in receipt of benefit in each week following a sbwa start/pseudo start
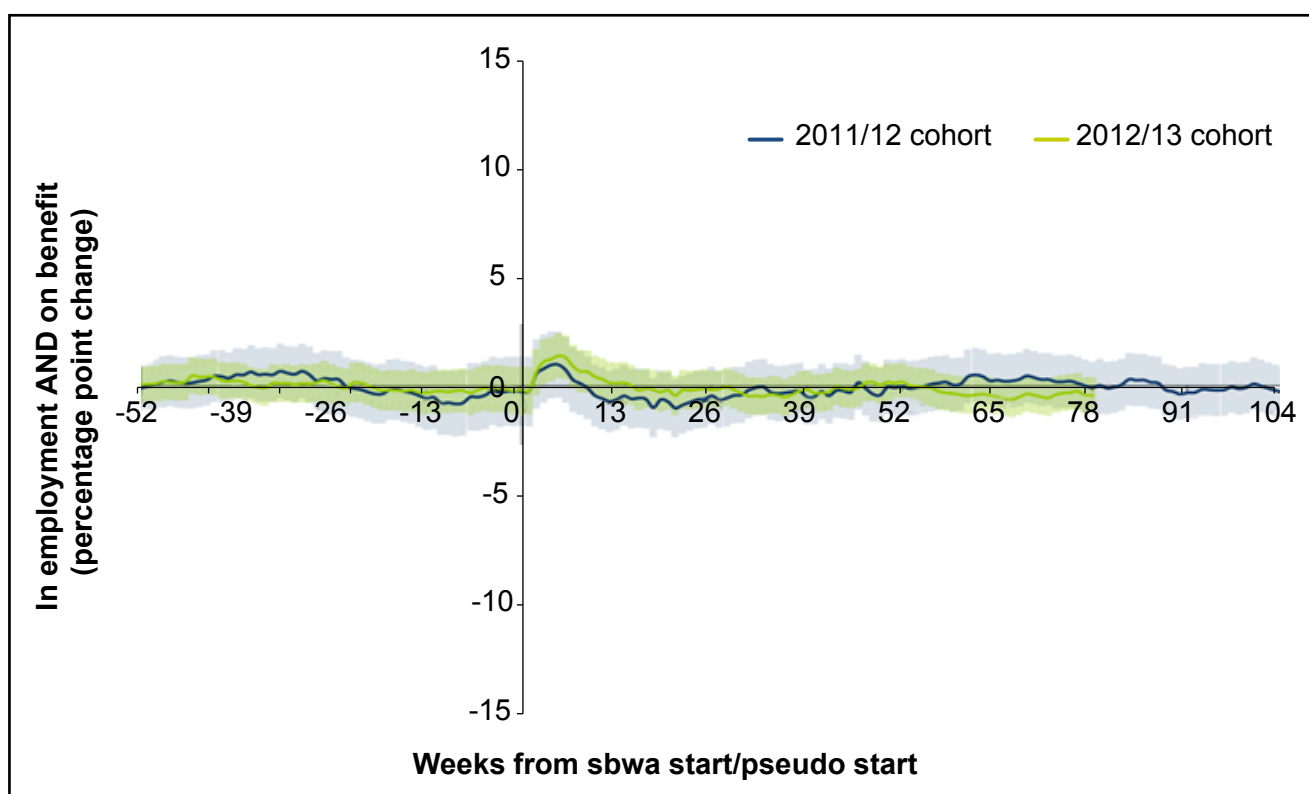
3. Effect of sector-based work academy participation on 'in employment and not claiming benefit' outcome state (see Figures 4.5 and 4.6):

- Mirroring the benefit 'lock-in' discussed in point 1, sector-based work academy participants were less likely to be in employment and not claiming benefit in the immediate period after starting a placement than non-participants. This lock-in was slightly shorter in duration than for the outcome 'in receipt of benefit and not in employment'; indicating that sector-based work academy participants may have found employment before completing the programme.

- Following this lock-in participants were significantly more likely to be in employment and not claiming benefit, sustained for the remainder of the tracking period. At 13 weeks after a start for the 2012/13 cohort, participants were 11 percentage points more likely to be in this outcome state than the matched comparison group. At 78 weeks after a placement start, participants were still 10 percentage points more likely to be in this outcome state.

- Translating percentage point impacts to days, participants spent on average 51 days more in employment and not claiming benefit during the 18 months following a sector-based work academy start (2012/13 cohort). The impact was greater for the 2011/12 cohort in which, during the two years after a placement start, participants spent an additional 71 days in this outcome state.

- As expected, outcomes 'claiming benefit and not in employment' and 'in employment and not claiming benefit' corroborate each other with the direction of the impact being opposite. However, the positive employment impact of sector-based work academies in Figure 4.6 is not the exact inverse of the benefit impact in Figure 4.2. This is discussed further in section 4.4.

Figure 4.5   Proportion of each group (post-matching) in employment and not in receipt of benefit in each week following a sbwa start/pseudo start date

Figure 4.6   Impact of sbwa participation on the likelihood of being in employment and not in receipt of benefit in each week following a sbwa start/pseudo start
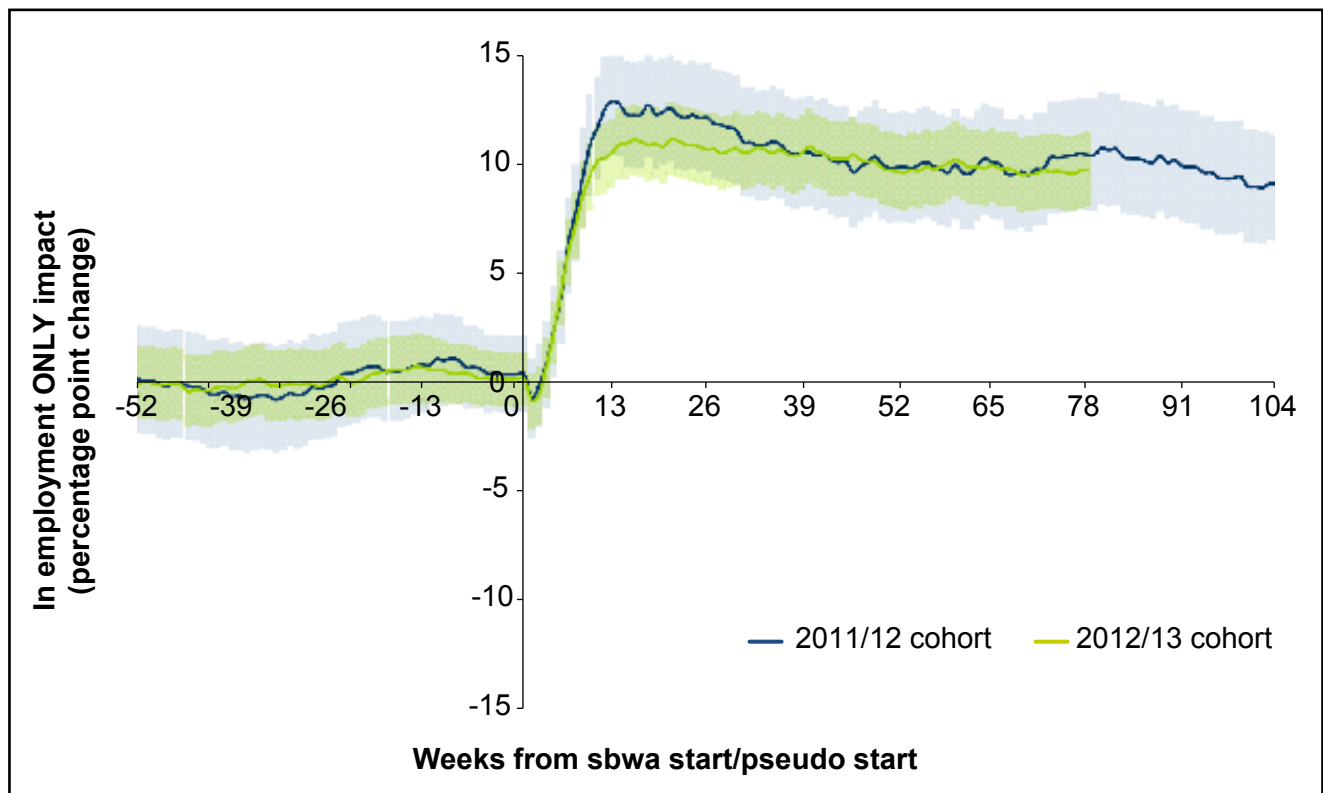
4. Effect of sector-based work academy participation on 'neither claiming benefit nor in employment' outcome state (see Figures 4.7 and 4.8):

- When compared with the comparison group, sector-based work academy participants were less likely to be neither claiming benefit nor in employment from the start of their placement.

- Figure 4.8 shows that this impact was maintained throughout the tracking period for each cohort: participants in both cohorts were four percentage points less likely to be in this outcome state at the end of the relevant tracking period.

- Taken in conjunction with the findings for the other three outcomes, this implies that a substantial proportion of those who moved into employment as a consequence of participating in a sector-based work academy would have left benefit in the absence of the programme, but to a destination other than work. This accounts for the discrepancy between the impacts measured in outcome states 'claiming benefit and not in employment' and 'in employment and not claiming benefit'.

Figure 4.7   Proportion of each group (post-matching) neither in employment nor in receipt of benefit in each week following a sbwa start/pseudo start date
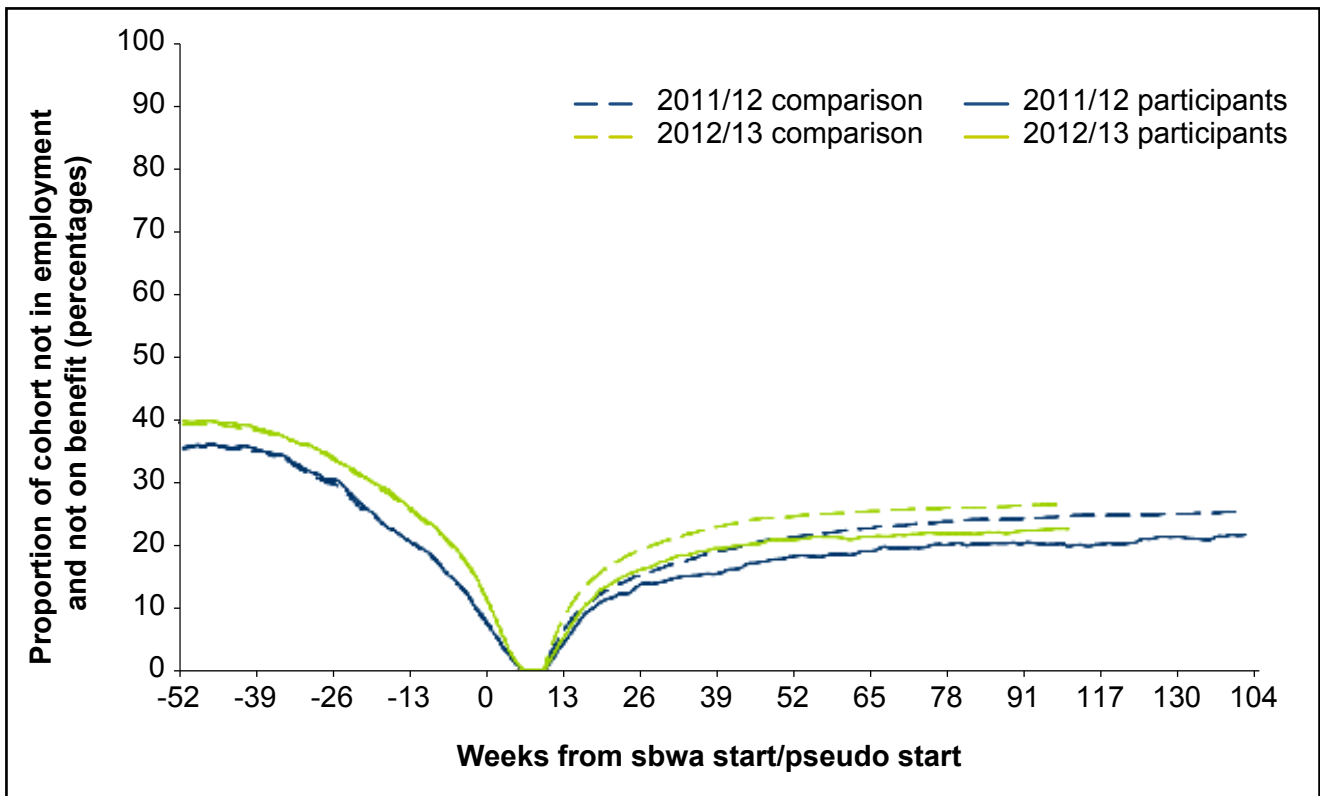
Figure 4.8   Impact of sbwa participation on the likelihood of being neither in employment nor in receipt of benefit in each week following a sbwa start/pseudo start
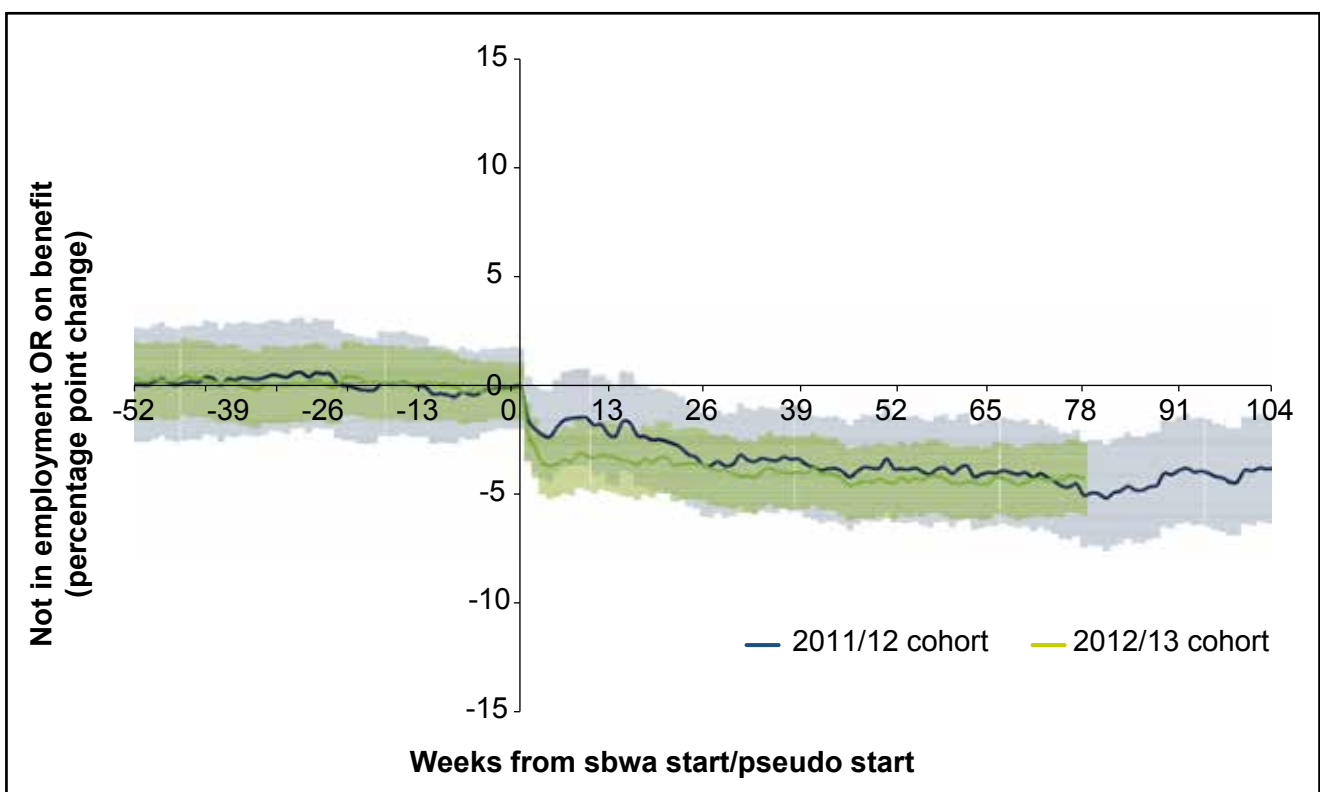
4.3 Findings from the 2012/13 cohort

Whilst both cohorts found a positive impact of sector-based work academies on helping people move off benefit and into employment, there was a noticeable difference in the size of this impact. In particular, the reduc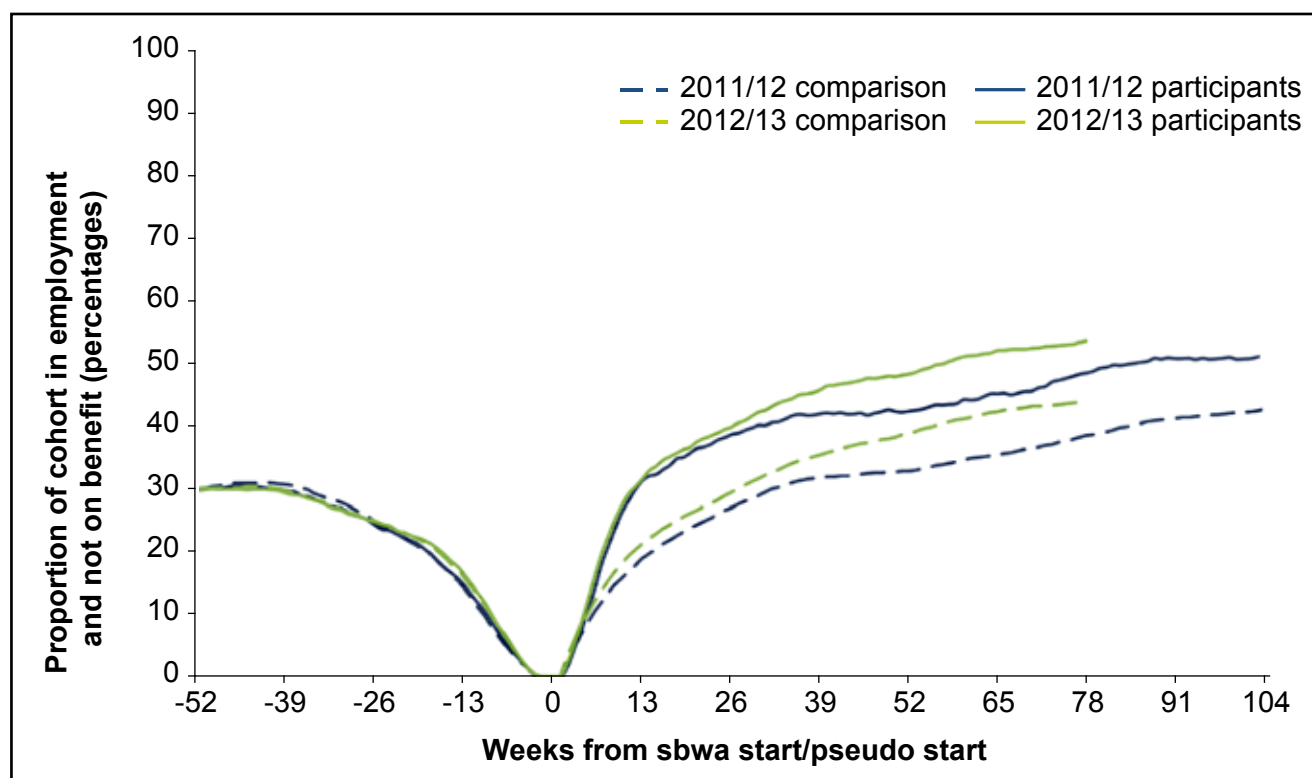tion in the likelihood of being in receipt of benefit and not in employment was substantially smaller for the 2012/13 cohort.

One possible contributing factor could be the changes in the targeting and composition of the cohorts. Evidenced by the increase in cohort size in Table 4.1, the year gap between cohorts coincided with an expansion of the sector-based work academy programme and the introduction of Youth Contract targets. It is likely that in the infancy of its rollout, placements in the smaller 2011/12 cohort would have been more specifically targeted at individuals who would benefit most. In the later 2012/13 cohort, these selection criteria may have relaxed.

Figure 4.9   **A breakdown of the (pre-match) participant group demographics for both cohorts. The size of each bubble is proportional to the fraction of the cohort in the relevant subset.**

Note: Claim duration refers to time spent on JSA prior to sector-based work academy start.
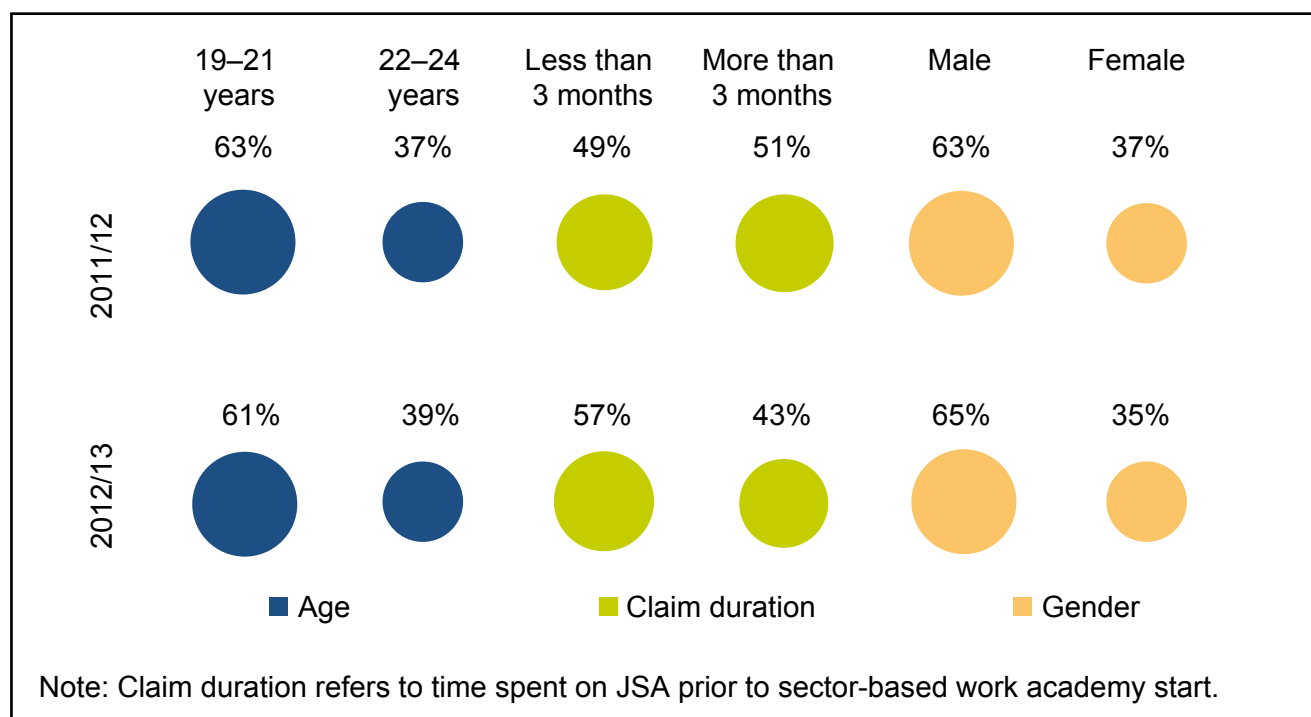
An examination of the characteristics of the participants in each group reveals differences in the composition for the cohorts, as shown in Figure 4.9. A smaller proportion of the pre-matched participant group in the 2012/13 cohort were claiming JSA for three months or more prior to starting their sector-based work academy. Subgroup analysis in section 4.3 shows that the impact of participation is greater for the longer-term claimant group, which may help explain the increased impact measured for the 2011/12 cohort.

Section 4.3 also discusses the greater impact of sector-based work academies for those participants who engage in all three elements of the programme (pre-employment training, work experience placement and guaranteed job interview). Examination of the element breakdown shows there was no significant difference in the proportion of the two cohorts' participant groups who engaged in all three components.

In the subgroup analysis in the following section and in the cost-benefit analysis in section 5 we have focused on results for the 2012/13 cohort. This cohort has been selected after considering the trade-off between sample size and tracking period data availability. Firstly, the 2012/13 dates represent a period when roll-out of sector-based work academies was sufficiently advanced to allow for a larger sample size, enabling more robust subgroup analysis. Secondly, whilst the 2011/12 cohort allows for a two-year tracking period, the 18-month tracking period used with the 2012/13 cohort still provides substantial information on how the impact of the programme is maintained over time. Lastly, given the policy change in March 2012 making the work experience placement voluntary, the 2012/13 cohort represent the more recent sector-based work academy design.

Across both cohorts, the impact of sector-based work academies on subsequent time spent in employment was greater than the impact on time spent on benefit. This pattern has been observed in previous evaluations of DWP labour market programmes, including 'Work experience: A quantitative impact assessment' published in March 2016 and the work experience 'Early Impacts' study. This aspect of the results is discussed in more detail in section 4.4.

4.4   Findings from subgroup impact analysis

The analysis described in the sections above was repeated for a number of subgroups in order to build an understanding of which groups sector-based work academies are most effective for. As discussed in the previous section, the findings presented here are for the 2012/13 cohort, since this provides the most suitable combination of sample size and tracking period.

The subgroups examined were as follows:

• Participants aged 19 to 21 years;

• Participants aged 22 to 24 years;

• Participants who had been claiming JSA for three months or less prior to a sector-based work academy start;

• Participants who had been claiming JSA for more than three months prior to a sector-based work academy start;

• Male participants;

• Female participants;

• Participants who engaged in all three elements of the sector-based work academy (pre-employment training, work experience placement and guaranteed job interview).

The methodology used was identical to that used for the main cohorts, with the addition of a filter applied to both the participant and comparison groups prior to the propensity score matching so that only the appropriate individuals were retained in both. Table 4.3 shows the sample size in each subgroup before and after matching was carried out. In all cases the proportion of participants on support following matching was over 97 per cent.

Table 4.3   Subgroup participant and comparison group sample sizes before and after matching, and the proportion of participants on support

	Full cohort	19–21-year-olds	22–24-year-olds	Claiming under 3 months	Claiming over 3 months	Males	Females
Comparison group (pre-matching)	424,696	229,059	195,637	218,547	206,149	275,439	149,257
Participant group (pre-matching)	14,689	8,966	5,723	8,367	6,322	9,564	5,125
Participant group (post-matching)*	14,530	8,814	5,594	8,200	6,191	9,409	5,005
Participants not on support	159	152	129	167	131	155	120
Percentage of participants on support	98.9%	98.3%	97.7%	98.0%	97.9%	98.4%	97.7%

*Note: The comparison group sample size is identical to the participant group sample size after matching by definition, since matched observations are weighted to ensure this is the case.

Figure 4.10 and Figure 4.11 provide a comparison of the subgroup results for the two main outcome states ('on benefit and not in employment', and 'in employment and not on benefit'), expressed in terms of the additional days spent in each state during the 78 week tracking period.

Figure 4.10 Impact of sbwa participation on time spent on benefit and not in employment by subgroup (2012/13 cohort, 78 weeks tracking)
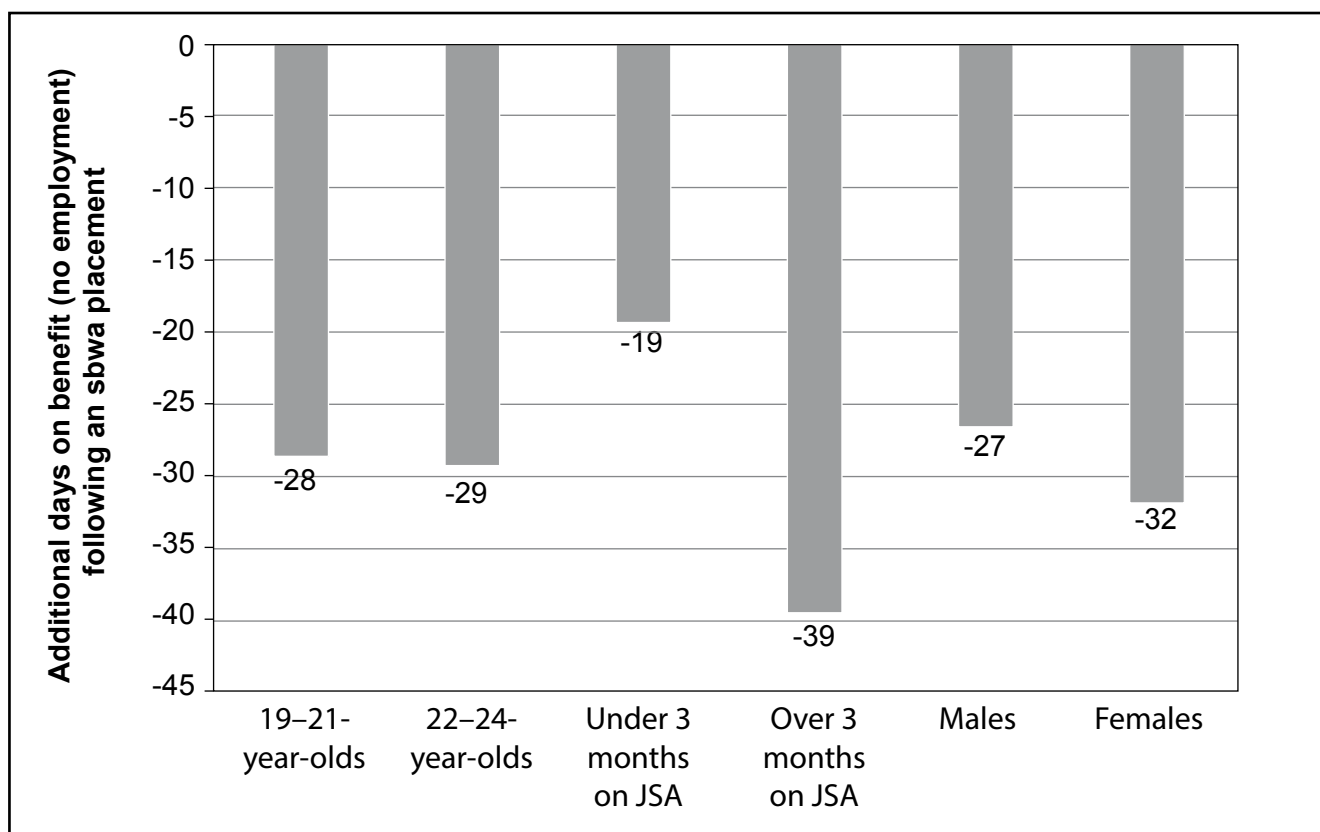
As shown in Figure 4.10, there was a wide variation across the subgroups in the impact on time spent on benefit but not in employment. Across all subgroups the impact of sector-based work academy participation was beneficial, with the largest impact being for those who had been on JSA for more than three months at the point when they started their placement. There were also differences between the genders, with a greater reduction in time spent on benefits for females than males. This is discussed in more detail below.

Age did not appear to have any significant impact on time spent in receipt of benefit and not in employment; relative to a younger subgroup of participants, 22 to 24 year-old sector-based work academy participants spent one extra day less on benefit and not in employment during the 18 months after starting a placement.

Interestingly, the equal impact between age cohorts in Figure 4.10 is not evident in Figure 4.11, which shows the impact for each subgroup on time spent in employment but not on benefit. This means that whilst sector-based work academies are equally helpful at moving 19 to 21 year-olds and 22 to 24 year-olds out of the state 'on benefit and not in employment', older participants are more likely to move off benefit and into work as a result of participating.

Figure 4.11 also shows the variation across subgroups in the impact on time spent in employment and not on benefit. This is far smaller than the variation shown in Figure 4.10. Whilst the largest impacts here were for 22 to 24 year-olds and for those claiming JSA for more than three months when starting a sector-based work academy, the impact of increasing time in employment was consistently large across all subgroups considered.

Figure 4.11   Impact of sbwa participation on time spent in employment and not on benefit by subgroup (2012/13 cohort, 78 weeks tracking)
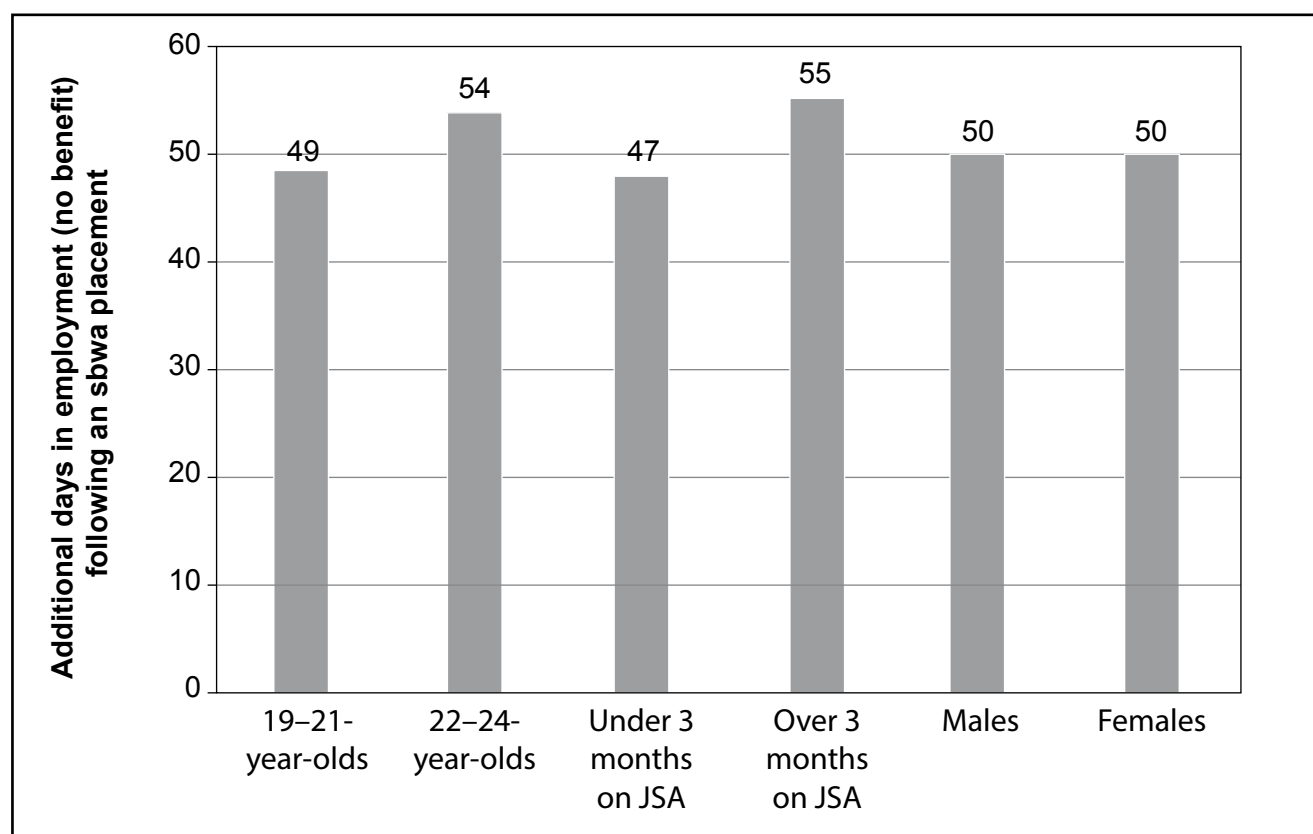
With regards to gender subgroups, the two outcome measures discussed above are inconsistent in the impact of sector-based work academies. Females see a larger reduction in time spent on benefit compared with males, but an equal impact in terms of additional time spent in employment. Further investigation of the impact on time spent in benefit for females indicates that this difference is driven by a reduction in movement onto IS for women who participate in a sector-based work academy.

It is possible that this apparent impact is an artefact of the approach used rather than a genuine phenomenon, since pregnant women would be both less likely to participate in sector-based work academies and more likely to transition to IS. The matching process would be unable to control for this due to a lack of suitable input data, so the apparent differences in the impact of a sector-based work academy across the genders should be interpreted with caution[3].

We also looked at the impact, relative to the matched comparison group, specifically of those participants who undertook all three elements of the sector-based work academy. As expected, across both cohorts those who participated in all three elements experienced the largest impact. Figure 4.12 shows the proportion of the pre-matched treatment group who undertook each of the different combinations of sector-based work academy elements. Across both cohorts, approximately 40 per cent of participants engaged in all three elements. There is no flexibility in the guidance for completing partial sector-based work academy placements. Therefore, the proportion of participants completing all three elements as recorded in the data is lower than expected. Considering that only pre-employment training starts are formally acknowledged for performance purposes, it may be that the Labour Market System (LMS) is not updated correctly. It could also be due to participants leaving the scheme before completion.

Figure 4.12 Combinations of elements amongst the pre-matched treatment groups

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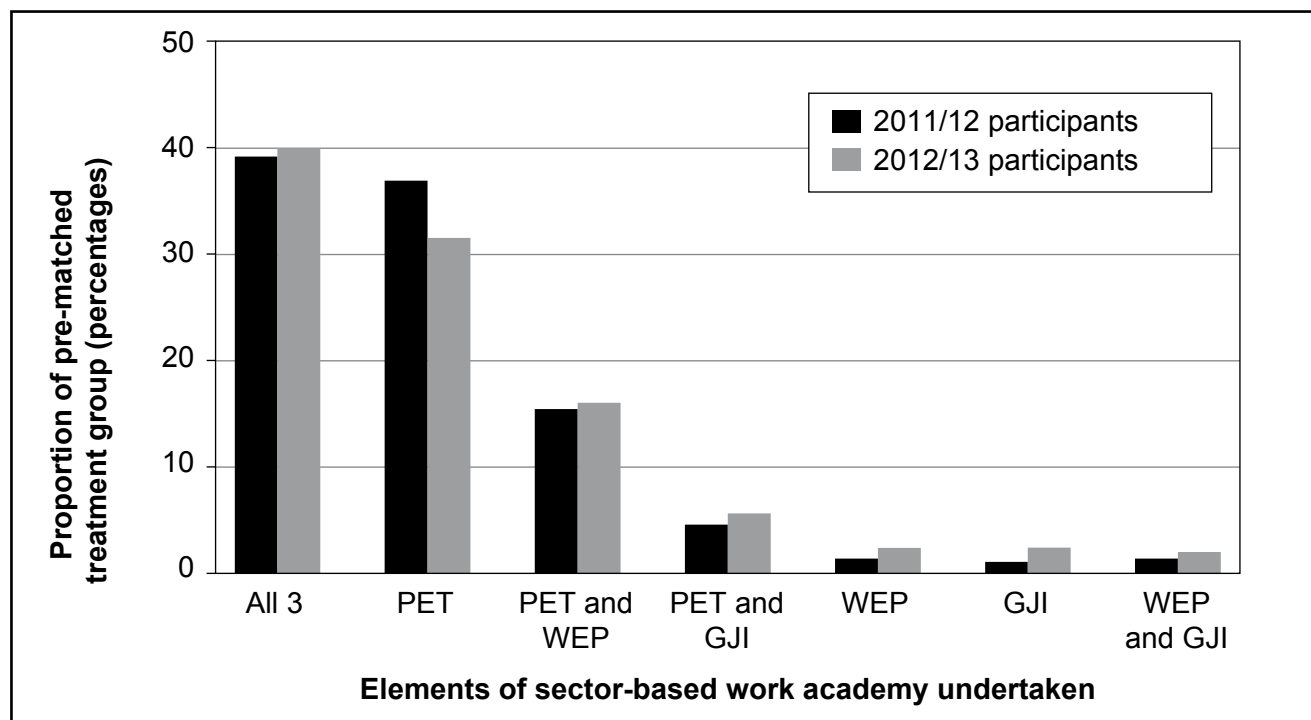
[3]   This may also have had a small effect on the overall cohort results; however, we are confident that the effect is too small to significantly alter the findings of this study. In future evaluations of this type we will explore options for incorporating Child Benefit data into the matching variables as a proxy for pregnancy to remove the issue.

After an initial 'lock-in' period coinciding with participation in the programme, Figure 4.13 shows that participants off all three components were significantly less likely to be on benefit and not in employment, sustained for the tracking period than non-participants. Furthermore, this reduction in the likelihood was greater than in the full cohort. Participants of all three programme elements in the 2012/13 cohort spent on average 39 days less in receipt of benefit and not in employment relative to non-participants across the tracking period. The full cohort results which include all combinations of sector-based work academy combinations implied 29 days less.

Figure 4.13   Impact of sbwa participation in all three elements of the programme on the likelihood of being in receipt of benefit and not in employment in each week following an sbwa start/pseudo start
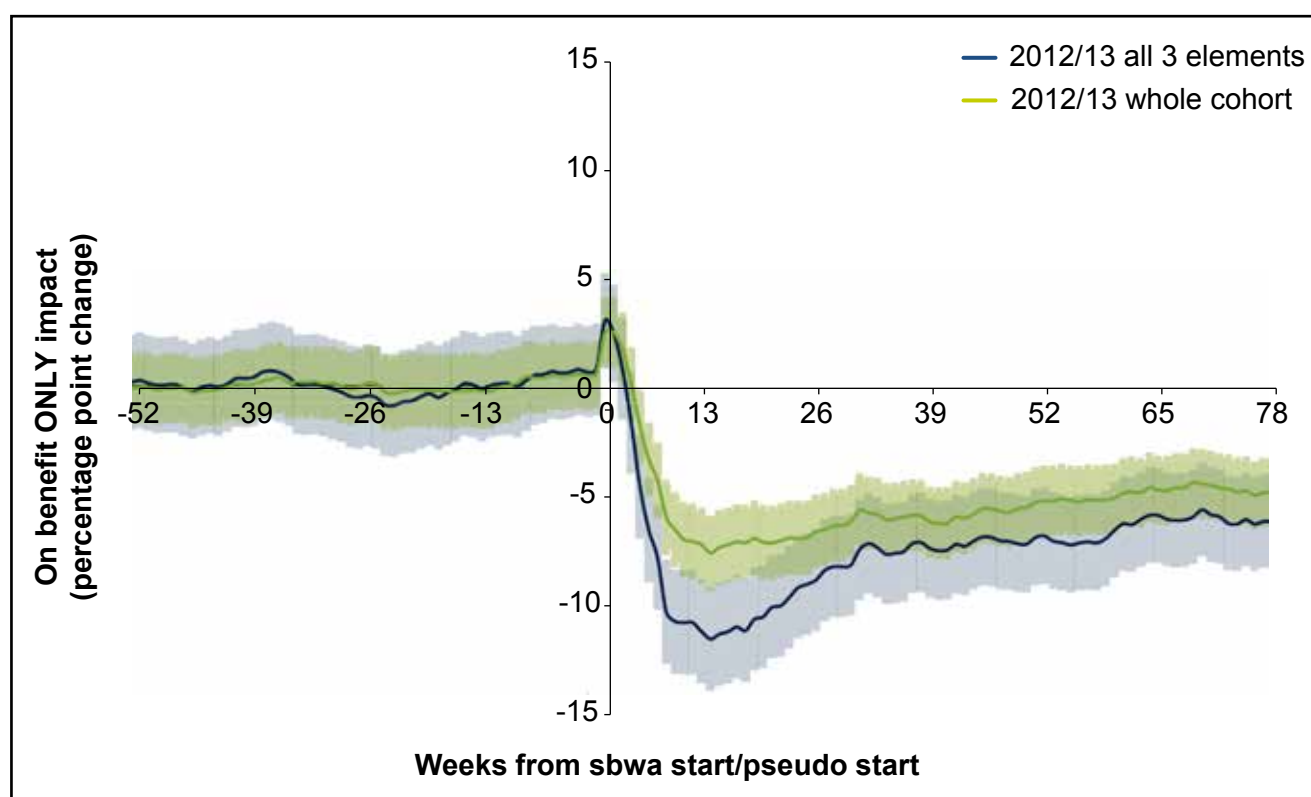
Likewise, the employment impact was greater for participants of all three elements. For the 2012/13 cohort, these individuals spent on average 64 days more in employment and not in receipt of benefit relative to the matched comparison group during the year and a half after a placement start. This exceeds the employment impact results for the full cohort which suggested an additional 51 days in this outcome state over the same tracking period.

We do not estimate and compare the impacts on the benefit and employment outcomes of sector-based work academies in which individuals participate in different combinations of the scheme's elements (e.g. PET and work experience placement (WEP) only). This is because we are unable to account for selection into the guaranteed job interview element of sector-based work academies via the explanatory variables used in the Propensity Score regression. As a consequence, Propensity Score Matching did not provide robust results in creating separate comparison groups for the individual components of sector-based work

academies. For example, the Department for Work and Pensions (DWP) does not hold data on the LMS recording whether the employer offering the placement was able to offer an interview or not. Therefore we were unable to identify whether a claimant did not participate in a guaranteed job interview because (i) the employer did not offer one as it went against their recruitment policy (where employers are not able to offer a preferential interview to one group of applicants), (ii) the interview participation was not recorded on LMS, or (iii) the claimant didn't successfully complete the pre-employment training and work experience placement components so was not offered a guaranteed job interview by the employer.

Due to this issue, we were only able to use propensity score matching (PSM) to create a pseudo comparison group to estimate the impact of sector-based work academies consisting of individuals who did not participate in the scheme.

Figure 4.14 Impact of sbwa participation in all three elements of the programme on the likelihood of being in employment and not in receipt of benefit in each week following an sbwa start/pseudo start
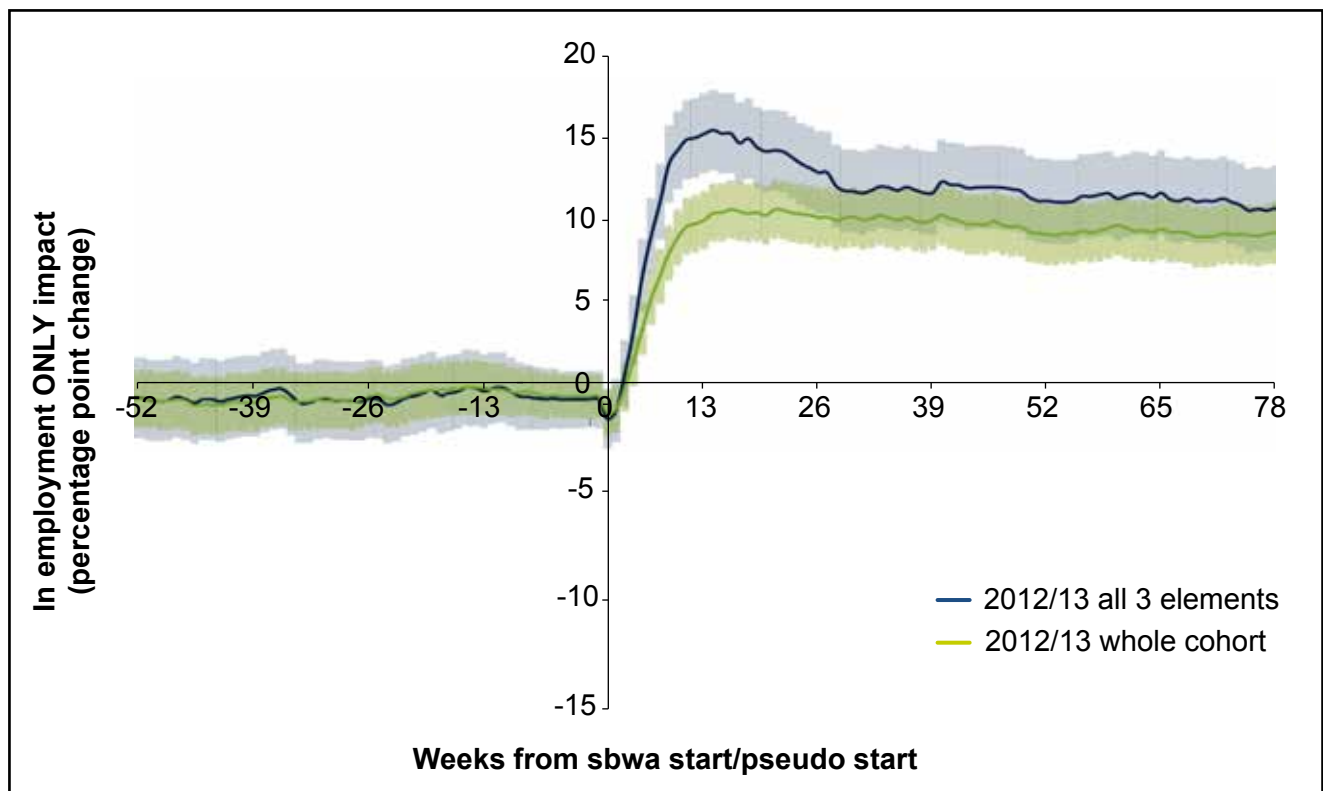
The key findings from the subgroup analysis are:

• Referrals to sector-based work academies are likely to be most effective in helping people off benefit if they are made after the three month point in the JSA claim;

• Participation in sector-based work academies appears to have a greater impact on future work outcomes for 22 to 24 year-olds than for younger claimants. This may indicate that a lack of local, sector-specific training is a greater barrier to finding employment for individuals in this age group;

• Participating in all three elements of the sector-based work academy increases the impact of participation on the likelihood of moving off benefit and into employment.

4.5 Understanding the differences between benefit and employment impacts

The findings for all cohorts covered in this report showed substantial differences between the benefit and employment impacts of sector-based work academies, with the increase in time spent in employment being greater than the reduction in time spent on benefit in all cases.

This combination of results is possible because of the large proportion of claimants in this age group who leave benefit without moving into employment. Sector-based work academies appear to have a substantial impact on reducing movement from benefit to non-work destinations for those who participate: following a placement start, some individuals who otherwise would have been in this group become more likely to move into work instead.

However, we are unable to examine what these 'non-work destinations' are for the specific individuals involved in the study. Possible options include education, training, self-employment and low-paid work (although towards the end of the tracking period this latter option should be reducing as a result of improved coverage of the employment data, as discussed in section 3.3).

For the age group under consideration, it is likely that a significant proportion of those who are neither in employment nor on benefits are in education. This could pose a problem for the findings presented here if the intention to return to education at a later point reduced the likelihood of participating in a sector-based work academy for a significant number of individuals in each cohort, since these individuals would be less likely to be in work once their studies commenced. This scenario would introduce bias into employment impact estimate, with the effect of inflating the apparent effect.

It is therefore reassuring that the employment impact remains large for the 22 to 24 year-old subgroup. For this group, the likelihood of returning to education or training might be expected to be lower, so the presence of a large employment impact here supports the hypothesis that the impact is genuine.

In their feedback on the work experience 'Early Impacts' study, NIESR raised a concern that there could be differences in the quality of employment data for participants compared with non-participants. It could occur in a scenario where sector-based work academy employers tended to be on average larger, and so would be more likely to submit complete records to Her Majesty's Revenue and Customs (HMRC). If this were the case, this could result in an inflated employment impact being measured for the programme.

The introduction of Real Time Information (RTI) systems provides some evidence that this is not the case: following the roll-out of RTI, the vast majority of employers should be submitting employment records, so any impact caused by this effect should disappear. By the tail end of the 2012/13 cohort tracking period included in this study, RTI deployment should be nearing completion. As Figure 4.6 shows, the impact of sector-based work academies on the likelihood of being in employment remains consistent up to the end of the tracking period, despite the background level of coverage in the employment data increasing beyond the levels in the earlier cohorts. This is as you would expect if the employment impact were genuine.

5 Cost benefit analysis

This section presents a cost-benefit analysis (CBA) of sector-based work academies for the 2012/13 cohort of 19 to 24 year-old Jobseeker's Allowance (JSA) claimants for the 18-month period after starting the scheme.

The methodology underpinning this CBA is outlined in section 5.1. The findings of the CBA are presented in section 5.2. Conclusions are drawn in section 5.3.

5.1 Cost benefit analysis methodology

The methodology underpinning the CBA of sector-based work academies is based on the Department for Work and Pensions (DWP) Social Cost-Benefit Analysis framework[4]. This framework aims to provide a thorough, consistent and evidence-based approach to the CBA of employment programmes. The application of this approach is outlined below in terms of:

• whose perspective is considered – section 5.1.1;

• which costs and benefits are estimated – section 5.1.2; and

• the estimated scale of the costs and benefits under consideration – section 5.1.3.

The limitations of the adopted methodology are discussed in section 5.1.4. The application of this methodology is consistent with the approach used in the recent work experience impact assessment (Haigh and Woods, 2016).

5.1.1 The perspectives under consideration

The costs and benefits of the sector-based work academy programme are considered from the perspectives of:

• the sector-based work academy participants (henceforth 'participants');

• participants' employers;

• the Exchequer (i.e. the Government budget perspective); and

• society.

For the purposes of this analysis, 'society' represents an aggregate of all British citizens. Therefore a cost or benefit to participants, their employers or the Exchequer can also represent a cost or benefit to society. However, it should be noted that many of the gross impacts are essentially 'transfer payments'. Transfer payments represent a cost to one group of citizens but a benefit to another. For example, the wages earned during additional employment as a result of a sector-based work academy represent a benefit to participants but a cost to their employers. Such transfer payments cancel out when estimating the net benefits of a policy from society's perspective. An example of a net benefit to society is the increase in output that occurs when a policy leads to resources being used more efficiently. In the case of sector-based work academy, this occurs when participants (who were previously producing no output) produce output during additional time spent in unsubsidised employment as a result of the policy. This additional output represents a net benefit to employers and society.

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[4]   For a thorough discussion of the DWP Social Cost-Benefit Analysis framework, see Fujiwara (2010).

5.1.2   The costs and benefits under consideration

Table 5.1 summarises the sector-based work academy impacts which have been translated into monetised costs and benefits for inclusion in this CBA. These impacts and the associated costs and benefits are discussed separately below.

Table 5.1   Monetised costs and benefits of the sector-based work academy programme

| | Perspective | | | |
Sector-based work academy impact	Participants	Employers	Exchequer	Society
Increase in output	0	+	0	+
Increase in wages	+	-	0	0
Programme costs	0	0	-	-
Reduction in operational costs	0	0	+	+
Reduction in benefit payments	-	0	+	0
Increase in taxes	-	-	+	0
Increases in travel and childcare costs	-	0	0	-
Reduction in healthcare costs	0	0	+	+
Redistributive costs and benefits	+	0	0	+
Social cost of Exchequer finance	0	0	0	-

Key: '+' denotes a net benefit, '-' denotes a net cost; '0' denotes neither cost nor a benefit.

Increase in output

This refers to the economic output produced by participants as a result of additional time spent in unsubsidised employment. This output represents a benefit to employers (who sell it) and society (who consume it). The Department for Work and Pensions (DWP) does not have information on the value of this output so it is necessary to make a number of simplifying assumptions, discussed below.

We assume that the labour market is perfectly competitive. This implies that employers will hire workers up to the point where the value of an additional unit of output is equal to the associated marginal cost of production[5]. The cost of production, and therefore the value of the output produced during additional spells in unsubsidised employment, is assumed to equal the commensurate gross wage payments and employers' National Insurance contributions.

Increase in wages

This refers to the gross wages received by participants during additional time spent in employment. Wages represent a benefit to participants but a cost to their employers. This means they do not represent a net cost or benefit to society as a whole (except via redistributive effects – see below) DWP does not have information on the wages received by participants. The weekly wage received by participants in unsubsidised employment is assumed to equal the average weekly wage received by employed former JSA claimants aged 18 to 24[6].

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[5]   See, for example, Borjas (2009).

[6]   Estimates of the average weekly wage received by employed former JSA claimants aged 18 to 24 are based on the findings of Adams *et al.* (2012).

Programme costs

Sector-based work academy administration costs refer to both the set-up and management costs of the placement by Jobcentre Plus work coaches, and Flexible Support Fund (FSF) funding for travel and childcare costs during sector-based work academy participation. Youth Contract funding provides for up to 250,000 sector-based work academy or work experience places, for claimants aged 18 to 24 years, from April 2012 to March 2015. Placements for claimants aged 25 years or over are funded from Jobcentre District core budgets.

The Department of Business, Innovation and Skills (BIS), through the Adult Skills Budget (ASB), funds the pre-employment training (PET) aspect in England. In Scotland the PET is funded by the Scottish Government through Skills Development Scotland. In some cases, where there are gaps in provision, Jobcentre Plus can procure and fund the pre-employment training with local providers through the FSF. Employers cover the costs of the work experience placement and guaranteed job interview.

These payments represent a cost to the Exchequer and society (as this diverts economic resources from alternative uses).

The estimated average cost of setting up and administering each sector-based work academy placement is £665. This includes brokerage time for employment advisors, referral interview time for jobcentre staff and average FSF payments to support travel and childcare costs during participation on the programme. The majority of this total, however, is attributable to the PET unit element which DWP has estimated to cost on average £400 per participant (in 2014/15 prices). Whilst there exists variety in the scope of PET, the general trend is for short, 2 to 3 week duration training focused on preparation for work credits in the relevant industry. The £400 average PET unit cost is taken from the Skills Funding Agency's (SFA) estimate of the average of cost of 'Sector Subject Area – Preparation for Life and Work' provision training for 19 to 24 year-olds delivered in England in the 2014/15 academic year and funded through the BIS Adult Skills Budget. Analysis of case studies of pre-employment training suggests that the common trend for pre-employment training is to cover 2 to 3 QCF units: the cost of 3 QCF units is also approximately £400.

Reduction in operational costs

Sector-based work academy participants are less likely to receive support from Jobcentre Plus advisers following a placement because they are more likely to be working and less likely to be claiming benefit. As a result, this also means participants are less likely to participate in other DWP employment programmes. This translates into operational savings which represent a benefit to the Exchequer and society (as economic resources can be reallocated to alternative uses).

Reduction in benefits

This refers to the net reduction in benefit entitlement and take-up that occurs when participants spend additional time in employment as a result of a sector-based work academy[7]. This represents a cost to participants but a benefit to the Exchequer, which means there is no net cost or benefit to society as a whole (except via redistributive effects –

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[7]   Increases in Tax Credit entitlement and take-up are more than offset by reductions in Jobseeker's Allowance, Housing Benefit and Council Tax Benefit.

see below). Changes in benefit entitlement and take-up are estimated using the DWP Policy Simulation Model[8].

Increase in taxes

This refers to the increase in income tax, National Insurance and indirect tax revenue that occurs when participants spend additional time in unsubsidised employment as a result of a sector-based work academy. This represents a benefit to the Exchequer but a cost to participants and employers, which means there is no net cost or benefit to society as a whole (except via redistributive effects – see below).

Increases in tax revenue are estimated using the DWP Policy Simulation Model[9]. The costs and benefits associated with the remaining sector-based work academy impacts are described briefly below. For a detailed description of the methodologies used to estimate these costs and benefits, see Fujiwara (2010).

Increase in travel and childcare costs

This refers to the additional travel and childcare costs that are incurred by participants during additional employment as a result of a sector-based work academy. This also represents a cost to society as the provision of additional travel and childcare services diverts economic resources from alternative uses.

Reduction in healthcare costs

This refers to the reduction in National Health Service (NHS) costs which is expected to occur when participants spend additional time in unsubsidised employment as a result of their sector-based work academy[10]. This represents a benefit to the Exchequer (via reductions in NHS expenditure) and society (as economic resources which had been allocated to healthcare provision can be reallocated to alternative uses).

Redistributive costs and benefits

This refers to the redistributive costs and benefits associated with monetary transfers between participants, employers and the Exchequer. In line with the methodology prescribed in the HM Treasury Green Book[11], participants (who have relatively low incomes) are assumed to value each additional pound more highly than employers and the average taxpayer (who both have a relatively high income compared to participants). This implies, for example, that monetary transfers from the Exchequer to participants represent a benefit to society as a whole. In line with the recommendations of Fujiwara (2010), redistributive costs and benefits are estimated by applying a 'welfare weight' of 2.5 to monetary transfers made to and from programme participants.

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[8]   The DWP Policy Simulation Model is a microsimulation model which combines data from the Family Resources Survey with information on the UK tax and benefit systems. This allows users to estimate the changes in benefit payments and tax revenue that occur when unemployed individuals with a given set of characteristics move into work.

[9]   In order to estimate increases in indirect tax revenue, Office for National Statistics estimates of indirect tax burdens were applied to estimates of participants' disposable income obtained from the DWP Policy Simulation Model.

[10]   Fujiwara (2010) presents evidence of a causal relationship between individuals' employment status and NHS usage.

[11]   See HM Treasury (2003).

Social cost of Exchequer finance

This refers to the cost of raising the tax revenue that was required to finance sector-based work academies. This 'deadweight loss' arises because taxation creates market distortions which have an adverse effect on economic efficiency. The distribution of the social cost of Exchequer finance amongst members of society depends on the specific details of taxation policy.

For the purposes of this analysis, it is assumed to accrue to society as a whole. In line with the recommendations of Fujiwara (2010), the social cost of Exchequer finance is assumed to equate to 20 per cent of the net cost of the programme to the Exchequer. However, as this estimate is subject to considerable uncertainty, it is only considered as part of sensitivity analysis (see section 5.2.2).

5.1.3 Estimating the scale of the costs and benefits under consideration

The scale of the costs and benefits of sector-based work academies depends on the magnitude and the duration of its impacts. Specifically, it depends on the programme's impacts on the amount of time that participants spend:

• in unsubsidised employment; and

• not in receipt of unemployment benefits (but not in unsubsidised employment).

These impacts have been derived from the two of the four mutually exclusive "off benefit" estimates presented in section 4.2.

However, the costs and benefits of the programme will be underestimated if the impacts persist beyond the tracking period, i.e. 78 weeks after the sector-based work academy start date. For this reason, the costs and benefits of the sector-based work academy were estimated in relation to three possible scenarios:

i. the impacts of the programme do not persist beyond the tracking period (this forms the basis of a conservative 'lower bound' estimate);

ii. the impacts of the programme persist for one year beyond the tracking period; and

iii. the impacts of the programme persist for 6 months beyond the tracking period.

Under the latter two scenarios, it is assumed that the impacts of sector-based work academies continue at the same level as at the end of the tracking period, for six months and one year respectively[12]. It should be borne in mind that the further the impacts are assumed to persist beyond the tracking period, the less reliable the resultant cost and benefit estimates become.

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[12] This assumption was made because the estimated impacts of the sector-based work academy programme exhibit little variation during the last six months of the tracking period.

It is also necessary to account for the possibility that a proportion of the positive employment impacts experienced by sector-based work academy participants are obtained at the expense of non-participants. If this is the case then the overall benefits of the programme will be overstated. In order to account for this 'substitution effect', Fujiwara (2010) recommends that estimates of the additional time that participants spend in sector-based work academy jobs and unsubsidised employment should be reduced by approximately 45 and 20 per cent, respectively. However, as these estimates are subject to considerable uncertainty, substitution effects are only considered as part of sensitivity analysis (see section 5.2.2).

5.1.4   Limitations of this approach

The CBA estimates presented in section 5.2 are subject to two main caveats. First, the accuracy of the estimates depends on the robustness of the impact estimates from which they are derived (see section 4) and the validity of the assumptions upon which they are based (see sections 5.1.2 and 5.1.3). Uncertainty regarding these inputs has been partially mitigated by undertaking sensitivity analysis (see section 5.2.2).

Second, the CBA estimates exclude a number of potentially significant costs and benefits due to a lack of robust evidence[13]. For example, it has not been possible to obtain robust estimates relating to:

- the additional leisure time which participants forego (this represents a potential cost to participants and therefore society);

- the non-pecuniary benefits associated with additional time in unsubsidised employment (these represent a potential benefit to participants and therefore society);

- the cost of hiring and training incurred by employers (this represents a potential cost to employers and therefore society);

- the reduction in crime[14] which may result from the programme (this represents a potential benefit to society); and

- the economic multiplier effect which may result from the programme (this represents a potential benefit to society).

These non-monetised costs and benefits should be borne in mind when interpreting the CBA estimates presented in section 5.2

5.2   Findings of cost benefit analysis

This section presents estimates of the costs and benefits of sector-based work academy. Estimates based on a set of baseline assumptions are presented in section 5.2.1. The effects of varying these assumptions are examined in section 5.2.2.

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[13]   For a thorough discussion of the non-monetised costs and benefits of employment programmes, see Fujiwara (2010).

[14]   Fujiwara (2010) presents evidence of a causal relationship between individuals' income levels and their propensities to commit acquisitive crime. However, the voluntary nature of sector-based work academy participation means that this relationship cannot be used to obtain robust estimates of the programme's effects on crime levels.

The estimates presented in this section are expressed in 2015/16 prices and have been discounted in order to account for social time preference[15].

5.2.1   Baseline estimates

Table 5.2 below presents estimates of the costs and benefits of sector-based work academies which are based on the following baseline assumptions:

• the value of the output produced during additional unsubsidised employment is equal to the commensurate gross wage payments and employers' National Insurance contributions;

• the sector-based work academy programme results in redistributive costs and benefits but does not result in substitution effects or a social cost of Exchequer finance; and

• the employment impacts of a sector-based work academy do not persist beyond the tracking period (see section 5.1.3).

Table 5.2   The estimated costs and benefits of the sector-based work academies for 19 to 24 year old JSA claimants under baseline assumptions

Programme impact	Cost/benefit (£)			
	Participants	Participants' employers	Exchequer	Society
Increase in output	0	+ 1,500	0	+ 1,500
Increase in wages	+ 1,450	- 1,450	0	0
Programme costs	0	0	- 650	- 650
Additional employer costs	0	0	0	0
Employment subsidies	0	0	0	0
Change in operational costs	0	0	+ 100	+ 100
Change in benefits	- 300	0	+ 300	0
Increase in taxes	- 200	- 50	+ 300	0
Increase in travel & childcare costs	- 50	0	0	- 50
Reduction in healthcare costs	0	0	+ 50	+ 50
Distributional costs & benefits	+ 1,050	0	0	+ 1,050
Social cost of exchequer finance	0	0	0	0
Net benefit	**+ 1,950**	**0**	**+ 100**	**+ 2,000**

Note: The figures in this table have been rounded to the nearest £50. The columns may not sum due to rounding.

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[15]   Members of society generally prefer to receive goods and services sooner rather than later. In order to take account of this 'social time preference', costs and benefits which occurred in 'future' periods (i.e. from 2010/11 onwards) have been discounted in line with the methodology prescribed in the HM Treasury Green Book. For a detailed description of this methodology, see HM Treasury (2003).

Participants

Table 5.2 shows that, under the baseline assumptions, a sector-based work academy is estimated to result in a net benefit to participants. This is because the additional wages received by participants are expected to outweigh the costs associated with a net reduction in benefit receipt and net increases in tax liabilities, travel and childcare costs. Table 5.2 suggests that, on average, participants are financially better-off by approximately £900 as a result of the programme. The assumption that participants value additional income more highly than the average taxpayer means that the programme is also estimated to result in a net redistributive benefit of £1,050, bringing the total net benefit to £1,950.

Participants' employers

Table 5.2 shows that, under the baseline assumptions, sector-based work academies are estimated to be cost neutral to employers. This is because the value of the output produced is assumed to equal the commensurate gross wage payments and employers' National Insurance contributions. However, it should be borne in mind that this analysis excludes the costs of hiring and training participants.

The Exchequer

Table 5.2 shows that, under the baseline assumptions, the sector-based work academy programme is estimated to result in a net benefit to the Exchequer of approximately £100 per participant. This is because the programme costs are expected to be less than the benefits associated with a net increase in tax revenues and net reductions in benefit expenditure, operational costs and NHS expenditure.

Society

Table 5.2 shows that, under the baseline assumptions, the sector-based work academy programme is estimated to result in a net benefit to society of approximately £950 per participant. This is largely due to the additional economic output that is produced by participants during additional spells in unsubsidised employment as a result of the sector-based work academy. The assumption that participants value additional income more highly than the average taxpayer means that the programme is also estimated to result in a net redistributive benefit of £1,050. However, it should be borne in mind that the estimated net benefit to society excludes the cost of hiring and training participants.

Table 5.2 suggests that the sector-based work academy programme would still result in a net benefit to society provided that the sum total of these costs was less than £2,000 per participant.

5.2.2 Sensitivity analysis

As noted in section 5.1, there is considerable uncertainty regarding the accuracy of the baseline assumptions. For this reason, the net benefits of sector-based work academies were estimated on the basis of several potential scenarios (see Table 5.3 below).

Table 5.3   The estimated costs and benefits of sector-based work academies for 19 to 24 year old JSA claimants under alternative scenario assumptions

Scenario	Participants	Net benefit per participant (£)		
		Employers	Exchequer	Society
(1) Baseline assumption	+1,950	0	+100	+2,000
(1a) Redistributive costs and benefits excluded	+900	0	+100	+950
(1b) Partial substitution effects included	+1,950	0	-100	+1,500
(1c) Social cost of Exchequer finance included	+1,950	0	+100	+2,050
(1d) Employment impacts persist for one year beyond the tracking period	+3,200	0	+750	+3,900
(2) Conservative assumptions	+900	0	-100	+600
(3) Optimistic assumptions	+3,200	0	+750	+4,050
(4) Employment impacts persist for six months beyond the tracking period	+2,550	0	+400	+2,950

Note: The figures in this table have been rounded to the nearest £50.

Scenarios (1a) to (1d) in Table 5.3 show the effects of varying each of the baseline assumptions individually, **whilst holding the other baseline assumptions constant**. These scenarios are discussed separately below.

Under scenario (1a) it is assumed that the sector-based work academy did not result in redistributive costs or benefits. Under this scenario the estimated net benefits of the programme to participants and society are approximately £1,050 lower per participant than under the baseline assumptions, although both estimates remain positive. Excluding redistributive costs and benefits does not affect the estimated net benefits to the Exchequer or participants' employers.

Under scenario (1b) it is assumed that sector-based work academies results in substitution effects. This implies that a proportion of the positive employment impacts experienced by participants are obtained at the expense of non-participants. Arguably due to the nature of sector-based work academies it should not cause job displacement[16].

Including substitution effects reduces the estimated net benefit of the programme to the exchequer by approximately £200, resulting in sector-based work academies generating a slight loss to the Exchequer. This is because the 'substituted' non-participants would be expected to pay less tax and receive more benefits than under the baseline assumptions. Including substitution effects also reduces the estimated net benefit to society by approximately £500 per participant. This is mainly because the 'substituted' non-participants would be expected to produce less output than under the baseline assumptions. However, Table 5.3 shows that the estimated net benefit to society remains positive.

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[16]   See, for example, DWP (2013) – Employer perceptions of work experience and sector-based work academies.

Under scenario (1c) it is assumed that the sector-based work academy results in a social benefit of Exchequer finance, as the programme results in exchequer savings and so reduces the tax burden. Including the social benefit of Exchequer finance has a minimal affect on the estimated net benefits to participants, their employers or the Exchequer.

Under scenario (1d) it is assumed that the employment impacts of a sector-based work academy placement persist beyond the tracking period for one year. This essentially 'scales up' the cost and benefit estimates associated with the baseline scenario. This means that the longer the programme's impacts are assumed to persist for, the greater the estimated net benefit to participants, the Exchequer and society.

Scenario (2) in Table 5.3 shows the estimated net benefits of sector-based work academy under the most conservative combination of assumptions considered in this analysis. Under this scenario it is assumed that:

• sector-based work academies does not result in redistributive costs and benefits but do result in substitution effects; and

• the positive employment impacts of a sector-based work academy do not persist beyond the tracking period (see section 5.1.3).

Table 5.3 shows that, even under the particularly conservative assumptions of scenario (2), sector-based work academies are still estimated to result in a net benefit to participants and to society. Imposing these conservative assumptions does imply that sector-based work academies generate a small net loss to the Exchequer per participant.

Scenario (3) shows the estimated net benefits of sector-based work academies under the most optimistic combination of assumptions considered in this analysis. Under this scenario it is assumed that:

• sector-based work academies result in redistributive costs and benefits as well as the social benefit of Exchequer finance but does not result in substitution effects; and

• the positive employment impacts of a sector-based work academy persist for one year beyond the tracking period (see section 5.1.3).

Scenario (4) shows the cost benefit results for the 2012/13 cohort where the employment impact persists for 6 months beyond the tracking period, equivalent to an artificial two-year tracking period.

5.3   Conclusions from cost benefit analysis

There is considerable uncertainty regarding the costs and benefits of sector-based work academies. However, it is notable that under **all** of the scenarios considered in this analysis, the programme is estimated to result in a net gain to the participants and society as a whole.

Under the baseline assumptions the sector-based work academy programme is estimated to result in:

• a net benefit to participants of approximately £1,950 per participant;

• a neutral impact on employers;

- a net benefit to the Exchequer of approximately £100 per participant; and

- a net benefit to society of approximately £2,000 per participant.

Assuming that the cohort of young participants who started their sector-based work academy between August 2012 and April 2013 is representative of all sector-based work academy participants[17] then, under the baseline assumptions, the total net benefit of the programme to the Exchequer is estimated to be in the region of £20m.

It should be noted that the longer the beneficial impacts of the programme persist beyond the tracking period, the greater the estimated net benefit to participants, the Exchequer and society.

It is important to reiterate that the cost and benefit estimates presented in this paper are subject to the caveats discussed in section 5.1.4. The accuracy of these estimates is dependent on the robustness of the impact estimates from which they are derived and the validity of the assumptions upon which they are based. It should also be borne in mind that a number of potentially significant costs and benefits have been excluded from this analysis due to a lack of robust evidence. These include the non-pecuniary benefits associated with sector-based work academy participation (e.g. improvements in participants' confidence) and any additional training costs incurred by employers.

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[17] This is a strong assumption considering that nearly half of sector-based work academy participants were aged 25 and over, and considering that people started the scheme whilst on benefits other than JSA.

6   Conclusions

In this report we have presented the results of an impact evaluation of sector-based work academies on two cohorts of young Jobseeker's Allowance (JSA) claimants, alongside cost-benefit analysis (CBA) based on the impacts measured. This is the first attempt at a quantitative assessment of the programme.

6.1   Impact analysis

We examined the impact of participating in a sector-based work academy placement on the subsequent likelihood of being in each of four mutually exclusive outcome states for a period of up to two years following a placement start. The outcome states explored were as follows:

1.   Claiming benefit and **not** in employment;

2.   Claiming benefit **and** in employment;

3.   In employment and **not** claiming benefit;

4.   **Neither** claiming benefit **nor** in employment.

The methodology used was identical to that deployed in the work experience impact assessment published in March 2016.

The results showed the following:

• Participation in sector-based work academies had a positive impact on the likelihood of being in employment: 18 months after starting the scheme, participants had on average spent 50 days more in employment than a comparison group of non-participants.

• The impact of sector-based work academies on subsequent time spent on benefit was also positive: participants spent 29 days less on benefit during the 18 months following starting their scheme.

• The apparent incongruity between the substantial increase in time spent in employment and the more modest decrease in time spent on benefit following a placement can be explained by the impact of sector-based work academy participation on the likelihood of subsequently being neither in employment nor in receipt of benefit. Those who participate in a sector-based work academy are significantly less likely to leave benefit without finding employment: participants in the 2012/13 cohort spent on average 22 fewer days neither in receipt of benefit nor in employment following a placement. Given the age group of the cohorts studied in this evaluation, this may suggest that those who take part in sector-based work academies are less likely to return to education than those in the comparison group. The data we have on further/higher education participation is limited and therefore no further analysis investigating this was done.

• Across all subgroups sector-based work academies had a positive impact in terms of increasing the likelihood of finding work and reducing time spent on benefit. 22 to 24 year-olds were more likely to move into being 'in employment and not on benefit' than younger, 19 to 21 year old participants. Participants who had been claiming JSA for over three months prior to starting their sector-based work academy were more likely to move both off benefit and into employment than participants who had a JSA duration claim of less than three months.

• Individuals who participated in all three elements of the sector-based work academy experienced a greater impact than the participant cohort as a whole. Those who participated in all three elements spent on average 39 days less in receipt of benefit and not in employment relative to non-participants across the 18 month tracking period. For the results, which include participants who undertook all combinations of the scheme's elements, participants spent 29 days less on benefit relative to non-participants.

6.2 Cost-benefit analysis

Cost-benefit analysis was carried out on the basis of the 2012/13 cohort impact analysis results. This cohort was chosen because it offers the best compromise between sufficient sample size and tracking period duration. Furthermore, the 2012/13 cohort participated under the more recent policy design. The methodology used was based on the Department for Work and Pensions (DWP) Social Cost-Benefit Analysis Framework (Fujiwara, 2010), which is consistent with the approach used in the Future Jobs Fund impact assessment (Marlow, Hillmore and Ainsworth, 2012).

The findings from the cost-benefit analysis suggest that each sector-based work academy placement has an average net benefit to the Exchequer of £100, and an average net benefit to each participant of £1,950. If we assume that the Exchequer benefit estimate is representative of all placements undertaken since the programme was introduced in August 2011, this gives a total net benefit to the Exchequer in the region of £20m. This is a strong assumption given that the cohorts included in this study do not represent all participants.

6.3 Limitations of this analysis

Benefit claimants voluntarily opt into a sector-based work academy placement[18] and therefore it is likely that those who choose to participate are more motivated job seekers on average than those who do not. The matching methodology used in this analysis has been designed to account for these differences, and is considered to be a plausible means of estimating the impact of interventions of this type. However, it is extremely difficult to be confident of capturing all the effects of self-selection in a matching approach: although the matching on observed variables appears to be of good quality, a number of potentially relevant variables (perhaps most importantly for this study, educational attainment) were not available to be used for matching. Therefore we acknowledge the possibility that some self-selection bias remains unaccounted for in these results.

When considering the results of the cost-benefit analysis, it should be remembered accuracy of these estimates is dependent on the robustness of the impact estimates from which they are derived. It should also be borne in mind that a number of potentially significant costs and benefits have been excluded from this analysis due to a lack of robust evidence. These include the non-pecuniary benefits associated with participation (e.g. improvements in participants' confidence) and any additional training costs incurred by employers. These limitations are common to other cost-benefit analyses of labour market programmes carried out by DWP, including the Future Jobs Fund impact assessment (Marlow, Hillmore and Ainsworth, 2012).

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[18]   See Policy Design section 2.2.

Appendix A
Propensity Score Matching

A.1 Why use propensity score matching?

Propensity score matching is often employed in evaluations of this type in order to more accurately estimate the counterfactual, i.e. the outcomes that would have occurred in the absence of sector-based work academies. It is impossible to measure the counterfactual directly, since we cannot know what outcomes sector-based work academy participants would have attained without the programme, so it is necessary to estimate this figure using outcomes for individuals who did not participate.

A sector-based work academy is a voluntary programme on the part of participants, and is discretionary from the point of view of the Jobcentre advisor who refers potential participants. Therefore it is likely that the group who do not participate will be on average different from those who do. The ways in which the groups are different may well include factors which could influence the outcomes being measured. Differences that affect outcomes are known as **relevant** differences.

For example, the group who volunteer for a sector-based work academy may be on average more motivated and willing to work than those who do not. This is a relevant difference as it is likely to affect this group's probability of finding work in the subsequent year even without completing a placement.

Any relevant differences between the participant and non-participant groups would introduce bias into the impact estimate if this were calculated using the non-participant group as a whole to estimate the counterfactual. The aim of employing propensity score matching is to eliminate this potential source of bias by creating a comparison group which is identical to the participant group in terms of all relevant characteristics.

The assumption that the matching has successfully controlled for all factors affecting both the likelihood of participation in the programme and the likelihood of attaining the outcomes under evaluation is referred to as the 'conditional independence assumption'. If this assumption is met, then the two groups being should be indistinguishable from two groups selected at random from the same population.

A.2 How propensity score matching is carried out

The starting point for propensity score matching is to define an overall sample containing both participants and non-participants in the intervention under consideration. The methodology applied to select the samples used in this evaluation is described in Appendix B.

Once the sample has been defined, propensity score matching is carried out as follows:

1. Data on the characteristics of individuals in the sample are used as the input to a logistic regression model (here using a binary Probit approach) to estimate the probability of each individual participating in the programme. This probability is also known as an individual's 'propensity score'.

2. The propensity scores determined in part (1) are then used to match participants to individuals in the comparison group with a similar likelihood of participating in the intervention. Here, the matching approach used was one-to-many kernel matching with a kernel bandwidth of 0.0001. Under this approach each participant is matched to all those non-participants in the sample who have propensity scores within the kernel bandwidth of their own. Matched non-participant records are weighted according to their proximity to the participant propensity score that they have been matched to, so that closer matches are given a higher weighting than more distant ones. This is repeated for all participants in the sample. Finally, the weightings are normalised so that the total weights applied to non-participants sum to the number of participants for whom a match was found.

At the end of this process, the desired outcome is for the large majority of participant records to have found at least one match in the non-participant group. The records where matching has been successful are described as 'on support'. The proportion of records which are on support is one of the main criteria used to assess the quality of the matching result. The other major success factor is the bias reduction achieved by the matching, i.e. how similar the matched comparison group is to the participant group compared with the unmatched comparison group based on their observed characteristics.

A.3   Variables used in propensity score matching

The success of propensity score matching depends on the quality and coverage of the data used in the matching and in particular, its ability to control for any factors which affect both selection onto the programme and the subsequent outcomes of interest.

Propensity score matching is considered to be a viable approach for evaluating DWP's labour market programmes because DWP holds a wide range of data on individuals on its benefit caseload which can be used as the basis of the matching. This includes detailed information on claimants' benefit and employment histories, which have been shown to be a valid proxy for unobserved but relevant characteristics such as personality traits and motivation (Caliendo, Mahlstedt and Mitnik, 2014).

Table A.1 below lists the variables used as the basis for propensity score matching in this evaluation.

Table A.1   Variables used in propensity score matching

Variable	Type	Values
Gender	Categorical	Male; female
Age	Numerical	19–24 years old
Disability[1]	Categorical	Not disabled; Disabled; Unknown
Ethnicity	Categorical	White; Black; Asian; Mixed; Chinese; Other; Unknown
Sought occupation	Categorical	26 broad categories: e.g. 'Administrative'; 'Health Professionals'; 'Sales Occupations'
Lone parent[2]	Categorical	Lone parent; Not a lone parent (at any time within 2 years prior to start date/ pseudo start date)
Jobcentre Plus District	Categorical	37 Jobcentre Plus districts in Great Britain and Unknown
Low qualified	Categorical	No; Yes; Unknown
Local authority labour market characteristics: • Employment rate • Unemployment rate • Economic inactivity rate • Average pay • Job density • Vacancy density	Numerical	Employment, unemployment and economic inactivity rate can range between 0 and 1. Average pay, job density and vacancy density can take any positive value.
Benefit[3] history	Categorical	52 binary variables for each of the main out of work benefits (JSA or TA/ESA or IB/IS – representing each of the 52 weeks prior to a sector-based work academy start date/pseudo start date. Values are: in receipt of specific benefit; not in receipt of specific benefit
Number of benefit claims	Numerical – integer	Number of benefit claims made in the previous 52 weeks prior to a sector-based work academy start date/pseudo start date.
Time spent on benefit in past 3 months, 6 months and 12 months respectively	Numerical – integer	Number of days spent on benefit in relevant period
Employment history	Categorical	52 binary variables – representing each of the 52 weeks prior to a sector-based work academy start date/pseudo start date. Values are: in work; not in work
Sanction and disallowance history	Numerical – integer	Number and type of sanction/disentitlements in the year prior to a sector-based work academy start date/pseudo start date. Three types 'High','Medium','Low' level sanctions.

Continued

Table A.1   Continued

Variable	Type	Values
Failure to attend	Numerical – integer	Number of recorded Jobcentre Plus appointments which individual has failed to attend in the 52 weeks prior to a sector-based work academy start date/pseudo start date
Sector-based work academy start/ pseudo start month	Categorical	Months from January to May for each cohort year are given distinct values
Benefit start month[4]	Categorical	All months up to the cohort end date are given distinct values for the benefit spell prior to a sector-based work academy start/pseudo start
Other programme participation	Numerical	Number of days spent on other Department for Work and Pensions (DWP) programmes in year prior to a sector-based work academy start date:
		Integers from 0 to 365

[1] Since disability is set by a Jobcentre Plus adviser based on claimant self-disclosure, this variable is not a systematic identification of disability as defined by the Equality Act.

[2] 'Lone parent' defined by marital status information to infer partner status and Her Majesty's Revenue and Customs (HMRC) Child Benefit data to infer parental status.

[3] 'Benefit' is defined as any of four out of work benefits (Jobseeker's Allowance, Incapacity Benefit, Employment and Support Allowance, Income Support) or training allowance. Other benefits are not included in the benefit history variables or outcomes.

[4] Benefit start and end dates refer to the benefit spell leading up to the start of the placement.

Appendix B
Defining the non-participant samples

In preparation for carrying out propensity score matching to identify groups of non-participants with similar characteristics to the participant cohorts, it is first necessary to more broadly define the populations that these groups will be selected from.

The initial selection criteria used to do this should mirror as closely as possible the criteria applied in defining the participant cohorts. These cohorts were selected based on three characteristics:

1. The individual had a sector-based work academy start within the cohort time period;

2. The individual was claiming Jobseeker's Alllowance (JSA) one week before starting and in the week in which this start occurred;

3. The individual was aged 19 to 24 at this point.

Clearly the first criterion is not applicable to the non-participant group. Instead, the initial filter applied in selecting each comparison group was to retain only those individuals who had **never** had a sector-based work academy start. This approach was chosen over the softer option of retaining only individuals who did not have a start during the time period covered by the evaluation, because it was the simplest approach to implement and proved not to greatly reduce the remaining population of non-participants.

In order to re-create the latter two selection criteria, it is necessary to assign a date to each individual in the non-participant group which can be used in place of the sector-based work academy start date for participants. This date is known as a 'pseudo start date'. Assigning a pseudo start date is a prerequisite for selecting individuals based on criteria such as age and claim status which change over time.

Pseudo start dates were generated using the methodology employed by Ainsworth and Marlow in their assessment of the European Social Fund (Ainsworth and Marlow, 2011). This method applies pseudo start dates to non-participants based on the point at which they began their current JSA claim. This is done in such a way that the 'prior length of claim' distribution for non-participants with pseudo start dates in a given month is identical to that for participants with a start date in that month.

Once assigned, pseudo start dates for non-participants were subsequently treated as equivalent to actual start dates for participants. For example, pseudo start dates were used to align the time periods over which outcomes were compared between the participant and non-participant groups in order to determine the impact of the programme.

Following the assignment of pseudo start dates, the non-participant sample to be matched to each cohort could be selected based on the following criteria from everyone on the Department for Work and Pensions (DWP) administrative datasets who had never had a sector-based work academy start[19]:

1. The individual had a pseudo start date within the cohort time period;

2. The individual was claiming JSA one week before starting and in the week in which this start occurred;

3. The individual was aged 19 to 24 at this point.

The number of individuals retained in the pre-matched comparison group for each cohort following this filtering process is given in Table 4.1 in section 4.1

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[19]   All available data was considered when making this exclusion, so individuals were removed from the comparison group if they had a sector-based work academy start at any point after the cohort period, as well as during or before.

Appendix C
Outcomes of matching

This section outlines the results of diagnostic tests to determine whether the propensity score matching approach was successful in creating a comparison group that is similar to the participant group in terms of its observed characteristics.

The participant and comparison groups for each cohort were compared using each of the variables that contributed to the determination of the propensity score in turn. The bias between the two groups was calculated both before and after matching had taken place for each variable. These figures were then compared to determine the extent to which the bias had been reduced. A t-test was also carried out for each variable before and after matching to determine whether the means of the two groups were significantly different. The results of this testing for a range of key variables are shown in Table C.1 and Table C.2.

These results show that the propensity score matching approach was successful in creating a comparison group which is statistically identical to the participant group on the basis of all but two observed characteristics; the proportion of the group who had participated in the Work Programme in the 12 months prior to their start/pseudo start date, and, the proportion of group who had participated in a Get Britain Working initiative in the 12 months prior to their start/pseudo start date (none of the variables not included in the tables showed a significant difference following matching). For these two variables there was a statistically significant difference in the means of the two groups after matching for the 2012/13 cohort.

The variables used in the matching were skewed towards ensuring equivalent benefit and employment histories across the participant and comparison groups. Therefore, the remaining difference between the two groups is likely to indicate that for a subset of sector-based work academy participants, there was no one in the non-participant sample with a similar benefit and employment history who had not recently participated in the Work Programme. This may be a consequence of the linking rules used to decide who is referred to the Work Programme, which can mean that groups with similar benefit histories have very different probabilities of being referred. Conversely, with regards to Get Britain Working, it is likely there was no one in the non-participant sample with similar benefit and employment history who had recently participated in an initiative.

The proportion of the post-matching sample affected by this issue is small (less than 2 per cent of the participant or matched comparison group had previously participated in the Work Programme in the 2012/13 cohort and less than 6 per cent had previously participated in a Get Britain Working initiative). The t-test result for the Get Britain working variable was only marginally significant at the 5 per cent level. In addition, assuming that Work Programme participation has a positive impact (if any) on future benefit and employment outcomes, the presence of more recent Work Programme participants in the comparison group should only serve to reduce the apparent impact of sector-based work academies. Therefore this remaining difference is not considered to be an issue for the findings presented in this report.

Table C.1   Bias reduction following propensity score matching for 2011/12 cohort

Variable	Sample	Mean		% bias	% reduction |bias|	t-test	
		Treated	Control			t	p>|t|
% of group on benefit 12 months before sbwa start/pseudo start	Unmatched	34%	38%	-7.2	0.0	-5.13	0.00
	Matched	34%	34%	0.1	98.9	0.04	0.97
% of group on JSA 12 months before sbwa start/pseudo start	Unmatched	30%	33%	-5.7	0.0	-4.05	0.00
	Matched	30%	30%	0.4	93.6	0.19	0.85
% of group in work 12 months before sbwa start/pseudo start	Unmatched	36%	33%	6.2	0.0	4.53	0.00
	Matched	36%	36%	0.1	98.5	0.05	0.96
Average age (years)	Unmatched	21.0	21.3	-14.5	0.0	-10.33	0.00
	Matched	21.0	21.0	0.1	99.0	0.07	0.94
% of group who are male	Unmatched	63%	66%	-7.1	0.0	-5.15	0.00
	Matched	63%	62%	1.3	82.2	0.63	0.53
% of group who have a disability marker set	Unmatched	14%	17%	-7.2	0.0	-4.99	0.00
	Matched	14%	14%	0.0	99.9	0.00	1.00
% of group with ethnicity = 'white'	Unmatched	80%	79%	0.8	0.0	0.60	0.55
	Matched	80%	80%	0.1	82.1	0.08	0.94
% of group who claimed benefit as a lone parent in the two years prior to sbwa start/pseudo start	Unmatched	1%	1%	-4.7	0.0	-3.04	0.00
	Matched	1%	1%	-1.0	79.7	-0.55	0.58
% of group who participated in the Work Programme in the 12 months prior to sbwa start/ pseudo start	Unmatched	2%	11%	-38.2	0.0	-21.29	0.00
	Matched	2%	2%	-0.9	97.8	-0.76	0.45
% of group who participated in a Get Britain Working initiative in the 12 months prior to sbwa start/pseudo start	Unmatched	1%	1%	4.8	0.0	4.05	0.00
	Matched	1%	1%	0.0	99.5	0.01	0.99
Average days spent on benefit in 12 months prior to sbwa start/ pseudo start	Unmatched	196	192	4.0	0.0	2.68	0.01
	Matched	196	196	0.1	96.6	0.07	0.94
Average number of spells on benefit in 12 months prior to sbwa start/pseudo start	Unmatched	1.8	1.8	7.8	0.0	5.66	0.00
	Matched	1.8	1.8	1.9	75.4	0.96	0.34

Table C.2   Bias reduction following propensity score matching for 2012/13 cohort

Variable	Sample	Mean		% bias	% reduction |bias|	t-test	
		Treated	Control			t	p>|t|
% of group on benefit 12 months before sbwa start/pseudo start	Unmatched	30%	43%	-26.0	0.0	-29.92	0.00
	Matched	30%	30%	-0.6	97.5	-0.57	0.57
% of group on JSA 12 months before sbwa start/pseudo start	Unmatched	24%	37%	-27.6	0.0	-31.18	0.00
	Matched	24%	24%	-0.4	98.4	-0.39	0.70
% of group in work 12 months before sbwa start/pseudo start	Unmatched	36%	31%	10.9	0.0	13.24	0.00
	Matched	36%	36%	0.5	95.8	0.38	0.70
Average age (years)	Unmatched	21.1	21.3	-15.2	0.0	-17.88	0.00
	Matched	21.1	21.1	0.7	95.2	0.63	0.53
% of group who are male	Unmatched	65%	65%	0.7	0.0	0.79	0.43
	Matched	65%	65%	0.5	21.9	0.44	0.66
% of group who have a disability marker set	Unmatched	12%	16%	-11.9	0.0	-13.40	0.00
	Matched	12%	12%	-0.7	94.0	-0.64	0.52
% of group with ethnicity = 'white'	Unmatched	79%	80%	-1.9	0.0	-2.24	0.03
	Matched	79%	79%	-0.4	80.4	-0.31	0.76
% of group who claimed benefit as a lone parent in the two years prior to sbwa start/pseudo start	Unmatched	2%	2%	-2.8	0.0	-3.19	0.00
	Matched	2%	2%	0.0	98.8	-0.03	0.98
% of group who participated in the Work Programme in the 12 months prior to sbwa start/ pseudo start	Unmatched	2%	22%	-65.4	0.0	-58.64	0.00
	Matched	2%	2%	-1.1	98.3	-2.18	0.03
% of group who participated in a Get Britain Working initiative in the 12 months prior to sbwa start/pseudo start	Unmatched	7%	2%	22.7	0.0	37.47	0.00
	Matched	6%	6%	-2.8	87.5	-2.02	0.04
Average days spent on benefit in 12 months prior to sbwa start/ pseudo start	Unmatched	181	199	-15.4	0.0	-16.70	0.00
	Matched	180	181	-0.8	94.9	-0.76	0.45
Average number of spells on benefit in 12 months prior to sbwa start/pseudo start	Unmatched	1.8	1.7	18.2	0.0	22.56	0.00
	Matched	1.8	1.8	1.0	94.6	0.80	0.42

Appendix D
Detailed results of impact analysis (full cohort)

Table D.1   Summary of impact analysis findings for all full cohorts at 21, 52, 78 and 104 weeks following a sector-based work academy start

Impact on the proportion of participants in given state at end of the tracking period (%pts)		Impact at 21 weeks			Impact at 52 weeks			Impact at 78 weeks			Impact at 104 weeks		
		In employment	Not in employment	Total	In employment	Not in employment	Total	In employment	Not in employment	Total	In employment	Not in employment	Total
2011/12 cohort	In receipt of benefit	-1	-9	**-10**	0	-6	**-6**	0	-5	**-5**	0	-5	**-5**
	Not in receipt of benefit	12	-3	**10**	10	-4	**6**	10	-5	**5**	9	-4	**5**
	Total	**11**	**-11**		**10**	**-10**		**10**	**-10**		**9**	**-9**	
2012/13 cohort	In receipt of benefit	0	-7	**-8**	0	-5	**-5**	0	-5	**-5**			
	Not in receipt of benefit	11	-3	**8**	10	-5	**5**	10	-4	**5**			
	Total	**11**	**-11**		**10**	**-10**		**9**	**-9**				

Results are expressed in terms of the change in the proportion of participants in each state at the end of the tracking period.

Table D.2 **Summary of impact analysis findings for all full cohorts at 21, 52, 78 and 104 weeks following a sector-based work academy start**

Change in average number of days participants spent in given state during tracking period		Impact at 21 weeks			Impact at 52 weeks			Impact at 78 weeks			Impact at 104 weeks		
		In employment	Not in employment	Total	In employment	Not in employment	Total	In employment	Not in employment	Total	In employment	Not in employment	Total
2011/12 cohort	In receipt of benefit	0	-9	**-9**	-1	-24	**-25**	-1	-34	**-35**	-1	-44	**-45**
	Not in receipt of benefit	12	-3	9	36	-11	25	54	-18	35	71	-26	45
	Total	**12**	**-12**		**34**	**-34**		**53**	**-53**		**70**	**-70**	
2012/13 cohort	In receipt of benefit	1	-7	**-6**	0	-20	**-20**	-1	-29	**-29**			
	Not in receipt of benefit	11	-5	6	33	-14	20	51	-22	29			
	Total	**11**	**-11**		**33**	**-33**		**50**	**-50**				

Results are expressed in terms of the change in the total number of days participants spent in each state during the tracking period.

Appendix E
Detailed results of subgroup analysis

Table E.1   Summary of subgroup impact analysis findings for all cohorts at the end of their respective tracking periods

Change in average number of days participants spent in given state during tracking period		Impact for 19–21-year-olds			Impact for 22–24-year-olds			Impact for participants claiming less than 3 months at start			Impact for participants claiming more than 3 months at start			Impact for males			Impact for females		
		In employment	Not in employment	Total	In employment	Not in employment	Total	In employment	Not in employment	Total	In employment	Not in employment	Total	In employment	Not in employment	Total	In employment	Not in employment	Total
2011/12 cohort (156-weeks tracking)	In receipt of benefit	-1	-45	**-46**	1	-42	**-40**	-3	-35	**-38**	0	-52	**-52**	-2	-41	**-44**	1	-47	**-46**
	Not in receipt of benefit	73	-27	**46**	66	-25	**40**	67	-29	**38**	77	-25	**52**	70	-26	**44**	75	-29	**46**
	Total	**72**	**-72**		**67**	**-67**		**64**	**-64**		**77**	**-77**		**68**	**-68**		**76**	**-76**	
2012/13 cohort (104-weeks tracking)	In receipt of benefit	0	-28	**-28**	-2	-29	**-31**	-2	-19	**-21**	1	-39	**-38**	0	-27	**-28**	-1	-32	**-33**
	Not in receipt of benefit	49	-21	**28**	54	-24	**31**	47	-26	**21**	55	-17	**38**	50	-22	**28**	50	-17	**33**
	Total	**48**	**-48**		**52**	**-52**		**45**	**-45**		**56**	**-56**		**50**	**-50**		**49**	**-49**	

Results are expressed in terms of the change in the total number of days participants spent in each state during the tracking period.

Table E.2   Summary of impact analysis findings for participants who undertook all 3 elements at 21, 52, 78 and 104 weeks following a sector-based work academy start

Change in average number of days participants spent in given state during tracking period		Impact at 21 weeks			Impact at 52 weeks			Impact at 78 weeks			Impact at 104 weeks		
		In employment	Not in employment	Total	In employment	Not in employment	Total	In employment	Not in employment	Total	In employment	Not in employment	Total
2011/12 cohort	In receipt of benefit	-1	-15	**-16**	-3	-36	**-39**	-3	-50	**-53**	-4	-63	**-66**
	Not in receipt of benefit	20	-4	**16**	54	-15	**39**	77	-24	**53**	100	-34	**66**
	Total	**19**	**-19**		**51**	**-51**		**74**	**-74**		**97**	**-97**	
2012/13 cohort	In receipt of benefit	1	-11	**-10**	1	-28	**-26**	2	-39	**-38**			
	Not in receipt of benefit	16	-6	**10**	43	-17	**26**	64	-26	**38**			
	Total	**16**	**-16**		**44**	**-44**		**66**	**-66**				

Results are expressed in terms of the change in the total number of days participants spent in each state during the tracking period.

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