



Department  
for Education



# **An economic evaluation of the National Careers Service**

**Research report**

**March 2017**

**Marguerita Lane, Gavan Conlon,  
Viktoriya Peycheva, Iris Mantovani and  
Shantayne Chan – London Economics**

# Contents

Contents	2
List of figures	6
Glossary	10
Introduction and Executive Summary	14
Executive Summary - Part I	16
Data	16
Characteristics of National Careers Service customers	17
Referral routes and intensity of support provided	20
Labour market and learning outcomes	21
Executive Summary - Part II	24
Baseline results	25
Caveats and subsequent robustness checks	26
Refining the analysis to account for potential caveats	27
Results of analysis using preferred modelling approach - Employment	27
Education and Training	30
Conclusions	31
Part I: An assessment of the impact of the National Careers Service on customers before and after support	32
Part I - Introduction	33
Rationale for current analysis	33
Methodology	35
Data used and relevant time periods	35
National Careers Service data	35
Individualised Learner Record (ILR/SILR)	35
Department for Work and Pension Benefits data (DWP)	36
HM Revenue and Customs P14 and P45 (HMRC)	36
Initial cleaning and coding the data	36
National Careers Service	36
ILR/SILR	37
Department for Work and Pensions (DWP)	37

HM Revenue and Customs (HMRC)	38
Data merging	39
Linking datasets	39
Final dataset for analysis	39
Comparison of the matched and unmatched samples	40
Outcome measures	42
Characteristics of National Careers Service customers	44
Characteristics of National Careers Service customers	44
Age and Gender	45
Region, prior attainment and ethnic origin	46
Labour market characteristics of National Careers Service customers	47
Employment status and unemployment duration	47
Benefit receipt and referral route	49
Mode and number of intervention(s) by year of (first) intervention	51
Employment status and benefit receipt by referral route	52
Unemployment duration by referral route	52
Mode of intervention and number of sessions by referral route	53
What does this tell us?	54
Labour market histories of National Careers Service customers	56
Employment histories and outcomes amongst the treated	56
Employment histories and outcomes by calendar year of intervention	57
Employment histories and outcomes by referral route	57
Employment histories and outcomes by mode of intervention	58
Benefit dependency amongst the treated	59
Benefit dependency - by year of intervention	60
Benefit dependency - by referral route	61
Benefit dependency - by mode of intervention	61
Benefit dependency - by gender	62
Education and training histories and outcomes	63
Education and training histories and outcomes by year of intervention	64

Education and training histories and outcomes by referral route and intervention mode	65
Part I Conclusions	67
Part II: An assessment of the impact of the National Careers Service on customers using a treatment and counterfactual approach	69
Part II Introduction	70
Methodology and evaluation problem	71
Propensity Score Matching	71
Caveats	73
Comparing the 'treated' with the 'untreated'	77
Generating a counterfactual	82
Propensity Score Matching	82
Baseline Propensity Score Matching results	83
Impact of the National Careers Service	86
Summary of analysis undertaken	86
Baseline model	86
Why is this an improvement on the previous analysis?	87
Baseline model: Employment: all National Careers Service customers	87
Baseline model: Benefit dependency	89
Baseline model: Education and training outcomes	90
Limitations of baseline analysis - falsification tests	91
Falsification tests: testing regression to the mean - employment	92
Falsification tests: testing regression to the mean – benefit dependency	95
Falsification tests: testing regression to the mean – education and training	97
Robustness checks (I): Matching on intervention period	99
Robustness check (I) Employment	99
Robustness check (I) Benefit dependency	100
Robustness check (I): Education and training	101
What does this mean?	102
Robustness checks (II): Shortening the intervention period	103
Robustness checks (II): Employment	103

Robustness checks (II): Benefit Dependency	105
Robustness checks (II): Education and Training	106
What does this tell us?	107
Conclusions and recommendations	108
Options for further research	109
Annex 1: Part I - Additional information on National Careers Service Customers	110
Referral Route	110
Gender and region of residence by referral route	110
Age and prior attainment by referral route	111
Ethnic origin by referral route	111
Mode of intervention	112
Gender and region of residence by mode of intervention	112
Age and prior attainment by mode of intervention	113
Ethnic origin by mode of intervention	113
Benefit receipt and labour market status by mode of intervention	114
Unemployment duration by mode of intervention	114
Number of interventions by gender and region of residence	115
Number of interventions by age and prior attainment	116
Number of interventions by employment status and benefit dependency	117
Number of interventions by unemployment duration	117
Annex 2: Part II - Disaggregated Analysis	118
Employment outcomes: impact on Jobcentre Plus referred customers	118
Benefit dependency outcomes: impact on Jobcentre Plus referred customers	119
Learning outcomes: impact on Jobcentre Plus referred customers	120
Annex 3: Part II – Early intervention analysis	121
Employment - impact on early intervention customers	121
Benefit dependency outcomes: impact on early intervention customers	122
Learning outcomes: impact on early intervention customers	123
Annex 3: Part II - Matching on long run histories	124

## List of figures

Figure 1: National Careers Service customers by gender and age (by year)	17
Figure 2: National Careers Service customers by ethnicity and qualification (by year)	18
Figure 3: National Careers Service customers by employment status and duration of unemployment (by year)	19
Figure 4: National Careers Service customers by referral route, mode of intervention, benefit receipt and employment status (by year)	20
Figure 5: National Careers Service customers' labour market and learning histories	22
Figure 6: Propensity Score Matching model results	24
Figure 7: Differential employment outcomes between treatment and counterfactual	26
Figure 8: Employment outcomes - 1 month intervals matched on period of intervention	28
Figure 9: Benefit dependency - 1 month intervals matched on period of intervention	29
Figure 10: Education and training - 1 month intervals matched on period of intervention	30
Figure 11: Number of first time Next Step-National Careers Service customers by year	44
Figure 12: National Careers Service customers by gender and age (by year)	45
Figure 13: National Careers Service customers by region, prior attainment and ethnic origin	46
Figure 14: National Careers Service customers by employment status and unemployment duration (by year)	48
Figure 15: National Careers Service customers by benefit receipt and referral route (by year)	50
Figure 16: National Careers Service customers' mode and number of intervention(s) by year of first intervention	51
Figure 17: National Careers Service customers' employment status and benefit receipt by referral route	52
Figure 18: National Careers Service customers' unemployment duration by referral route	53

Figure 19: National Careers Service customers' mode of intervention and number of interventions by referral route	54
Figure 20: Employment histories and outcomes for National Careers Service customers	57
Figure 21: Employment histories and outcomes for National Careers Service customers by year	57
Figure 22: Employment histories and outcomes for National Careers Service customers by referral route	58
Figure 23: Employment histories and outcomes for National Careers Service customers by intervention mode	59
Figure 24: JSA histories and outcomes for National Careers Service customers by year	59
Figure 25: JSA histories and outcomes for National Careers Service customers by year	60
Figure 26: JSA histories and outcomes for National Careers Service customers by referral route	61
Figure 27: JSA histories and outcomes for National Careers Service customers by intervention mode	62
Figure 28: JSA histories and outcomes for National Careers Service customers by gender	63
Figure 29: Education and training histories and outcomes for National Careers Service customers by year	63
Figure 30: Education and training histories and outcomes for National Careers Service customers by calendar year	64
Figure 31: Learning histories and outcomes for National Careers Service customers by referral route, intervention mode and gender	66
Figure 32: Employment histories and outcomes for the treated and untreated	77
Figure 33: Employment histories and outcomes for the treated and untreated	78
Figure 34: JSA histories and outcomes for the treated and untreated	80
Figure 35: Training histories and outcomes for the treated and untreated	81

Figure 36: Reduction of bias following Propensity Score matching	84
Figure 37: Employment histories and outcomes for the treated and counterfactual	88
Figure 38: JSA histories and outcomes for treated and counterfactual	90
Figure 39: Learning histories and outcomes for treated and counterfactual	91
Figure 40: Falsification tests: Employment	93
Figure 41: Falsification tests: Benefit dependency	96
Figure 43: Falsification tests: Education and training	98
Figure 44: Employment outcomes matching on period of intervention	100
Figure 45: Benefit dependency outcomes matching on period of intervention	101
Figure 46: Education and training outcomes matching on period of intervention	102
Figure 47: Employment outcomes - 1 month intervals matched on period of intervention	104
Figure 48: Benefit dependency outcomes - 1 month intervals matched on period of intervention	105
Figure 49: Education and training outcomes - 1 month intervals matched on period of intervention	106
Figure 50: National Careers Service customers' gender and region (by referral route)	110
Figure 51: National Careers Service customers' age and prior attainment (by referral route)	111
Figure 52: National Careers Service customers' ethnic origin (by referral route)	111
Figure 53: National Careers Service customers' gender and region (by mode of intervention)	112
Figure 54: National Careers Service customers' age and prior attainment (by mode of intervention)	113
Figure 55: National Careers Service customers' ethnic origin (by mode of intervention)	113
Figure 56: National Careers Service customers' benefit receipt and labour market status (by mode of intervention)	114

Figure 57: National Careers Service customers' unemployment duration (by mode of intervention)	114
Figure 58: National Careers Service customers' number of interventions (by gender and region of residence)	115
Figure 59: National Careers Service customers' number of interventions (by prior attainment and age)	116
Figure 60: National Careers Service customers' number of interventions (by employment status and benefit dependency)	117
Figure 61: National Careers Service customers' number of interventions (by unemployment duration)	117
Figure 62: Employment histories and outcomes for JCP-referred treated and counterfactual	118
Figure 63: JSA histories and outcomes for JCP-referred treated and counterfactual	119
Figure 64: Learning histories and outcomes for JCP-referred treated and counterfactual	120
Figure 65: Employment and benefit outcomes matching two years prior to intervention	125
Figure 66: Benefit dependency outcomes - matching two years prior to intervention	126
Figure 67: Education and training outcomes - matching two years prior to intervention	127

## Glossary

<p><b>National Careers Service</b></p>	<p>The <b>National Careers Service</b> is a nationally branded careers and skills advice service that is available free to adults and young people in England.</p> <p>The service provides anyone aged 13 and over with access to up to date, impartial information and professional guidance on careers, skills and the labour market; through an online service and telephone helpline. Adults aged 19 and over, (or 18 and over if out of work and on benefits), have access to one to one support from a qualified, expert adviser, face to face in the community.</p>
<p><b>Next Step</b></p>	<p>Next Step refers to the branding of the <b>National Careers Service</b> between August 2010 and April 2012.</p>
<p><b>Customer</b></p>	<p>Any individual who has accessed careers advice and support from the National Careers Service between August 2010 and February 2014.</p>
<p><b>Individualised Learner Record (ILR)</b></p>	<p>The Individualised Learner Record (ILR) and Single Individualised Learner Record (SILR) contain information on learning aims and associated level of learning, as well as the personal characteristics of learners. The ILR/SILR comprises information recorded by providers of further education and returns are compulsory for all state-funded further education. The ILR/SILR is organised by academic year, and we use information from the academic years 2008/09 to 2013/14 inclusive.</p>
<p><b>HMRC P14/P45 data</b></p>	<p>The P14 dataset is organised by tax year and employment spell, and covers the years from 2004/05 to 2013/14 inclusive. The P45 details start and end dates of employment spells between 2004/05 and 2013/14 inclusive. These datasets were used to create both learners' labour market histories and outcomes in respect of earnings and employment status respectively.</p>
<p><b>Intervention</b></p>	<p><b>Intervention</b> refers to the careers support, advice and guidance received through the National Careers Service. In many cases, National Careers Service customers receive more a number of 'interventions', which can extend over a substantial period of time (and can be face-to-face, telephone based and/or web-based). In general, <b>intervention</b> refers to the <i>first instance</i> of careers support and advice received through the National Careers Service</p>

<p><b>Period of intervention/ Interval of intervention</b></p>	<p>The <b>period of intervention</b> refers to the episode in time in which the National Careers Service customer was in receipt of careers advice and support for the first time. In the analysis, the <b>period of intervention</b> ranges between 1 month and 6 months. In other words, the analysis might identify all customers in receipt of careers support within the given 6 month or 1 month timeframe (or period of intervention).</p> <p>The rationale for adopting this approach is to</p> <ul style="list-style-type: none"> <li>• Understand the employment and benefit dependency outcome in subsequent (equivalently sized) periods of time following the <b>period of intervention</b>.</li> <li>• Facilitate the comparison of employment, benefit dependency and learning outcomes following the intervention irrespective of the point in time in which they actually occurred</li> </ul> <p>For instance, for those National Careers Service customers in receipt of face-to-face careers advice for the first time within any given 6-month period of time, in the period 12-18 months post intervention (i.e. the 3<sup>rd</sup> six-month period post intervention), their employment outcomes had improved by xx percentage points.</p>
<p><b>DWP data</b></p>	<p>The DWP National Benefits Database contains data on benefit spells collected by the Department for Work and Pensions. The dataset covers benefit spells running from 2004 to 2014.</p>
<p><b>Regression (reversion) to the mean</b></p>	<p>In a statistical sense, <b>regression to the mean</b> refers to the phenomenon where the greater the deviation of a random variable from its mean, the greater the probability that the next measure will deviate less (from its mean). Also known as <b>reversion to the mean</b>.</p>
<p><b>Propensity Score Matching</b></p>	<p><b>Propensity Score Matching</b> (PSM) is used to derive a counterfactual group which has been matched to the treatment group based on similarities in observable personal and socioeconomic attributes, as well as labour market histories. In other words, a sample of 'statistical twins' is generated from within the untreated group to make post-intervention comparisons with those receiving the intervention. Comparing outcomes across the treatment and counterfactual groups provides a more accurate indication of the potential success of the intervention.</p> <p>The PSM process involves generating a score that indicates the likelihood of any particular individual being selected for treatment(s),</p>

	<p>while a score or probability of being selected is also estimated for individuals not receiving the treatment. This score or probability is derived from a first stage estimation of a <i>probit</i> or <i>logit</i> equation model – and individuals in the treatment group are matched with individuals in the untreated group in possession of the same probability of selection.</p> <p>In this analysis, multiple specifications of the PSM were tested. In the main model, variables in the final PSM model, and therefore used for matching, included:</p> <ul style="list-style-type: none"> <li>• <b>Employment history</b> – defined as the proportion of the period immediately <b>before or during</b> the period of intervention spent in employment (depending on the model specification);</li> <li>• <b>Education and training history</b> – defined as the proportion of the period immediately <b>before or during</b> the period of intervention spent in learning (depending on the model specification);</li> <li>• <b>Benefit dependency history</b> – defined as the proportion of the period immediately <b>before or during</b> the period of intervention spent receiving JSA (depending on the model specification);</li> <li>• <b>Gender;</b></li> <li>• <b>Age;</b></li> <li>• <b>Age squared;</b></li> <li>• <b>Ethnicity;</b> and,</li> <li>• <b>Prior educational attainment.</b></li> </ul>
<b>Baseline model</b>	<p>The <b>baseline model specification</b> involves matching the treatment group with a counterfactual group using personal characteristics and employment histories in the <b>6-month interval preceding</b> access to National Careers Service support, followed by the comparison of the labour market and education and training outcomes between the treatment and counterfactual groups in each subsequent 6-month interval.</p>
<b>Counterfactual</b>	<p>The general evaluation problem of determining the effects of a particular programme or initiative involves the identification of the <i>additional benefits</i> that an individual has gained through participation in the programme compared to what might have happened in the absence of the programme.</p>
<b>Preferred model specification</b>	<p>The <b>preferred model specification</b> involves matching the treatment group with a counterfactual group using personal characteristics and employment histories in the <b>1-month interval in</b></p>

	<p><b>which</b> access to National Careers Service support occurred for the first time, followed by the comparison of the labour market and education and training outcomes between the treatment and counterfactual groups in each subsequent 1-month interval.</p>
<p><b>Falsification Tests</b></p>	<p><b>Falsification tests</b> were used to compare the evolution of labour outcomes of two groups of individuals not in receipt of the National Careers Service (the <i>original</i> counterfactual and a '<i>pseudo</i>' counterfactual generated by matching the original treatment group with an adjusted (higher) level of employment and a new counterfactual group). This falsification test was undertaken to address the extent of regression to the mean - and in particular - the extent to which subsequent (improved) measures of labour market outcomes might simply be a function of the initial (low) measurement of that same labour market outcome</p>

## Introduction and Executive Summary

The National Careers Service provides anyone aged 13 and over with access to up to date, impartial information and professional guidance on careers, skills and the labour market through an online service and telephone helpline. Adults aged 19 and over, (or 18 and over if out of work and on benefits), have access to one-to-one support from a qualified, expert adviser, face-to-face in the community.

From the original Terms of Reference, the overall twin aims of this project were to undertake similar analysis undertaken in 2012 ([here](#)), including

- Undertaking a detailed analysis of employment and learning outcomes for National Careers Service customers, and
- Addressing the issues raised within the previous study and coming up with ways to overcome and answer them in particular how to improve the comparison group.

To achieve these twin aims, the key sources of information included management information from the National Careers Service, and merged information from the Skills Funding Agency Individualised Learner Record (ILR); P45 employment information from the HM Revenue and Customs; and benefits information from the Department for Work and Pensions.

To address these aims, the main report is presented in two parts.

Part I of this report presents a detailed description the data sets used as part of the analysis, as well as an exposition of the various labour market measures used throughout the analysis. The analysis then presents the personal and socioeconomic characteristics of National Careers Service customers (i.e. gender, age, qualification attainment, employment status) and the nature of support received (i.e. referral route, mode of delivery); as well as how some of these customer and delivery characteristics have changed over time. Addressing the first aim of the analysis, the Part I Report concludes with an analysis of the labour market histories and outcomes achieved by National Careers Service customers before and after receipt of careers advice and support.

In Part II of this report, and reflecting the second aim of the project, we present a detailed methodology that outlines the evaluation problem in greater detail; the limitations of previous analyses; and the proposed analysis for undertaking the economic impact analysis. In particular, given the need to address the impact of the National Careers Service, we provide a detailed discussion of the methodological improvements achieved in this report compared to the previous analysis undertaken in 2012. Because of the methodological challenges faced in the previous research work in relation to the identification of a counterfactual group, and the over-riding requirement to improve the

analysis in this respect, this necessarily technical element was pivotal to the overall analysis.

The analytical chapters demonstrate the labour market histories and outcomes achieved by National Careers Service customers compared to individuals who never received careers support and advice; the approach towards generating an appropriate counterfactual group (and its success); and, a comparison of the labour market and education outcomes achieved by National Careers Service customers against a range of counterfactual groups. We also present some conclusions for the analysis and suggestions for further research improvements.

## Executive Summary - Part I

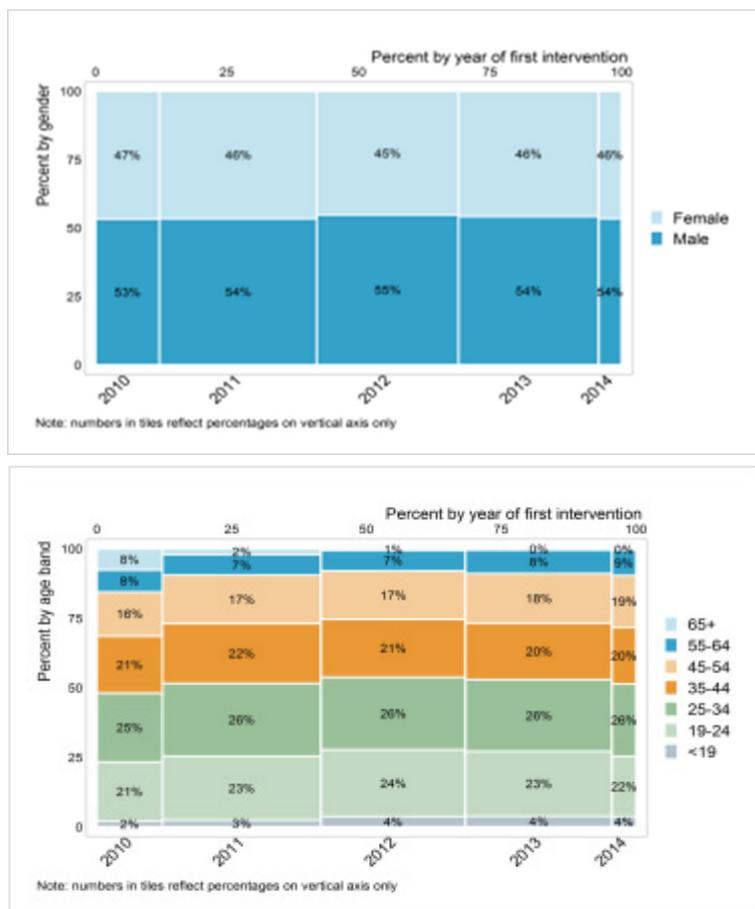
The **National Careers Service** is a nationally branded careers and skills advice service that is available free to adults and young people in England. London Economics were commissioned to undertake an economic evaluation to assess whether National Careers Service careers advice and support improved the labour market, and education and training outcomes of its customers.

### Data

Using the Individualised Learner Record (ILR), which contains information on all publicly funded further education and training for approximately **13.8 million** individuals in England between 2008/09 and 2013/14, we merged administrative information on **2.71 million** customers who received National Careers Service support between August 2010 and February 2014. Using detailed data from the Department for Work and Pensions, we then supplemented this data with information on the benefit spells of **5.2 million** individuals in receipt of Jobseeker's Allowance (JSA) and **2.6 million** individuals in receipt of Incapacity Benefit (IB) and (its replacement) Employment and Support Allowance (ESA) between 2004 and 2014. Finally, we included information on employment spells for **14.6 million** individuals between 2004/05 and 2013/14 using P45 information from HM Revenue and Customs. Merging these sources of data provided a unique dataset combining information about the timing of the support and advice provided by the National Careers Service, the personal characteristics of customers, as well as information on customers' employment, benefit dependency and education and training histories and outcomes.

## Characteristics of National Careers Service customers

Figure 1: National Careers Service customers by gender and age (by year)

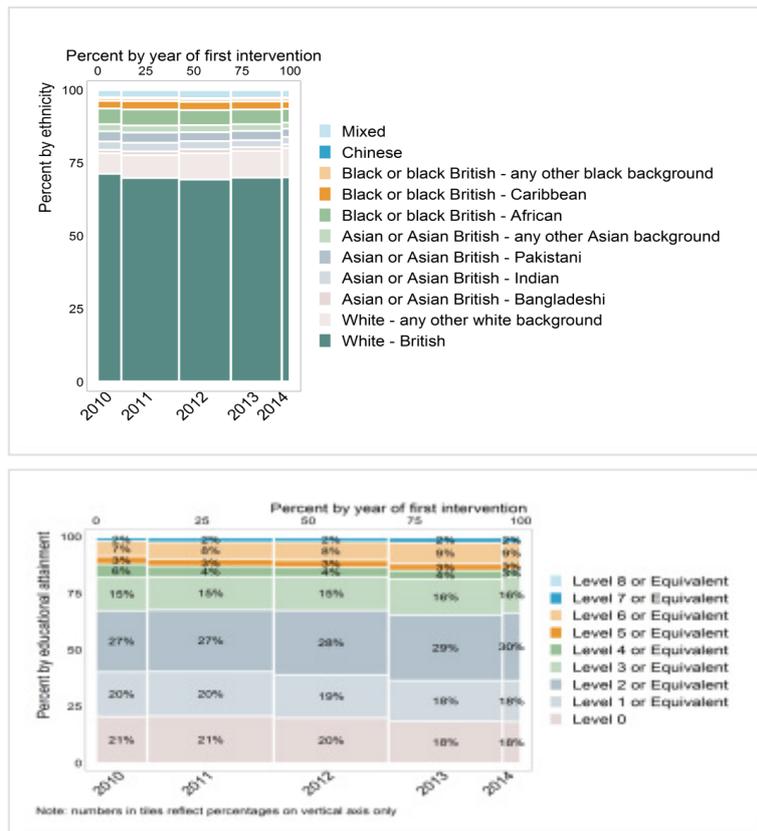


Throughout the analysis, all information is presented in terms of the customer's **first time** of receiving support from the National Careers Service. Of the **2.71 million** National Careers Service customers between August 2010 and February 2014, the findings indicate that the careers advice and support was used by men to a greater extent than women (i.e. men accounted for between **53%** and **55%** of customers) remaining relatively constant across time.

In terms of the age profile, individuals aged between 19 and 34 make up almost half (**46-50%**) of all National Careers Service customers.

Furthermore, a significant number of National Careers Service customers were aged between 35 and 44 (approximately **20%**) or between 45 and 54 (**18%**).

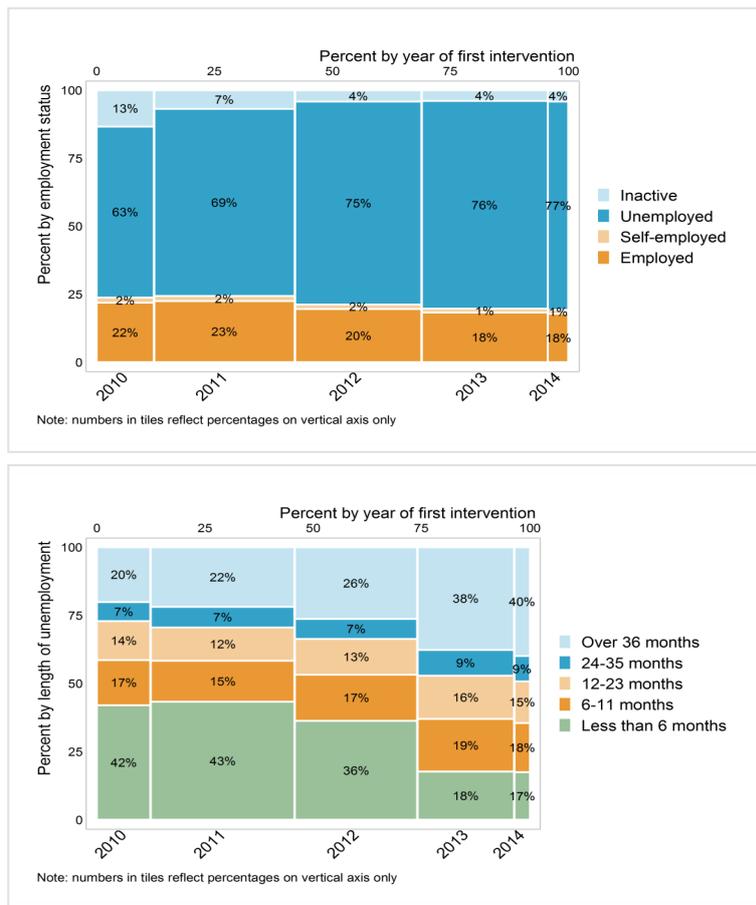
**Figure 2: National Careers Service customers by ethnicity and qualification (by year)**



There has been little change in the ethnic composition of National Careers Service customers over time. While the proportion of customers of white-British ethnic origin has remained relatively constant (**64-67%**) the proportion of customers from a white-non-British ethnic origin has increased (from **7%** in 2011 to **9%** in 2013), and the proportion of customers from Black-African backgrounds has declined over time (from **5%** in 2011 to **4%** in 2013).

In terms of prior attainment, at the time of National Careers Service customers' first intervention, between **18%** and **21%** of customers had no formally recognised qualifications, with a further **18%-20%** in possession of Level 1 qualifications. Between **27%** and **30%** of customers were in possession of Level 2 qualifications.

**Figure 3: National Careers Service customers by employment status and duration of unemployment (by year)**

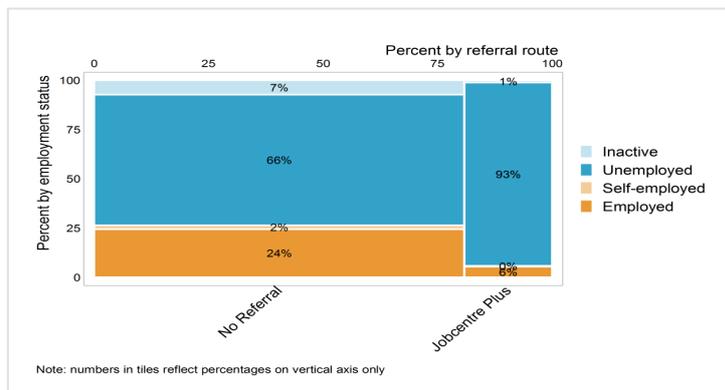
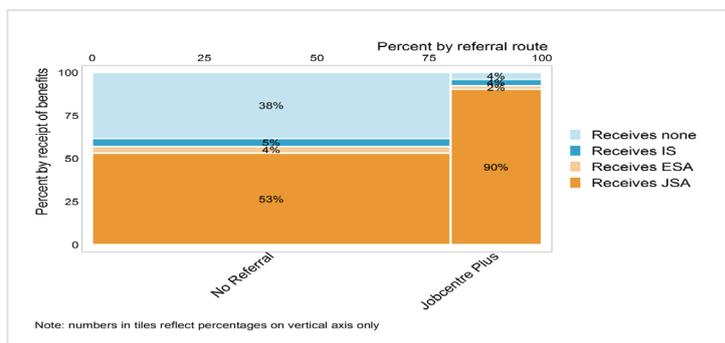
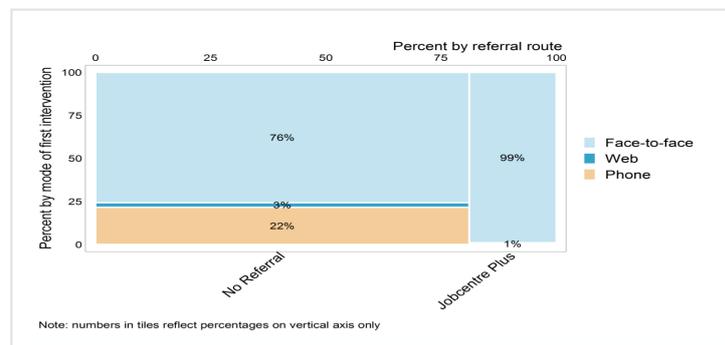
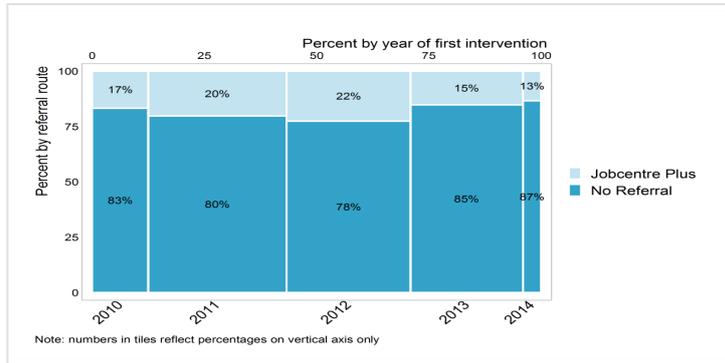


On average, the majority of customers (**72%**) reported that they were unemployed, of which **35%** had been out of work for less than 6 months, while over **25%** had been unemployed for more than three years.

The majority of National Careers Service customers (**70%**) reported that they were in receipt of JSA, Incapacity Benefit or Employment and Support Allowance. Over time, the precarious labour market status of National Careers Service customers appeared to become more acute. In particular, there was a greater likelihood of customers being unemployed (**76%** in 2013 compared to **69%** in 2011), as well as being long term unemployed, and subsequently being in receipt of benefits.

# Referral routes and intensity of support provided

Figure 4: National Careers Service customers by referral route, mode of intervention, benefit receipt and employment status (by year)



Over the period, between **15%** and **22%** of customers who accessed the National Careers Service were referred by Jobcentre Plus<sup>1</sup>, with the remainder self-referring. Furthermore, there were significant differences between Jobcentre Plus referred customers and self-referred customers: Jobcentre Plus referred customers were more likely to be unemployed (approximately **93%** compared to **66%**), in receipt of benefits (approximately **90%** compared to **53%**), but also more likely to receive face-to-face support (**99%** compared to **76%**)

The analysis suggests that the National Careers Service may have become more targeted on those that need the most support; however, the challenge of moving the client group back to sustainable employment may have become inherently more difficult, as the degree of unemployment entrenchment among National Careers Service customers increased over time.

## Labour market and learning outcomes

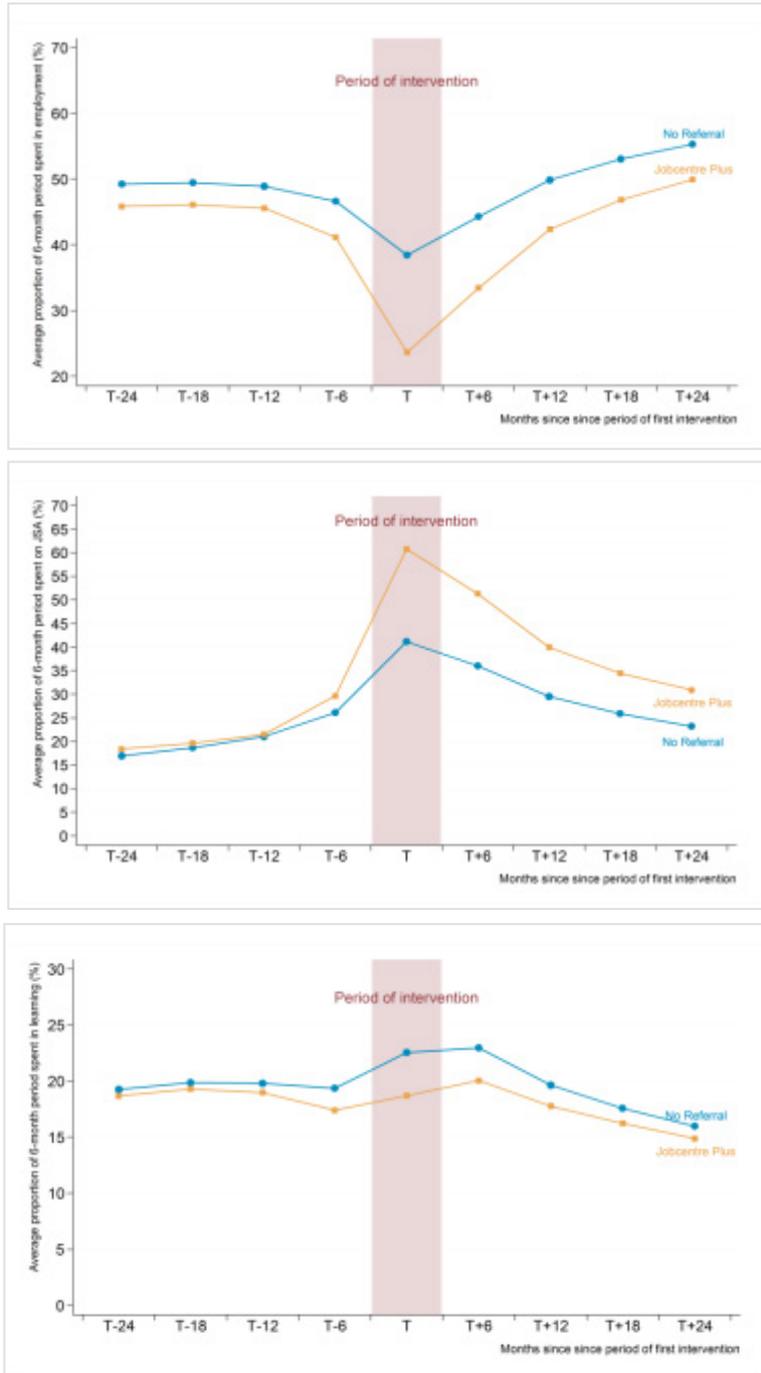
**The results that follow relate to the set of customers that have an ILR record only.**

The analysis demonstrates that National Careers Service customers suffered a sharp deterioration in the likelihood of being employed ahead of accessing National Careers Service support. Compared to 12-24 months in advance of receiving careers advice and support, National Careers Service customers spent **15 percentage points** less of the 6-month interval in which they received support in employment. Customers who were referred through Jobcentre Plus suffered the most extreme decline (approximately **24 percentage points** compared to an **11 percentage point** decline for those that self-referred).

---

<sup>1</sup> Note that over the period of the analysis, the Integrated Employment and Skills trials were in operation. This was followed by the roll out of lessons from the trials that put in place co-located working between the National Careers Service and Jobcentre Plus, leading to increasing referrals by JCP staff.

Figure 5: National Careers Service customers' labour market and learning histories



Unsurprisingly, ahead of the receipt of National Careers Service support, a comparable deterioration is demonstrated in relation to benefit dependency. Specifically, National Careers Service customers experience a significantly increased likelihood of spending that 6-month interval in receipt of benefits compared to the 6-month period preceding initial access to the service (60% compared to 30% for Jobcentre Plus referred customers and 41% compared to 26% for self-referred customers).

Reflecting both the potential rationale for accessing the National Careers Service, as well as the identification of potential skills gaps being one of the main functions of the service, the analysis indicates that there was a significant increase in the proportion of time spent in education and training in the 6-month period in which support was received and the 6-month period that followed.

In particular, amongst **self-referred** customers, there was a **4 percentage point** increase in the proportion of the 6-month period in which support was received compared to the 6-month interval immediately preceding initial access of National Careers Service support (**2 percentage point** increase for JCP referred customers).

Specifically, the findings of this component of the analysis are as follows:

- There is a substantial deterioration in employment status leading up to the period in which the careers support was received for the first time. National Careers Service customers spent approximately 15 percentage points less of the six-month period in which support was received in employment compared to the 6-month intervals 12 to 24 months pre-support (35% compared to 50%). Following the receipt of careers advice and support, this labour market deterioration reverses. One year after the support was received, on average, National Careers Service customers spend a comparable proportion of time in employment (48%) as they did 24 months prior to the receipt of National Careers Service support. This labour market reversal persists, with the average proportion of time in employment increasing further (to 54%) 24 months after the support.
- Comparable findings are demonstrated in relation to benefit dependency. There is a 20 percentage point increase in benefit dependency between the 6 month interval immediately preceding the receipt of National careers Service support and the 6-month interval in which support is received for the first time (from 25% to 45% of the proportion of the six-month interval). This adverse outcome then reverses following the receipt of National Careers Service support, with the proportion of the 6-month period in receipt of benefits declining to pre-support levels two years later.
- Whilst the average proportion of time spent in learning is stable in the 24 months leading up to intervention (at around 18-20%), the proportion of time spent in education and training increases during the period of National Careers Service support and in the first 6-month period following the first receipt of support (to between 22% and 24% of the 6-month interval). There is then a gradual decline in the proportion of successive 6-month periods spent in education and training (declining to 16% in the 6-month period two years post initial support).

## Executive Summary - Part II

To undertake a more robust analysis, we attempted to compare the outcomes of individuals in receipt of National Careers Service support and advice (the **treatment group**) with a sample of individuals that were not in receipt of the careers advice from the service, but had similar personal, socioeconomic and labour market histories as the treatment group (the **counterfactual group**). This was achieved using a rigorous methodology combined with a range of robustness checks to ensure the validity of the analysis.

To achieve this, we implemented a **Propensity Score Matching** approach using different variables (including labour market histories during the interval in which support was received) to match the treatment and control groups. The analysis was replicated for different categories of National Careers Service customers (for instance, those receiving support early in the service’s life and those customers referred through Jobcentre Plus)<sup>2</sup>.

**Figure 6: Propensity Score Matching model results**



The use of this econometric approach was successful, as demonstrated by the significantly reduced sample bias (Figure 6), and resulted in a better comparison

<sup>2</sup> It is important to note that identification of an appropriate counterfactual group is particularly challenging because the reason people access the National Careers Service may be to do with (an unobservable) motivation to change one’s circumstances, or as a specific result of a sharp deterioration in labour market outcomes.

between those in receipt of National Careers Service advice and those individuals not in receipt of this careers support and advice. Across all variables considered, the difference in the means between the treatment and (matched) control groups was substantially less than between the treated and untreated (unmatched) groups.

Following this propensity score matching model and the generation of a treatment and counterfactual, a comparison of the labour market outcomes of the two groups was undertaken in a number of stages.

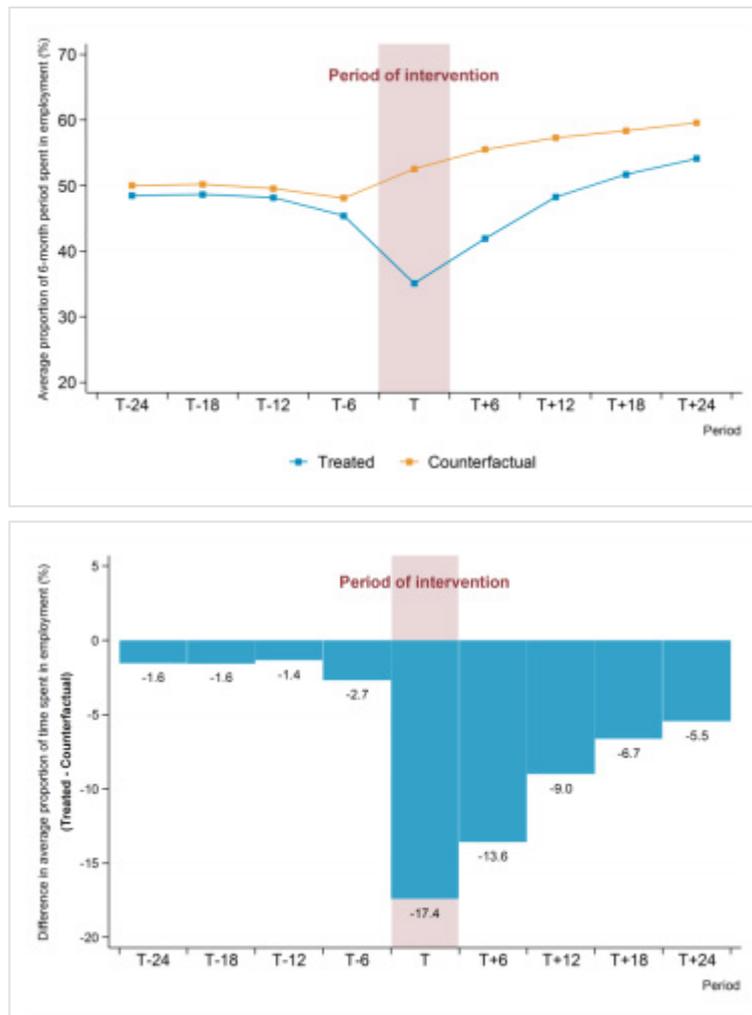
## Baseline results

In the **baseline model specification**, having matched on personal characteristics and employment histories in the **6-month interval preceding** access to National Careers Service support, we compared the employment outcomes between the treatment and counterfactual groups in each subsequent 6-month interval. The analysis (lower panel) *appears* to demonstrate the relatively superior employment outcome achieved by the treatment group post-support. However, despite being methodologically valid, a number of issues raised concerns in relation to the robustness of the match.

Specifically, there was a **significant divergence in employment measures** between the treatment and counterfactual in the 6-month interval during which National Careers Service support was received. In other words, it was not just the case that the employment outcomes achieved by the treatment group deteriorated in isolation.

Specifically, the employment outcomes achieved by the counterfactual group **improved** between the two 6-month intervals, potentially reflecting difference in unobservable characteristics between the two groups. This suggested that further work needed to be undertaken to refine the analysis.

Figure 7: Differential employment outcomes between treatment and counterfactual



## Caveats and subsequent robustness checks

The **first** caveat in interpreting the results in this paper is that the analysis of outcomes covers a specific subset of National Careers Service customers, i.e. those with an ILR record. As such, no conclusions can be drawn from this study on the impact of the service on customers without an ILR record.

**Secondly**, the decision initially to adopt 6-month intervals for analysis – and given the fact that the initial careers support and advice might occur at any point within that interval – might have resulted in a degree of ambiguity in relation to assessing the extent to which employment measures in the 6-month interval were **histories** or **outcomes**.

**Thirdly**, there was also a possibility that the apparent recovery in labour market outcomes amongst the treatment group might have been as a result of **regression to the mean**. Specifically, the fact that the estimate of the proportion of the 6-month period in employment was far from the mean during the interval in which careers support occurred,

might result in the next estimate of employment being closer to the mean – independent of the careers support received.

## Refining the analysis to account for potential caveats

To ensure the robustness of the results, several alternative approaches to the modelling and matching were undertaken. Specifically, we replicated the analysis by **reducing the interval of intervention to 1 month** (to remove the possibility of confusing histories with outcomes); matched the treatment and counterfactual groups using information on labour market status **during the 1-month interval in which careers support was received** by the treatment group (to limit the impact of unobservables); and undertook a range of **falsification tests** to compare the evolution of labour outcomes of two groups not in receipt of the National Careers Service (the *original* counterfactual and a '*pseudo*' counterfactual generated by matching the original treatment group with an adjusted (higher) level of employment and a new counterfactual group). This final element was undertaken to address the extent of regression to the mean<sup>3</sup>. **The preferred methodology and associated results are presented below.**

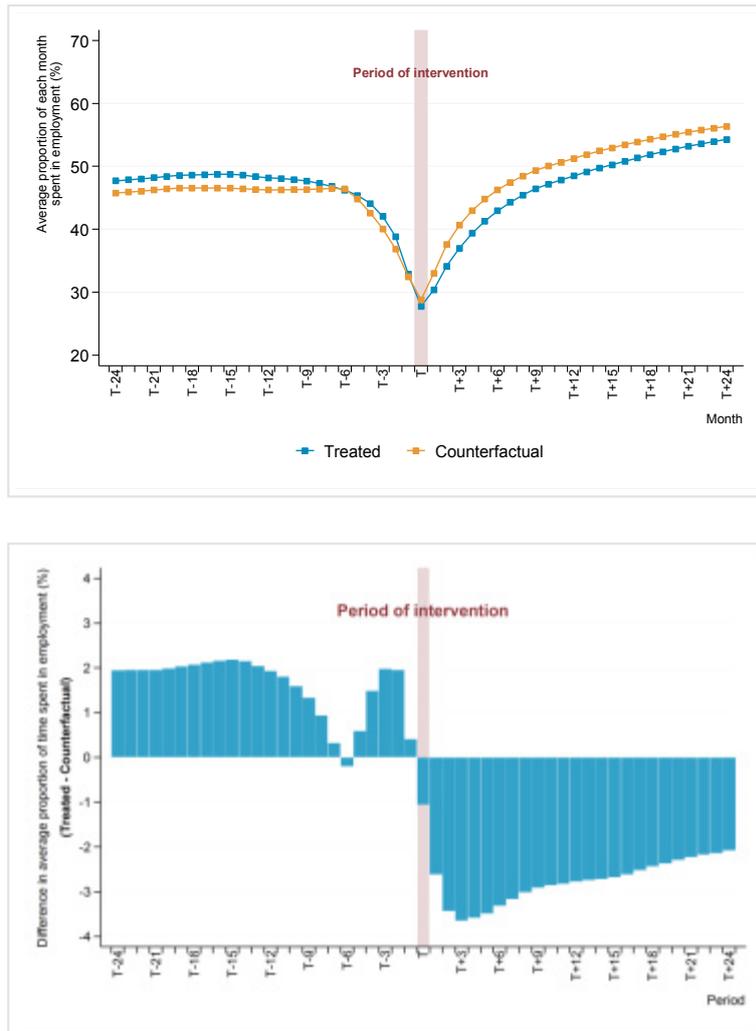
## Results of analysis using preferred modelling approach - Employment

As previously described, the treatment and counterfactual were matched on the proportion of the **1-month interval** in which National Careers Service support occurred. With less than a **1 percentage point** difference between the groups at the time of support (and less than a **2 percentage point** difference in any of the 24 individual months in the 2 years pre-support), the analysis indicates that the employment outcomes of National Careers Service customers continued to deteriorate in the first 6 months post support relative to those in the counterfactual, but gradually improves thereafter. Specifically, National Careers Service customers spend approximately **3.5 percentage points** less of the 6<sup>th</sup> month following the receipt of careers advice and support in employment compared to the counterfactual; however, by the end of the 24<sup>th</sup> month following National Careers Service support, the gap stands at just **2 percentage points**.

---

<sup>3</sup> This falsification test analysis illustrated that regression to the mean appeared to exist – and that at least some (approximately **27%** in relation to employment and **34%** in relation to benefit dependency) of the 'improvement' in labour market outcomes achieved by National Careers Service customers attributable to this phenomenon.

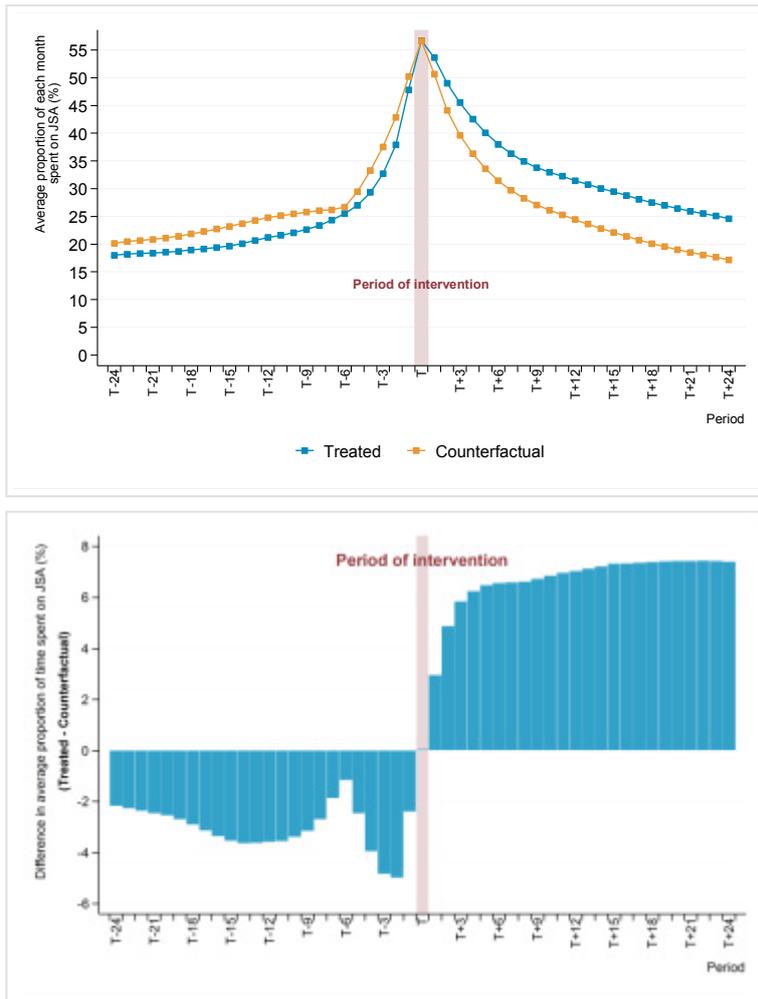
**Figure 8: Employment outcomes - 1 month intervals matched on period of intervention**



## Benefit Dependency

In relation to benefit dependency, a similar picture emerges. In the 1-month interval in which National Careers Service support was received, there was **no gap** between the treatment group and the counterfactual in the proportion of that month spent dependent on Jobseekers Allowance (whereas in the previous 2 years, the treatment group was between **2 and 4 percentage points** less likely to be benefit dependent than the counterfactual group). Following the receipt of National Careers Service support, the analysis indicates that the labour market outcomes of the treatment group deteriorated, with a **6-8 percentage point** gap opening up between the treatment and counterfactual groups. This gap in benefit dependency remained essentially unchanged in the 24 months post receipt of careers support and advice amongst National Careers Service customers.

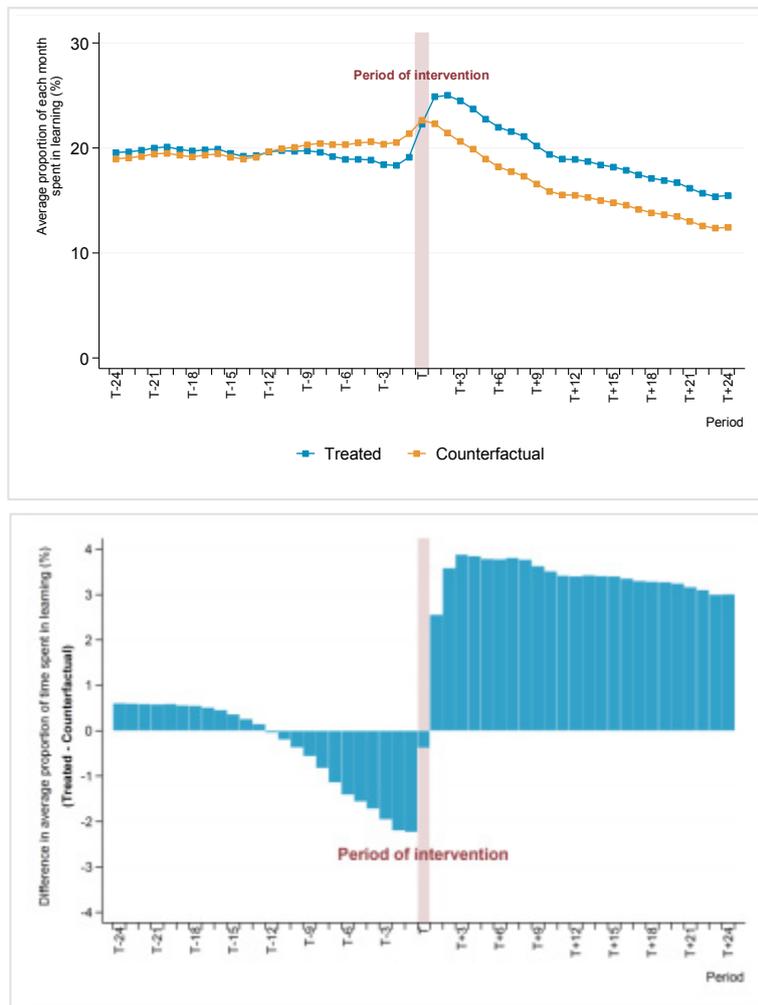
**Figure 9: Benefit dependency - 1 month intervals matched on period of intervention**



## Education and Training

Finally, in relation to the education and training outcomes associated with National Careers Service support, the analysis indicates that in the 6 months prior to the receipt of National Careers Service support, there was a general decline in the incidence of education and training amongst the treatment group relative to the counterfactual (reflected in a **2 percentage point** gap in the 1-month interval preceding the interval in which support was received). Although the size of the gap between the treatment and counterfactual was estimated to be almost **zero** in the 1-month interval in which the treatment group received careers advice and support, the analysis indicates that there was a **significant upward shift in the incidence of education and training**, with the treatment group spending between **3 and 4 percentage** points more of each successive 1-month interval in education and training relative to the counterfactual over the subsequent 24 months.

Figure 10: Education and training - 1 month intervals matched on period of intervention



## Conclusions

Given the fact that we can only match those National Careers Service customers that have been in receipt of publicly funded training in the academic years 2008-09 to 2013-14 inclusive, our Key Finding is that although we could not identify a positive impact of the National Careers Service on employment or benefit dependency outcomes, it was possible to identify a relatively strong positive effect in relation to education and training that persisted across the entire post-support period for this group.

The main caveats to these findings are that a) the analysis is limited to those National Careers Service Customers in possession of an ILR record and b) there may be some unobservable differences between the treatment and counterfactual groups identified that have failed to be addressed through the propensity score matching approach.

# **Part I: An assessment of the impact of the National Careers Service on customers before and after support**

## Part I - Introduction

London Economics were commissioned by the former Department for Business, Innovation and Skills to undertake an evaluation of the impact of the National Careers Service.

The National Careers Service provides anyone aged 13 and over with access to up to date, impartial information and professional guidance on careers, skills and the labour market through an online service and telephone helpline. Adults aged 19 and over, (or 18 and over if out of work and on benefits), have access to one-to-one support from a qualified, expert adviser, face-to-face in the community.

The aim of this component of the analysis (Part I) was to assess the impact that the service has had on the labour market outcomes of National Careers Service customers **before and after** the receipt of support. The analysis makes use of existing data through the linking of multiple datasets including as the **National Careers Service** administrative dataset, the **Individualised Learner Record** (ILR) which covers all publicly funded further education and training in England, the **DWP National Benefits Database** (NBD) containing information on benefit dependency, and **HMRC employment** (P45) data.

The next section describes the methodology underlying the data merging and the various outcome measures under consideration. In the subsequent section, we present descriptive statistics outlining who exactly is receiving careers advice from the National Careers Service and how this has changed over time. We then examine the labour market histories and outcomes of National Careers Service customers before and after the receipt of support.

### Rationale for current analysis

In the previous work undertaken in 2012 ([here](#)), there was relatively limited administrative information relating to the National Careers Service, while it was also the case that the availability of post-support information in relation to employment and benefit dependency was substantially less than currently the case.

In particular, administrative information on National Careers Service customers was only available between August 2010 and July 2011, while in relation to employment information, because of the lag in reporting HMRC P45 data, only information between 2003/04 and 2010/11 was available. As such, there were a number of individuals in receipt of careers support for whom there was very limited information on post support outcomes. Similarly, in relation to DWP benefit dependency data, information was used between 1999/00 and 2010/11, again restricting the post support outcomes that could be considered.

Given these data limitations, the previous analysis demonstrated an almost instantaneous snapshot of post support outcomes – generally just 3 to 6 months after the

careers support might have been received. Furthermore, the previous analysis considered the probability of an individual being in employment or in receipt of benefits as binary variables (i.e. employed or not-employed; in receipt of benefits/ not in receipt of benefits).

Whilst this assessment of labour market outcomes post-support was a reasonable approach given the limited data availability at the time, the approach was relatively crude compared to the assessment of post-careers support outcomes presented here. In particular, rather than considering the labour market outcomes at a particular point in time (and essentially assuming that the individual's labour market status on that date is indicative of their more general labour market outcomes over the period), in this analysis, we generate a more refined assessment of labour market outcomes by estimating the **proportion** of a particular (smaller) period in employment or in receipt of benefits. Methodologically and computationally, this is a significant improvement on the previous analysis.

# Methodology

## Data used and relevant time periods

### National Careers Service data

The National Careers Service administrative dataset contains detailed information on National Careers Service customers, including:

1. Demographic characteristics;
2. Labour market status at the time of intervention;
3. How the service was accessed (i.e. face to face, online); and,
4. The route of referral (i.e. self-referral, referral through Jobcentre Plus).

At the time when the data was extracted, the dataset covered **3,216,506** intervention sessions starting in August 2010. To undertake this analysis, the data for analysis was extracted at the start of March 2014, and as such, the dataset covers only the intervention sessions that occurred prior to this.

### Individualised Learner Record (ILR/SILR)<sup>4</sup>

The Individualised Learner Record (ILR) and Single Individualised Learner Record (SILR) contain information on learning aims and associated level of learning, as well as the personal characteristics of learners. The ILR/SILR comprises information recorded by providers of further education and returns are compulsory for all state-funded further education. The ILR/SILR is organised by academic year, and we use information from the academic years 2008/09 to 2013/14 inclusive.

**This is the core data source for this analysis, as the matched analysis described in this paper has been carried out on those with an ILR record only.** The main reason for this was to ensure that the treatment and counterfactual groups were comparable, since benefit, employment and earnings data were only available for non-customers who had an ILR record. The ILR/SILR is also important for this analysis as it provides comparable demographic information on National Careers Service customers (as well as non-customers), which is needed for propensity score matching. Additionally, learning outcomes are derived from the ILR dataset.

---

<sup>4</sup> It is important to note that National Careers Service do not use the ILR to record interventions with customers

## Department for Work and Pension Benefits data (DWP)

The DWP National Benefits Database contains data on benefit spells collected by the Department for Work and Pensions. The dataset covers benefit spells running from 2004 to 2014. The start and end dates of the spells were used to create outcomes indicating whether an individual was on a benefit related to unemployment.

## HM Revenue and Customs P14 and P45 (HMRC)

HMRC administrative data was broken into two files:

- Pay and tax records in the P14 dataset; and,
- Employment start and end dates contained in the P45 dataset.

The P14 dataset is organised by tax year and employment spell, and covers the years from 2004/05 to 2013/14 inclusive. This is structured by financial year, and as such was not particularly suitable for comparable analysis given the fact that the main analysis is presented in intervals that are at most 6 months in length (and there is no information in the HMRC P14 data set on when within the financial year the earnings were generated). The P45 details start and end dates of employment spells between 2004/05 and 2013/14 inclusive. These datasets were used to create both learners' labour market histories and outcomes in respect of earnings and employment status respectively.

An important caveat to using the HMRC records is that, because these data cover those who pay tax through the PAYE system, this information source will not include all workers whose income is below the tax threshold or self-employed workers.

## Initial cleaning and coding the data

### National Careers Service

An inspection of the National Careers Service dataset showed a small number of missing values and occasional inconsistencies. Some of these issues could be easily remedied. In particular, some inconsistencies between learner sessions that were identified (for instance, where a customer's gender differed between sessions) could be eliminated by taking the most commonly occurring value for that individual. Some inconsistencies in relation to customer IDs could be resolved by examining other ID variables contained in the remaining data sets under consideration (i.e. the HMRC and DWP IDs). Inconsistencies in relation to the order of intervention sessions were fixed straightforwardly by considering the date of each session.

To produce descriptive statistics and for the subsequent analysis of matched labour market outcomes, the National Careers Service dataset was collapsed to individual level

(instead of the intervention level), where each observation in the dataset represented one National Careers Service customer. The date of the customer's **first** National Careers Service session was treated as their **date of intervention**, although relevant details of subsequent sessions were also retained. The collapsed National Careers Service dataset comprised **2,714,318 individuals**. This dataset was used to produce the descriptive statistics presented in the next section.

## **ILR/SILR**

The ILR/SILR dataset is organised at learning aim level. The initial cleaning and recoding of the ILR/SILR files took significant time and effort due to the size of the raw datasets, but also because of changes across time in the way the data was recorded. The learning aim raw data files were arranged so that each observation represented a course taken by an individual. These files were cleaned as follows:

1. The files were merged with associated LAD/LARA (Learning Aim Database/Learning Aim Reference Application) files that provided additional information on the learning aims, and with ILR learner files that contained additional demographic information on learners;
2. Any inconsistency in the basic recording of learning aims information for an individual was resolved by using a similar method as used for National Careers Service inconsistencies;
3. A prior attainment variable was constructed for each year using the maximum of the prior attainment variable in the ILR dataset for that year and the highest qualification level achieved in that year;
4. Learning spells were created using start and end dates of learning aims (with breaks over Christmas, Easter and Summer being treated as if the learner was still "in learning");
5. The dataset was then collapsed to learner level;
6. Datasets were merged across years, creating a dataset of 13,842,201 individuals.

## **Department for Work and Pensions (DWP)**

The DWP dataset was first restricted to those in receipt of Job Seekers Allowance (JSA), Incapacity Benefit (IB) and Employment and Support Allowance (ESA) only. Following these steps, the key activity involved recoding the information on the start and end dates in receipt of specific benefits into *benefit spells*. To achieve this, the benefit spells were generated and cleaned by merging overlapping spells and by merging adjacent spells where the start date of a spell was one day later than the end date of a previous spell. In

this process, JSA spells were treated as separate to IB and ESA spells so that, for example, overlapping JSA and IB spells were not merged.

Ultimately, the dataset included JSA spells for **5,207,112 individuals** and IB/ESA spells for **2,572,148 individuals**.

## **HM Revenue and Customs (HMRC)**

The P14 file relating to earnings required relatively little cleaning. The only adjustments made to the dataset were to collapse the dataset to tax year level (adding earnings from different employment spells) and then remove any negative earnings records. Ultimately, the dataset contained records for **14,703,442 individuals**.

Cleaning of the P45 dataset relating to employment spells required more effort. As a first step, the following types of records were dropped from the P45 dataset:

1. Employment spells with the start date following the end date (following the current approach of DfE and the DWP);
2. Records for individuals that could not be matched to the lookup file; and,
3. Duplicate records.

The biggest issue with the P45 dataset was the presence of unreliable start and end dates. Following the approaches of the DWP and DfE, the following remedies were applied:

1. Where the employment end date was after the end of the 2013/14 financial year, the individual was assumed to be in continuing employment;
2. Dates in the early 1900s (e.g. 1902) were replaced by a date 100 years later – these were assumed to be simple recording errors;
3. Spells with both missing start and end dates were dropped;
4. Start and end dates were assessed for quality and “certain” dates were chosen above “uncertain” dates, where there were multiple entries;
5. The JSA spells (which are more accurate because the dates come directly from the DWP payments system) were merged with the dataset. Using this check, employment spells were cleaned so that an individual could not be in employment and on JSA at the same time;
6. Finally, overlapping and adjacent employment spells were merged.

Once the P45 dataset was collapsed to individual level, it contained employment spells for **14,590,618 individuals**.

## Data merging

### Linking datasets

Best practices, identified in an analysis commissioned by the Department<sup>5</sup>, were used to match National Careers Service customers to labour market and learning outcomes, and also to link the labour market and learning outcomes of non-National Careers Service customers. A brief summary is provided here.

The *lookup file* (a data linking file provided by DfE) links the unique identifiers contained within the HMRC, DWP and ILR datasets and was crucial for merging the datasets<sup>6</sup>.

Once all possible links were identified between the four main datasets, a new ID was generated to uniquely identify each individual level record. Where multiple HMRC IDs were linked to a single DWP ID (or vice versa), the associated records were treated as belonging to one person. Where multiple HMRC IDs were linked to multiple DWP IDs, it was not possible to identify a unique individual and therefore these observations were not assigned a new ID.

The newly generated IDs could then be merged with the ILR dataset. Similar to previously, where multiple ILR IDs were linked to a single new ID (or vice versa), the associated records were treated as belonging to one person. Where there were multiple ILR IDs linked to multiple new IDs, these individuals were dropped from the final dataset. For the remaining ILR IDs, which were not matched to any HMRC or DWP records, these individuals were included in the final dataset and it was assumed that they never had any employment or benefit records.

### Final dataset for analysis

Of the **2,714,318** observations in the collapsed National Careers Service dataset, **1,510,013** National Careers Service customers could ultimately be used in the analysis of matched outcomes. The reason for attrition from the final dataset was that observations

---

<sup>5</sup> Department for Business, Innovation and Skills, "Measuring Further Education Outcomes Using Matched Administrative Data: Constructing a Research Database". Restricted access report.

<sup>6</sup> In addition to the linking identifiers existing in the raw lookup file, London Economics supplemented the raw lookup file with additional links contained in the HMRC (e.g. where some observations in the P45 dataset included DWP identifiers) and National Careers Service files.

could not be matched to an ILR record, meaning that we would lack the demographic variables required for the Propensity Score Matching process.

As the ILR/SILR files comprised **13,842,201 individuals** once it had been cleaned, and since the analysis focuses only on those that have an ILR/SILR record, this was the size of the full dataset for analysis. The **1,510,013 National Careers Service customers** represented just fewer than **11%** of the total number of observations available for analysis.

## Comparison of the matched and unmatched samples

The descriptive statistics in the next section describe the **2,714,318** National Careers Service customers (i.e. before matching) rather than the set of **1,510,013** that can be matched. In this section, we compare the demographic breakdown of the matched and unmatched observations to ensure that our analysis has been performed on a sample that is broadly similar to the general population of customers.

**Table 1: Comparison of matched National Careers Service customers vs. all National Careers Service Customers**

<b>Gender</b>	<b>Matched (%)</b>	<b>All NCS (%)</b>
Male	54.2	54.0
Female	45.8	46.0
<b>Age</b>	<b>Matched (%)</b>	<b>All NCS (%)</b>
<19	2.7	3.2
19-24	25.7	23.0
25-34	25.5	25.9
35-44	20.8	20.8
45-54	17.3	17.4
55-64	7.1	7.8
65-74	0.7	1.1
75+	0.3	0.7
<b>Educational attainment</b>	<b>Matched (%)</b>	<b>All NCS (%)</b>
Level 0	18.9	19.8
Level 1 or equivalent	20.4	19.1
Level 2 or equivalent	30.7	28.1
Level 3 or equivalent	15.8	15.1
Level 4 or equivalent	3.9	4.3

Level 5 or equivalent	2.7	3.2
Level 6 or equivalent	5.9	8.1
Level 7 or equivalent	1.4	2.1
Level 8 or equivalent	0.2	0.3
<b>Ethnicity</b>	<b>Matched (%)</b>	<b>All NCS (%)</b>
White – British	71.6	70.0
White - any other white background	7.0	8.4
Asian or Asian British – Bangladeshi	1.4	1.4
Asian or Asian British – Indian	2.3	2.7
Asian or Asian British – Pakistani	3.2	3.3
Asian or Asian British - any other Asian background	2.2	2.4
Black or black British – African	5.3	5.2
Black or black British – Caribbean	3.1	2.8
Black or black British - any other black background	1.0	1.0
Chinese	0.3	0.3
Mixed	2.6	2.6
<b>Region</b>	<b>Matched (%)</b>	<b>All NCS (%)</b>
North East	6.2	5.1
North West	15.0	14.1
Yorkshire and the Humber	10.8	10.5
East Midlands	8.8	8.7
West Midlands	10.7	10.4
East of England	10.0	10.7
London	16.9	18.1
South East	12.1	12.7
South West	9.3	8.8
Outside of England	0.2	0.9
<b>Benefit receipt</b>	<b>Matched (%)</b>	<b>All NCS (%)</b>
Receives JSA	66.1	61.7
Receives ESA	3.6	3.5
Receives IS	5.0	4.4
Receives none	25.4	30.4
<b>Employment status</b>	<b>Matched (%)</b>	<b>All NCS (%)</b>

Employed	18.4	20.4
Self-employed	1.2	1.6
Unemployed	75.7	72.0
Inactive	4.7	6.0
<b>Length of unemployment</b>	<b>Matched (%)</b>	<b>All NCS (%)</b>
Less than 6 months	33.9	34.6
6-11 months	16.9	16.7
12-23 months	14.1	13.7
24-35 months	8.2	7.9
Over 36 months	26.9	27.1
<b>Referral</b>	<b>Matched (%)</b>	<b>All NCS (%)</b>
No Referral	79.8	81.1
Jobcentre Plus	20.2	18.9
<b>Mode of first intervention</b>	<b>Matched (%)</b>	<b>All NCS (%)</b>
Face-to-face	85.0	80.6
Phone	14.2	17.3
Web	0.9	2.2

Source: London Economics' analysis

Overall, the differences between the two groups are relatively minor, and as such should not constrain or bias the subsequent analysis. However, a few differences between the two groups are noted, for example:

- There are very minor differences in age, education, ethnicity and region between the matched National Careers Service sample and the entire (matched and unmatched) sample.
- The dataset used for matched analysis has a marginally higher proportion of individuals in receipt of JSA and a higher proportion of individuals who are unemployed.
- The dataset used for matched analysis has a higher proportion of customers whose mode of first intervention was a face-to-face session (which as presented in the next section is correlated with (un)employment status).

## Outcome measures

This study considers the impact of National Careers Service on the following outcomes:

- Employment;
- Benefit dependency; and
- Learning.

When assessing employment, benefit dependency and learning, we estimated the **proportion of a period** (for instance, six months) spent in employment, on benefits (Jobseekers Allowance or Incapacity Benefit (or its replacement, Employment and Support Allowance)) or in learning (derived from the ILR which covers publicly funded learning aims).

It should be noted that the construction of the outcomes measures differs from the approach used in previous research by London Economics in the initial exploratory analysis of the National Careers Service<sup>7</sup>. The approach followed previously was to examine the labour market status of an individual at particular points in time (i.e. a binary outcome (employed/non employed) exactly three and six months before and after the intervention date). This was an appropriate method of deriving a *snapshot* of an individual's labour market status given that the dataset at that time only covered National Careers Service interventions that occurred over a 12 month period<sup>8</sup>. The decision to use the average proportion of time spent in employment or benefit dependent over a period makes better use of the data available, and allows for a relative smoothing of histories and outcomes, rather than relying on a potentially volatile binary outcome.

---

<sup>7</sup> London Economics, *Exploratory evaluation of the Next Step service*, 2012. Available at: [www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/197848/12-1279-exploratory-evaluation-of-next-step-service-updated-reduced.pdf](http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/197848/12-1279-exploratory-evaluation-of-next-step-service-updated-reduced.pdf)

<sup>8</sup> Since the original study covered Next Step interventions between August 2010 and July 2011, they matched on labour market outcomes in a fixed period, the year of 2009.

# Characteristics of National Careers Service customers

## Characteristics of National Careers Service customers

In this section, we analyse the socio-demographic breakdown of National Careers Service customers using administrative data. The graph below shows the number of **first time customers per year**, as recorded in the dataset. Note that the smaller numbers in 2010 and 2014 were due to the dataset not covering the full calendar year, and the fact that 2010 and 2014 reflect only **partial calendar years** should be noted throughout the subsequent analysis.

As illustrated in Figure 11, the total number of National Careers Service customers stood at between **722,000** and **810,000** between 2011 and 2013 (full calendar years).

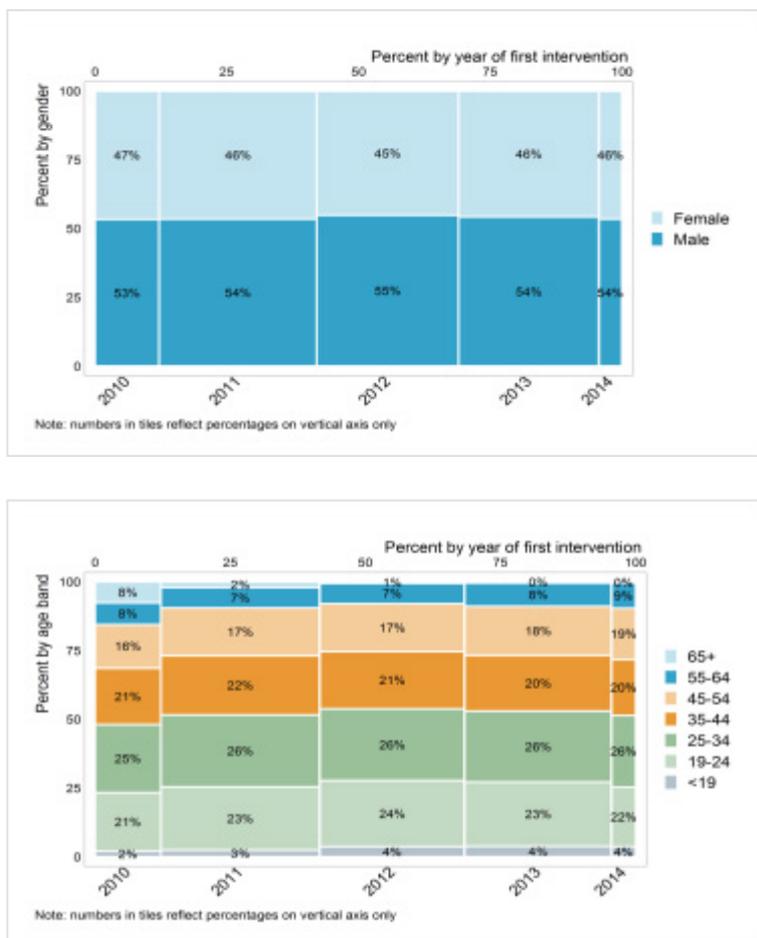
**Figure 11: Number of first time Next Step-National Careers Service customers by year**

Number of first time customers by year	
2010	331,372
2011	810,450
2012	731,119
2013	722,707
2014	118,670

The graphs that follow illustrate the percentage of customers falling into different demographic categories, excluding from the calculation National Careers Service customers that have missing observations for the relevant variable.

## Age and Gender

Figure 12: National Careers Service customers by gender and age (by year)



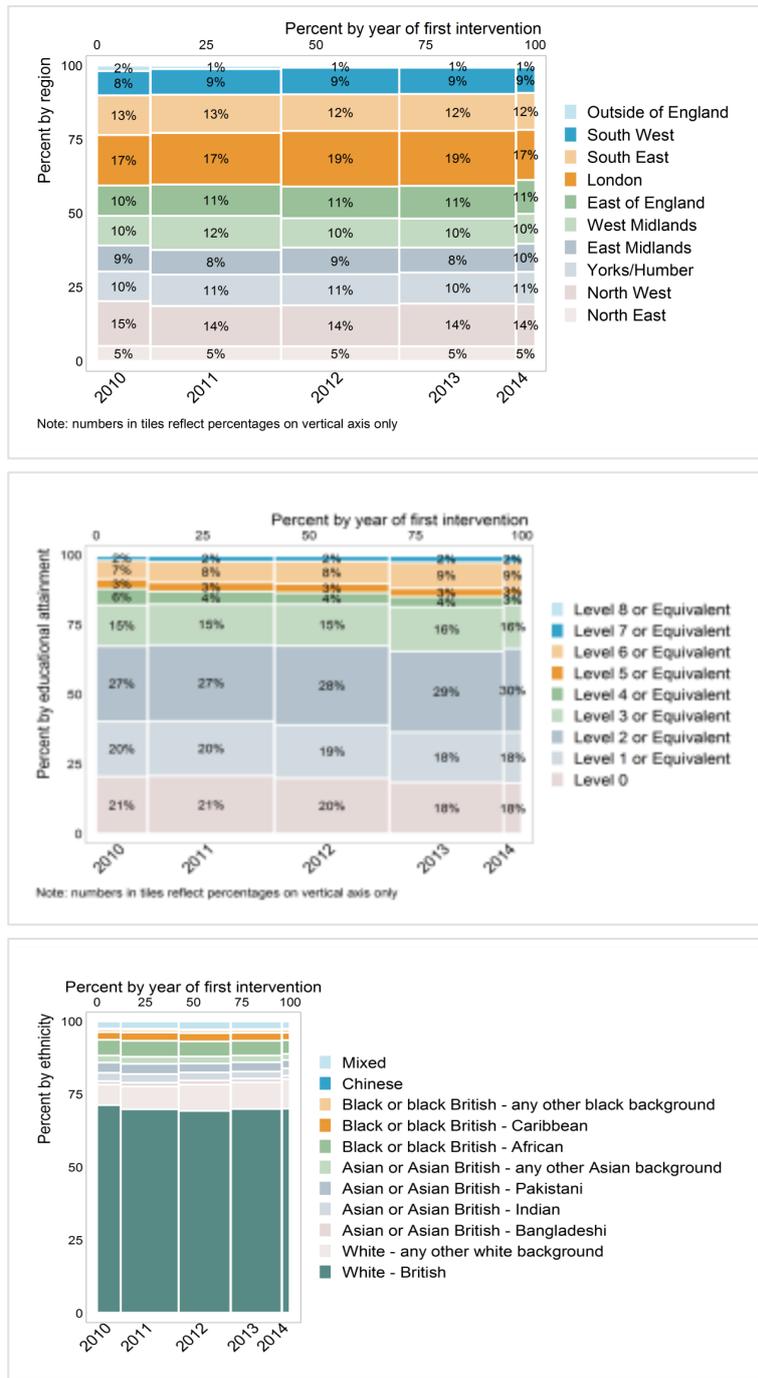
The graphs presented in Figure 12 show the composition of National Careers Service customers in terms of age and gender in each year (or partial year) from 2010 to 2014. Note that throughout the analysis, when presenting information by calendar year, this relates to the time of an individual customer's **first intervention** (see Glossary). It is apparent that the service is used by men to a greater extent than women (i.e. men accounted for between **53%** and **55%** of National Careers Service customers) although the gender split has remained relatively constant across time.

In terms of the age profile of customers, individuals aged between 19 and 34 make up almost half (**46-50%**) of all first time customers.

Furthermore, a significant number of National Careers Service customers were aged between 35 and 44 (approximately **20%**) or between 45 and 54 (**18%**). In 2010 (partial year), approximately **8%** of customers were over the age of 65; however in subsequent years, this has dropped to almost zero (although **9%** were above the age of 55 in 2014 (partial year)).

## Region, prior attainment and ethnic origin

Figure 13: National Careers Service customers by region, prior attainment and ethnic origin



The regional breakdown of National Careers Service customers has remained relatively stable across time, although there has been a marginal increase in the proportion of individuals in London receiving careers advice (increasing from approximately 17% of all National careers Service customers in 2011 to approximately 19% in 2013).

In terms of prior qualification attainment, at the time of National Careers Service customers' first intervention, between 18% and 21% of customers had no formally

recognised qualifications, with a further **18%** in possession of Level 1 qualifications (which across the two categories reflects a **5 percentage point** decline between 2011 and 2013). Between **27%** and **29%** of customers were in possession of Level 2 qualifications between 2011 and 2013, with **30%** at this qualification level in (partial year) 2014. At the other end of the qualification spectrum, there was a small but significant proportion of National Careers Service customers in possession of undergraduate degree level qualifications (Level 6) or above, which has been increasing over time.

Compared to **10%** in 2011, in 2013 and 2014, approximately **11%** of first time customers had a Level 6 undergraduate degree or above (with a further **6-7%** in possession of sub-degree level qualifications at NQF Levels 4/5).

There has been little change in the ethnic composition of National Careers Service customers over time. While the proportion of customers of white-British ethnic origin has remained relatively constant (**64-67%**), the proportion of customers from a white-non-British ethnic origin has increased (from **7%** in 2011 to **9%** in 2013), and the proportion from Black-African backgrounds has declined over time (from **5%** in 2011 to **4%** in 2013).

## **Labour market characteristics of National Careers Service customers**

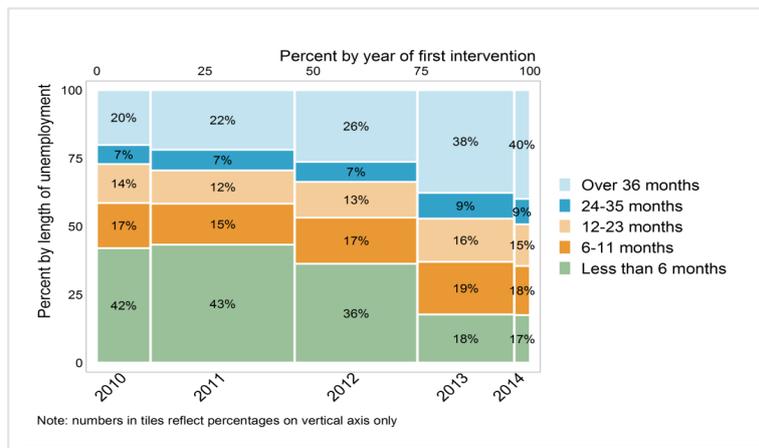
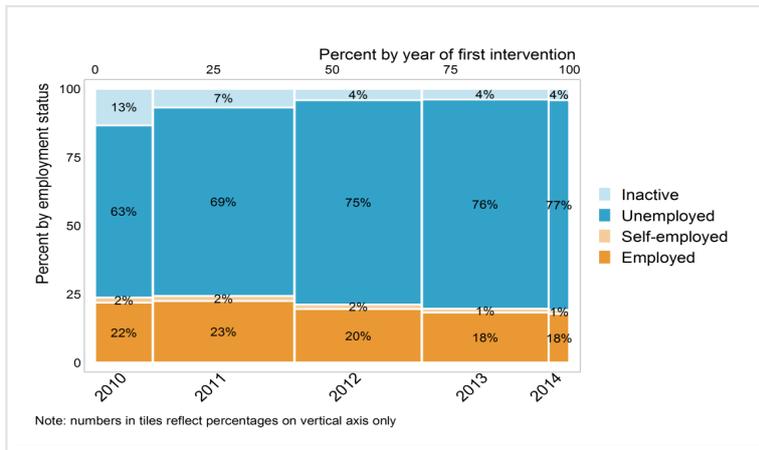
### **Employment status and unemployment duration**

One of the most striking findings of the data analysis was the increasing proportion of National Careers Service customers that unemployed (increasing from **63%** in 2010 to **76%** in 2013 and **77%** in 2014). Although approximately **19%** of customers were either employed or self-employed in 2013 and 2014, this proportion is considerably lower than in 2010 or 2011 (where the corresponding proportions stood at **24%** and **25%** respectively). At the same time, and potentially reflecting the changing age profile of National Careers Service customers, there has been a declining proportion of customers reported as economically inactive (from **13%** in 2010 to **4%** in 2013 and 2014).

In addition to the higher incidence of unemployment amongst customers, the extent of unemployment entrenchment is also evident. Specifically, amongst unemployed customers, the average duration of unemployment has increased substantially over time, from **41%** to **42%** of National Careers Service customers in long term unemployment (i.e. 12 or more months) in 2010 and 2011 respectively, to approximately **63%** to **65%** in 2013 and 2014.

Furthermore, potentially reflecting the wider deterioration of the labour market since the global recession of 2008 (and weak recovery since 2010), between **38%** and **40%** of National Careers Service customers were unemployed for more than 3 years 2013 and 2014 (compared to approximately **22%** in 2011).

**Figure 14: National Careers Service customers by employment status and unemployment duration (by year)**



This suggests that the National Careers Service may have become more targeted on those that need support. However, reflecting the wider deterioration in the labour market (especially for younger workers), the challenges moving National Careers Service customers back to sustainable employment have become inherently more difficult, as the degree of unemployment entrenchment among customers has increased.

## Benefit receipt and referral route

Consistent with the increasing incidence of unemployment amongst National Careers Service customers was the increasing incidence of benefit dependency. In particular, compared to the **50%** of National Careers Service customers in receipt of JSA in 2010, this proportion increased to approximately **67%** in 2012 and 2013 (corresponding to a **17 percentage point** increase). Interestingly, although the proportion of National Careers Service customers in receipt of Incapacity Benefit or Education Support Allowance has remained relatively constant, the proportion not in receipt of any form of benefit has declined by **17 percentage points** over the period.

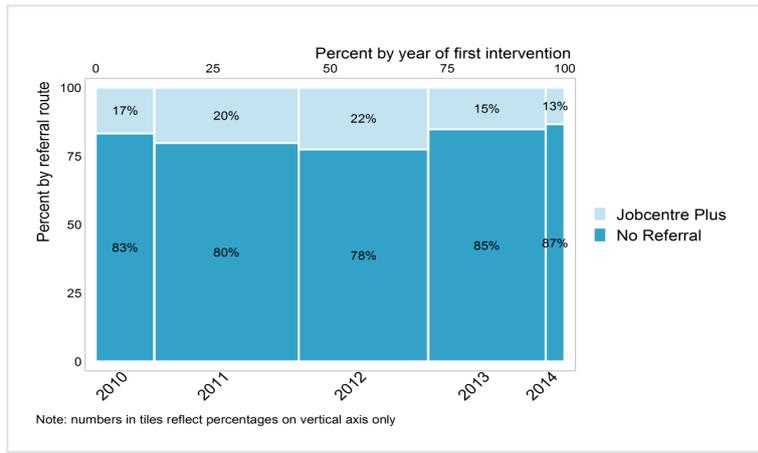
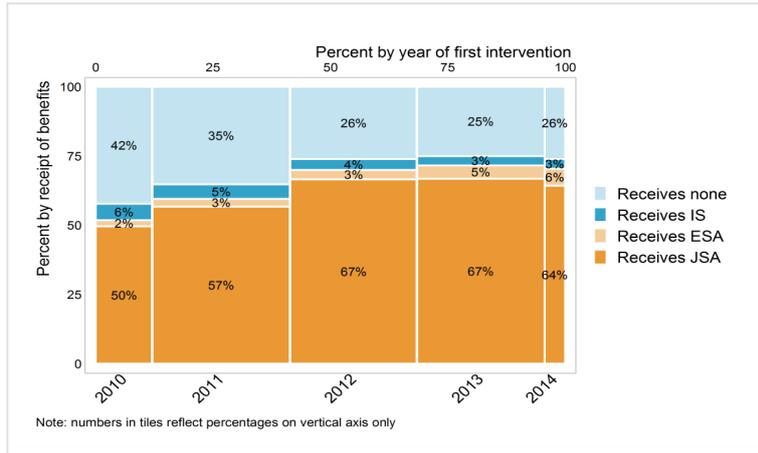
Although there have been significant changes in the labour market status of National Careers Service customers over time, these increases cannot be explained simply by a higher number of referrals from Jobcentre Plus. As Figure 15 demonstrates, the proportion of Jobcentre Plus referrals increased from **17%** in 2010 to **22%** in 2012<sup>9</sup>; however declined marginally afterwards. In 2013 and 2014, between **13%** and **15%** of first time National Careers Service customers were referred to the service through Jobcentre Plus.

The large majority of National Careers Service customers in all periods were self-referrals (between **78%** and **87%**).

---

<sup>9</sup> Note that over the period of the analysis, the Integrated Employment and Skills trials were in operation. This was followed by the roll out of lessons from the trials that put in place co-located working between the National Careers Service and Jobcentre Plus, leading to increasing referrals by JCP staff.

**Figure 15: National Careers Service customers by benefit receipt and referral route (by year)**

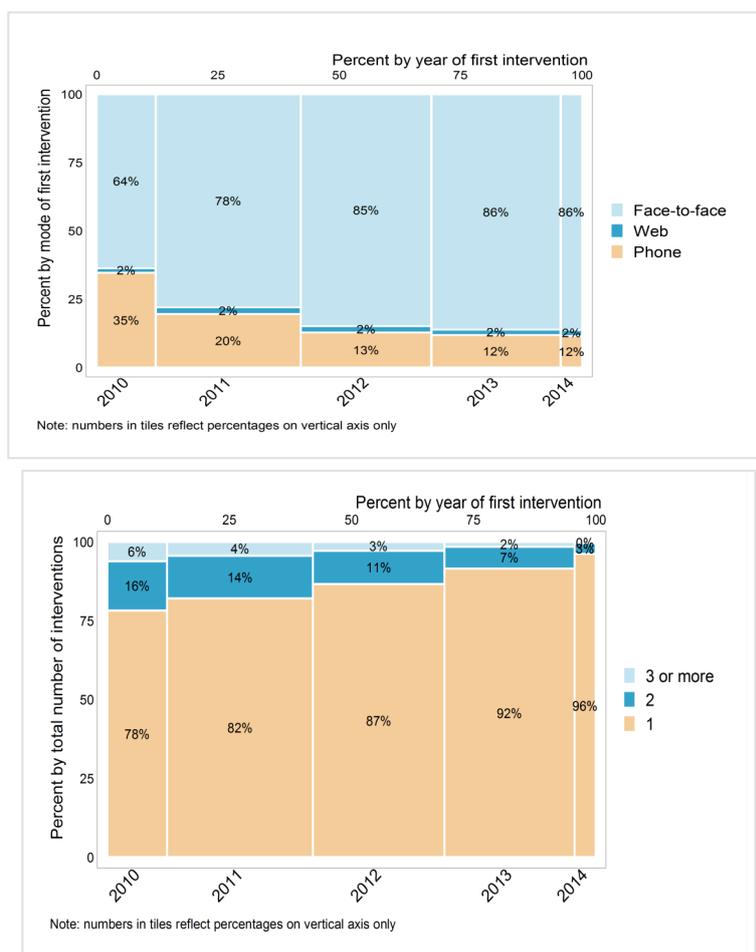


## Mode and number of intervention(s) by year of (first) intervention

The most common mode of first intervention is a face-to-face session (received by **86%** of first-time customers in 2013 and 2014). Interestingly, face-to-face sessions have become more common over time, replacing phone sessions which have dropped from **35%** of first interventions in 2010 to approximately **12%** of total first interventions in 2013/2014. Web sessions accounted for relatively few first time sessions in each year<sup>10</sup>.

Perhaps linked to the increasing incidence of face-to-face sessions, most customers receive just one intervention session – although this proportion has been increasing over time (from **82%** in 2011 to **92%** in 2013 and **96%** in the partial year 2014).

**Figure 16: National Careers Service customers' mode and number of intervention(s) by year of first intervention**

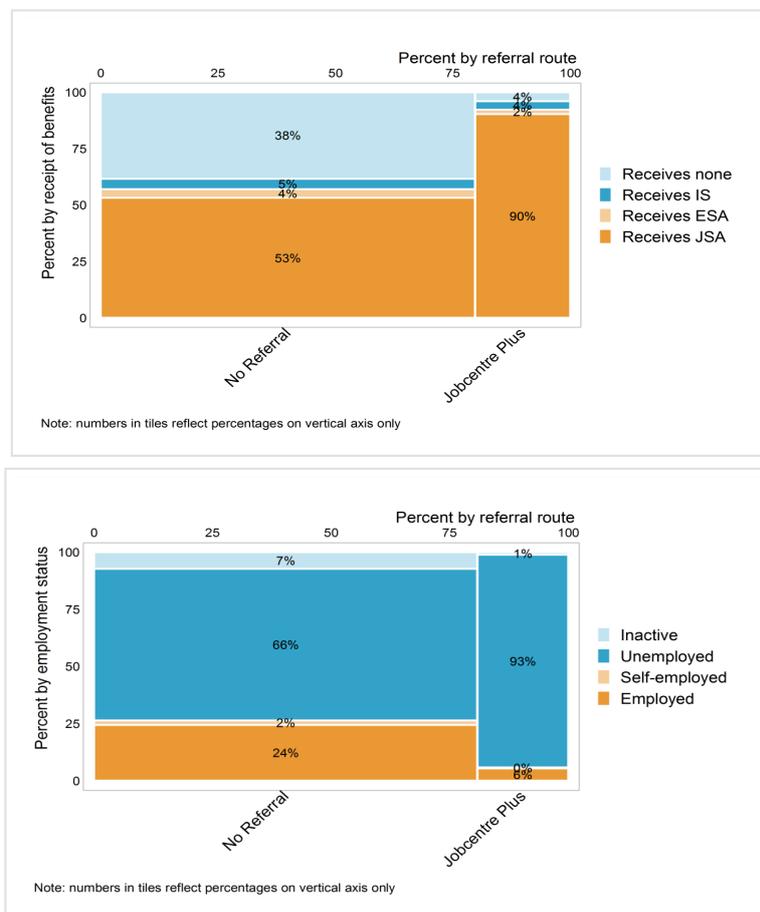


<sup>10</sup> Note that although the National Careers Service administrative data set does contain information on the number of web-based sessions, it is not the case that significant actual careers support took place through this channel. In particular, the recording of individuals who accessed support through the web is more likely to refer to individuals who gathered information through the website. Given the limited intensity associated with this form of support, no conclusions should be drawn in relation to the relative effectiveness between web-based 'support' and other modes of support (face-to-face and telephone)

## Employment status and benefit receipt by referral route

Unsurprisingly, Figure 17 (upper panel) demonstrates that National Careers Service customers who were referred through Jobcentre Plus (approximately 20% of the total number of National Careers Service customers) were significantly more likely to be in receipt of JSA than those who self-referred. In particular, compared to the 53% of self-referred National Careers Service customers who were in receipt of Jobseekers Allowance, approximately 90% of Jobcentre Plus referred customers were in receipt of Jobseekers Allowance. The lower panel of Figure 17 demonstrates that approximately 93% of customers referred by Jobcentre Plus were classified as unemployed compared to 66% of National Careers Service customers who self-referred.

**Figure 17: National Careers Service customers' employment status and benefit receipt by referral route**

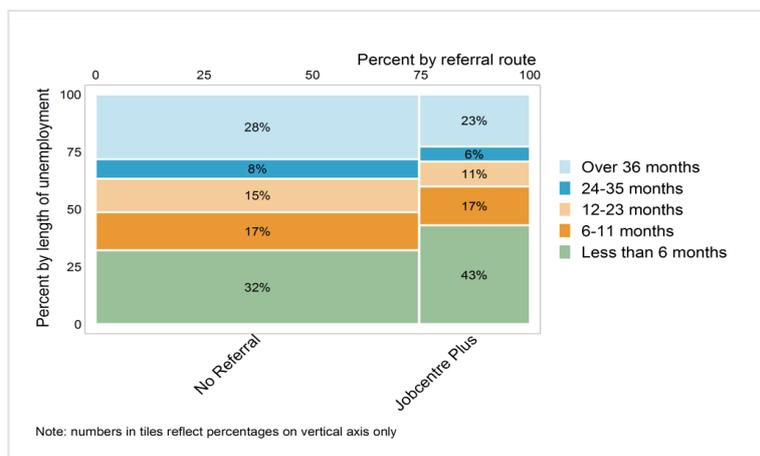


## Unemployment duration by referral route

National Careers Service unemployment duration is also significantly different depending on the two referral routes. Amongst unemployed National Careers Service customers, those referred by Jobcentre Plus tend to have been unemployed for a shorter period of time than those that self-referred (14.7 months compared to 17.6 months).

Compared to **49%** of self-referred customers that have been unemployed for less than 12 months, approximately **60%** of those referred by Jobcentre Plus are short term unemployed. **This does at least in part demonstrate JCP-referred National Careers service support is being targeted at those individuals in need of advice and guidance relatively quickly.**

**Figure 18: National Careers Service customers' unemployment duration by referral route**

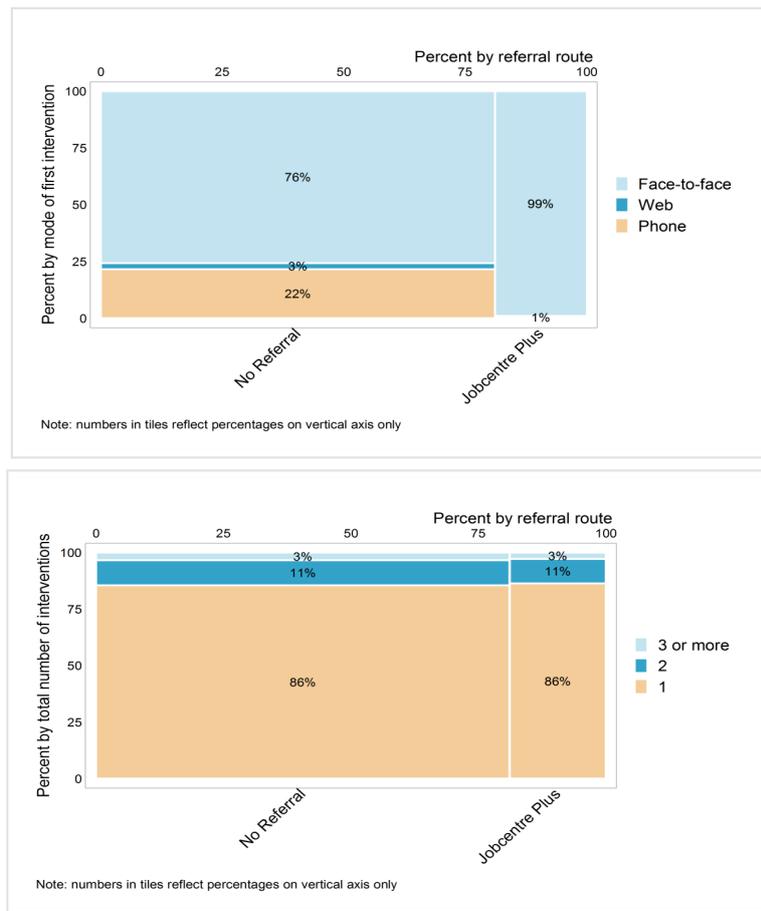


## Mode of intervention and number of sessions by referral route

Those National Careers Service customers that were referred to the service by Jobcentre Plus were almost certain to receive a face-to-face session in the first instance (**99%** of such customers), whereas **76%** of those that self-referred received a face-to-face session in the first instance. As with the information on the relatively short duration of unemployment amongst Jobcentre Plus referred customers, the analysis of the National Careers Service data indicates that the **intensity** of careers advice and support offered was appropriately targeted on those with the greatest potential need.

The total number of sessions received was essentially independent of whether the customer was self-referred or referred through Jobcentre Plus.

**Figure 19: National Careers Service customers' mode of intervention and number of interventions by referral route**



## What does this tell us?

- The composition of National Careers Service customers has changed over time: a greater proportion of National Careers Service customers are younger, more likely to be unemployed, in long term unemployment, and/or in receipt of work related benefits.
- The delivery of National Careers Service has changed over time – with more face-to-face advice, alongside a general reduction in the number of sessions. This suggests that the National Careers Service may have become more targeted on those that need support; however, the challenges moving the client group back to sustainable employment have become inherently more difficult.
- Within those receiving advice through the National Careers Service, customers are heterogeneous depending on the referral route, mode of intervention and number of sessions. For instance, and unsurprisingly given the co-location of services, customers referred to the service by Jobcentre Plus are more likely to be male, white, unemployed, in receipt of JSA, unemployed for a shorter period of

time, London based, and have lower educational attainment. As a result, these individuals are more likely to receive face-to-face careers advice and support.

## Labour market histories of National Careers Service customers

Having merged the National Careers Service dataset with HMRC, DWP and ILR data, we first present the employment, benefit dependency and education and training status of National careers Service customers before and after the period covering their first careers' advice session. **This analysis is restricted to the histories and outcomes achieved by National Careers Service customers only**, so there is no consideration at this stage of the individuals not receiving careers advice and support. As described previously, when assessing employment, benefit dependency and education and training, **we estimated the proportion of a period** (either six months or one month) spent in employment, benefit dependent (JSA or IB/ESA) or in education and training<sup>11</sup> **before and after the period in which the first National Careers Service intervention took place**. We also disaggregate labour market histories and outcomes by year of intervention, referral route, the mode of intervention and by gender.

### Employment histories and outcomes amongst the treated

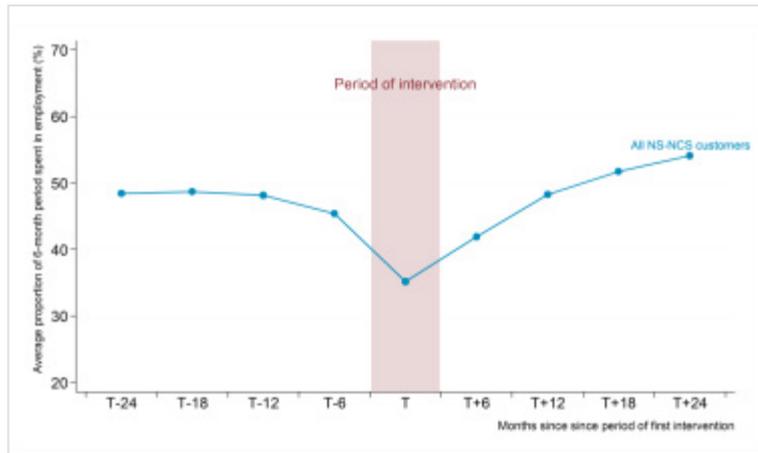
In Figure 20 below, we illustrate the employment histories and outcomes of customers in six-month periods 2 years prior to receiving their first National Careers Service support (T-24 months) to 2 years post-receipt of their first National Careers Service support (T+24 months). These labour market histories and outcomes are measured as the average proportion of time in a 6 month period spent in employment. The graph clearly demonstrates the **substantial deterioration in employment** leading up to the period in which the intervention took place (i.e. period T). National Careers Service customers spent approximately **15 percentage points** less of that six-month period in employment at the time of the National Careers Service intervention compared to 12 to 24 months pre-intervention.

**This labour market deterioration that led customers to receive careers advice reverses following the intervention.** One year after the support, customers spend a comparable proportion of time in employment (**48%**) as they did 24 months prior to the receipt of National Careers Service support. These improved labour market outcomes persist - with the average proportion of time in employment increasing further (to **54%**) 24 months after the intervention.

---

<sup>11</sup> Derived from the ILR although this sources of information may not cover all forms of education, training and qualification acquisition (i.e. privately provided)

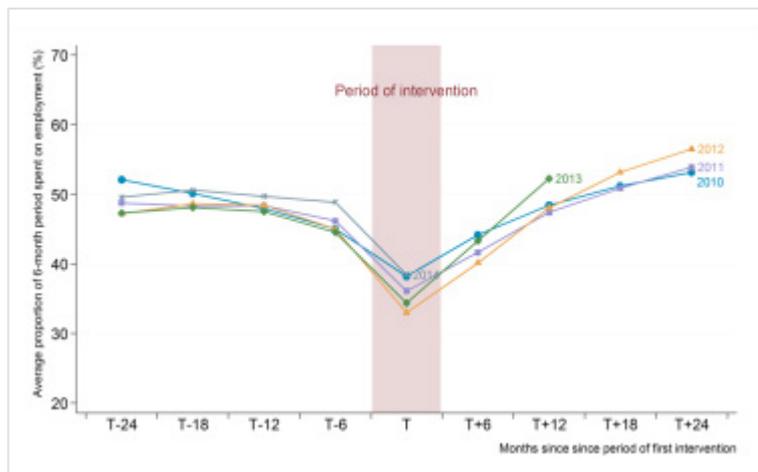
Figure 20: Employment histories and outcomes for National Careers Service customers



### Employment histories and outcomes by calendar year of intervention

Disaggregating the histories and outcomes by year demonstrates that the trend is common to all years of National Careers Service support. However, of interest when considering the labour market patterns by year of intervention, and re-iterating the previous findings presented in the section on descriptive statistics, **the analysis illustrates that those National Careers Service customers receiving careers advice in 2012, 2013 and 2014 suffered a greater deterioration in their labour market status prior to receipt of the intervention** (although the analysis also demonstrates the fact that the labour market recovery of these individuals was more rapid than in earlier years – and might suggest that there is some statistical regression to the mean (see Glossary) – indeed, the falsification tests in Part II confirm this).

Figure 21: Employment histories and outcomes for National Careers Service customers by year



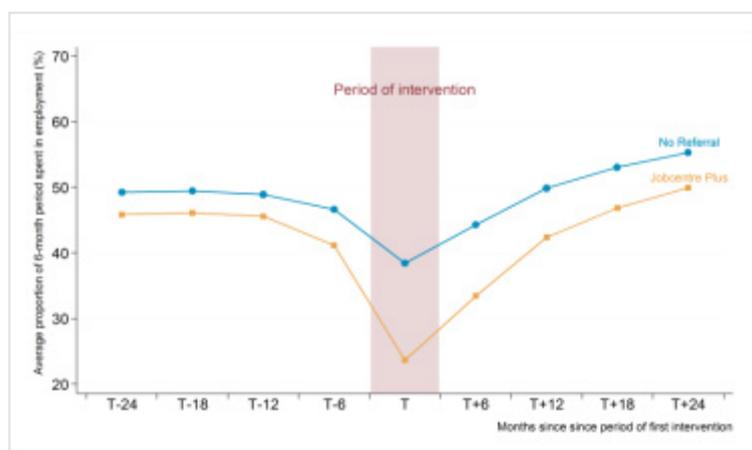
### Employment histories and outcomes by referral route

Further illustrating the heterogeneity of National Careers Service customers, the analysis in Figure 22 demonstrates that the **labour market histories and outcomes are**

**significantly different depending on the referral route.** Specifically, those customers that have been referred through Jobcentre Plus experienced a significantly worse deterioration in labour market outcomes leading up to the intervention period compared to those self-referring.

However, although there is a significant difference in the labour market histories and outcomes between those National Careers Service customers that were referred through Jobcentre Plus and self-referred, it is important to remember that there may be fundamental differences between the two groups in relation to the **reason** or rationale why they were seeking or referred to support in the first instance.

**Figure 22: Employment histories and outcomes for National Careers Service customers by referral route**



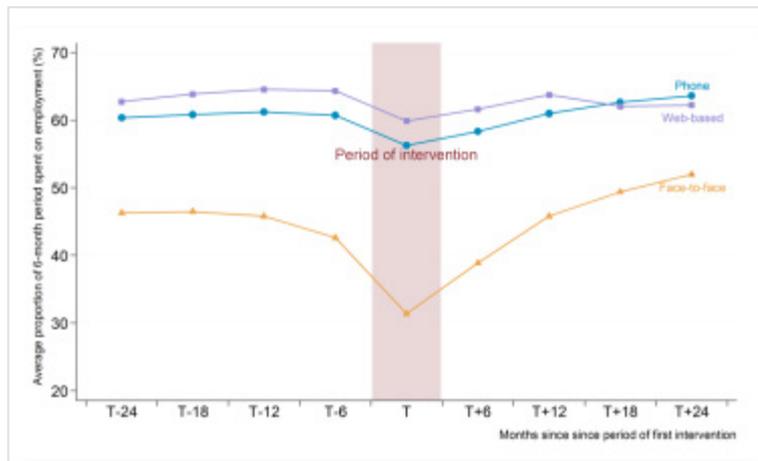
Specifically, 24 months before the intervention period, customers referred by JCP to the service were in employment for approximately **45%** of the six-month period compared to approximately **24%** of the 6 month period at the time of intervention (the equivalent for self-referred was **49%** and **39%** respectively). Two years after the National Careers Service support, employment outcomes amongst both groups had both recovered and surpassed pre-support levels; however, over the entire 4 year period, for those individuals who self-referred, the improvement in labour market outcomes (**5 percentage points**) exceeded the labour market gains amongst those who were referred by Jobcentre Plus (**3 percentage points**).

## **Employment histories and outcomes by mode of intervention**

Looking at the mode of intervention, the decline in employment outcomes for those in receipt of the telephone intervention is relatively small (potentially reflecting the more advantageous labour market position of these individuals, as well as the reasons for accessing careers advice). In contrast, and reflecting the correlation with route of referral, those customers in receipt of face-to-face careers advice see both a significant decline in

employment outcomes leading up to the intervention period, but also a substantial recovery post-intervention.

**Figure 23: Employment histories and outcomes for National Careers Service customers by intervention mode**

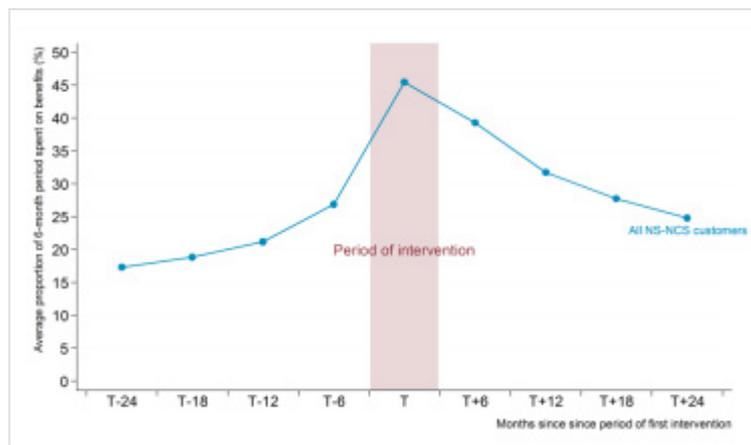


### Benefit dependency amongst the treated

Figure 24 shows the JSA benefit dependency histories and outcomes of customers before and after receiving National Careers Service support – measured as the average proportion of time in a six-month period spent receiving JSA. It is clear that there is an increase in benefit dependency in the 6 months preceding the intervention (by approximately **20 percentage points**), which then reverses after the intervention period.

Despite the relative recovery, National Careers Service customers on average spend a greater proportion of time in receipt of JSA two years following their first National Careers Service support compared to any six-month period in the two years pre-intervention.

**Figure 24: JSA histories and outcomes for National Careers Service customers by year**

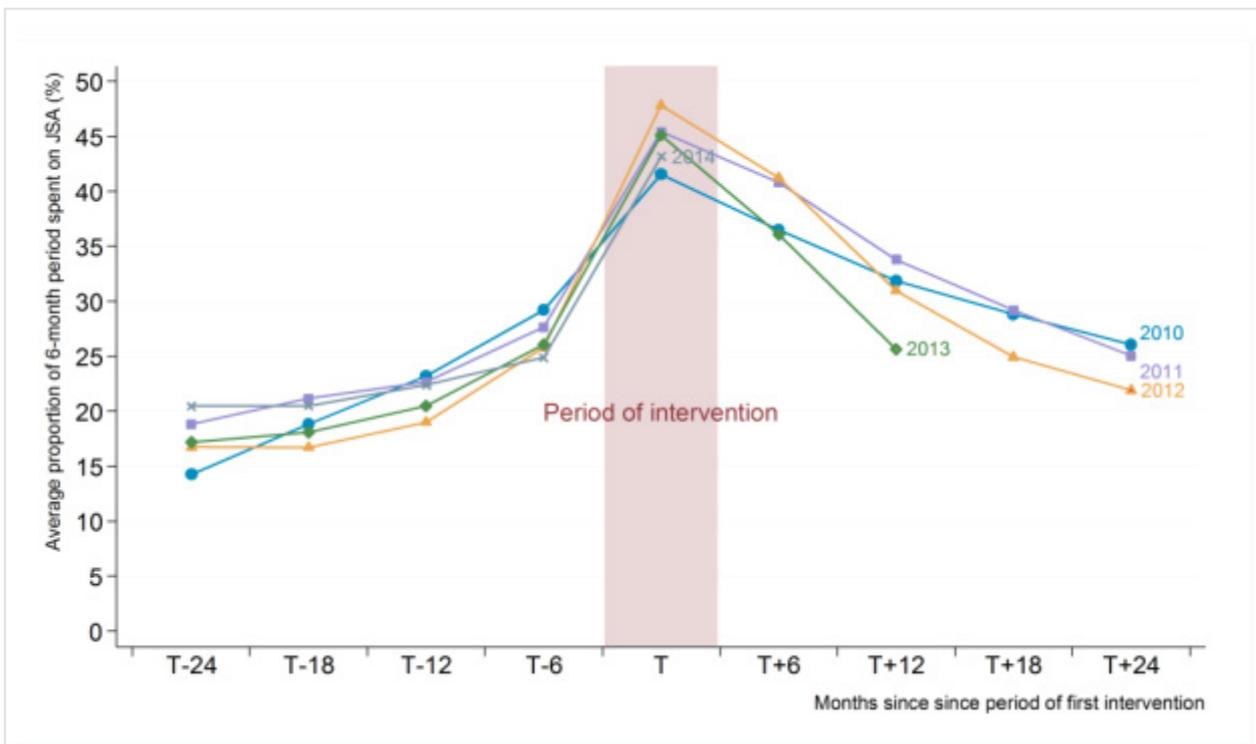


## Benefit dependency - by year of intervention

Unlike the analysis relating to employment effects, the findings suggest that there are some differences in JSA dependency depending on the calendar year in which National Careers Service support was received for the first time. For those that received the National Careers Service careers support and advice between 2011 and 2012, there was a *relatively* rapid increase in benefit dependency ahead of the 6-month period in which National Careers Service support was received (by approximately **21 percentage points** (in 2012) between the 6-month period pre-intervention and the 6-month period in which the National Careers Service support was received).

Those individuals that received National Careers Service careers advice in 2013 and 2014 were increasingly less dependent on JSA compared to customers in earlier years (an increase of approximately **16-18 percentage points** between the 6 month period pre-intervention and the six-month period in which the National careers Service support was received).

Figure 25: JSA histories and outcomes for National Careers Service customers by year



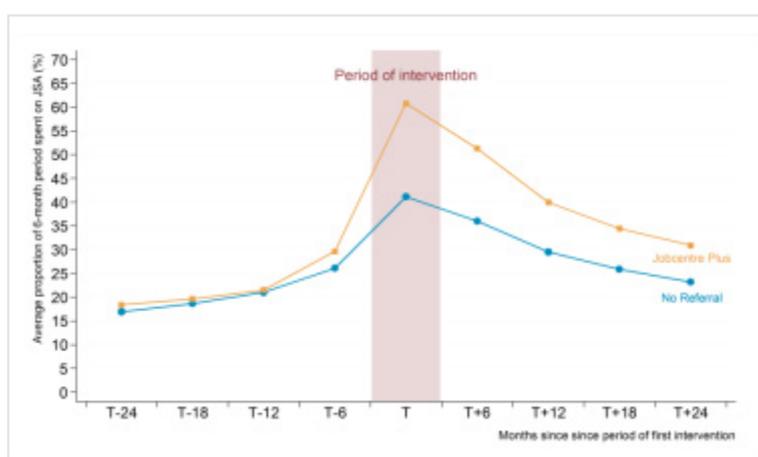
However, there seems to have been a relatively speedy reduction in benefit dependency in the first 12 months post-National Careers Service support amongst those receiving careers support in the 2013 calendar year compared to those receiving support between 2010 and 2012. In particular, for those that received support in 2013, in the *second* 6-month period post receipt of careers support, the proportion of the period spent JSA

dependent had declined by **20 percentage points** (to **25%**), compared to a **15 percentage point** decline (to **26%**) for those that received support in the 2010.

## Benefit dependency - by referral route

Re-iterating the previous analysis, the proportion of time in receipt of JSA varies by referral route. Prior to the 6-month period of support, the amount of time spent on JSA is similar between customers referred by Jobcentre Plus and self-referred customers. However, Jobcentre Plus referred customers spend a higher proportion (approximately **65 %**) of the intervention period on JSA (compared to approximately **40%** in the case of those individuals that self-refer).

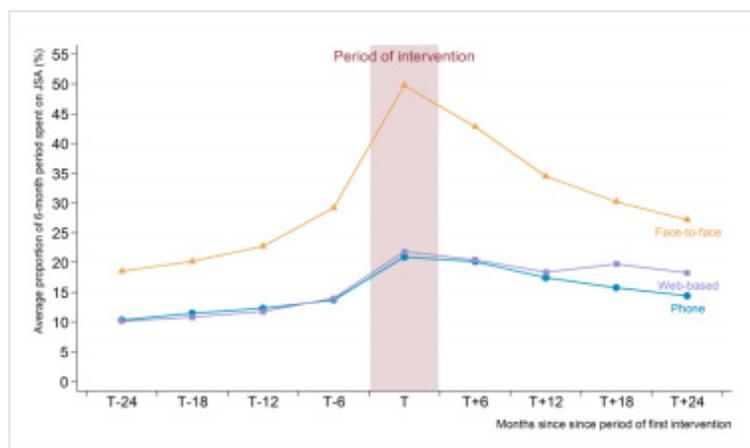
Figure 26: JSA histories and outcomes for National Careers Service customers by referral route



## Benefit dependency - by mode of intervention

First time National Careers Service customers who receive face-to-face advice experience the greatest deterioration in their labour market outcomes pre-intervention. JSA benefit dependency for this group increases from approximately **19%** in the 6-month period two years pre-intervention to **50%** in the 6-month period at the time of the advice (i.e. **31 percentage points**). However, the analysis indicates that there has been a decline in JSA benefit dependency to approximately **27%** in the 6-month period two years after the 6-month period in which the first incidence of National Careers Service support occurred. This compares to a **10 percentage point** increase in benefit dependency amongst those National Careers Service customers who received support via the telephone in the first instance (between the 6-month period two years pre-intervention to the 6-month period at the time support was received)

**Figure 27: JSA histories and outcomes for National Careers Service customers by intervention mode**

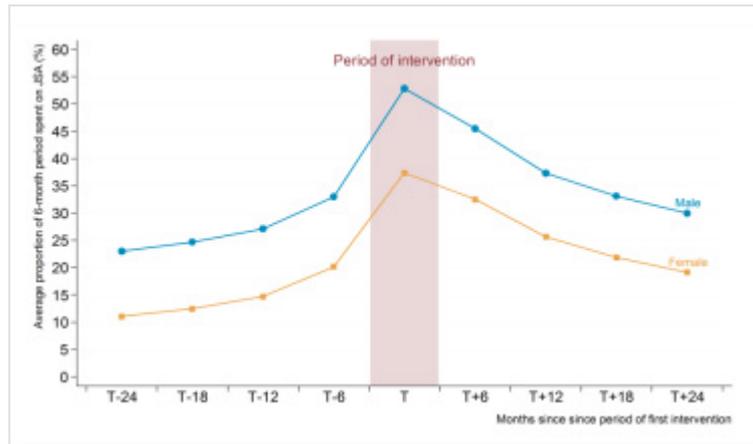


## Benefit dependency - by gender

In terms of gender, there is a clear difference in the incidence of JSA dependency with men being substantially more likely to be JSA benefit dependent than women (both pre and post National Careers Service support). In more detail, the analysis indicates that both men and women experienced approximately the same rate of decline in labour market outcomes pre-intervention, but have also experienced a comparable reduction in the incidence of benefit dependency post-support. Men spend approximately **32%** of the 6-month period preceding National Careers Service support in receipt of JSA, with the proportion of time increasing to approximately **53%** in the 6-month period in which the first support through the National Careers Service was received. For women, the comparable estimates stand at **20%** and **37%**.

However, the labour market outcomes do appear to improve post-support, with the proportion of the 6-month period dependent on JSA declining to approximately **30%** two years after the initial support. For women, the decline in benefit dependency was comparable, with the proportion of the fourth 6-month period following the receipt of National Careers Service support standing at **19%**.

**Figure 28: JSA histories and outcomes for National Careers Service customers by gender**

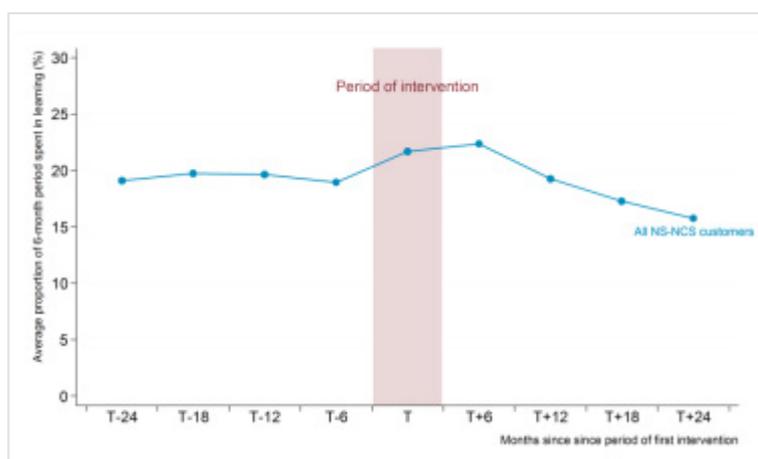


## Education and training histories and outcomes

Figure 29 illustrates the learning histories and outcomes of National Careers Service customers before and after receiving careers advice and support – measured as the average proportion of time in the six month period spent in education and training (as recorded in the ILR).

Whilst the average proportion of time spent in learning is stable in the 24 months leading up to intervention (at around **18-20%**), the proportion increases during the period of National Careers Service support and in the first 6-month period following the first receipt of support (to between **22%** and **24%**). There is then a gradual decline in the proportion of successive 6-month periods spent in education and training (declining to **16%** in the 6-month period two years post initial support).

**Figure 29: Education and training histories and outcomes for National Careers Service customers by year**

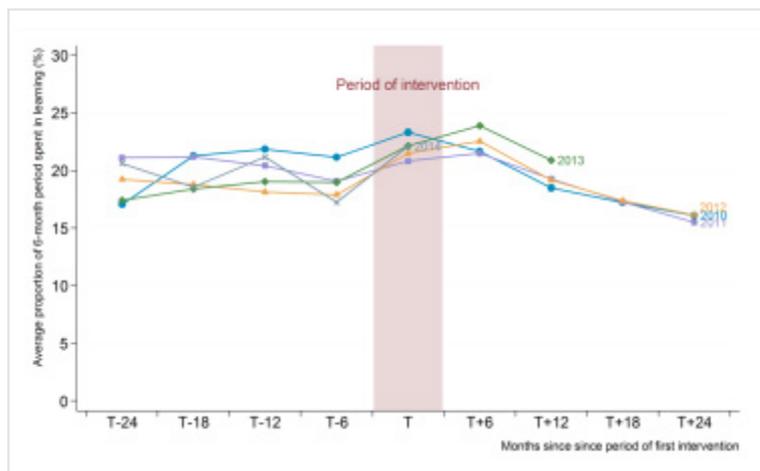


## Education and training histories and outcomes by year of intervention

When we consider education and training histories and outcomes by calendar year of National Careers Service support, we see a similar increase in time spent in education and training during – and immediately following the 6-month period in which National Careers Service support was initially received.

Customers who received National Careers Service careers support and advice in 2010 are the only group whose average proportion of time in education and training does not increase in the period immediately post-intervention (T+6); however this might be in part as a result of the relatively smaller number of National Careers Service customers for whom data exists.

**Figure 30: Education and training histories and outcomes for National Careers Service customers by calendar year**



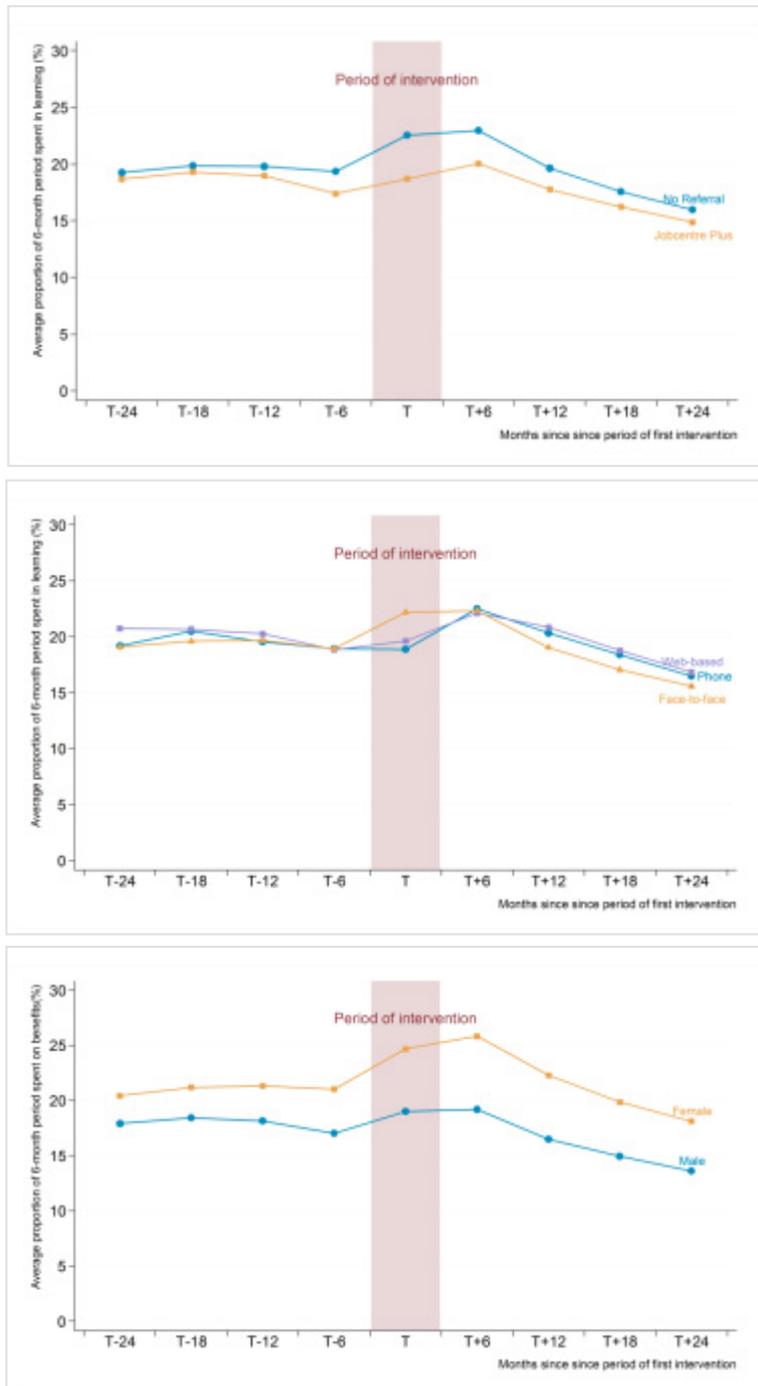
## Education and training histories and outcomes by referral route and intervention mode

The analysis demonstrates that customers referred to the programme by Jobcentre Plus have a marginally lower incidence of education and training activity in all time periods pre-intervention (by approximately **1-2 percentage points** compared to those self-referring), which widens immediately prior to the receipt of National Careers Service support. Although there is an increase in the proportion of time spent in education and training during the 6-month period in which support is received for the first time, **the increase is substantially greater for those self-referring compared to those referred through the Jobcentre Plus** (perhaps reflecting the rationale for self-referring in the first instance). A year after the intervention period, education and training participation declines gradually for both groups.

National Careers Service customers receiving face-to-face advice (middle panel) see an immediate increase in education and training participation during the 6-month period in which careers support is received for the first time. The change in education and training participation moves these individuals up to a level of educational participation that is comparable with those levels undertaken by individuals receiving or accessing careers information and advice via telephone or through the web. For individuals that do use the telephone or web to access the National Careers Service, there is an increase in education participation in the period immediately following the period of initial support (with the gradual decline thereafter).

Finally, in relation to gender, women in receipt of careers advice are substantially more likely than men to be engaged in publicly funded education and training (in all periods); however, in the period in which the careers advice takes place and in the subsequent 6-month period, women appear to be more likely to undertake *additional* education and training (as the gap in the proportion of time in education and training across genders widens). This gap in publicly funded education and training participation persists for the 24 months following the intervention period.

**Figure 31: Learning histories and outcomes for National Careers Service customers by referral route, intervention mode and gender**



## Part I Conclusions

Part I of the analysis describes efforts to understand how the National Careers Service has evolved over time and to assess its impact on the labour market status of those it serves.

Using administrative data, it has been possible to see how the composition of National Careers Service customers has changed since August 2010. The most striking change has been the increasing proportion of unemployed and benefit dependent customers, as well as the increasing proportion of unemployed customers who have been long term unemployed. This suggests a more significant challenge over time for providers of National Careers Service support as the degree of unemployment entrenchment amongst NS-NCS customers has increased.

Despite these challenges, the recovery path of those that receive National Careers Service support has been consistently positive over time. Even though a deterioration in labour market outcomes has likely drawn them to the National Careers Service, one year after the receipt of National Careers Service support, customers on average spend a comparable proportion of time in employment as they did one and two years prior to the receipt of support. Two years after the receipt of support, employment outcomes have improved further.

### Specifically, the analysis finds that:

- There is a substantial deterioration in employment status leading up to the period in which the careers support was received for the first time. National Careers Service customers spent approximately 15 percentage points less of the six-month period in which support was received in employment compared to the 6-month intervals 12 to 24 months pre-support (35% compared to 50%). Following the receipt of careers advice and support, this labour market deterioration reverses. One year after the support was received, on average, National Careers Service customers spend a comparable proportion of time in employment (48%) as they did 24 months prior to the receipt of National Careers Service support. This labour market reversal persists, with the average proportion of time in employment increasing further (to 54%) 24 months after the support.
- Comparable findings are demonstrated in relation to benefit dependency. There is a 20 percentage point increase in benefit dependency between the 6 month interval immediately preceding the receipt of National careers Service support and the 6-month interval in which support is received for the first time (from 25% to 45% of the proportion of the six-month interval). This adverse outcome then reverses following the receipt of National Careers Service support, with the proportion of the 6-month period in receipt of benefits declining to pre-support levels two years later.

- In relation to education and training, whilst the average proportion of time spent in learning is stable in the 24 months leading up to intervention (at around 18-20%), the proportion increases during the period of National Careers Service support and in the first 6-month period following the first receipt of support (to between 22% and 24% of the 6-month interval). There is then a gradual decline in the proportion of successive 6-month periods spent in education and training (declining to 16% in the 6-month period two years post initial support).

**Part II: An assessment of the impact of the National Careers Service on customers using a treatment and counterfactual approach**

## Part II Introduction

Part I of the analysis demonstrated the recovery in labour market outcomes amongst National Careers Service customers in the four 6-month intervals following the interval in which support was received. However, building on this analysis, it is necessary to understand what might have happened in the absence of the National Careers Service.

To undertake a more robust impact analysis, we attempted to compare the outcomes of individuals in receipt of National Careers Service support and advice (the **treatment group**) with a sample of individuals that were not in receipt of the careers advice from the service, but had similar personal, socioeconomic and labour market histories as the treatment group (the **counterfactual group**). This was undertaken using a **Propensity Score Matching** model. However, identification of an appropriate control group is particularly challenging because the reason people access the National Careers Service may be to do with (an unobservable) motivation to change one's circumstances, or as a specific result of a sharp deterioration in labour market outcomes.

In the next section of this element of the report, we discuss the methodological approach (and some of the potential caveats associated with the approach), as well as the fundamentals of the evaluation problem. Subsequently, we present a comparison of the labour market status between the **treated group** versus the **untreated group** that confirms the methodological approach adopted. In the final section of Part II of the analysis, we present the results associated with the generation of the counterfactual through the propensity score matching approach, followed by the **assessment of the relative labour market outcomes between the treatment and counterfactual groups**. We also present a range of **robustness and falsification tests** that were undertaken to overcome the potential limitations of the standard baseline analysis.

# Methodology and evaluation problem

## Propensity Score Matching

The general evaluation problem of determining the effects of a particular programme or initiative involves the identification of the *additional benefits* that an individual has gained through participation in the programme compared to what might have happened in the absence of the programme. Clearly, it is not possible to assess the outcomes of the *same* individuals simultaneously participating and not participating in the programme. Therefore it is necessary to generate an appropriate **counterfactual** and then undertake a comparison of the outcomes of those individuals participating in the programme (the **treatment** group) relative to the outcomes of those individuals in the counterfactual group (i.e. those individuals with similar characteristics to those in the treatment group with the exception of participation in the programme).

More specifically, if the treatment (National Careers Service) is allocated randomly and without bias, we can attribute the difference in the labour market outcomes between the two groups (the 'treated' and the 'untreated') to the effect of the programme. However, if the two groups are determined with some form of bias (i.e. there may be some specific reason why individuals receive the treatment in the first instance), there may be differences in the personal and/or socioeconomic characteristics between the treated group and those not in receipt of the support that accounts for some or all of the change in outcomes. Given the possibility of these biases, it is necessary to construct a more appropriate control or counterfactual group which will avoid these biases.

Following best practice in the field<sup>12</sup>, **Propensity Score Matching** (PSM) has been used to derive a counterfactual group which has been matched to the treatment group based on similarities in observable personal and socioeconomic attributes, as well as labour market histories. In other words, we attempt to generate a sample of 'statistical twins' from within the untreated group to make post-intervention comparisons with those receiving the intervention. Comparing outcomes across the treatment and counterfactual groups provides a more accurate indication of the potential success of the intervention.

The PSM process involves generating a score that indicates the likelihood of any particular individual being selected for treatment(s), while a score or probability of being selected is also estimated for individuals not receiving the treatment. This score or probability is derived from a first stage estimation of a *probit* or *logit* equation model

---

<sup>12</sup> See Todd, P. (2008). *Matching estimators*. The New Palgrave Dictionary of Economics; Gregg, P., Harkness, S. and Smith, S. (2009). Welfare reform and lone parents in the UK. *Economic Journal*, 119 (535), F38-F65; Kendall et al (2005) *Excellence in Cities: The National Evaluation of a Policy to Raise Standards in Urban Schools 2000-2003*, Department for Education and Skills Research Report 675A ([here](#))

(probit was used for this study) – and individuals in the treatment group(s) are matched with individuals in the untreated group in possession of the same probability of selection.

Multiple specifications of the PSM were tested. In the main model, variables in the final PSM model, and therefore used for matching, included:

- Employment history – defined as the proportion of the period immediately before or during the period of intervention spent in employment (depending on the model specification);
- Education and training history – defined as the proportion of the period immediately before or during the period of intervention spent in learning (depending on the model specification);
- Benefit dependency history – defined as the proportion of the period immediately before or during the period of intervention spent receiving JSA (depending on the model specification);
- Gender;
- Age;
- Age squared;
- Ethnicity; and,
- Prior educational attainment.

Note that the decision was taken to match National Careers Service customers using labour market status immediately prior to (or during) the intervention period only, as adding further lags of employment, learning and benefit dependency histories did not improve the matching process from a statistical perspective.

**Assigning dates of intervention:** For National Careers Service customers, the employment, learning and benefit dependency history measures were defined according to labour market status in the period just before (or during) the period in which the treated individual had the intervention, which could be any time between August 2010 and March 2014. However, non-customers did not have a comparable *period of intervention* (because they had no intervention at all) and therefore, employment, learning and benefit dependency history measures could not be constructed in the same way (i.e. based on the period (before or during) the period of intervention).

The approach used to overcome this issue was generate *an artificial period of intervention* for non-customers (based on the intervention date of the matched customer in the treated group), and to construct the historical measures according to labour market status in the periods before this point. Customers could then be matched to any non-customers that were similar in terms of demographic characteristics and in terms of

labour market status in the period before the period of intervention or *artificial period of intervention*. In order to carry out this approach, the dataset was split into multiple datasets by period of intervention and *artificial period of intervention* for customers and non-customers and the matching process was performed for each period. Once a counterfactual group associated with each period of National Careers Service intervention had been identified, the entire (combined) treatment group was compared to the entire (combined) counterfactual group.

**Matching strategy details:** Several different matching strategies were tested and the “k-nearest neighbour” matching strategy “with replacement” was picked as the most appropriate. With “k” set to 5, this meant that the 5 nearest untreated neighbours were matched to each treated individual, and that any control could be used more than once as a match. Using multiple neighbours leads to greater precision (lower variance) in the estimates, while ‘replacement’ has the advantage of boosting the quality of matches (decreases the bias). Where propensity scores of neighbours were tied with other untreated individuals, all tied individuals were matched to the treated individual.

A maximum distance for the matches (based on observable characteristics) was enforced by setting a ‘calliper’ of 0.2 times the standard deviation of individuals’ assigned propensity scores. This meant that any treated individual who did not have 5 nearest neighbours within the specified calliper was not included in the analysis. The application of a calliper meant that inadequate matches (at least in terms of observable characteristics) would not bias the results. The number of treated individuals excluded for this reason was very minor (just **35** out of the full dataset in the main analysis).

Once treated individuals have been matched to comparable but untreated neighbours, an OLS regression was used to estimate the average of pre-specified outcome variables for treated observations and their untreated matches. These estimated outcomes are the basis of the graphs comparing the employment, benefit and learning outcomes of the treated and counterfactual.

## Caveats

Three important caveats are noted here: (i) the representativeness of the treated group; (ii) the representativeness of the untreated group; and (iii) the difficulty in controlling for unobservable differences between the treated and untreated groups.

### *(i) The representativeness of the treated group*

The first issue derives from the datasets used in the analysis. As described above, the ILR is the foundation of the data merging and data matching performed in this study. Since ILR records contain demographic information necessary to complete the matched

analysis, all National Careers Service customers included in the analysis must have an ILR record.

However it must be noted that the labour market histories and outcomes of individuals in the ILR may not be representative of the wider population. The ILR is only mandatory for providers of publicly funded further education and training to complete, and therefore is unlikely to cover individuals who have undertaken other forms of education, training and skills acquisition (for instance, privately funded). Furthermore, the ILR is certain not to cover individuals who have not taken any training whatsoever.

As such, **any measurement of the impact of the National Careers Service programme in this study can only speak to the impact for customers who have undertaken some kind of publicly funded further education and training** in a relatively recent period. No conclusions can be drawn from this study on the impact of the service on customers who have not participated in publicly funded further education.

*(ii) The representativeness of the untreated group*

This issue also derives from using the ILR as the foundation for the construction of the final dataset, as all untreated individuals included in the analysis must also have an ILR record.

A result of including only untreated individuals that appear in the ILR is that we see a reasonably large number of untreated individuals (roughly 40%) in the final dataset with an ILR record but no employment record whatsoever. This proportion is higher than would exist in the population overall, and is higher than amongst National Careers Service customers (i.e. the treated group). This issue is demonstrated graphically and discussed in a later section demonstrating the labour market histories and outcomes of treated versus untreated individuals.

Through the use of a Propensity Score Matching approach, we can control for some large differences between the treated and untreated groups. However, as a result of the fundamental decision to match on the proportion of pre-intervention or intervention period spent in employment, many of those untreated individuals who do not have benefits or employment records will be removed from the analysis. However, not all differences between the groups can be accounted for (as discussed next) and, as a result, it is important to note the specific origin of the treatment group.

*(iii) The difficulty in controlling for unobservable differences*

As described above, Propensity Score Matching is a useful tool for overcoming differences between the treated and untreated groups, so that the impact of the treatment can be isolated. However, it must be noted that only differences that can be observed and captured in the data can be overcome. Any remaining differences in the personal or

socioeconomic characteristics that are unobserved or not captured in the data will be difficult to disentangle from the effect of the treatment.

Some of these characteristics are difficult to capture by nature (e.g. ability or motivation). Other characteristics may not be available due to the quality of the data. As an example, information on prior achievement is used in the matching process, however, the quality of the information is limited, as only the individual's prior attainment as it was when they undertook the learning aim in question will have been recorded in the ILR. In other words, the matching is performed on the basis of a potentially historic level of prior attainment, rather than their prior attainment at the time that they receive<sup>13</sup> or do not receive the careers advice and support. Similarly, although a region of residence variable is also available in the ILR dataset, this information also related to the time when they undertook the learning aim, rather than their current region of residence<sup>14</sup>.

The difficulty in capturing all relevant differences between the treated and counterfactual becomes more evident in the 6-month period analysis, where divergences in labour market outcomes (potentially based on unobservable characteristics) appear between the two groups during the period of careers advice and support. However, we have undertaken an array of robustness and falsification tests in an attempt to identify the extent and impact of these unobservable characteristics between the treatment and counterfactual groups.

#### *(iv) Regression (or reversion) to the mean*

In a statistical sense, **regression to the mean** refers to the phenomenon where the greater the deviation of a random variable from its mean, the greater the probability that the next measure will deviate less (from its mean). Understanding the extent of regression to the mean may be important in the evaluation of the National Careers Service. This is because it is crucial to assess the extent to which any perceived recovery in labour market outcomes 'achieved' by National Careers Service customers are specifically as a result of the careers support received, as opposed to the possibility that following a particularly poor measure of labour market performance (employment, say), subsequent measures of employment outcomes are closer to customers' (higher) mean measures.

In other words, a significant improvement in the proportion of a period in employment might simply be as a result of regression to the mean, and have a limited relationship to the careers support and advice. To assess the extent to which the case, it is necessary to undertake a number of **falsification tests** (between groups of individuals not in receipt of

---

<sup>13</sup> Prior attainment is available as a variable in the National Careers Service dataset however non-National Careers Service customers would not have comparable information for matching purposes.

<sup>14</sup> For this reason, region of residence contained in the ILR was not used as a matching variable in the PSM model

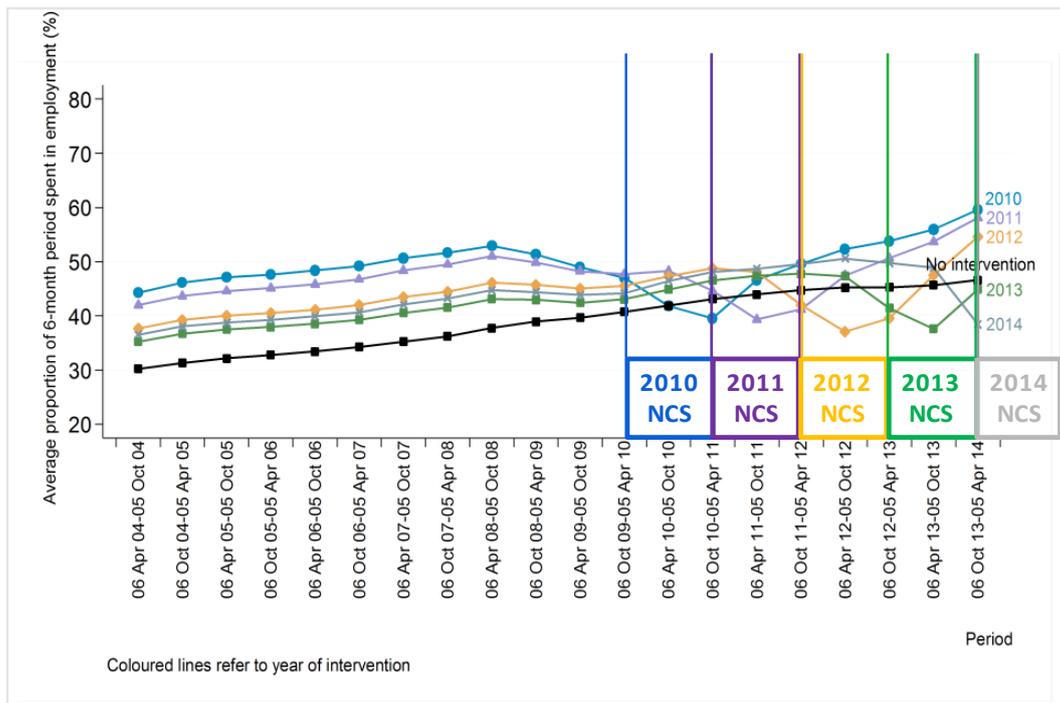
the National Careers Service, but with different proportions of particular time periods in employment) to assess the extent to which the regression to the mean phenomenon might occur in the absence of the National Careers Service. Using this information on the scale of regression to the mean, it is possible to discount to difference-in-difference in labour market performance between the treatment and counterfactual groups by the extent of the regression to the mean identified.

## Comparing the 'treated' with the 'untreated'

In this short section, we explore simple comparisons of the labour market histories and outcomes of the **treated** (i.e. National Careers Service customers) and **untreated** (i.e. the individuals in the ILR dataset who have not received National Careers Service treatment). We demonstrate that **these simple comparisons are inadequate for assessing the impact of receiving careers advice from the National Careers Service** and highlight the need for an appropriate matched counterfactual group (the development of which was discussed in the methodology section).

Figure 32 shows the employment histories and outcomes of customers using coloured lines to represent individual calendar years in which the first instance of National Careers Service support took place. These histories and outcomes have been derived in exactly the same way as shown in the previous section. The only difference is that the x-axis refers to actual calendar periods rather than periods named according to their relation to the initial 6-month period of National careers Service support (i.e. T-12, T, T+12). The rationale for this is to allow for comparisons to be made between the treated and untreated (who by definition cannot be assigned an intervention date). Looking at each year individually, it is possible to see the dip in the proportion of time spent in employment approaching and during the 6-month intervention period and the increase in the periods that follow.

**Figure 32: Employment histories and outcomes for the treated and untreated**

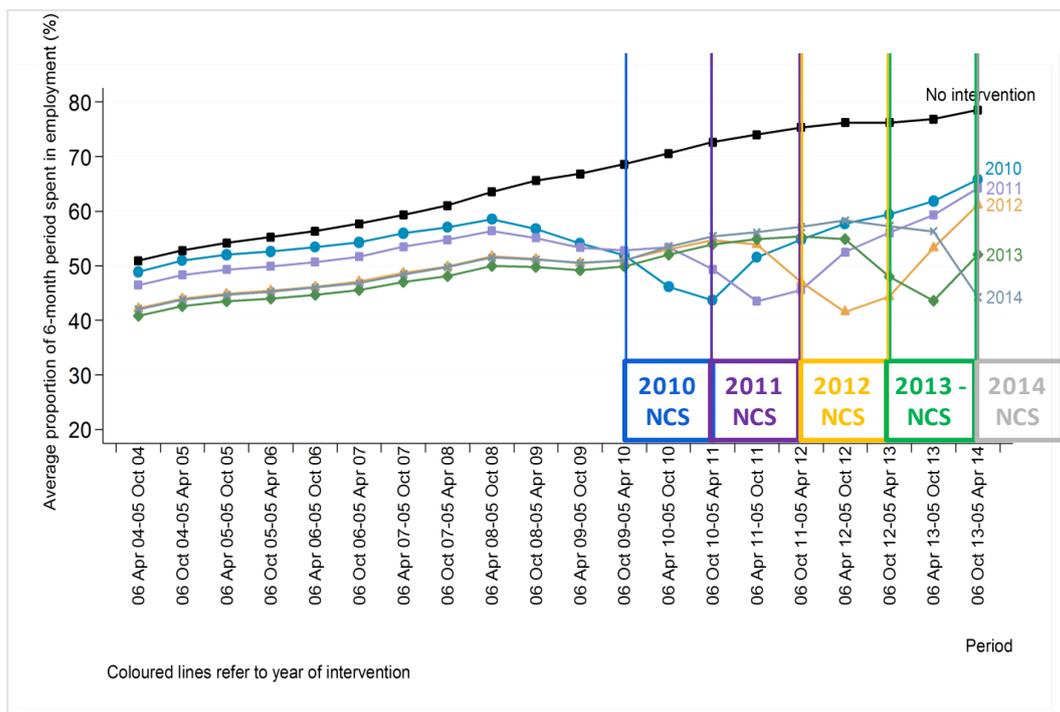


As the descriptive statistics of the administrative dataset showed, the National Careers Service is successfully targeted at the unemployed, with **76%** of National Careers Service customers being unemployed in 2013 (an increase from **63%** in 2010). As such, the question arises why the untreated individuals in the dataset have apparently spent a smaller proportion of time in employment than those that have received the treatment, as shown above.

The black line illustrates the average proportion of time spent in employment for those who are in the dataset but have not received National Careers Service treatment<sup>15</sup>.

The answer relates to the construction of the dataset, and specifically the inclusion of those individuals that have an ILR record *only* (i.e. no HMRC record of employment or DWP record of benefit dependency), as well as fundamental differences in the composition of the treated and untreated groups. Specifically, the overwhelming majority of those receiving the National Careers Service support (the ‘treatment’ group) have some employment record (c. **89%**) or some benefit dependency record (c. **80%**). By contrast, amongst untreated individuals, there is a reasonably large number that have some ILR record (with the duration of training on occasion being as little as 1 day), but only **60%** have an employment record and **20%** have a benefit dependency record.

**Figure 33: Employment histories and outcomes for the treated and untreated**



<sup>15</sup> Note that all untreated individuals shown below (also treated individuals) have an ILR record, as the ILR dataset is the basis for this analysis, and therefore their labour market histories and outcomes may not be representative of the wider population

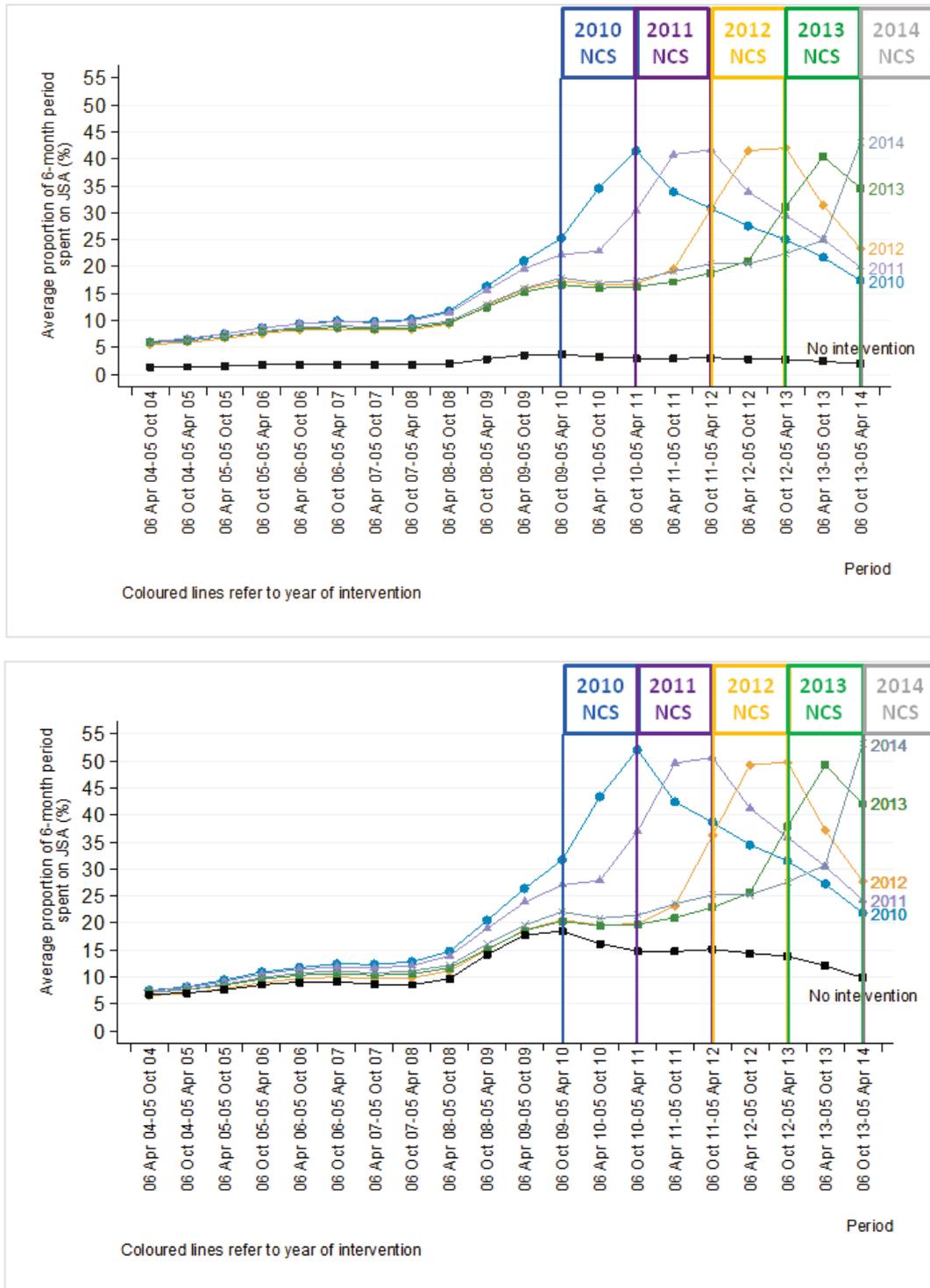
In data terms, when we look at the proportion of the year in employment or in receipt of benefits, this means there is a significant proportion of individuals in the untreated group who have spent no time in employment or on benefits, which brings down the average. Although there are corresponding individuals in the treated group, there are not as many. This explains why the proportion of time spent in employment is lower in the untreated group than the treated group, which seems counter-intuitive given the targeting of the National Careers Service.

In Figure 33, we present the corresponding information when those individuals without HMRC or DWP records are removed from the analysis (and comparable information in relation to JSA benefit dependency in Figure 34).

Under this approach, it can be clearly seen that although the lines representing the proportion of the year in employment shift up, the shift in the apparent employment outcomes posted by those in the untreated group is to a much greater extent.

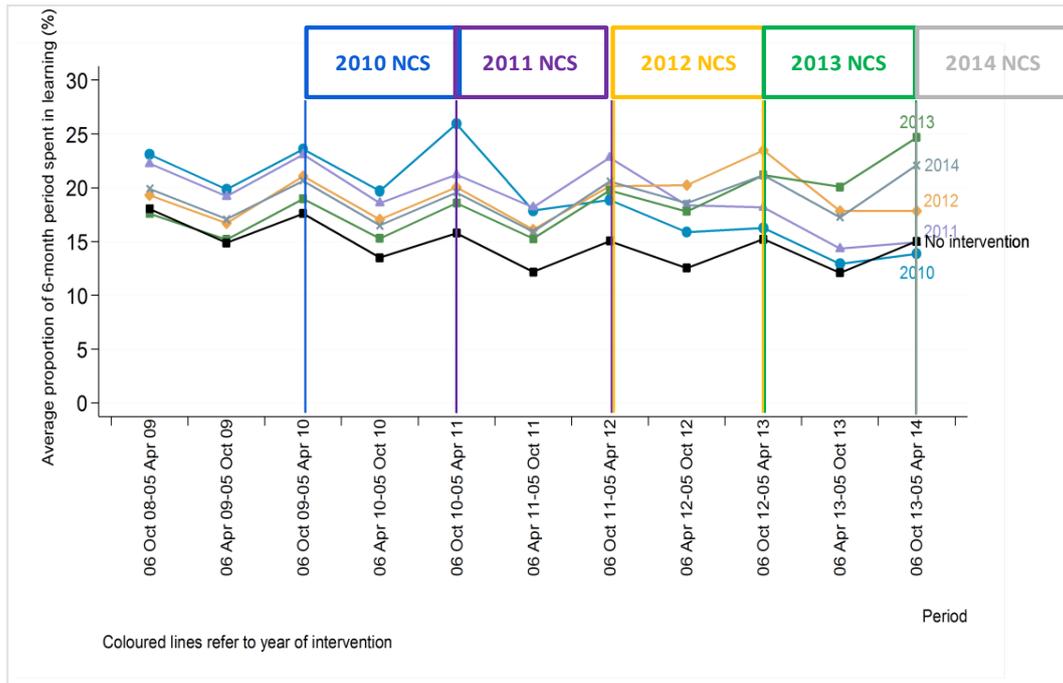
A similar case arises when comparing the benefit histories and outcomes of the treated and untreated groups, as shown below, where the black line showing benefit dependency of the untreated group is always lower than the benefit dependency of the treated groups (but is marginally more comparable when those individuals who have no DWP records are removed from the analysis).

Figure 34: JSA histories and outcomes for the treated and untreated



The comparison of learning outcomes for treated and untreated individuals does not have the same issue, since by construction all treated and untreated individuals in the dataset have an ILR record. Unsurprisingly, the incidence of training amongst National Careers Service customers is heavily influenced by the point in the academic year. However, in general, the average proportion of the year spent in education and training for those that have not received National Careers Service support is less than those that have.

**Figure 35: Training histories and outcomes for the treated and untreated**



These fundamental differences in the labour market and learning histories between the treated and untreated groups is evidence for the need for the development of an appropriate matched counterfactual.

# Generating a counterfactual

## Propensity Score Matching

Described in detail in an earlier section, a range of counterfactuals were developed using a Propensity Score Matching model. In summary, the process consists of pairing one observation in the **treatment group** (i.e. National Careers Service customers or a subgroup of National Careers Service customers) with one (or more) observation(s) in the **untreated group** according to a specified set of observable characteristics. Selecting these 'statistical twins' allows us to generate a **control or counterfactual group** from within non National Careers Service customers that have comparable personal and socioeconomic characteristics to those in the treatment group.

After testing multiple specifications of the PSM model, the following selection of variables were chosen for matching in the baseline scenario:

- Employment history – in the first instance, this was defined as the proportion of the 6-month period spent in employment preceding the 6-month period in which National Careers Service support was received;
- Learning history – this was defined as the proportion of the 6-month period spent in education and training preceding the 6-month period in which National Careers Service support was received;
- Benefit dependency history – this was defined as the proportion of the 6-month period spent in receipt of Jobseekers Allowance preceding the 6-month period in which National Careers Service support was received;
- Gender;
- Age;
- Age squared;
- Ethnicity; and,
- Prior educational attainment.

As presented in later sections, a wide range of models were undertaken in order to test for the robustness of the specification, including **shortening the period of intervention** (i.e. receipt of National Careers Service support); matching on labour market outcomes **at the point** of intervention (rather than preceding the intervention); and matching on labour market histories **two years prior to the intervention**. In addition, throughout the analysis, we tested the inclusion or exclusion of a range of different variables (for instance, additional information on labour market histories; however, we found that adding further lags of employment, learning and benefit dependency histories was not found to improve the matching process).

In addition to the main analysis involving finding matches for all National Careers Service customers, given the heterogeneity of the characteristics of customers (as presented in the section on descriptive statistics), we also undertook a number of analyses using different ‘cuts’ of Next Step customers:

1. Jobcentre Plus referred customers and self-referred customers; and,
2. Customers that received a face-to-face session and customers that did not.

Furthermore, given the large samples available for analysis, it was also possible to replicate the analysis by year of intervention to allow us to consider the impact over time – throwing light on whether the impact changed over time.

### **Baseline Propensity Score Matching results**

The graph in Figure 36 below shows a comparison of the mean value of each variable in the treatment and counterfactual groups, both before and after matching for all National Careers Service customers. A significant **reduction in the bias** across the treatment and counterfactual groups after matching would indicate that the Propensity Score Matching procedure has been successful in selecting a counterfactual group for the analysis more similar in a statistical sense to the treatment group than the original untreated group.

Figure 36: Reduction of bias following Propensity Score matching

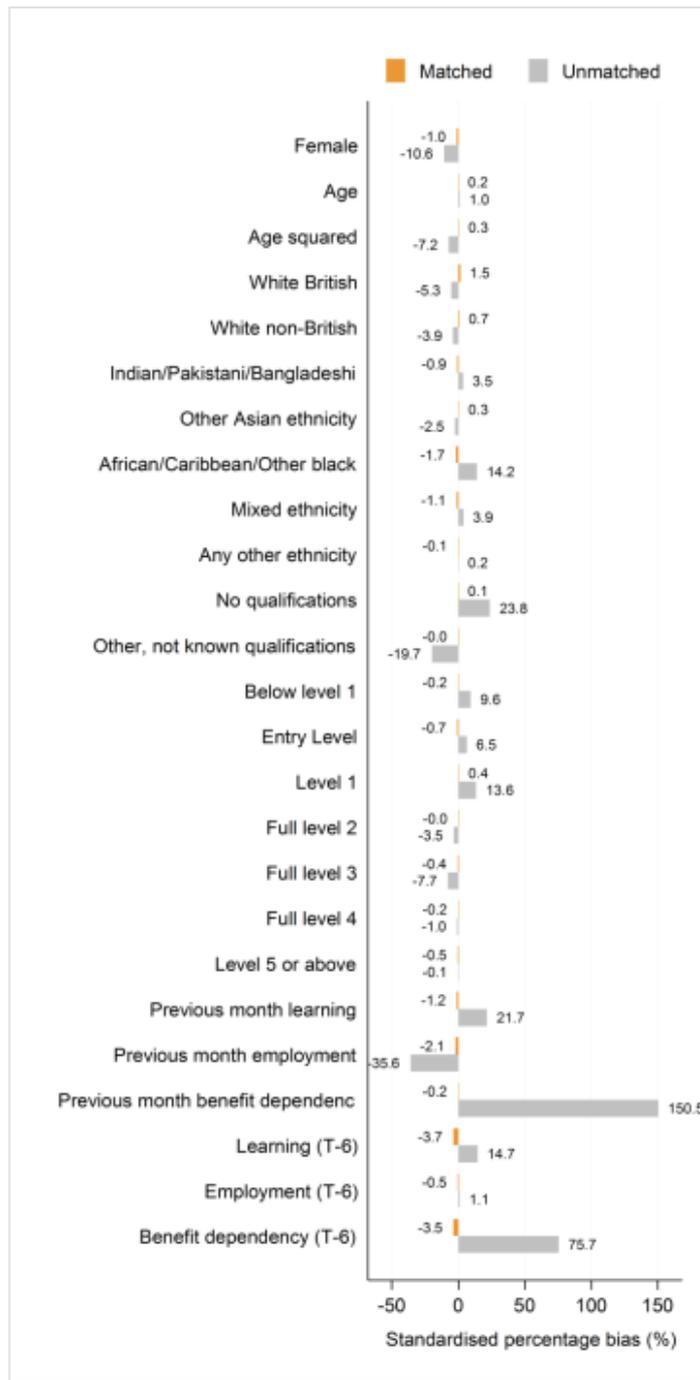


Figure 36 illustrates the standardised percentage biases before and after matching, averaged across periods. For each variable in each period, the bias is calculated as the difference in means between the two groups as a percentage of the square root of the average of sample variances in both groups. As such, a lower bias following matching indicates that differences in a variable between the two groups have been successfully reduced.

The standardised bias in absolute terms is below **6%** across all covariates and below **1%** for many, and demonstrates the relative effectiveness of the Propensity Score Matching technique in reducing the observed differences between the treated and untreated groups.

The analysis shows that the counterfactual group selected by the PSM procedure and used in the baseline analysis is much more similar to the treatment group in terms of personal and labour market characteristics compared to the original comparison group consisting of any individuals not in receipt of careers advice from National Careers Service.

# Impact of the National Careers Service

## Summary of analysis undertaken

In this section we present the findings of the analysis undertaken. There were a range of models implemented in order to assess the extent to which some of the findings might have been generated as a result of statistical anomalies (such as **regression to the mean**); the decision relating to the selection of the **duration** of the intervention period; or the decision in relation to whether to match **on the period** in which the National Careers Service support was received or the period preceding National Careers Service support. These are itemised as follows (and discussed in detail in the subsequent sections):

- Baseline model: 6 month intervention period with matching taking place on 6-month pre-intervention period
- Falsification tests between the baseline counterfactual group and a matched 'pseudo' counterfactual group to assess the extent of regression to the mean amongst non National Careers Service customers.
- Robustness Test 1: 6 month intervention period with propensity score matching taking place on period of National Careers Service support
- Robustness Test 2: 1 month intervention period with propensity score matching taking place on period of National Careers Service support
- Robustness Test 3: 6 month intervention period with propensity score matching taking place four 6-month periods (i.e. 2 years) preceding of National Careers Service support (presented in Annex)

## Baseline model

In the **baseline model**, we compared the respective labour market outcomes of the treatment and counterfactual group identified in the Propensity Score Matching model in 6-month time periods following the receipt of National Careers Service support. The important point to note is that in the baseline approach,

- The period in which National Careers Service support occurred was 6-months in duration (i.e. the intervention period). This does not mean that the actual support received occurred over the entire period of 6 months, but rather that the support was received at some point within the 6-month window.

- The treatment and counterfactual groups were matched using labour market histories in the 6-month period immediately preceding the 6-month period in which National Careers Service support was received.

## Why is this an improvement on the previous analysis?

In the previous work undertaken in 2012 (Department for Business, Innovation and Skills Research Report 97 [here](#)), there was relatively limited administrative information relating to the National Careers Service, while it was also the case that the availability of post-support information in relation to employment and benefit dependency was substantially less than currently the case.

In particular, administrative information on National Careers Service customers was only available between August 2010 and July 2011, while in relation to employment information, because of the lag in reporting HMRC P45 data, only information between 2003/04 and 2010/11 was available. As such, there were a number of individuals in receipt of National Careers Service support for whom there was very limited information on post support outcomes. Similarly, in relation to DWP benefit dependency data, information was used between 1999/00 and 2010/11, again restricting the post support outcomes that could be considered.

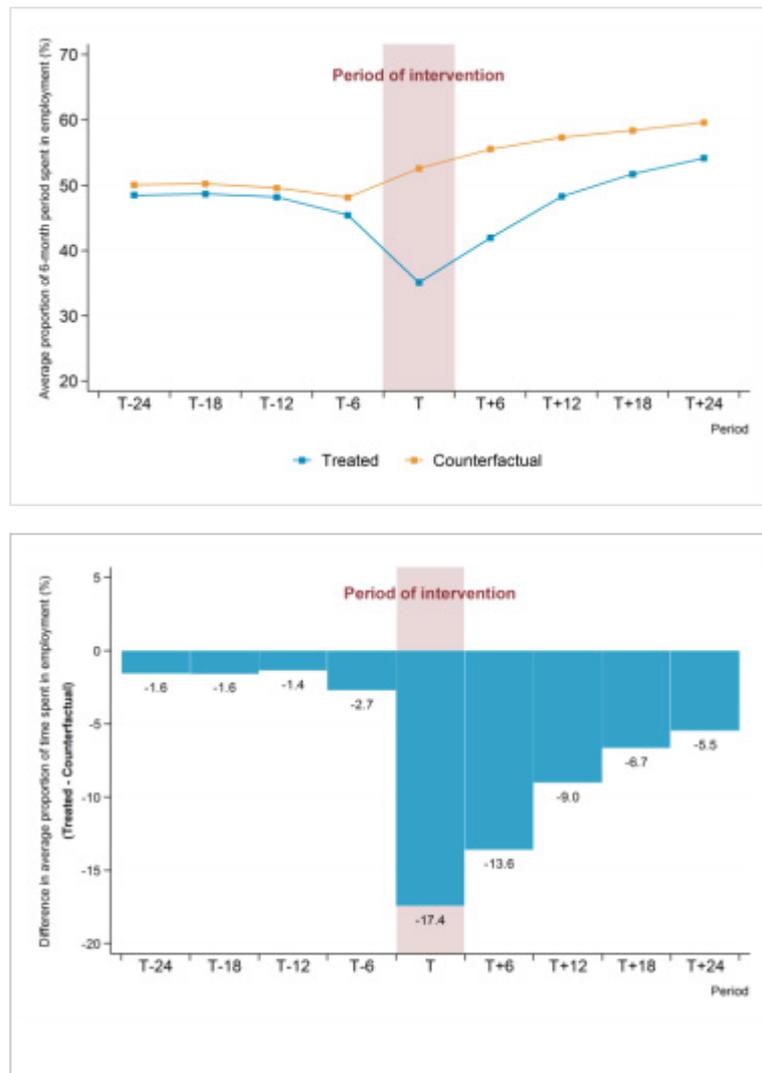
Given these data limitations, the previous analysis demonstrated an almost instantaneous snapshot of post support outcomes – generally just 3 to 6 months after the careers support might have been received. Furthermore, the previous analysis considered the probability of an individual being in employment or in receipt of benefits as binary variables (i.e. employed or not-employed; in receipt of benefits/ not in receipt of benefits). Whilst this assessment of labour market outcomes post-support was a reasonable approach given the limited data availability at the time, the approach was relatively crude compared to the assessment of post-careers support outcomes presented in this report. In particular, rather than considering the employment or benefit dependency outcomes at a particular point in time (and essentially assuming that the individual's labour market status on that date is indicative of their more general labour market outcomes over the period), in this analysis, we generate a much more refined assessment of labour market outcomes by estimating the **proportion** of a particular period in employment or in receipt of benefits. Methodologically and computationally, this is a significant improvement on the previous analysis.

## Baseline model: Employment: all National Careers Service customers

Figure 37 shows employment histories and outcomes for the treated and matched counterfactual groups. Following the use of the Propensity Score Matching approach (and in particular, matching based on labour market histories pre-intervention), the analysis demonstrates that both the treatment and counterfactual groups spent similar

amounts of time in employment leading up to the period of support. In particular, the difference in the proportion of the 6-month period spent in employment stood at less than **3 percentage points** in the four 6-month periods pre-intervention. However, the analysis clearly demonstrates that a **significant employment wedge opens** up at the point of intervention between those in receipt and not in receipt of support (with the gap in the proportion of the period spent in employment stands at **17.4 percentage points**).

**Figure 37: Employment histories and outcomes for the treated and counterfactual**



This ‘splitting’ of the sample is important. Specifically, although both the treatment and counterfactual groups both see a gradual deterioration in their employment status in the 24 months pre-support, individuals in the treatment group see a further decline in outcomes in the 6-month period in which the National Careers Service support occurs – and it may be for this specific reason that they receive support through National Careers Service.

In contrast, in the counterfactual group, labour market outcomes improve in the 6-month period in which the careers support is received by the treatment group (and hence these

individuals are less likely to receive any National Careers Service support). From a methodological perspective, this divergence in labour market outcomes at the time of support implies that there may be **unobservable characteristics** that have determined selection into the treatment group that have not been identified or controlled for. In other words, despite an appropriate and careful assessment of the data, it might be the case that the control group does not fully reflect what would have happened in the absence of the programme (as, if any individuals in the counterfactual group had experienced a comparable decline in labour market status, they would also have received National Careers Service support).

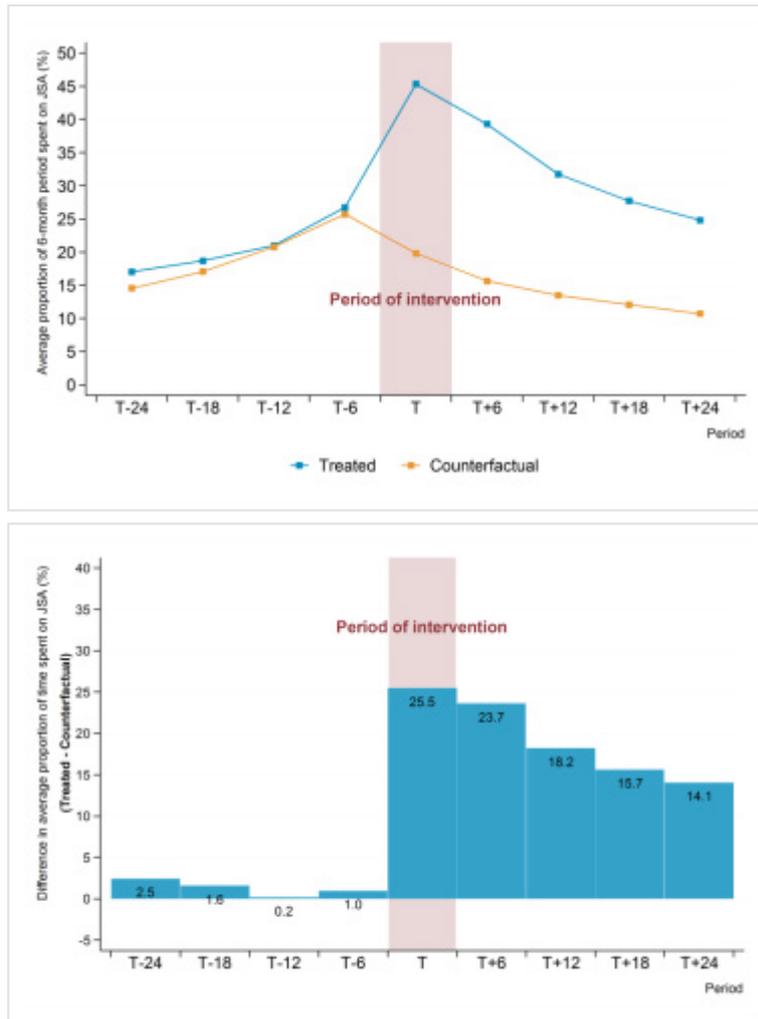
Despite this, it is important to note the swift recovery of National Careers Service customers following the intervention. One year after the intervention period, employment is comparable to its level 12-24 months pre-intervention. Furthermore, the gap in the proportion the period spent in employment between the treatment and counterfactual groups had declined to **5.5 percentage points** (equivalent to a **69%** decline in the gap).

### **Baseline model: Benefit dependency**

As with the analysis relating to employment, Figure 38 demonstrates that both the treatment and counterfactual groups spent similar amounts of time in receipt of JSA leading up to the period of intervention. However, at the time of intervention, the findings again indicate that individuals going on to receive the National Careers Service intervention spent approximately **25 percentage points** more of the period in receipt of JSA compared to the counterfactual group.

The National Careers Service intervention appears to arrest and reverse this relative decline – and 2 years post-intervention – the gap between the treatment and counterfactual groups stands at 14 percentage points, corresponding to a 44% reduction in the gap between the groups.

Figure 38: JSA histories and outcomes for treated and counterfactual

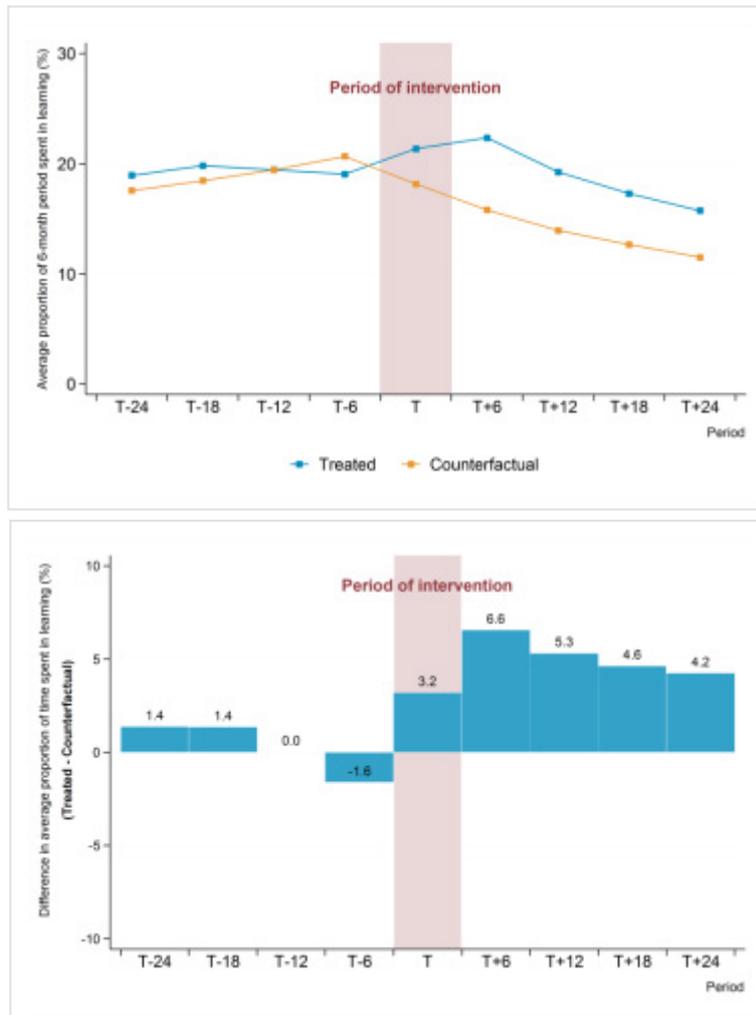


## Baseline model: Education and training outcomes

In relation to education training outcomes, the analysis of the ILR again suggests that the incidence of training between the treatment and counterfactual groups before National Careers Service intervention was very close. In the 6-month period in which those National Careers Service customers received support, on average, the treatment group spent approximately **3.2 percentage points** more of the 6 months period in training, which further increases to **6.6 percentage points** in the first 6-month period immediately post-intervention. The gap in the proportion of the subsequent 6-month periods spent in education and training between the treatment and counterfactual groups remained at **4.2 percentage points** 24 months post-intervention. This would suggest that careers support

has had an effect in bringing customers into training, which the wider economic literature would suggest would have a longer term effect on employment outcomes<sup>16</sup>.

**Figure 39: Learning histories and outcomes for treated and counterfactual**



## Limitations of baseline analysis - falsification tests

However, at this stage it is not possible to categorically assess the impact of the National Careers Service, as some or all the illustrated effect might be either as a result of a number of factors, including **reversion to the mean**; the matching of the treatment and the counterfactual on the period **preceding** the period of time in which the National Careers Service support was received; or the **selection of 6-month periods** for analysis (which might result in confusing histories and outcomes within the period in which support occurred).

<sup>16</sup> Department for Business, Innovation and Skills (2013), A disaggregated analysis of the long run impact of vocational qualifications, BIS Research Report 106, February 2013.

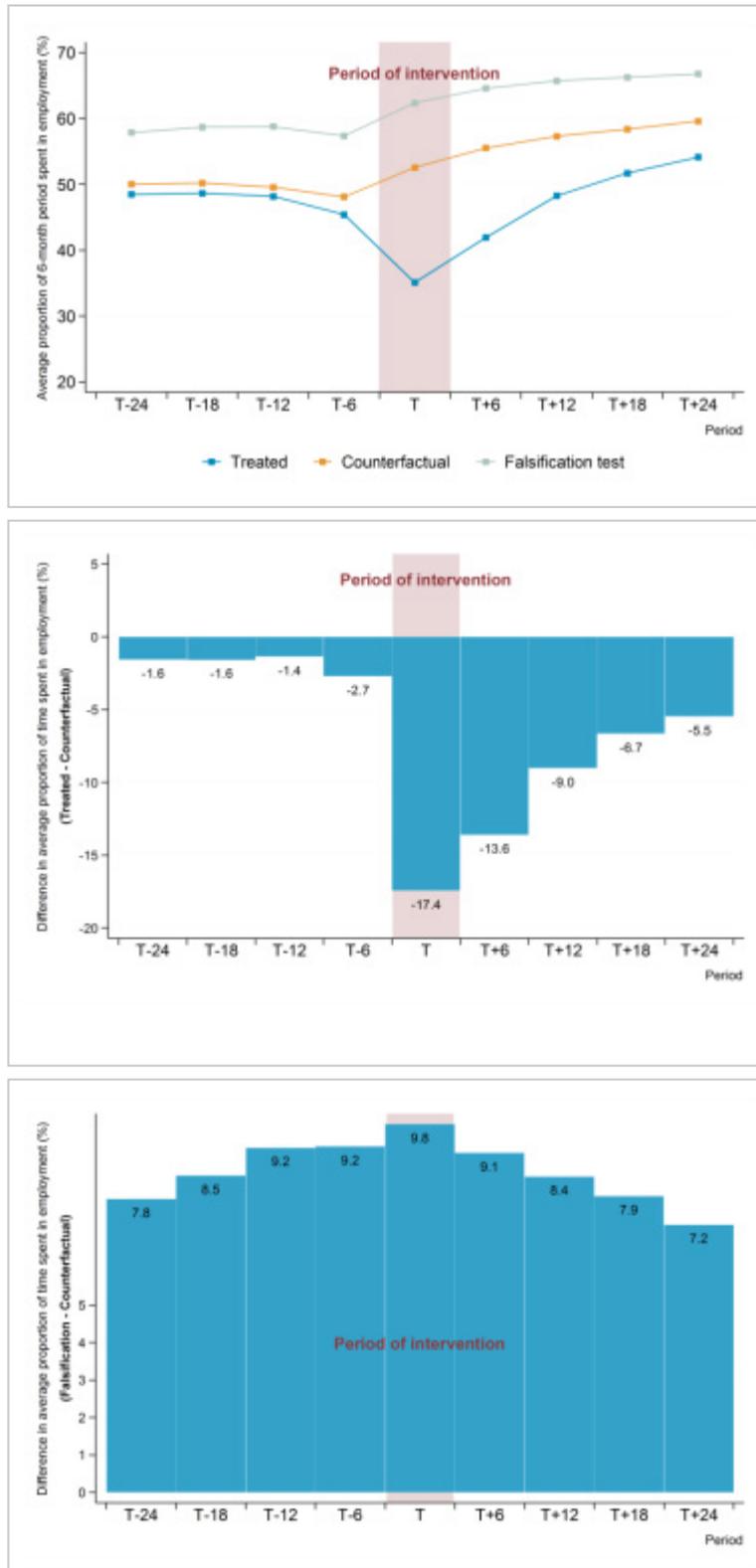
## Falsification tests: testing regression to the mean - employment

Regression to the mean describes the phenomenon where the *second* recording of a particular variable (such as the proportion of a 6-month period spent in employment) might be seen to be higher than the *first* measure simply because the first measurement of the variable is 'far' from the mean.

In this context, the apparent recovery in employment (by **11.9 percentage points**) amongst the treatment group might simply be because the estimate of the proportion of the 6-month period that National Careers Service customers were in employment for at the time that they received support was **17.4 percentage points** below the counterfactual group (i.e. 'far' from the mean); so that a subsequent assessment of employment is more likely to be closer to the mean (the second measurement indicates that the employment gap between the treatment and the counterfactual stood at **13.6 percentage points**).

In Figure 40, we have tested for this by generating a 'pseudo' counterfactual. Specifically, from the baseline analysis, we have selected the treatment group (National Careers Service customers), and recoded their employment outcome in each pre intervention period so that it equals the actual proportion of the period in employment plus **10 percentage points** (simultaneously adjusting benefit dependency down by **5 percentage points**). We have then generated a pseudo counterfactual using the same PSM approach as previously. We then compared this pseudo counterfactual to the actual counterfactual. In this case, both the counterfactual and pseudo counterfactual have not been affected by the National Careers Service, but the original counterfactual group has a historically lower proportion of each pre intervention period in employment.

Figure 40: Falsification tests: Employment



The analysis indicates that the gap in the proportion of the intervention period in employment between the original counterfactual and the pseudo counterfactual stood at 9.8 percentage points (essentially by construction). However, despite neither the original counterfactual group nor the pseudo counterfactual group receiving any form of National

Careers Service support, the analysis suggests that the gap in the employment outcome in the successive 6-month periods declines – with the employment outcomes of the original counterfactual group (starting from a lower point) increasing at a faster rate than those in the pseudo counterfactual. In particular, in the fourth 6-month period following the date of the assigned intervention (amongst the original treatment group), the gap in the proportion of the 6-month period in employment stood at approximately **7.2 percentage points** (a decline of **2.6 percentage points**). This suggests that approximately **27%** of the change in employment outcomes that are identified may be as a result of reversion to the mean.

Given the original finding contained in the **baseline** analysis, where the employment gap declined from **17.4 percentage points** to **5.5 percentage points** by the fourth 6-month period post receipt of National Careers Service support, the analysis of the falsification test suggests that at least this proportion (i.e. **27%**) of the reduction in the employment gap between the treatment and the counterfactual (i.e. at least **3.2 percentage points** of the **11.9 percentage point** gap) might be as a result of reversion to the mean.

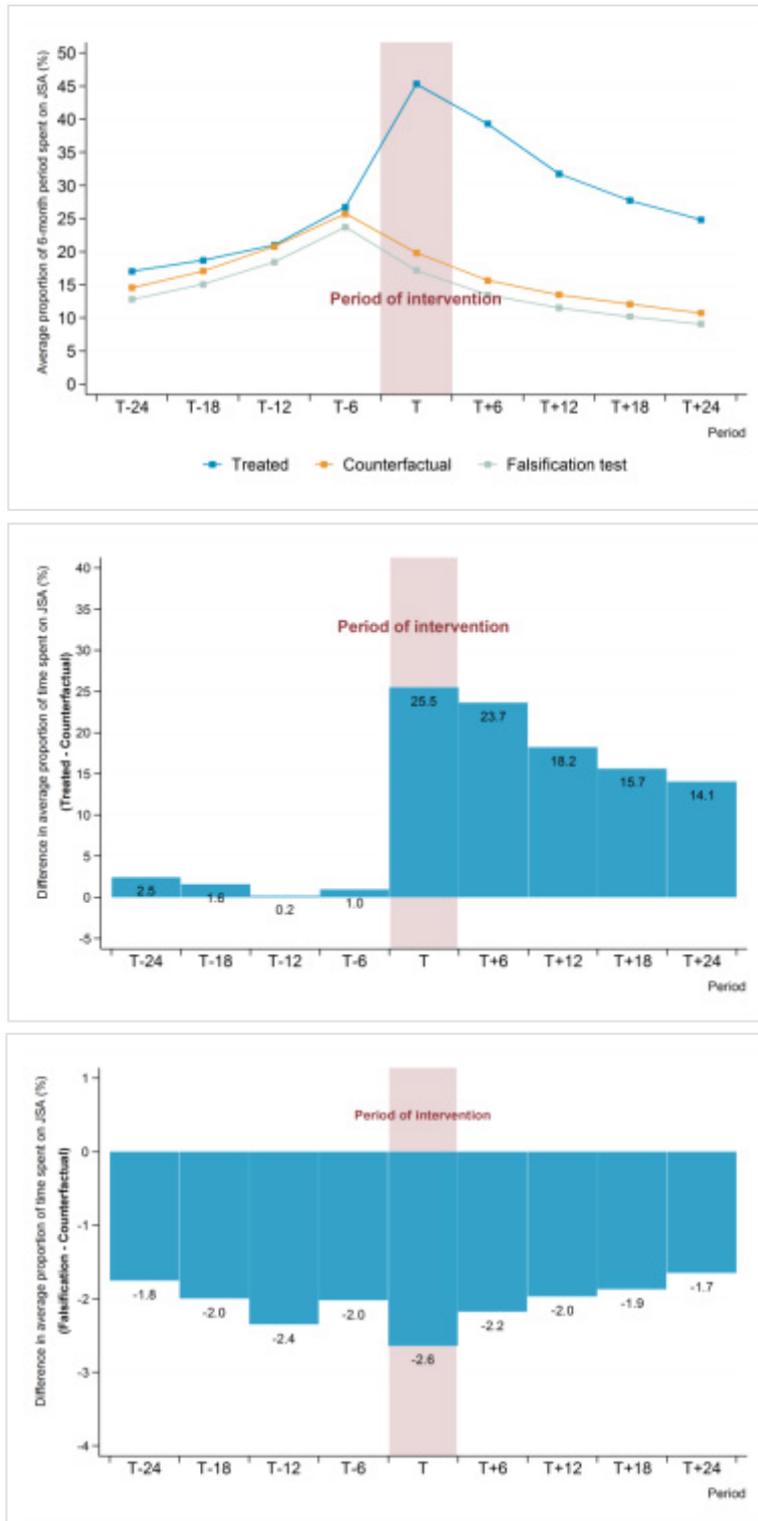
## Falsification tests: testing regression to the mean – benefit dependency

Replicating the falsification analysis in relation to benefit dependency, the upper panel of Figure 41 illustrates the proportion of each 6-month period in receipt of JSA for the original treatment and counterfactual groups, whilst also presenting the 'pseudo' counterfactual group, which was created by generating a matched sample based on the average benefit dependency of the treatment group minus **5 percentage points**.

Again, both the original and pseudo counterfactual groups *did not* receive support through the National Careers Service; however, compared to a benefit dependency gap of **2.6 percentage points** in the 6-month period in which the original treatment group received careers support, the benefit dependency gap between the original counterfactual and the pseudo counterfactual stood at **1.7 percentage points** in the fourth 6-month period.

The fact that the decline in benefit dependency amongst the original counterfactual was greater than that for the pseudo counterfactual group does suggest again that there is some evidence of regression to the mean, with the econometric analysis suggesting that approximately **35%** (i.e.  $0.9\text{pp}/2.6\text{pp}$ ) of the decline was associated with reversion to the mean.

Figure 41: Falsification tests: Benefit dependency

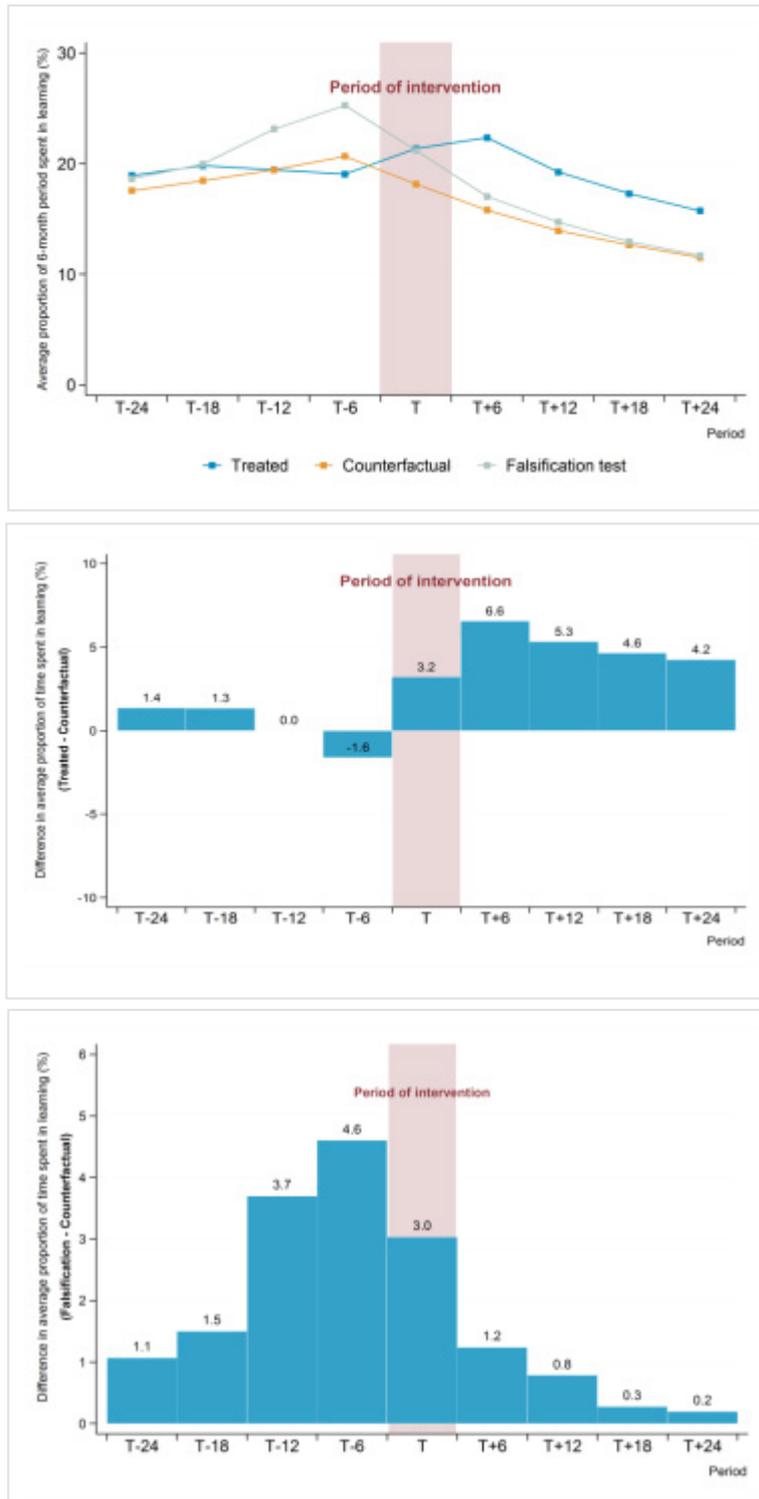


## Falsification tests: testing regression to the mean – education and training

Turning to education and training, the original analysis presented in Figure 43 indicates that the treatment group spent approximately **1.6 percentage points** less of the 6-month period preceding the period in which careers support occurred in education and training. This education and training gap between the treatment and counterfactual reversed with the treatment group spending **4.2 percentage points** more of the fourth 6-month period post National Careers Service support in education and training compared to the counterfactual.

Using the same pseudo counterfactual group as generated previously (through the adjustment of employment and benefit dependency histories), despite *neither* the original counterfactual group nor the pseudo counterfactual group receiving any form of National Careers Service support, the analysis suggests that the gap in education and training outcomes in the successive 6-month periods declines. In particular, in the fourth 6-month period following the date of the assigned intervention (amongst the original treatment group), the gap in the proportion of the 6-month period in education and training was close to zero (a decline of **2.8 percentage points** from the 6-month period of intervention).

**Figure 42: Falsification tests: Education and training**



This element of the analysis suggests that, in respect of education and training, there was no identified reversion to the mean – and that if anything – the education and training effect of the National Careers Service might have been greater than originally estimated under the baseline modelling approach.

## Robustness checks (I): Matching on intervention period

Although substantial care has been taken to generate appropriate counterfactuals, the analysis suggests that there may be unobservable characteristics that have not been accounted for in the Propensity Score Matching models. In particular, between the 6-month period preceding the receipt of National Careers Service support and the 6-month period in which support actually took place, the analysis (in Figure 37 and Figure 38) indicates that the labour market status of the counterfactual groups improved whilst the labour market status amongst the treatment group further deteriorated.

The falsification tests suggest that some of the closing of the employment and benefit dependency gaps may have been accounted for by regression to the mean, in which case it becomes more difficult to disentangle the true impact of the National Careers Service on labour market outcomes. For this reason, it is necessary to assess how the outcomes of treated and counterfactual compare when the differences in labour market status are eliminated or reduced significantly by matching individuals according to their labour market status **during the period of support**. Note that any outcomes that occur within the 6-month period in which the individual received support cannot be picked up using this approach.

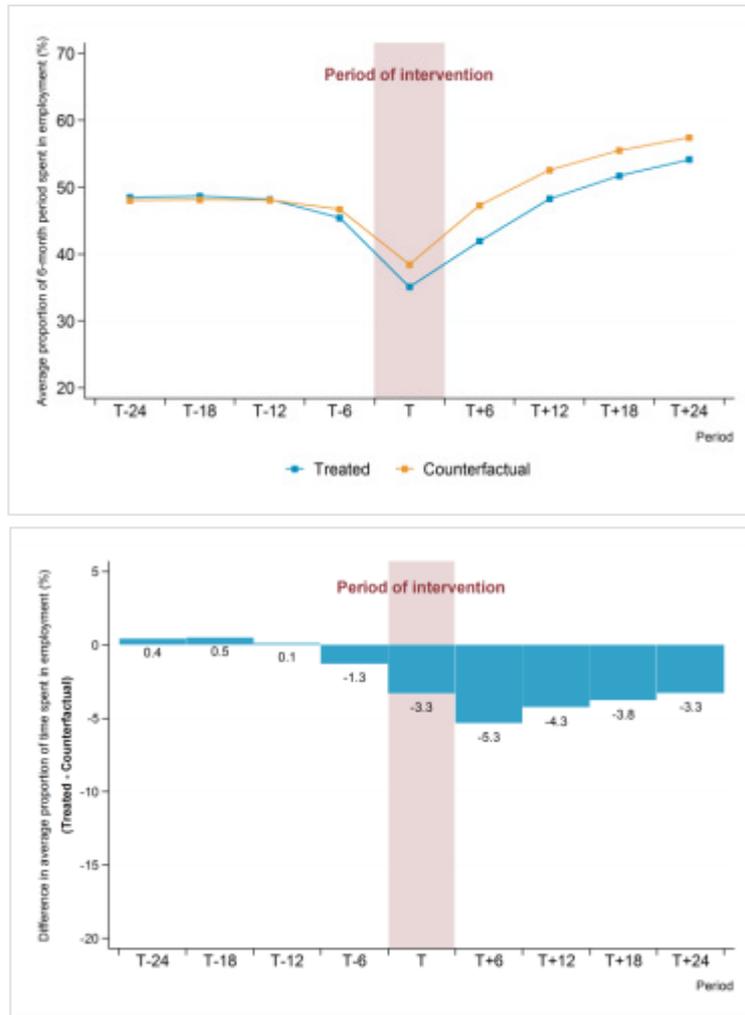
### Robustness check (I) Employment

First, continuing with 6-month periods, we matched on benefit and employment status **during** the 6-month period in which the National Careers Service support was received. This robustness check examined how the outcomes of treated and counterfactual compared when the differences in labour market status was reduced by matching individuals according to their labour market status during the period of support.

As expected, at the time of receipt of National Careers Service support amongst the treatment group, the proportions of time spent in employment were much more comparable between the treatment and counterfactual groups (a **3.3 percentage point** difference). We then see very similar upward trends for both groups in the 6-month periods that follow. In the fourth 6-month period post receipt of National Careers Service support, the difference in the employment gap is essentially unchanged (standing again at **3.3 percentage points**, albeit declining to approximately **5.3 percentage** points in the first 6-month period post support).

A 'simple' interpretation might be that following a deterioration in labour market status, all individuals regain employment at a similar speed, irrespective of whether they have been in receipt of National Careers Service support or otherwise.

Figure 43: Employment outcomes matching on period of intervention

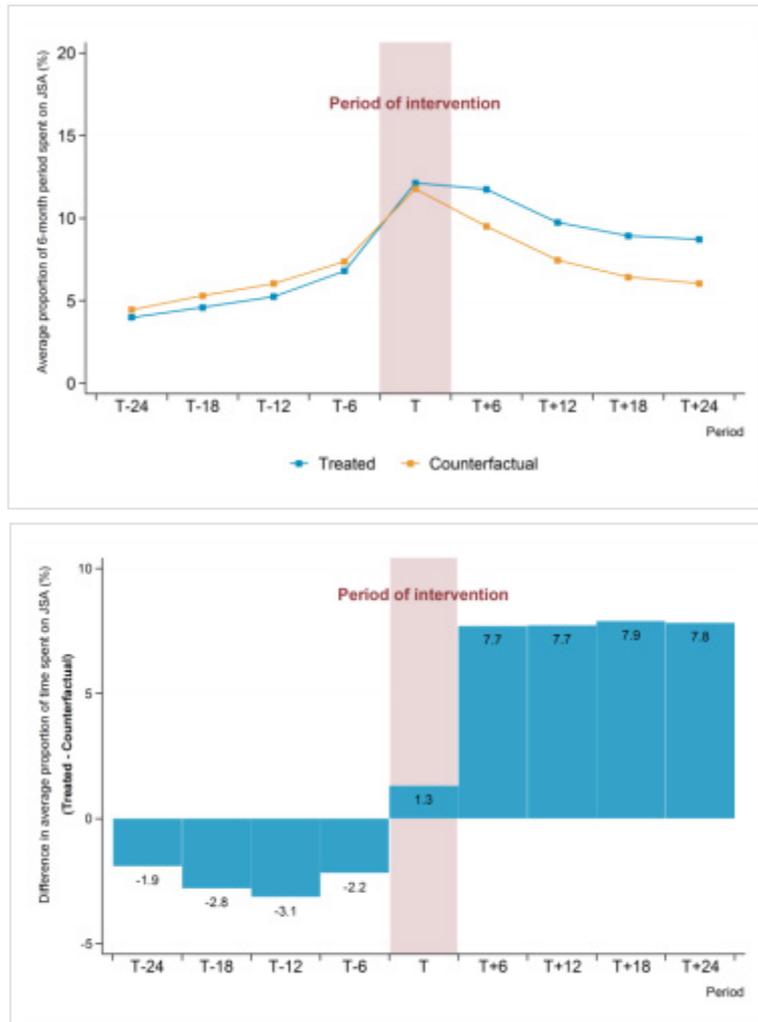


## Robustness check (I) Benefit dependency

In relation to benefit dependency, having replicated the Propensity Score Matching model using 6-month support intervals, and matching on the interval of intervention, the analysis suggests that there the treatment group is approximately **1.2 percentage points** more likely to be dependent on Jobseekers Allowance compared to the counterfactual group (and less than **3 percentage points** less likely to be benefit dependent in any of the four 6-month period prior to the treatment group receiving National Careers Service support).

However, the analysis also suggests that following the receipt of National Careers Service support, National careers Service customers are between **7 and 8 percentage points** more benefit dependent compared to the counterfactual group. This suggests that the labour market outcomes achieved by those in receipt of National Careers Service support continuous to worsen despite the careers advice.

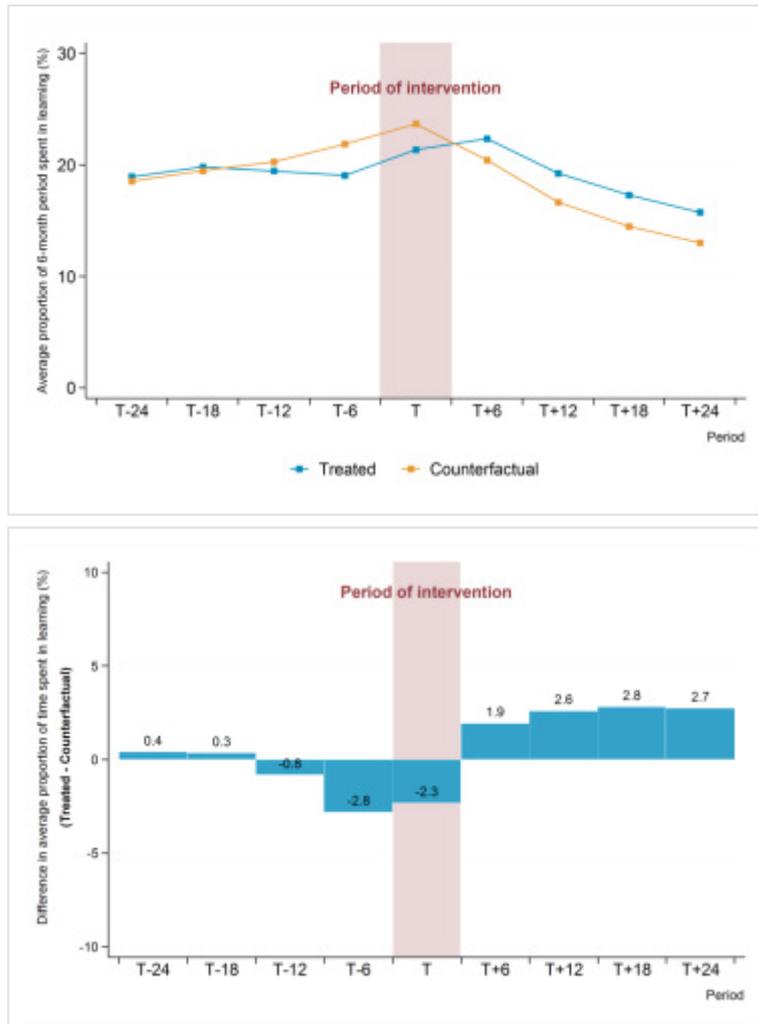
Figure 44: Benefit dependency outcomes matching on period of intervention



## Robustness check (I): Education and training

However, despite the potential neutral findings in relation to employment and benefit dependency, the comparable analysis relating to education and training again illustrates that the provision of National Careers Service support does appear to have a positive impact on National Careers Service customers. In particular, having matched the treatment and counterfactual groups on the 6-month period in which support was received, the analysis indicates that there was a small (**2.3 percentage point**) deficit in the proportion of the 6-month period that the treatment group spent in education and training compared to the counterfactual. However, in each of the four 6-month periods post National Careers Service support, the analysis indicates that National Careers Service customers spent between **1.9** and **2.7 percentage points** more of each successive 6-month period in education and training compared to the counterfactual group.

Figure 45: Education and training outcomes matching on period of intervention



## What does this mean?

Although the decision to match on the 6-month period in which National Careers Service support was received for the first time, the fact that this careers support could have occurred at any point across the entire 6 months means that **there is the possibility that labour market and education histories are being confused with labour market and training outcomes**. In particular, if an individual received support in the first day of the 6-month period, then a Propensity Score Matching model based on the actual treatment period would wrongly assign the entire (potentially positive) labour market or training outcome as a customer's history.

Although significantly more computationally intensive, to address this issue, a comparable matching process was undertaken based on the period of intervention; however, we reduced the interval of intervention from 6-months to **1-month**. This further robustness check is presented in the next section.

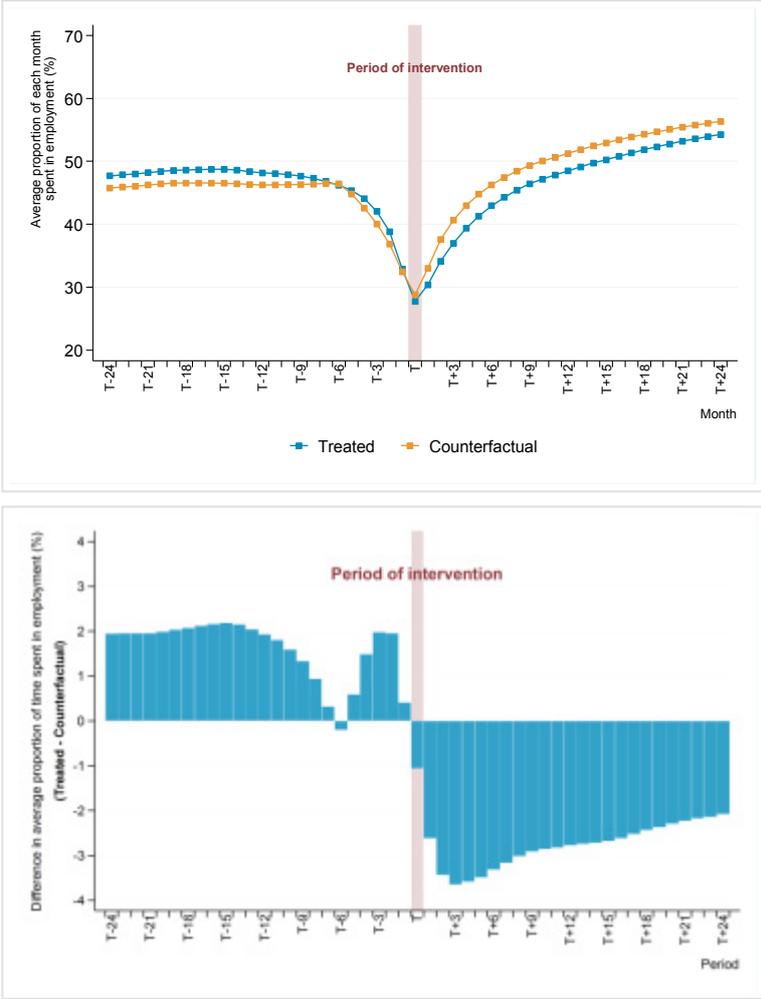
## Robustness checks (II): Shortening the intervention period

### Robustness checks (II): Employment

Matching on the 1-month period of intervention allows all labour market histories up to the point of intervention to be taken into account. It is also the case that any outcomes that occur within this 1-month period as a result of the intervention will not be picked up in the analysis. However, the fact that this issue is limited to a 1-month period, rather than 6-month period, is a significant improvement upon the preceding analysis.

In this final robustness check, the treatment and counterfactual were matched on the proportion of the **1-month interval** in which National Careers Service support occurred. With less than a **1 percentage point** difference between the groups at the time of support (and less than a **2 percentage point** difference in any of the 24 individual months in the 2 years pre-support), the analysis indicates that the employment outcomes of National Careers Service customers worsens in the first 6 months post support, but gradually improves thereafter. Specifically, National Careers Service customers spend approximately **3.5 percentage points** less of the 6th month in employment following the receipt of careers advice and support; however, by the end of the 24th month post National Careers Service support, the gap stands at just **2 percentage points**.

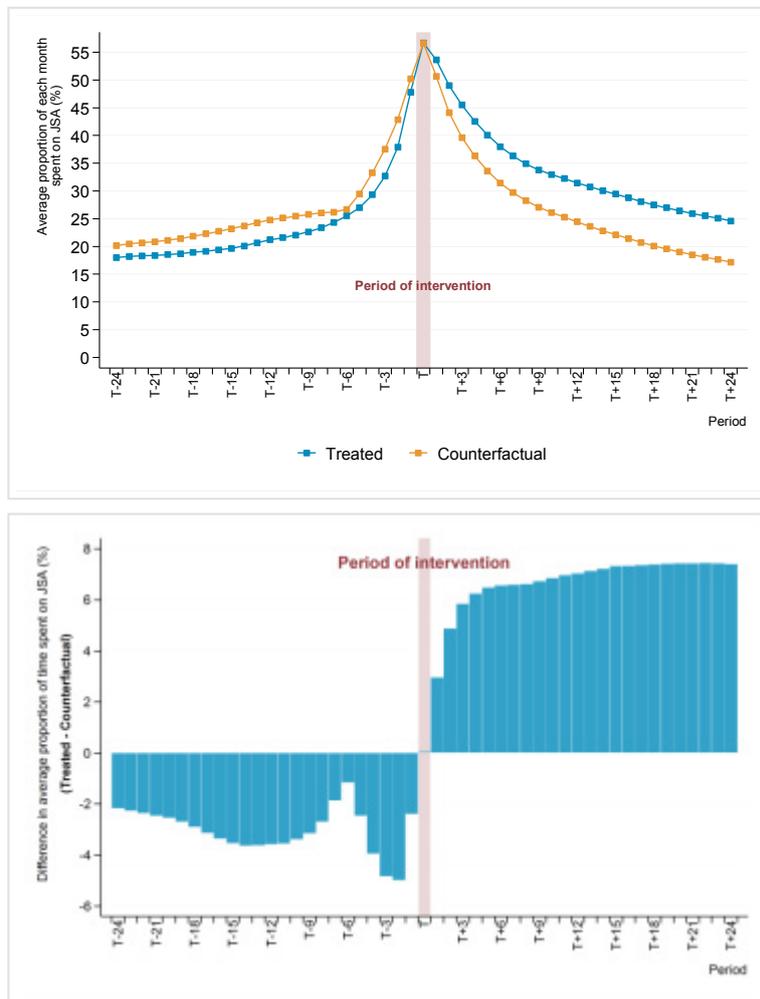
Figure 46: Employment outcomes - 1 month intervals matched on period of intervention



## Robustness checks (II): Benefit Dependency

In relation to benefit dependency, a similar picture (again) emerges. In the 1-month interval in which National Careers Service support is received, there was **no gap** between the treatment group and the counterfactual in the proportion of that month spent dependent on Jobseekers Allowance (whereas in the previous 2 years, the treatment group were between **2 and 4 percentage points** less likely to be benefit dependent than the counterfactual group). Following the receipt of National Careers Service support, the analysis indicates that the labour market outcomes of the treatment group continued to deteriorate, with a **6-8 percentage point** gap opening up between the treatment and counterfactual groups. This gap in benefit dependency remained essentially unchanged in the 24 months post receipt of careers support and advice amongst National Careers Service customers.

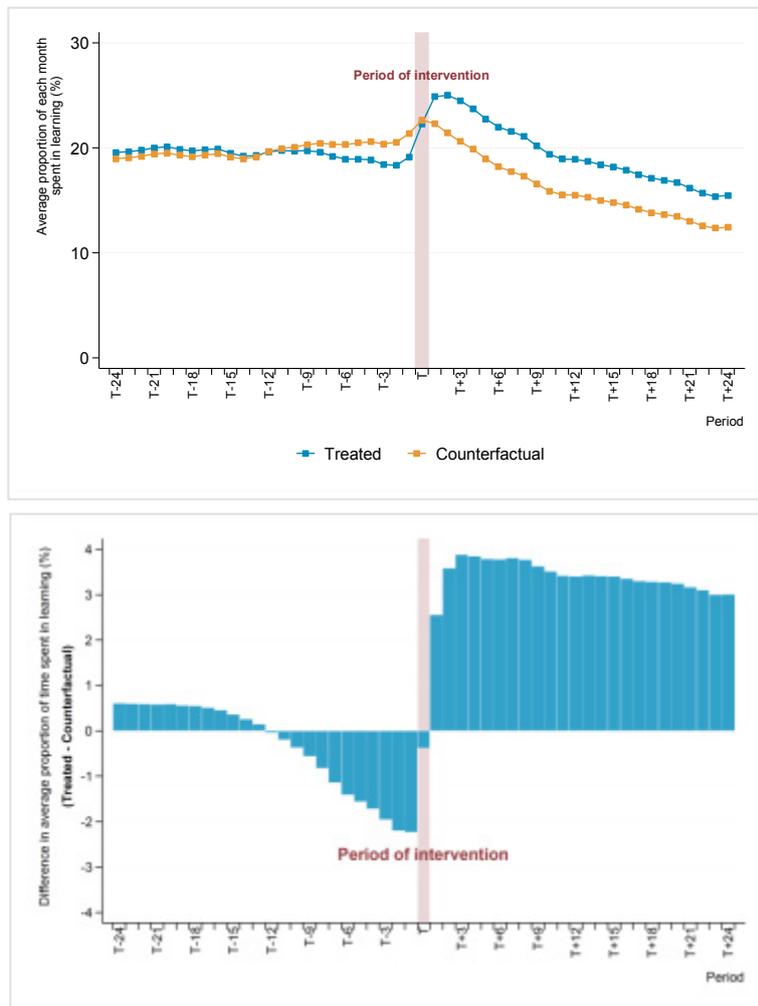
**Figure 47: Benefit dependency outcomes - 1 month intervals matched on period of intervention**



## Robustness checks (II): Education and Training

Finally in this section, we consider the education and training outcomes associated with National Careers Service support. The analysis indicates that in the 6 months prior to the receipt of National Careers Service support, there was a general reduction on the incidence of education and training amongst the treatment group relative to the counterfactual (reflected in a **2 percentage point** gap). Although the size of the gap between the treatment and counterfactual declined to almost **zero** in the 1-month interval in which the treatment group received careers advice and support (in part by the manner in which the counterfactual was constructed), the analysis indicates that there was a significant upward shift in the incidence of education and training, with the treatment group spending between **3 and 4 percentage** points more of each successive 1-month interval in education and training relative to the counterfactual.

**Figure 48: Education and training outcomes - 1 month intervals matched on period of intervention**



## What does this tell us?

Having considered the original baseline analysis, we have undertaken a range of falsification and robustness checks to better understand the extent of a range of potential analytical deficiencies (including **regression to the mean**; **unobservable differences** between the treatment and the counterfactual; the potential **confusion between histories and outcomes** as a result of the time intervals under consideration). The 1-month interval analysis matched on the interval of National Careers Service support emerges as the best methodology for generating an appropriate counterfactual.

The analysis suggests that although we could not identify a positive impact of the National Careers Service on employment or benefit dependency outcomes, it was possible to identify a relatively strong effect in relation to education and training that persisted across the entire post-support period.

## Conclusions and recommendations

This paper describes efforts to understand how the National Careers Service has evolved over time and to assess its impact on the labour market status of those it serves.

Using administrative data, it has been possible to see how the composition of National Careers Service customers has changed since August 2010 and through the rebranding in April 2012. The most striking change has been the increasing proportion of unemployed and benefit dependent customers, as well as the increasing proportion of unemployed customers who have been long term unemployed (65% in 2014). This suggests a more significant challenge over time for providers of National Careers Service support as the degree of unemployment entrenchment amongst National Careers Service customers increases.

Despite these challenges, the recovery path of those that receive National Careers Service careers advice appears to have been relatively consistent over time. Even though a deterioration in labour market outcomes has likely drawn them to the National Careers Service, one year after the intervention session, National Careers Service customers on average spend a comparable proportion of time in employment as they did one and two years prior to the intervention. Two years after the careers support and advice, employment outcomes have improved further.

However, for a range of reasons, simple comparisons between National Careers Service customers and non-customers were shown to be inadequate for assessing the impact of the service. Furthermore, normally reasonable attempts to compare the outcomes between the treatment group and a standard counterfactual proved inadequate. As such, significant additional effort was undertaken to refine and improve the methodological approach.

Given the fact that we were only able to match National Careers Service customers that have been in receipt of publicly funded training in the academic years 2008-09 to 2013-14 inclusive, our Key Finding is that although we could not identify a positive impact of the National Careers Service on employment or benefit dependency outcomes, it was possible to identify a relatively strong positive effect in relation to education and training that persisted across the entire post-support period.

The main caveat to these findings is that there are some unobservable differences between the treatment and counterfactual groups identified that have failed to be addressed through the propensity score matching approach.

## Options for further research

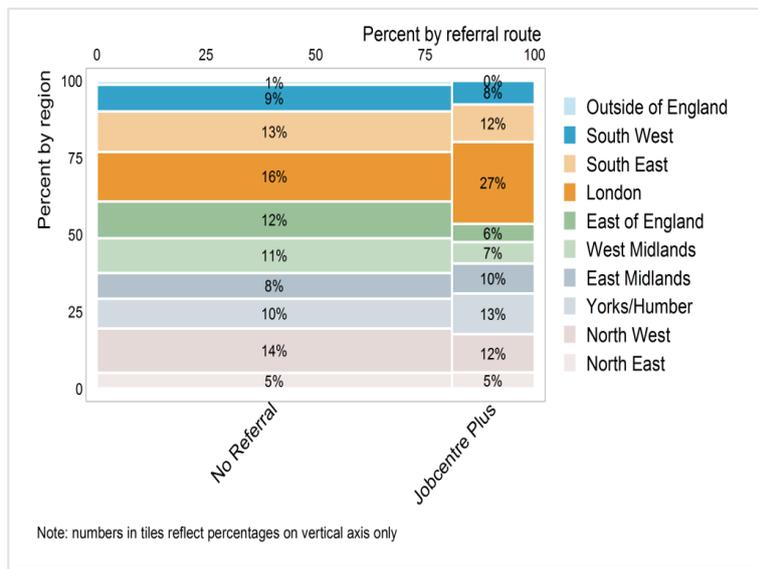
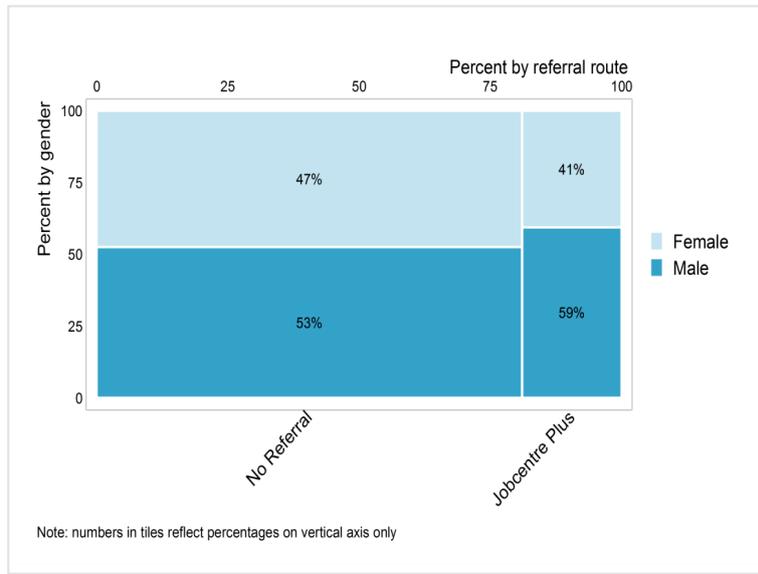
- Since a positive effect was established in relation to education and training, it could be interesting to explore the extent to which the National Careers Service has an indirect effect on employment and benefit dependency, through education and training. Subsequent analysis could track the employment and benefit dependency outcomes of National Careers Service customers where the primary short term impact has been reflected in an increased incidence of education and training.
- To overcome one key methodological challenge (namely the fact there continue to be unobservable differences between the treatment and counterfactual groups), it is necessary to understand better the rationale for an individual accessing National Careers Service support, but also to assess whether there is additional National Careers Service administrative information that might allow a better comparison between the treatment and counterfactual. In particular, we would like to understand to what extent the improvement in labour market outcomes might simply have happened to National Careers Service customers anyway. To achieve this, it would be beneficial to understand whether there are individuals who were either referred or self referred to National Careers Service and were scheduled to receive support, but did not do so (either because the individual returned to work and support was unnecessary or because they failed to attend). Depending on the quality of this data (if it exists), this additional information would allow for a more rigorous assessment of the relative outcomes between the treatment and counterfactual - and hence the impact of National Careers Service support.
- Another approach using National Careers Service administrative data would be to examine the outcomes of those that received face-to-face support, and to compare them with the outcomes of those that received phone support only. The advantage of this approach would be that it would be possible to control for access to the service and potentially the motivation to seek help. The main limitation of the approach is that it would only measure the impact of face-to-face support relative to phone support. The key challenge would be finding an appropriate counterfactual group for the face-to-face group, given the relatively small number of individuals in the administrative data that receive phone support only (and the restrictions on age and benefit dependency status that govern eligibility for free face-to-face support).

# Annex 1: Part I - Additional information on National Careers Service Customers

## Referral Route

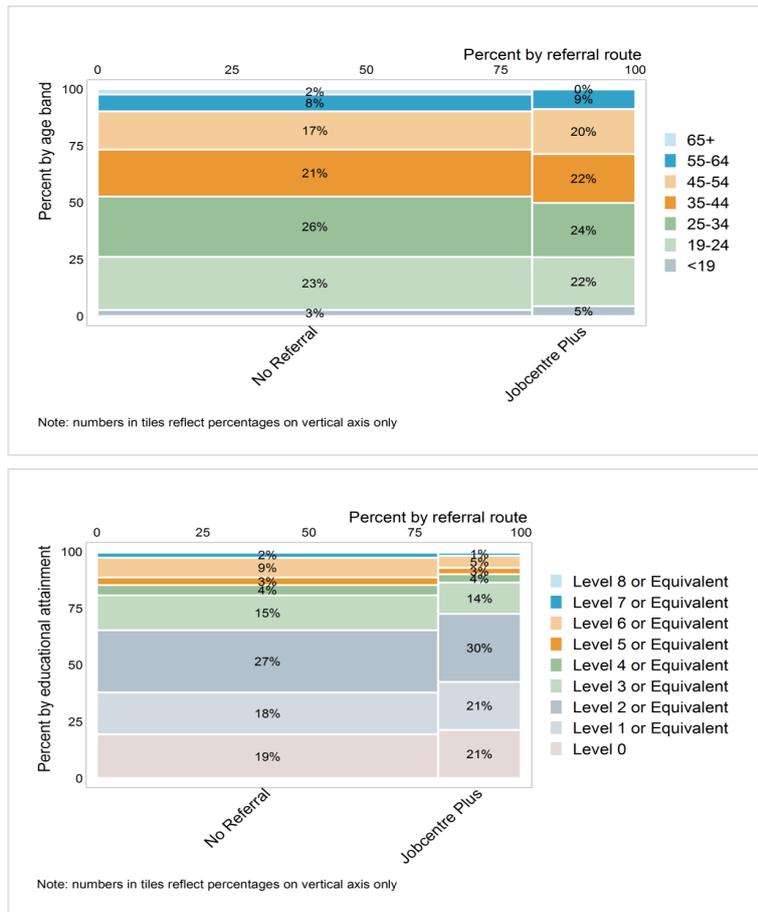
### Gender and region of residence by referral route

Figure 49: National Careers Service customers' gender and region (by referral route)



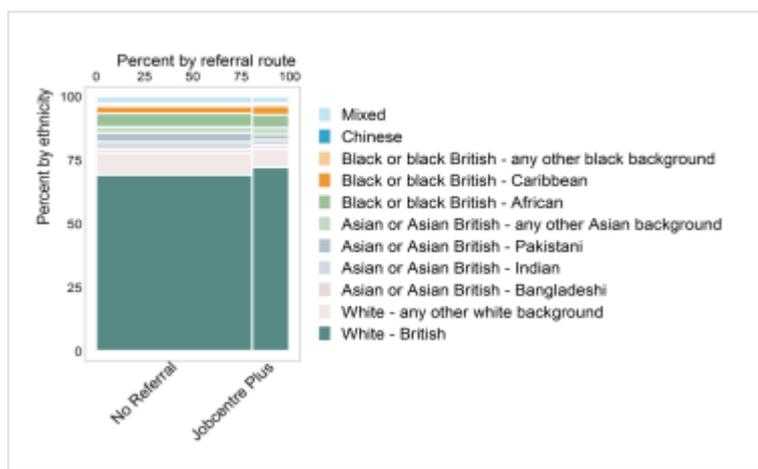
## Age and prior attainment by referral route

Figure 50: National Careers Service customers' age and prior attainment (by referral route)



## Ethnic origin by referral route

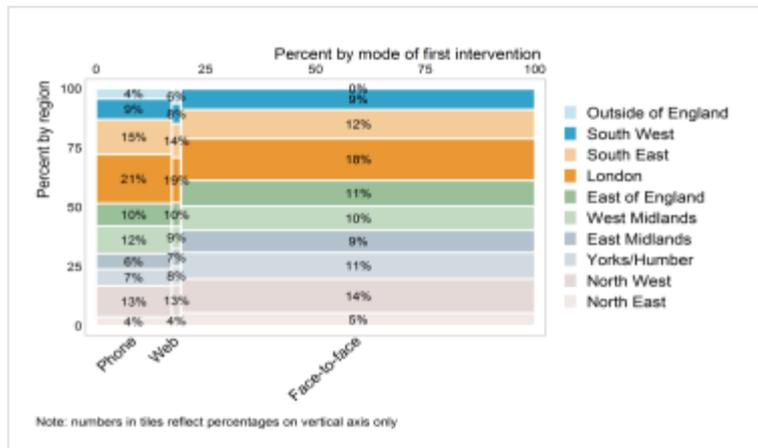
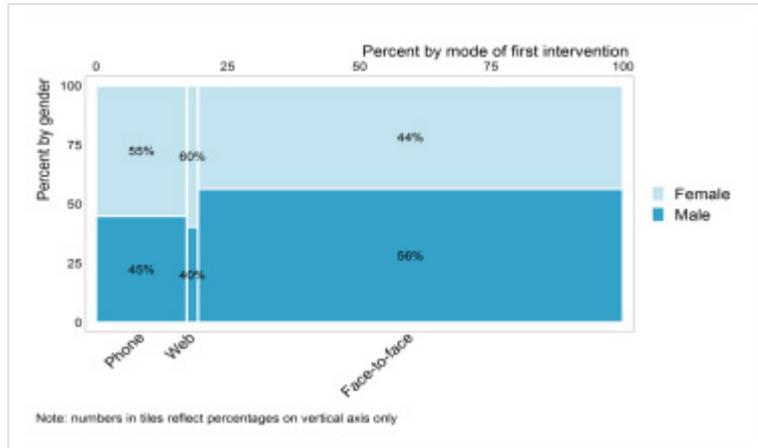
Figure 51: National Careers Service customers' ethnic origin (by referral route)



# Mode of intervention

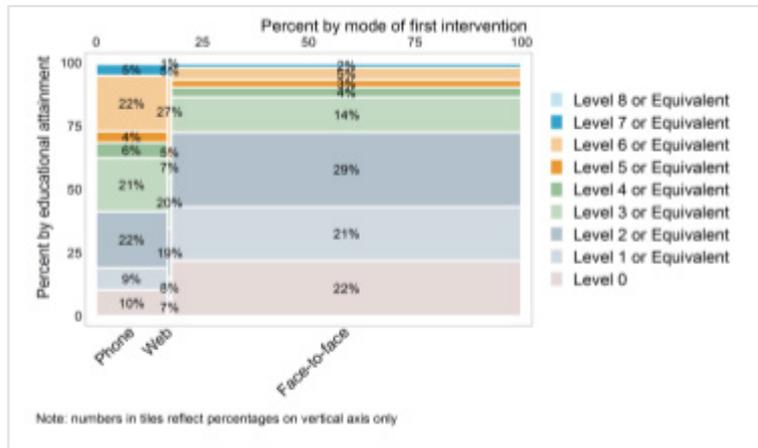
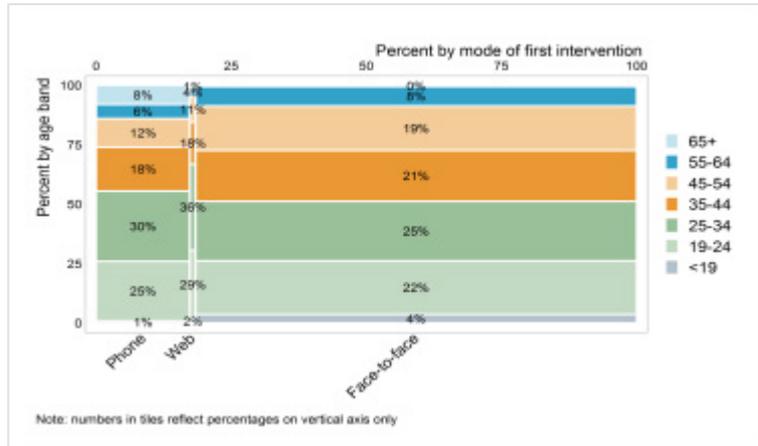
## Gender and region of residence by mode of intervention

Figure 52: National Careers Service customers' gender and region (by mode of intervention)



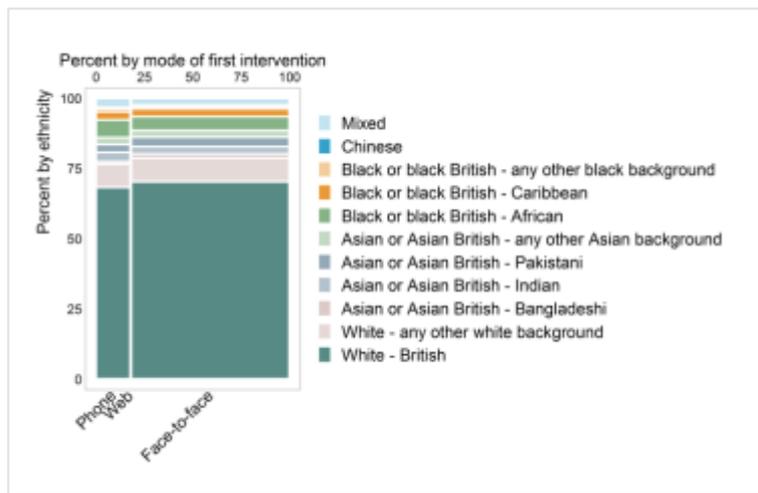
## Age and prior attainment by mode of intervention

Figure 53: National Careers Service customers' age and prior attainment (by mode of intervention)



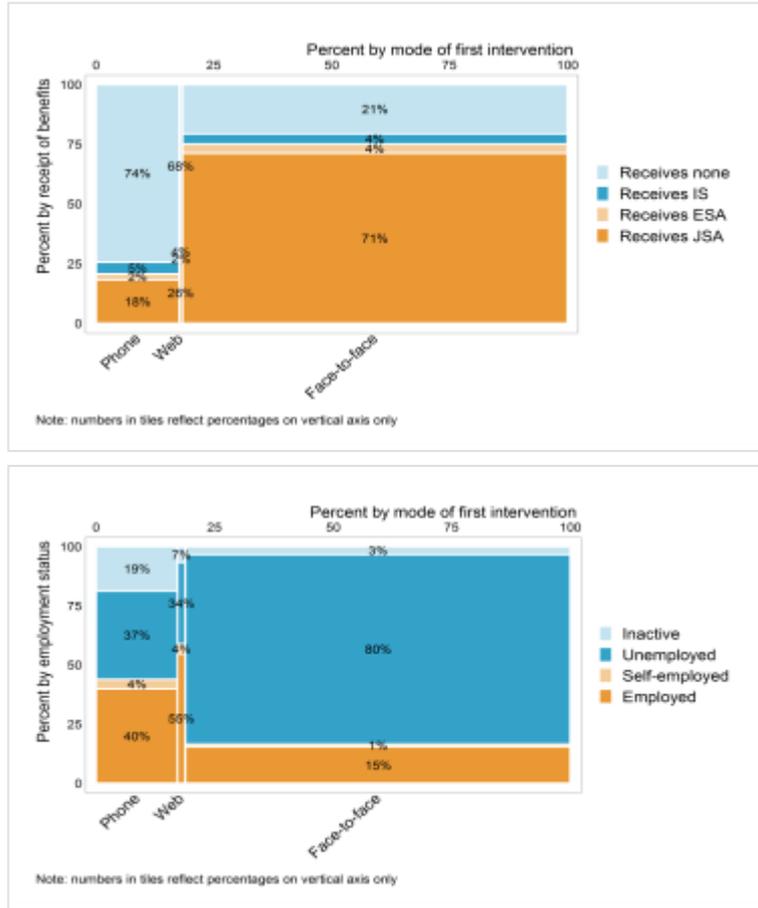
## Ethnic origin by mode of intervention

Figure 54: National Careers Service customers' ethnic origin (by mode of intervention)



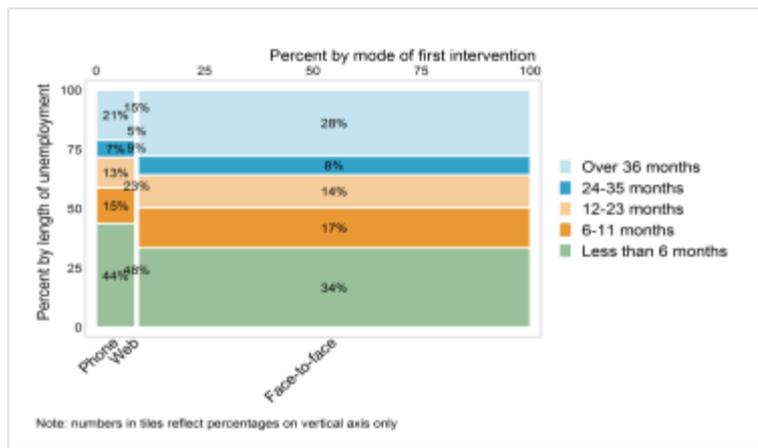
## Benefit receipt and labour market status by mode of intervention

Figure 55: National Careers Service customers' benefit receipt and labour market status (by mode of intervention)



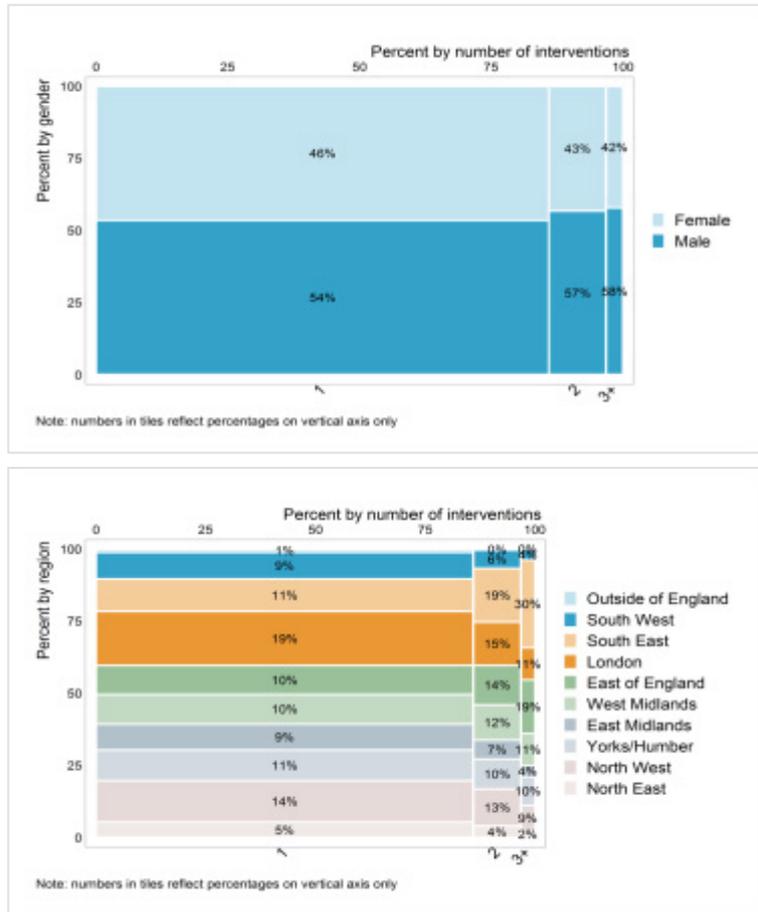
## Unemployment duration by mode of intervention

Figure 56: National Careers Service customers' unemployment duration (by mode of intervention)



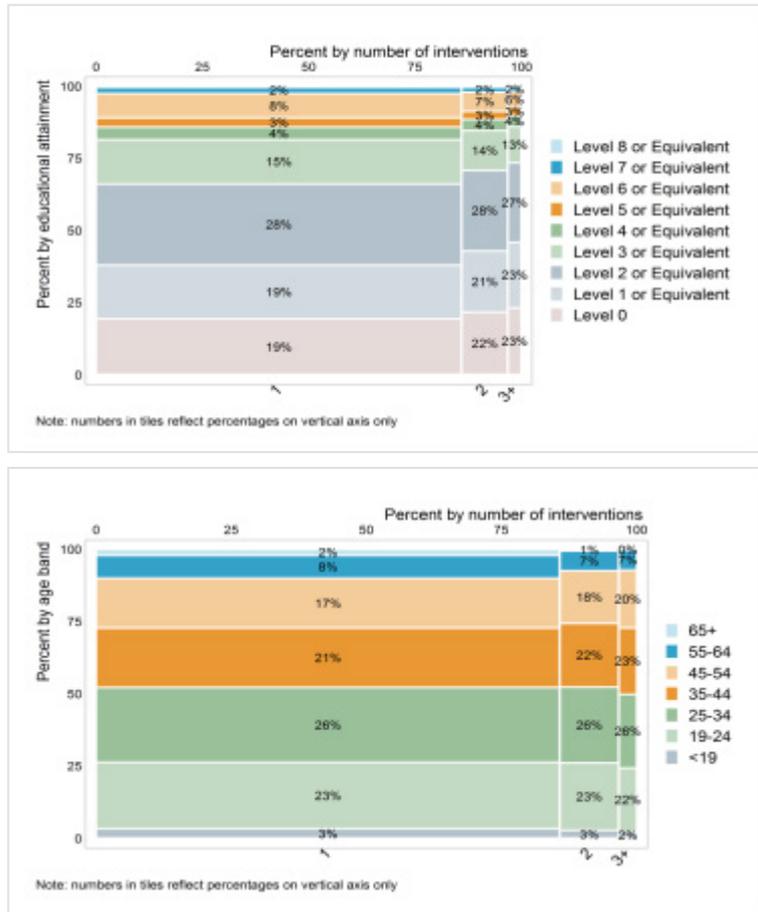
## Number of interventions by gender and region of residence

Figure 57: National Careers Service customers' number of interventions (by gender and region of residence)



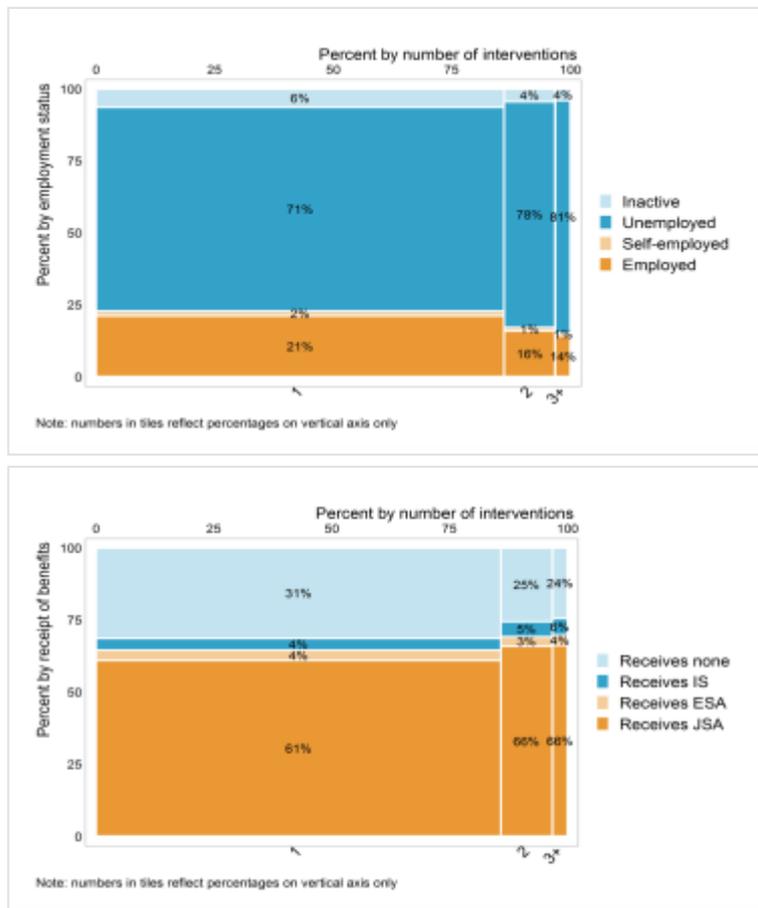
## Number of interventions by age and prior attainment

Figure 58: National Careers Service customers' number of interventions (by prior attainment and age)



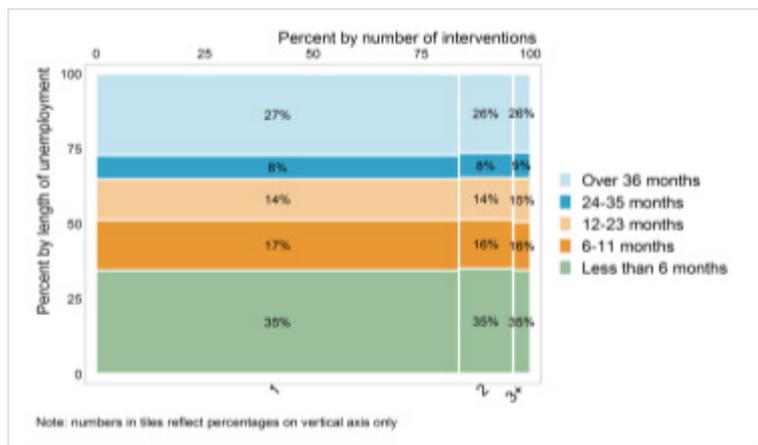
## Number of interventions by employment status and benefit dependency

Figure 59: National Careers Service customers' number of interventions (by employment status and benefit dependency)



## Number of interventions by unemployment duration

Figure 60: National Careers Service customers' number of interventions (by unemployment duration)



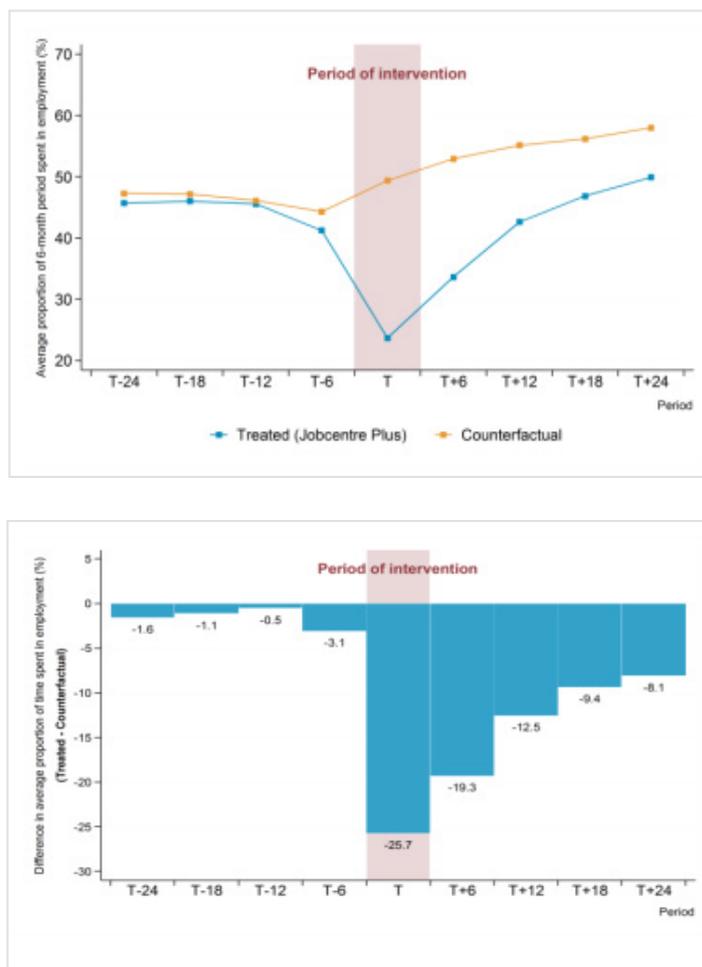
## Annex 2: Part II - Disaggregated Analysis

### Employment outcomes: impact on Jobcentre Plus referred customers

Reflecting the fundamentally different personal and socioeconomic characteristics between those National Careers Service customers referred through JCP and self-referring, the original matching process and subsequent outcomes analyses were replicated for the subgroup of National Careers Service customers referred through Jobcentre Plus. As before, replacing the original treatment group with just those JCP referred customers, the counterfactual group was again generated using a range of personal and socio-economic characteristics, as well as labour market histories immediately prior to intervention.

The analysis demonstrates that at the time of intervention, the employment gap between the treatment and counterfactual stood at **25.7 percentage points**; however, this employment gap starts to be immediately closed post-intervention – standing at **19.3, 12.5, 9.4** and **8.1 percentage points** in each successive 6 month period post-intervention.

Figure 61: Employment histories and outcomes for JCP-referred treated and counterfactual

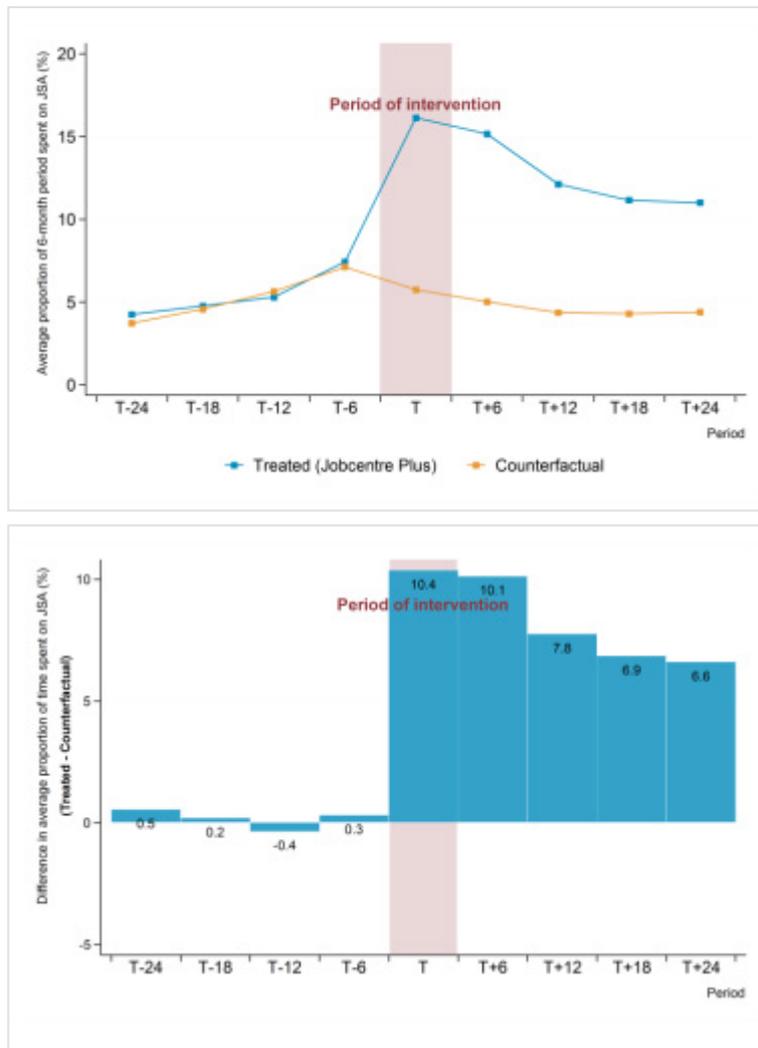


## Benefit dependency outcomes: impact on Jobcentre Plus referred customers

For those individuals referred through Jobcentre Plus, the benefit dependency gap between the treatment and counterfactual at the time of intervention stood at **10.4 percentage points** – and again reflects the more severe deterioration in labour market position compared to National Careers Service customers as a whole.

However, by two years post-intervention, the gap between this treatment group and associated counterfactual has declined by approximately **3.8 percentage points**.

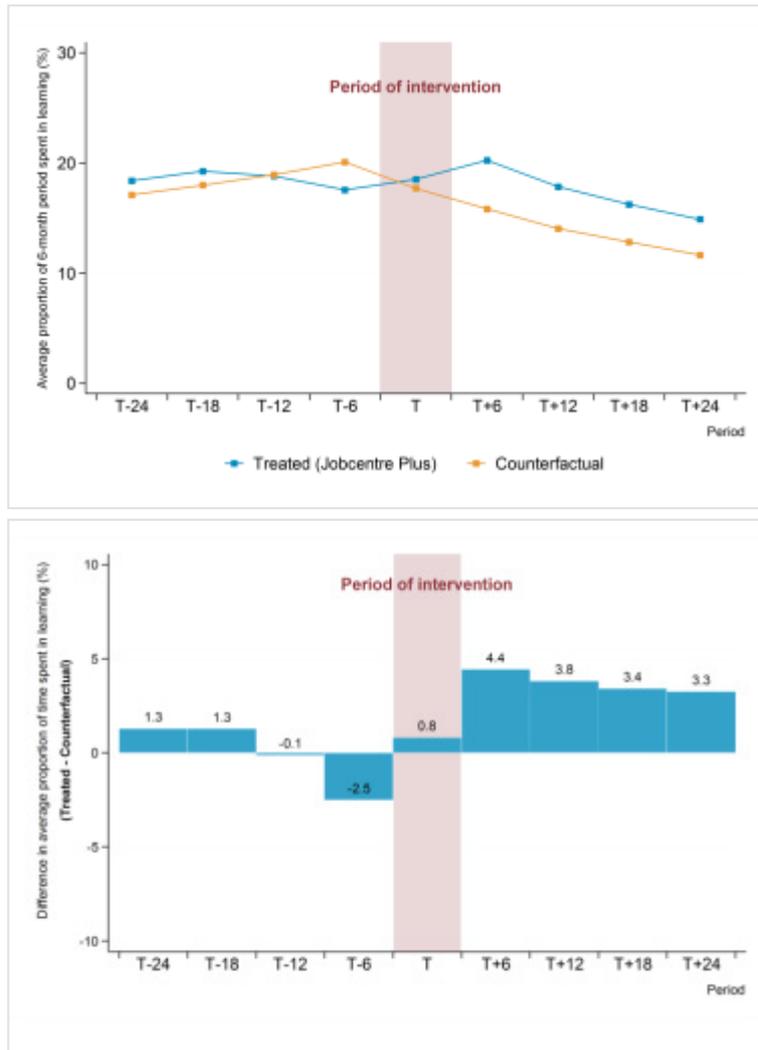
**Figure 62: JSA histories and outcomes for JCP-referred treated and counterfactual**



## Learning outcomes: impact on Jobcentre Plus referred customers

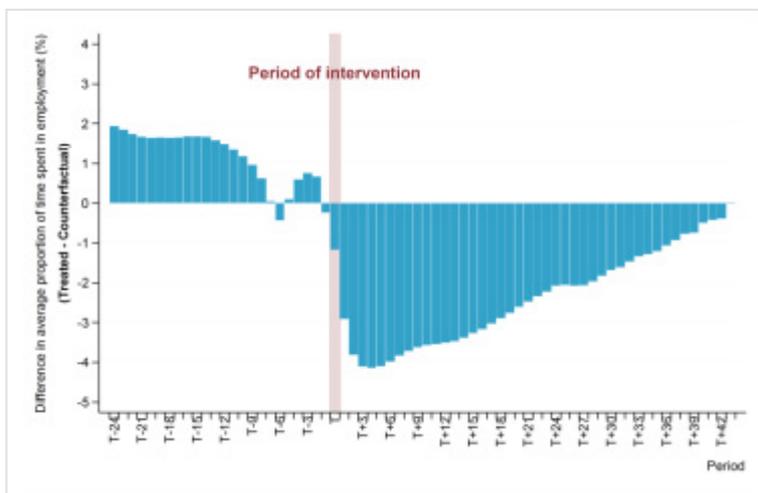
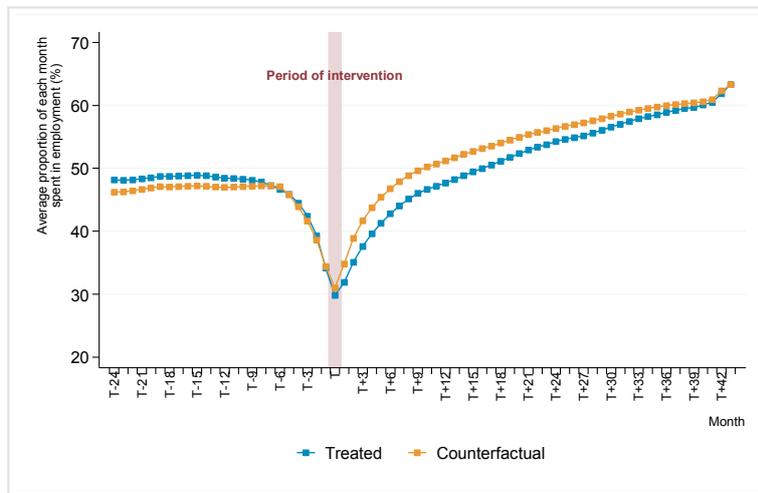
Finally, turning to learning outcomes, in the 6 month period of intervention, the treatment group was estimated to spend approximately an additional **1 percentage point** of the 6 month period in education and training; however, following the receipt of support through National Careers Service, the gap in the incidence of learning, training and qualification acquisition increases to between **3 and 4 percentage points** of the 6-month period in the two years post-intervention, again demonstrating the impact of National Careers Service on customers.

Figure 63: Learning histories and outcomes for JCP-referred treated and counterfactual

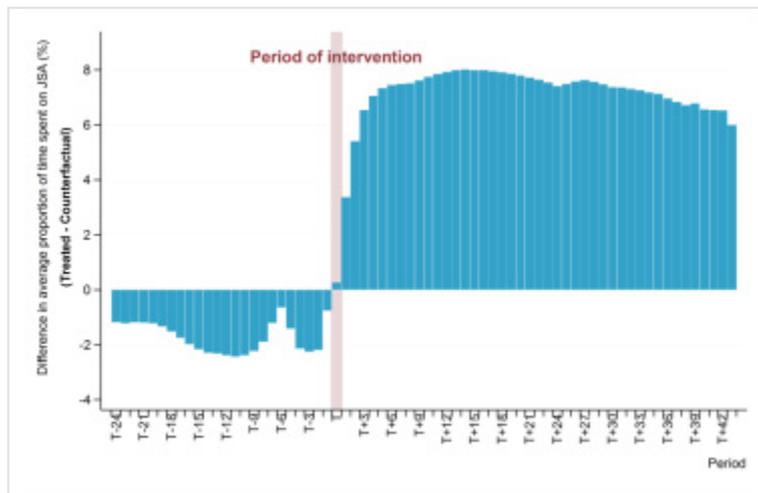
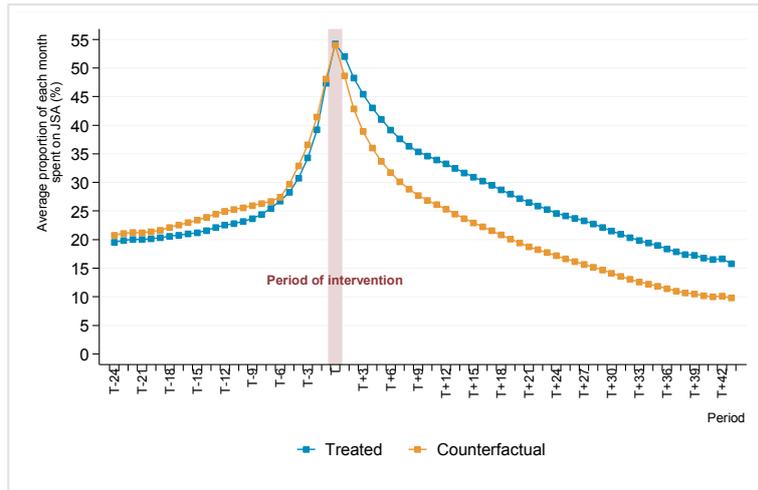


# Annex 3: Part II – Early intervention analysis

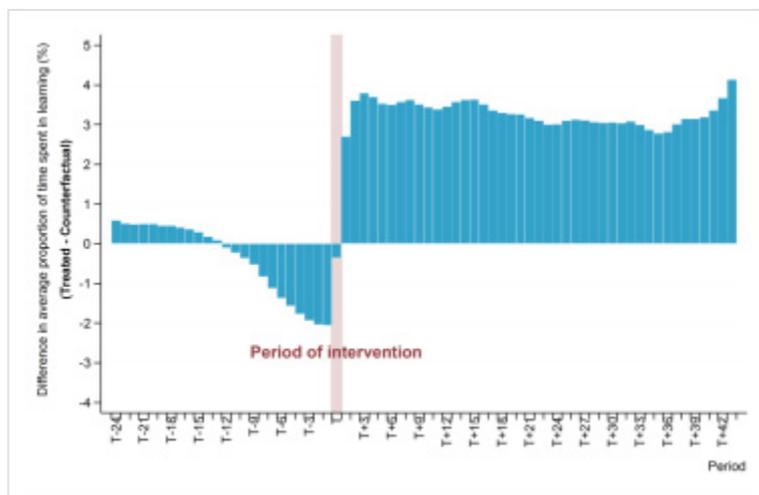
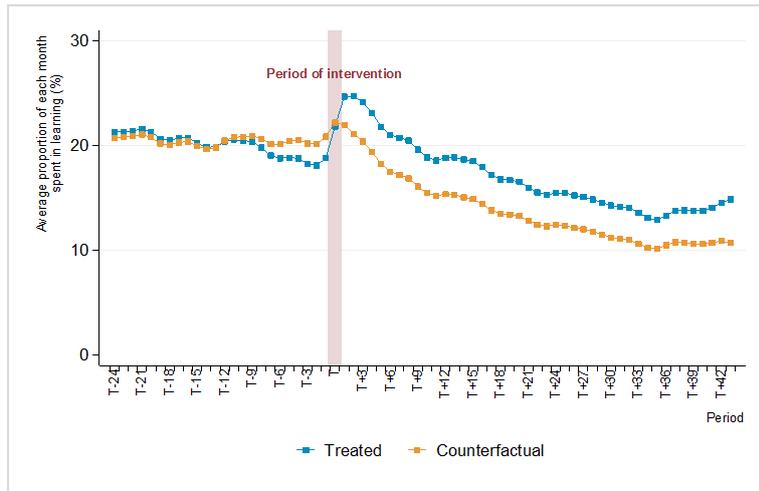
## Employment - impact on early intervention customers



# Benefit dependency outcomes: impact on early intervention customers



# Learning outcomes: impact on early intervention customers



## Annex 3: Part II - Matching on long run histories

In this further case, we constructed a counterfactual group that was again matched to the treatment group; however, instead of matching on labour market histories immediately prior to the intervention, the treatment and counterfactual were matched on more distant labour market histories (two years pre-intervention). In other words, we matched individuals according to demographic characteristics (for instance, educational attainment at time T-6, gender, age, and ethnicity) and their benefit and employment status **two years before the period of intervention**. Because we removed the constraint that the treatment and counterfactual must be similar in terms of *recent employment history* (e.g. at time T-6), this resulted in the generation of a counterfactual group which was very similar in terms of demographics but less similar in terms of employment histories *immediately prior to intervention*. However, this allowed us to examine the eventual outcomes of a counterfactual group that did not, on average, experience a worsening in labour market status in the period immediately prior to the treated group receiving the National Careers Service intervention (T-12 and T-6).

Clearly, this is not a perfectly matched counterfactual group (especially at the time immediately prior in intervention) but it does provide some interesting insights. For example, the average proportion of time spent in employment and on benefits is relatively steady but we see a small improvement in labour market outcomes over time. Even though this group has not on average suffered a deterioration in labour market outcomes in times T-6 and T-12, the proportion of time spent in employment at time T+24 (**60%**) is equal to the proportion of time spent in employment by the original counterfactual group at time T+24 (i.e. the group that *did* suffer a deterioration in outcomes in T-12 and T-6). This suggests that among the original counterfactual group, the deterioration in labour market outcomes was temporary, as they recovered even without accessing National Careers Service. It is unclear whether the deterioration in labour market outcomes was also temporary for National Careers Service customers (in which case they may have recovered even without intervention) or whether there are fundamental (but unobserved) differences between customers and their counterfactual group, which would mean that individuals in more need are drawn to National Careers Service intervention (potentially due to targeting of the service).

Figure 64: Employment and benefit outcomes matching two years prior to intervention

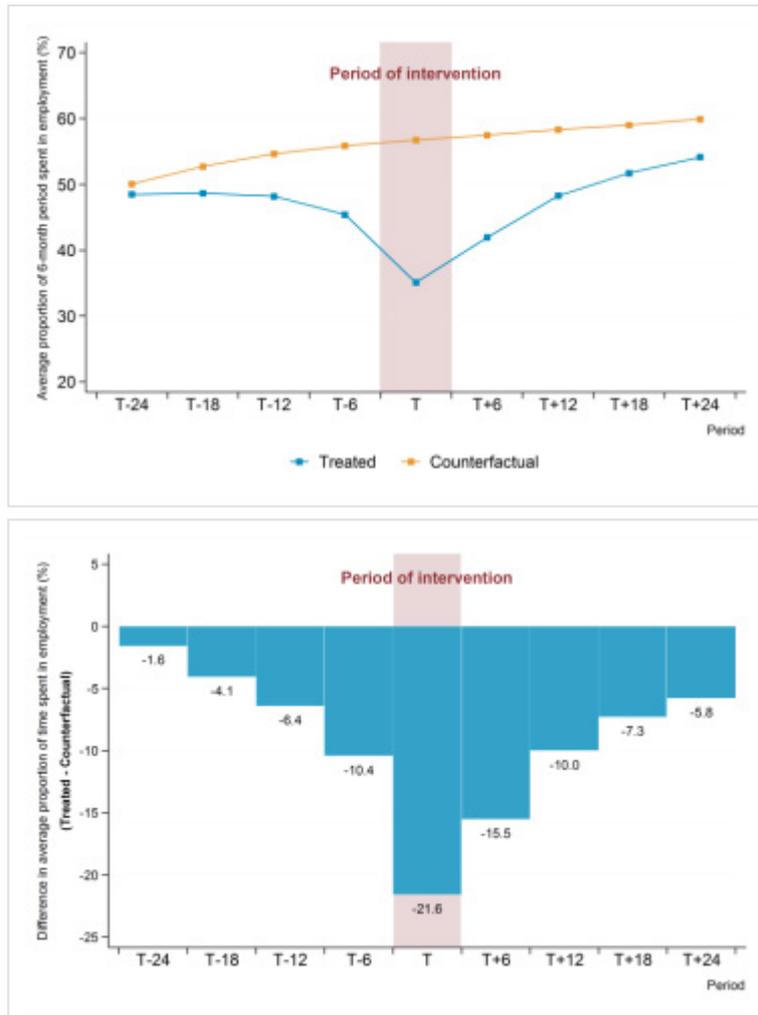


Figure 65: Benefit dependency outcomes - matching two years prior to intervention

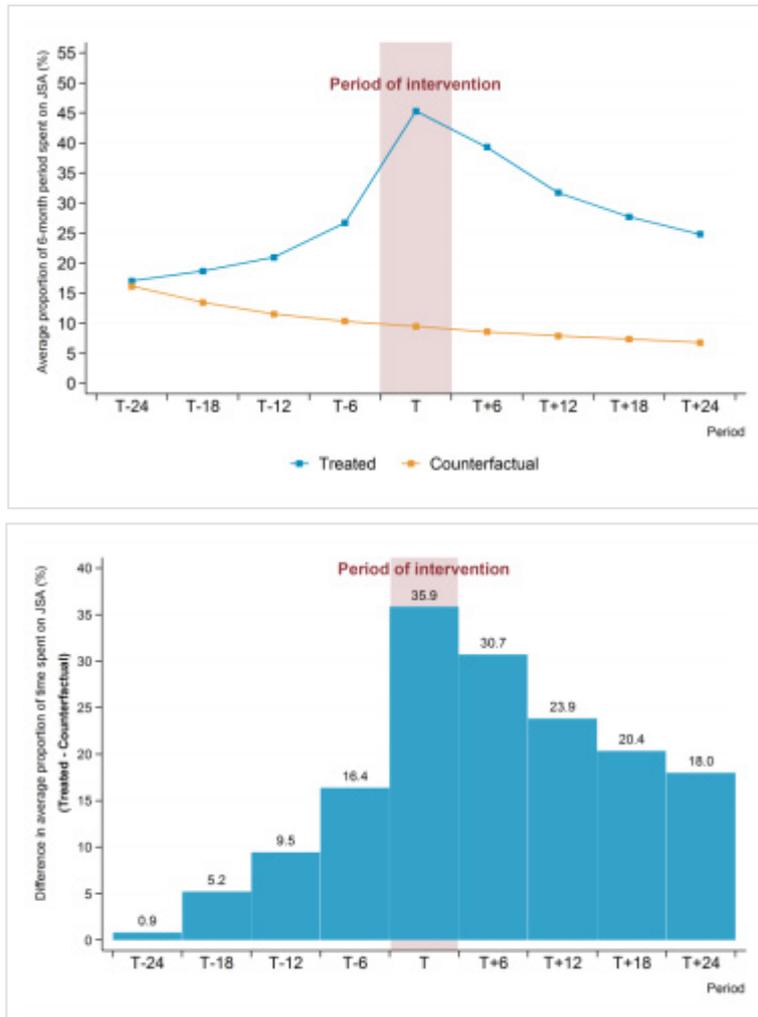
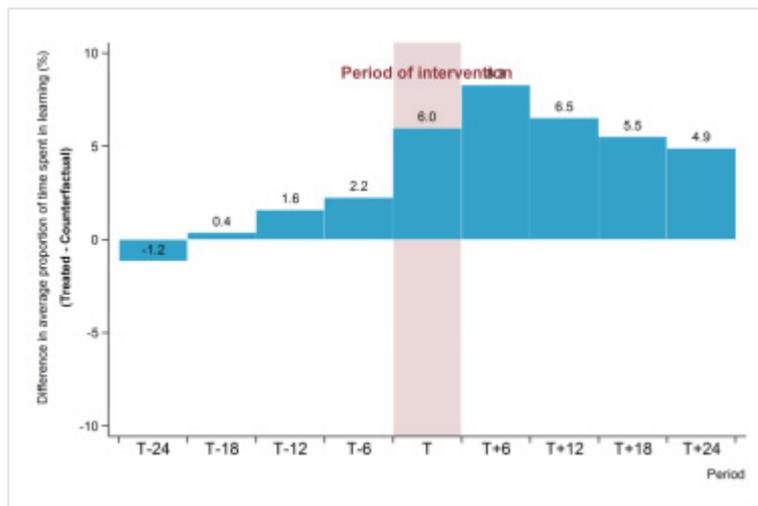
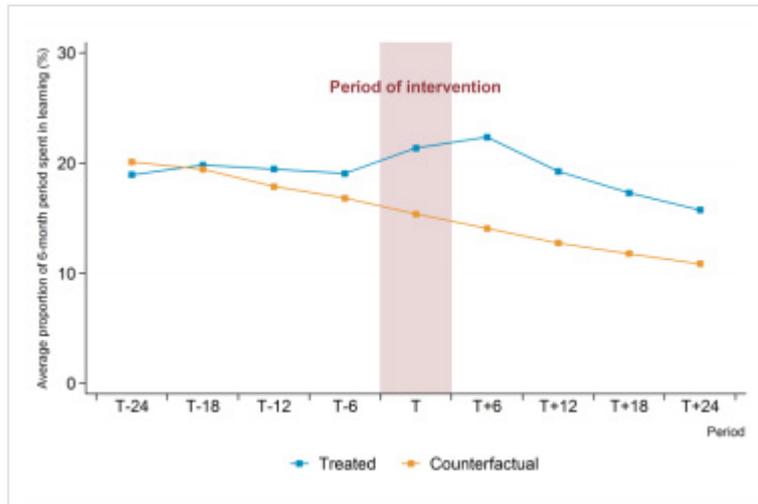


Figure 66: Education and training outcomes - matching two years prior to intervention





Department  
for Education

© Crown copyright 2017

**Reference: DFE- RR672**

**ISBN: 978-1-78105-740-7**

This research was commissioned under the 2010 to 2015 Conservative and Liberal Democrat coalition government. As a result the content may not reflect current Government policy. The views expressed in this report are the authors' and do not necessarily reflect those of the Department for Education.

Any enquiries regarding this publication should be sent to us at:

[www.education.gov.uk/contactus](http://www.education.gov.uk/contactus)

This document is available for download at [www.gov.uk/government/publications](http://www.gov.uk/government/publications)