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**A Disaggregated Analysis of the Long
Run Impact of Vocational
Qualifications**

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RESEARCH

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The views expressed in this report are the authors' and do not necessarily reflect those of the Department for Business, Innovation and Skills.

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Contents

Contents	3
Executive Summary	6
Background	6
Methodological approach and caveats.....	6
Findings.....	7
Aggregate earnings and employment returns	7
Returns by age.....	7
Returns mode of attainment.....	8
Returns by subject of study.....	8
Apprenticeships.....	9
Full versus non full qualifications	9
Skills for Life.....	10
Concluding remarks	11
1 Introduction	12
2 Methodology.....	13
2.1 Datasets under consideration.....	13
2.2 Stage 1 – ILR coding and determinants of qualification attainment	13
Further Education datasets.....	13
Work Based Learning (WBL) datasets.....	16
2.3 Stage 2 – Reshaping data to generate highest qualification per learner.....	17
2.3.1 Moving from learning aim level to learner level	17
2.4 Stage 3 – Matching information from the ILR with data from HMRC	19
Pay and tax records - P14.....	19

Employment spells – P45.....	19
Merging with the ILR	20
2.5 Stage 4 – Econometric Analysis.....	21
Counterfactual.....	21
3 Findings	23
3.1 Comparison with previous analyses.....	23
3.1.1 Earnings outcomes.....	27
3.1.2 Employment outcomes	28
3.2 Age of attainment	29
3.3 Mode of attainment.....	33
3.4 Subject of attainment.....	39
3.5 Subject of study - apprenticeships	48
3.6 Full versus non-full qualifications	52
3.7 Skills for Life	55
Annex 1 Disaggregated results by gender	60
A1.1 Comparison with previous analyses - men.....	60
A1.2 Age of attainment - men	63
A1.3 Mode of attainment - men	66
A1.4 Subject of attainment – all.....	69
A1.5 Subject of attainment - men	78
A1.6 Subject of study – apprenticeships - men	87
A1.7 Full versus non-full qualifications - men	89
A1.8 Skills for Life - men.....	90
A1.9 Comparison with previous analyses - women	92
A1.10 Age of attainment - women	95

A1.11	Mode of attainment - women.....	98
A1.12	Subject of attainment - women.....	101
A1.13	Subject of study – apprenticeships - women.....	110
A1.14	Full versus non-full qualifications - women.....	112
A1.15	Skills for Life - women	113

Executive Summary

Background

London Economics were commissioned by the Department for Business, Innovation and Skills to undertake a disaggregated assessment of the long term effect of vocational education and training on labour market outcomes. To undertake this analysis, we combined information from the Individual Learner Record (ILR) between 2002/03 and 2005/06 on learner attainment; and detailed earnings (between 2003/04 and 2009/10) and employment information (between 1999/2000 and 2009/10) from HM Revenue and Customs. This analysis builds on previous work undertaken for the Department (BIS Research Report 47 (here)). The key differences between the analysis undertaken previously and the current analysis is that in addition to being undertaken at a more disaggregated level, the analysis here focuses on the employment and earnings outcomes of learners aged 19 and above undertaking vocational qualification only, compared to the previous analysis where the learners included anyone at or above the age of 16 undertaking either academic or vocational qualifications, and included a detailed analysis of benefit dependency in addition to earnings and employment outcomes.

Methodological approach and caveats

To understand the relative impact of vocational qualification attainment, we would ideally compare a group of individuals attaining a particular level of qualification with a group of individuals with similar (observable and unobservable) characteristics that did not attain the qualification. However, data availability limits the options available in relation to the construction of the comparison group. Most importantly, we only have (earnings and employment) information on learners. Therefore, it is necessary to construct an alternative comparison group from the pool of learners.

The original analysis undertaken for BIS considered the simple '*before and after*' outcomes associated with qualification attainment, while we also assessed the relative impact of groups of individuals '*simultaneously attaining*' qualifications at adjacent qualification levels. Having discounted these two counterfactuals because of the limited relevance of the '*before and after*' approach and the difficulty in interpreting the results generated through the '*simultaneous attainment*' counterfactual, throughout this report, we compare the outcomes achieved by individuals completing a qualification at a particular level (treatment) relative to individuals who attempted, but failed to complete, a qualification at the same level (counterfactual). Despite the selection of the '*completer versus non completer*' counterfactual throughout the analysis, it is important to note that this approach may not control for some differences in the personal characteristics between the groups of learners. Specifically, there may be a motivation gap between completers and non-completers, as well as some difference in ability, which cannot be suitably controlled for. The reader should be aware of these caveats when considering the results of the analysis.

Findings

Aggregate earnings and employment returns

The average hourly earnings associated with vocational attainment at Level 1 and Level 2 range between 2.5% and 5.0% compared to non-completers with a relatively flat gradient over the period of analysis. In contrast, at Level 3, although there is a relatively limited earnings return in the first two to three years post completion, the earnings premium increases relatively quickly in subsequent years. A similar outcome is illustrated in relation to Level 4 qualifications with completers achieving an immediate 4% earnings premium compared to non-completers, which further increases to almost 12% seven years post completion.

The analysis demonstrates that the enhanced earnings profiles vary according to the specific vocational qualification in question. At Level 3, City & Guilds qualifications are associated with an earnings premium of approximately 6% across the entire period of analysis. NVQs are associated with a relatively small premium in the immediate aftermath of completion (2.8%); however, earnings returns increase substantially over time, reaching approximately 15% seven years post completion. At Level 2, there appears to be a relatively flat profile for both City & Guilds and National Vocational Qualifications with the earnings premium standing at approximately 12% and 6% respectively over the seven years post completion.

The regression results indicate that there are consistently strong employment effects associated with qualification completion. At Level 1, completers are estimated to be employed for approximately 2.4% more in the first financial year following completion, increasing to approximately 3.7% in the seventh year post completion. At Level 2, the positive employment effect increases from 3.0% to 4.5% over the seven years, compared to an increase from 2.2% to 5.1% at Level 3.

As with the analysis relating to earnings premiums, when looking at the impact of specific qualifications on employment outcomes, NVQ Level 3 qualifications offer their holders increasing employment returns over time compared to other Level 3 qualifications (3.5% rising to 8.2% compared to a flat 5% for City & Guilds at Level 3). Both NVQs and City & Guilds qualifications at Level 2 offer gradually increasing returns over time (5.5% rising to 7.2% and 3.3% rising to 6.0% respectively).

Returns by age

The findings indicate that younger workers achieving qualifications at Level 1 outperform individuals achieving this level of qualification later in life, although there does appear to be some erosion of the earnings returns for younger completers. Individuals aged between 19 and 24 achieve a 5-6% earnings premium in the first four years post attainment compared to a premium of between 2% and 4% for older workers. However, the earnings premium for older workers persists over the entire period of analysis, while the earnings premium for younger workers steadily erodes and is only marginally above zero in the seventh year. In contrast, at Level 2 and Level 3, the earnings premium achieved by individuals attaining the qualification between the ages of 19 and 24 is greater than the premium achieved by older workers and increases over time. At level 2, an individual aged between 19 and 24 completing a qualification achieves an earnings premium of approximately 7.4% in the first year post completion (compared to 4.0% for an older worker), which increases to 10.3%

after seven years (compared to 3.5% for an older worker). A similar outcome occurs for completers aged between 19 and 24 at Level 3.

Employment outcomes appear to be relatively independent of age for all levels. The analysis demonstrates the persistence and (relative) improvement in the employment outcomes achieved over time by completers, irrespective of age, with the only difference between the two sub-groups relating to the starting point. At Levels 1, 2 and 3, younger completers are approximately 1 percentage point more likely to be employed (compared to a non-completer) relative to an individual attaining the qualification after the age of 25.

Returns mode of attainment

There are greater returns associated with the completion of vocational qualifications when undertaken through the workplace route as opposed to the classroom route. Individuals completing qualifications at Level 3 through the classroom route do not achieve an earnings premium relative to non-completers until four years post qualification attainment. In contrast, for those individuals attaining the qualification through the workplace route, the earnings returns are immediate and significant – standing at between 7% and 8% relative to non-completers in the first three years post attainment. These returns persist for the entire duration of the analysis and increase to approximately 17% in the sixth and seventh year post attainment. Of additional interest is the fact that apprenticeships at Level 3 appear to offer their holders the largest earnings benefits. In particular, an individual gaining a Level 3 apprenticeship achieves an annual earnings benefit of between 15% and 20% in each of the first six years after the qualification is attained (relative to a non-completer). The results in relation to Level 2 are qualitatively similar to those in relation to Level 3 qualifications.

The employment outcomes associated with qualification attainment by mode of acquisition generally replicate the results relating to earnings. Unsurprisingly, individuals that attain qualifications through the workplace route spend between 4½% and 6½% more of the financial year in employment compared to between 2% and 5½% for individuals attaining qualifications through the classroom based route. Apprenticeship attainment at Level 3 results in completers being employed for approximately 5% more of the financial year compared to non-completers. The results associated with Level 2 qualification attainment are broadly similar.

Returns by subject of study

The descriptive statistics indicate that the greatest proportions of vocational qualification learners are engaged in Health, Public Services and Care related subjects (approx 25%), Engineering and Manufacturing Technologies (11.2%), Business Administration and Law (11.2%), Retail and Commercial Enterprise (10.5%), and Construction, Planning and Built Environment (5.4%).

The most popular subject (Health, Public Services and Care) is associated with the relatively low and stable returns at Level 3 (ranging between 3% and 6½% over the period of analysis), while the returns at Level 2 are stronger (ranging between 8% and 15% over the period). The subjects appearing to offer the strongest returns at Level 3 are Engineering and Manufacturing Technologies and Construction, Planning and the Built Environment with Level 3 completers achieving an 8.3% increase in annual earnings in the

first year post qualification relative to non-completers, which increases steadily to approximately 15% in the fourth year post completion and beyond. At Level 2, qualification completers in Engineering and Manufacturing Technologies also see strong and significant returns, again standing at between 8% and 9% in the first few years post completion, although eroding marginally as the time from initial attainment passes.

Retail and Commercial Enterprise and Business, Administration and Law also offer recipients enhanced earnings, however, of particular interest in relation to these subjects is that there appears to be no erosion of the annual earnings premium achieved, and if anything, the returns appear to increase steadily over time. The only popular subject area that does not provide strong and significant earnings returns to their recipients are those undertaking and completing qualifications in Information and Communications Technology. At Level 3, completers of these qualifications achieve a negative return, while at Level 2; the analysis suggests that there is no statistically significant earnings return.

Apprenticeships

The analysis also illustrates that the annual earnings premium associated with the fields of Engineering and Manufacturing Technologies and Construction, Planning and the Built Environment at Level 3 offer apprentices the greatest returns – between 20% and 30% in the first six years post qualification attainment. Unlike qualification completion in vocational qualifications more generally, apprentices completing qualifications in ICT also see a large earnings premium, although this gradually erodes over the period of analysis. The earnings outcomes associated with other apprenticeship subjects also offer consistently strong returns over time relative to non-completers, with Health, Public Services and Care, Retail and Commercial Enterprise and Business, Administration and Law all offering their holders double digit earnings premiums compared to non-completers at Level 3. Only apprenticeships in Arts, Leisure, Travel and Tourism fail to offer equivalent returns. The outcomes achieved for those in possession of Level 2 apprenticeships are qualitatively equivalent, although are marginally lower than those achieved at Level 3 (by between 5 and 7 percentage points).

In terms of employment outcomes, completers of qualifications in all the most popular subject areas achieve positive and sustained employment outcomes. Individuals in the fields of Engineering and Manufacturing Technologies and Construction, Planning and the Built Environment increase the proportion of the financial year they are in employment for by between 4% and 5% at Level 2 and by between 5% and 6% at Level 3. The employment outcomes associated with Retail and Business Administration are a little lower, but still offer substantial positive benefits to holders, while the returns to ICT subjects are generally insignificant in the immediate post attainment period, but grow to between 4% and 5% by the end of the seven years

Full versus non full qualifications

When comparing the marginal earnings return associated with completion of a full qualification relative to non-completion of a full qualification, there are either negative or zero marginal returns associated with both Level 2 and Level 3 qualification attainment. In contrast, completion of non-full Level 2 qualifications (compared to non-completion of non-full qualifications) offer an annual earnings return of between 2-3% over the 7 years, while at Level 3, the earnings premium stands at approximately 7% in the first few years post completion but partially erodes to approximately 3% by the end of the period.

The aggregate analysis on the marginal employment returns is in complete contrast to the findings related to earnings. Following completion of a full Level 3 (or full Level 2) qualification, individuals see a 3.6% (4.0%) increase in the proportion of the financial year in employment compared to those who did not complete a full Level 3 qualification (full Level 2). The employment effect increases over the seven years of the analysis. However, the opposite outcomes are associated with the completion of non-full qualifications at both Level 2 and Level 3. Both men and women achieving a non-full qualifications see a 3-4% decline in the proportion of the year in employment.

Skills for Life

The results indicate that there is some degree of variation in the earning outcomes achieved by learners depending on the specific *Skills for Life* qualification completed; however, one consistent theme is the increasing returns that occur over time irrespective of the qualification attained.

Individuals completing Key Skills Level 2 Numeracy qualifications achieve a 15% earnings premium within the first 2 years post completion, rising further to approximately 33% by the sixth and seventh year. Although Key Skills Level 2 Communication qualifications demonstrate the same growth in the relative return over the seven year period of analysis, it is from a lower starting point, and it is only in the fourth year post completion that the earnings returns turn positive. Level 2 Certificates in Numeracy and Literacy are also associated with positive earnings returns (between 0 and 12% during the first six years post completion), while individuals undertaking and completing GCSE qualifications in Maths see a strong, significant and increasing return over time (increasing from 4.5% in the first year post completion to almost 19% by the end of the time period). As with Certificates in Literacy at Level 2, individuals completing GCSE qualifications in English achieve insignificant return in the first four years post completion and it is not until the fifth year post qualification attainment that earnings returns turn positive.

For Skills for Life qualifications at Level 1, the results indicate that there are also consistently strong earnings returns associated with completion. Individuals completing Level 1 Certificates in Numeracy and Literacy achieve earnings returns of 0%-6% and 6%-15% (respectively) in the first five years post completion. Individuals completing Key Skills qualifications at Level 1 also achieve strong positive returns relative to non-completers, though these positive earnings outcomes do not materialise until the third year post completion. Holders of Key Skills Level 1 Communication qualifications see a steadily increasing earnings outcome between the third and seventh year post completion (6.3% to 24.5%), while those in possession of a Key Skills Level 1 Numeracy qualification see their earnings premium increase from 11.5% to 18.5% between the third and sixth year post completion.

Skills for Life qualifications generally offer their recipients strong employment returns. At Level 2, the more numerical qualifications (such as GCSE in Maths, Certificate in Numeracy and Key Skills Numeracy) result in their holders being employed for at least 3.7% more of the year immediately following completion. However, there is some variation in the extent to which these qualifications continue to offer their holders employment benefits over time. For those individuals in possession of a GCSE in Maths, the employment outcomes improve further (to almost 13% by the end of the period of analysis), while individuals in possession of Key Skills qualification witness an erosion of employment outcomes (compared to non-completers). Individuals in possession of Level 2

Certificates in Numeracy maintain the initial positive employment benefits for the duration of the analysis.

Concluding remarks

In terms of the specific results presented in the report, the findings indicate that there are strong positive effects of qualification attainment on both the long term earnings and employment outcomes of those completing learning aims relative to non completers. Although there is some variation on the extent of the gains depending on the level of learning aim or the specific qualification, in general the results are unambiguous: education and skills acquisition result in improved labour market outcomes that persist for many years post attainment.

1 Introduction

London Economics were commissioned by the Department for Business Innovation and Skills to undertake an assessment of the long term effect of vocational education and training on labour market outcomes. To undertake this analysis, we combined information from the Individual Learner Record (ILR) between 2002/03 and 2005/06 on learner attainment, and detailed earnings (between 2003/04 and 2009/10) and employment information (between 1999/2000 and 2009/10) from HM Revenue and Customs.

This short report is set out as follows: in section 2, we detail the methodological approach incorporating a description of the data used, the approach to cleaning the data, as well as the econometric approach and presentation of the model specifications. In section 3 of the report, we present the findings. In particular, we provide a brief comparison with the previous analysis undertaken by London Economics, and then provide a disaggregated analysis of the earnings and employment returns associated with vocational qualifications broken down by age of attainment, mode of attainment, and whether the qualification is full or non-full. We also provide a disaggregated analysis by subject of study, both for vocational qualifications more generally, as well as apprenticeship qualifications and Skills for Life qualifications.

In the Annex, we provide the equivalent analysis for men and women separately.

2 Methodology

2.1 Datasets under consideration

In this section we describe the different datasets used in the analysis, the variables contained, the time period covered and the approach used to clean and merge the information into one dataset. The datasets used in the analysis contain information from a number of different sources:

- The Individualised Learner Record (ILR) contains information on learning aims and level, as well as personal characteristics supplied by learning providers and collected through the ILR. The ILR is organised by academic year (1st August – 31st July) and this research report uses information from the academic years 2002/03 to 2005/06 inclusive. The files are divided by academic year and funding stream (Further Education and Work Based Learning, with the latter containing information on apprenticeships).
- HMRC Pay and tax records (P14) contain administrative data collected by HM Revenue & Customs, including information on tax year, tax code, pay and tax records for different employment spells. The information is organised by tax year and employment spell and covers the years from 2003/04 to 2009/10 inclusive.
- HMRC employment spell records (P45) contain administrative data collected by HM Revenue & Customs detailing information on start dates and end dates of employment spells.

We describe in detail the different datasets and how they were cleaned, reshaped and merged into a single dataset containing information on qualification participation and attainment, earnings and employment, and benefits dependency.

2.2 Stage 1 – ILR coding and determinants of qualification attainment

Further Education datasets

Preliminary steps

A series of preliminary cleaning steps were carried out, which involved:

- Retaining those aged between 19 and 59;
- Excluding those individuals with a learning aim that is ‘not live’;
- Excluding those individuals on an employment training pilot;
- Removing those individuals with no information on their funding source;
- Defining a ‘learning window’ associated to each academic year, covering a period from August before the start of the academic year to December after the end of the

academic year (for example the learning window for 2005/06 would cover the period from August 2004 to December 2006).

Variable definitions

The ILR contains, among other things, information on level of participation, course outcome (i.e. attainment or non-attainment) and also course title. The relevant variables identifying treatment and counterfactual groups were defined combining information on learning aim level, course outcome and extracting details on aim type from course title. The relevant groups for the analysis were defined both at an aggregate level, using notional aim levels as defined by the National Qualification Framework and identified through the variable **a_nvqlev**, and at a disaggregated level. Specific aim types at a disaggregate level were identified through the combination of aim level and aim type.

Aggregated level

For the aggregated classification of learning aims, participation in different aims is classified by level, using the variable **a_nvqlev** (including both academic and vocational/professional aims), as follows:

- **Level 4** occurs when **a_nvqlev** =4
- **Level 3** occurs when **a_nvqlev** =3
- **Level 2** occurs when **a_nvqlev** =2
- **Level 1 or Entry level** occurs when **a_nvqlev** =1

The category of aims identified by **a_nvqlev** =9 (“other”) is of miscellaneous nature, including a large variety of aims. Some of the most common aims include: short courses such as Diagnostic Tests in Numeracy, Literacy etc (generally prior to starting a SFL course); tutorial and enrichment studies for full time students (16-18), studying GCE ‘A’ levels; AS levels; GCSEs and short course GCSEs; courses for individuals with learning disabilities (e.g. Essential Skills Awards); introduction to IT etc.; Health and Safety courses; First Aid courses; vocational study not leading to a recognised qualification; and other education/leisure type courses.

The 2004/05 and 2005/06 datasets also included higher education qualifications under this miscellaneous category, which were removed from the dataset as they were not the primary focus of the analysis.

Disaggregated level

At a disaggregated level, we identified participation in the following learning aims using a combination of **a_nvqlev** and the variables **a_atype** (identifying aim type), and **a09_titl** (detailing the course title) as follows:

- 1) **Level 4** (any qualification at level 4).
- 2) **Level 3**

- NVQ/GNVQ at level 3 (identified through variable **a_atype**);
- BTEC at level 3 (identified through variable **a09**);
- City and Guilds at level 3 (identified through variable **a09**);
- Any academic aim at level 3 (identified through variable **a_atype**);
- Other qualifications at level 3

3) Level 2

- NVQ/GNVQ at level 2 (identified through variable **a_atype**);
- BTEC at level 2 (identified through variable **a09**);
- City and Guilds at level 2 (identified through variable **a09**);
- Skills for Life at level 2 (using variable **a_sfipar**);
- Any academic aim at level 2 (identified through variable **a_atype**);
- Other qualifications at level 2

4) Level 1 or Entry level

- Skills for Life at level 1 or entry level (using variable **a_sfipar**);
- Skills for Life at entry level (using variable **a_sfipar** and variable **a09**);
- Other qualifications at level 1 or entry level;

In Table 1 we present the detailed combination of **a_nvqlev**, **a_atype** and **a_sfipar** through which we identified the different qualification aims used in the analysis.

Table 1: Variable definition – learning aim level	
Variable Name	Definition
NVQ3/GNVQ 3	Combination of a_nvqlev=3 & (a_atype=3 or a_atype=4 or a_atype=5 or a_atype=9)
BTEC 3	Identified using the variable a09_titl : we identified those aim titles starting with the code BTEC and combined it with a_nvqlev=3
C&G 3	Identified using the variable a09_titl : we identified those aim titles starting with the code CG and combined it with a_nvqlev=3
Academic level 3	Combination of a_nvqlev=3 & (a_atype =1 a_atype =6)
NVQ/GNVQ 2	Combination of a_nvqlev=2 & (a_atype =3 or a_atype =4 or a_atype =5 or a_atype =9)
BTEC 2	Identified using the variable a09_titl : we identified those aim titles starting with the code BTEC and combined it with a_nvqlev=2
C&G 2	Identified using the variable a09_titl : we identified those aim titles starting with the code CG and combined it with a_nvqlev=2
Academic level 2	Combination of a_nvqlev=2 & (a_atype=2)
Skills for Life Level 2	Combination of a_nvqlev =2 & a_sflpar=1
Skills for Life Level 1	Combination of a_nvqlev =1 & a_sflpar=1
Skills for Life Entry	Identified using the variable a09_titl : we identified those aim titles containing the word “Entry” and combined it with a_nvqlev=1 & a_sflpar=1

Source: *London Economics analysis*

Work Based Learning (WBL) datasets

Apprenticeships are split into Foundation and Advanced apprenticeships (at levels 2 and 3), and similar to Further Education qualifications, are available for the academic years 2002/03 to 2005/06 inclusive.

Qualification completion and attainment

The ILR also includes details on course completion and aim attainment. In particular, the variable **a34** identifies whether the learner has completed or not the learning activities and the reason for non-completion at the end of the academic year (withdrawal, transfer to another course, continuing learning). Variable **a35** provides information on learning outcome, indicating whether the learner has achieved the learning aim, partially achieved, failed to achieve or whether, at the end of the academic year, the learner has still to take the exam (or the exam was taken but the outcome is still unknown).

The combination of **a34=2** and **a35=1** provides information on those who successfully completed the course and achieved the learning aim. This information was combined with the information on qualification level and type to generate information on achievers and non-achievers at different levels and by different qualifications.

The various treatment groups, formed by qualification achievers, correspond to learners having completed the learning activities (**a34=2**) and having (fully) achieved the qualification aim (**a35=1**). Non-completers, which constitute the main counterfactual group for each qualification (or level), are defined as those not completing the course because of withdrawal, or completing but failing to achieve the qualification aim. All other cases

(continuing or transferring learners, partial achievers and learners whose outcome is unknown) were dropped from the dataset before looking at the determinants of attainment and at the impact of qualification attainment.

For each learning aim level and qualification type (as detailed above), we generated a treatment group formed of qualification achievers and a counterfactual group formed of learners enrolling in the same learning aim but failing to achieve.

2.3 Stage 2 – Reshaping data to generate highest qualification per learner

2.3.1 Moving from learning aim level to learner level

The analysis on determinants of qualification attainment was carried out at learning aim level. However, in order to assign each learner to the appropriate treatment or counterfactual group, we needed to move from a dataset organised by learning aim, with multiple entries per each learner, to a dataset organised by learner, with one entry per learner.

Hence, the next step consisted of aggregating information to learner level. Some learners have more than one entry, because they have enrolled in more than one qualification aim. We therefore aggregated information at learner level, keeping detailed information on the highest qualification achieved and summary information on other aims. When no qualification was achieved at any level we kept detailed information on the highest aim enrolled in.

This reshaping process was carried out first by aggregating information within the same academic year, then merging across academic years (from 2002/03 to 2005/06). Table 2 provides information on the hierarchical ranking of qualifications in the first instance (e.g. a NVQ Level 3 qualification is ranked more highly than a City & Guilds Level 3 qualification), as only the qualification aim at highest level achieved (or enrolled in for non achievers) was retained. When a learner achieved more than one qualification of the same type (for instance two NVQ Level 2 qualifications), the NVQ qualification with the highest number of guided learning hours was retained as the highest qualification. In case of two aims of the same type with identical guided learning hours, we kept the more recent qualification as the highest.

Variable	Definition
Level 4	Any qualification at level 4
NVQ/GNVQ Level 3	NVQ or GNVQ at level 3
BTEC Level 3	BTEC at level 3
C&G Level 3	City and Guilds at level 3
Academic level 3	Any academic qualification at level 3
Other Level 3	Any other qualification at level 3
NVQ/GNVQ Level 2	NVQ or GNVQ at level 2
BTEC Level 2	BTEC at level 2
C&G Level 2	City and Guilds at level 2
Academic level 2	Any academic qualification at level 2
SFL Level 2	Skills for Life at level 2
Other Level 2	Any other qualification at level 2
Skills for Life Level 1	Skills for Life at level 1
Skills for Life Entry Level	Skills for Life at entry level
Other Level 1	Any other qualification at level 1
Other qualifications	Any qualification with level undefined

Source: London Economics

The main identifier available to aggregate information across years and across sources was the “*person instance*” identifier from HMRC. We removed cases when the identifier was attributed to individuals with differences in characteristics such as date of birth, gender and ethnicity.

Overall, we generated the following number of observations for subsequent merging:

Year	2002/03	2003/04	2004/05
2005/06			
Aims 7,372,907	8,384,557	7,993,771	7,934,950
Learners 2,355,256 (keep highest aim)	2,740,968	2,725,156	2,721,444
Learners 2002-06 (keep highest aim)			6,868,830

Source: London Economics’ analysis

The cleaning and reshaping process described so far has focused exclusively on data on learning aims and learners’ characteristics from the ILR. At this stage the ILR dataset has one observation per learner in the period 2002-2006 and learners are assigned to the relevant treatment or counterfactual groups, depending on the highest qualification aim achieved or enrolled in (without achievement). Note that this reshaping of the data from learning aim level to learner level does result in a significant reduction in the number of observations (from approximately 8 million per year to less than 3 million). The primary reasons for this is associated with the fact that a number of learners (especially those

learners undertaking Skills for Life qualifications and apprenticeships) are enrolled in multiple qualifications. The extent of multiple learning aim attainment associated with Skills for Life accounts for approximately **16%** of the reduction in sample. Similarly, replication across GCSE qualifications is associated with approximately **11%** of the gap. There is also a significant replication issues associated with undertaking and completing apprenticeships, where the apprenticeship may consist of a National Vocational Qualification, a technical certificate and a Key Skills qualification. The extent to which apprenticeships are responsible for the wide gap between the learning aim sample and the learner level sample is more difficult to ascertain by may be of similar order of magnitude as for Skills for Life qualifications.

In addition to the replication issue, the ILR also collects information on a number of very short courses or learning aims that are outside the National Qualification Framework (or ‘other’ qualifications). This accounts for approximately **32%** of the reduction in the sample when moving from learning aim to learner level data.

In section 2.4, we describe how the relevant variables on earnings and employment were generated, using data from P14 and P45. The relevant data were then merged with ILR information to generate a dataset covering the period from the financial year 1998/99 to 2009/10 and containing information on training, earnings, and the proportion of the year spent in employment.

2.4 Stage 3 – Matching information from the ILR with data from HMRC

Pay and tax records - P14

This dataset contains the *person instance* identifier, along with information on tax year (from 2003/04 to 2009/10), tax code, pay and tax records for the different employment spells, start date and end date when an employment spell started or finished within the tax year, and a ripeness flag to indicate if all **P14** data has been received for the individual for that year. Overall there are around **76 million** records in the dataset. After removing records with zero or negative earnings and removing a few duplicate observations (most were removed before the data transfer), we used information on pay and taxes to generate a variable containing total pay and total tax for each individual in each available year.

This “clean” dataset, where we have at most one observation per individual per year contains slightly more than **10 million** individuals, as identified through the *person instance* identifier

Employment spells – P45

The **P45** dataset contains, apart from the identifiers, information on start date and end date of an employment spell and a flag to identify whether the record is a main or subsidiary source of income.

There are a few issues associated to **P45** records:

- The flag on source of income is missing in many cases and might not be entirely reliable when it is available;

- There is a high occurrence of records with uncertain start (e.g. 06 Apr YYYY) or uncertain end (e.g. 05 Apr YYYY) associated to the start/end of the financial year. The spells with an uncertain start or an uncertain end may overlap with records with certain start and end dates, signalling that the two records may be “near duplicates”. There are also records with the same (certain) start and different ends, as well as the same (certain) end and different start dates;
- Continuing spells of employment are flagged as ending on ‘31Dec9999’. However, in many cases it is difficult to assess if the end date is coded ‘31Dec9999’ because the employment spell is associated to an ongoing job or because the end date is missing;
- To take into account the presence of possible “near duplicates” we adopted the following strategy:
 - For records with an uncertain start (06 Apr) ending on the same date of records with a certain start, we kept the record with a certain start;
 - For records with an uncertain end (05 Apr or 31 Dec9999) starting on the same date of records with a certain end, we kept the record with a certain end;
 - When two records have the same (certain) end but different starts, we kept the record with the earliest start;
 - When two records have the same (certain) start but different ends, we kept the record with the latest end;
 - When two records have different starts and both have missing ends (31 Dec9999), we kept the record with the latest start (it is more plausible that later starts are a genuine record of ongoing employment).

After removing these “near duplicates” we generated a variable keeping track of the days spent in employment by each individual in each financial year. The variable was then further recoded and expressed as the proportion of the year spent in employment (ranging from 0 to 1).

The original dataset contains around **72 million** records. After cleaning the dataset and generating a dataset with one observation per year per individual we are left with almost **11 million** individuals. We kept track of employment history starting from the financial year 1998/99.

Merging with the ILR

Information from the ILR was matched with the history of earnings employment in the P14 and P45. The resulting dataset covers the earnings, employment and benefit history of **6,868,830** individuals between 1998/99 and 2009/10 (all those kept after the reshaping of the ILR).

Some learners were not matched to any of the datasets, while others were matched to one or more of the datasets. Also information may be missing for some learners in some years.

Overall we have approximately 20 million earnings records (earnings records are not available before 2003/04) and 55 million employment records.

2.5 Stage 4 – Econometric Analysis

Counterfactual

To assess the long term impact of further education qualifications and apprenticeships, we compared the outcomes between achievers (i.e. those completing and achieving a qualification aim) and the counterfactual group formed of individuals who enrolled in the same course (or a course at the same level for the aggregated analysis), but failed to achieve (either because of non-completion or because they failed in the final examinations). This counterfactual analysis is described as “**completers versus non-completers**”. Table 3 summarises this information.

As noted later in the document, there is always a degree of methodological ambiguity in relation to the selection of an appropriate counterfactual. Alternatives, such as the comparison of learners simultaneously attaining qualifications at adjacent levels, were considered in the previous analysis undertaken by London Economics, although there were a number of issues relating to whether this previous approach adequately controlled for unobservable learner characteristics, as well an inherent difficulty in interpreting the results. With the comparison of completers and non-completers, there may be an issue, especially in relation to apprenticeships, as to whether the comparison is always appropriate. Specifically, apprenticeships generally consist of a Key Skills component, a technical certificate alongside the core National Vocational Qualification; however a number of apprentices are not required by their employers to complete all elements of the apprenticeship to remain in employment, and this varies significantly according to the sector (or subject of the apprenticeship). This should be noted throughout the subsequent analysis.

Table 3: Counterfactuals		
Type	Composition	Time periods under consideration
Completers versus non-completers	Individuals enrolled in same learning aim but failing to achieve (excluding those continuing or transferred to another course).	t+i, where i=1 to 7

It should be noticed that at time period t+1, there might be some overlap between learning period and earnings and employment records (given the structure of the academic year and financial year).

In the analysis we estimated the following model:

$$Y_{it} = \alpha + \beta'X_{it} + \delta D_t + \varepsilon_{it} \quad t=1, \dots, 7$$

Where the dependent variables is, depending on the specification:

- (log of) real earnings;

- Employment (defined as the proportion of the year spent in employment);

The dummy variable D_i identifies whether the individual is in the treatment or counterfactual group. For the main counterfactual group of non-completers, the variable D_i identifies whether the learner has achieved the qualification aim (D_i equal to one) or has enrolled in the learning aim but failed to achieve (D_i equal to zero). The other explanatory variables (grouped in X) capture course and learner characteristics:

- Socio-demographic characteristics: age, age squared, gender, ethnicity, disability, region of residence, Index of Multiple Deprivation; and
- Course characteristics: type of funding, delivery mode, number of guided learning hours, course subject;

The earnings variable was generated as income from work earned by an individual during a financial year. In the model specification we included additional labour market controls including the proportion of the year spent in employment and benefit reliance (using JSA, Incapacity Benefit and Income Support). These additional variables control for the fact that higher annual earnings are normally associated with a higher proportion of the year spent in employment and are expected to attenuate the earnings effect.

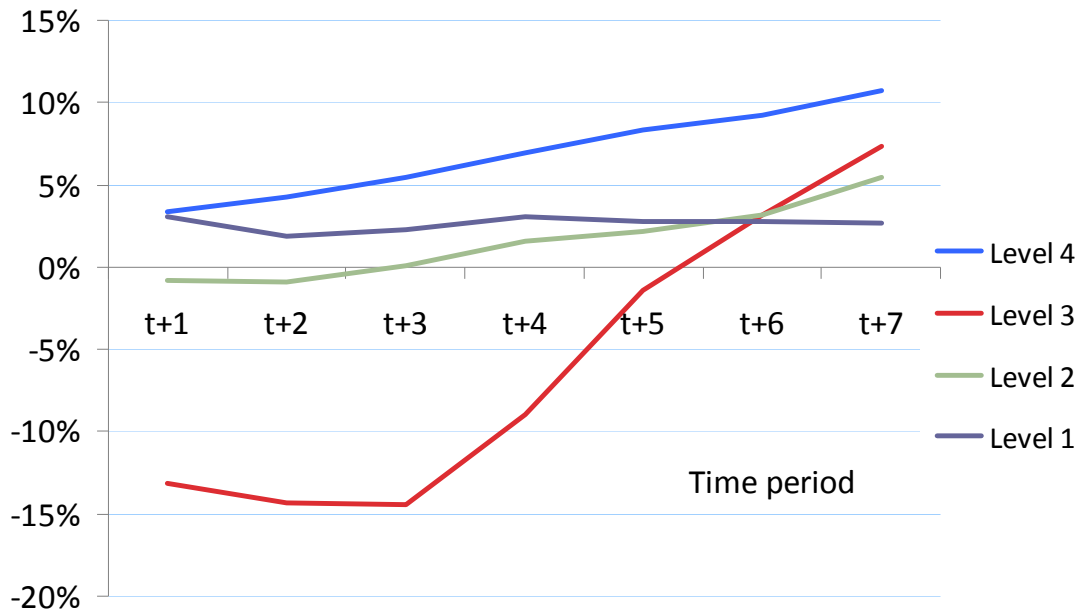
3 Findings

3.1 Comparison with previous analyses

To ensure a comparison with the previous results relating to the long term outcomes associated with qualification attainment (London Economics (2011)¹), we have presented our results alongside those from the previous analysis (see Figure 2).

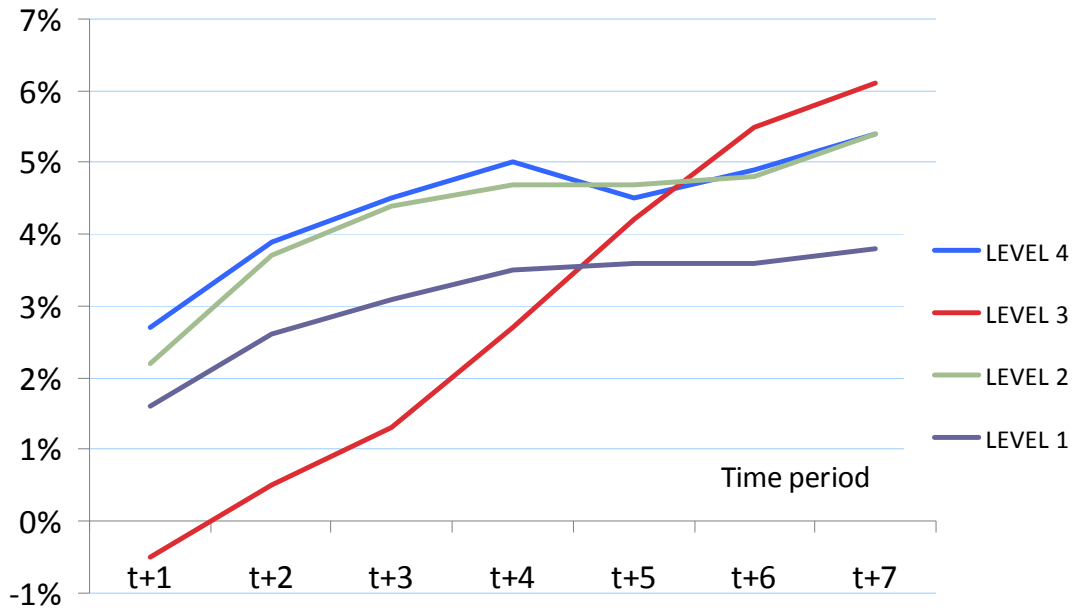
Figure 2: Comparison with previous analysis

Earnings: Learners aged 16+ academic and vocational qualifications

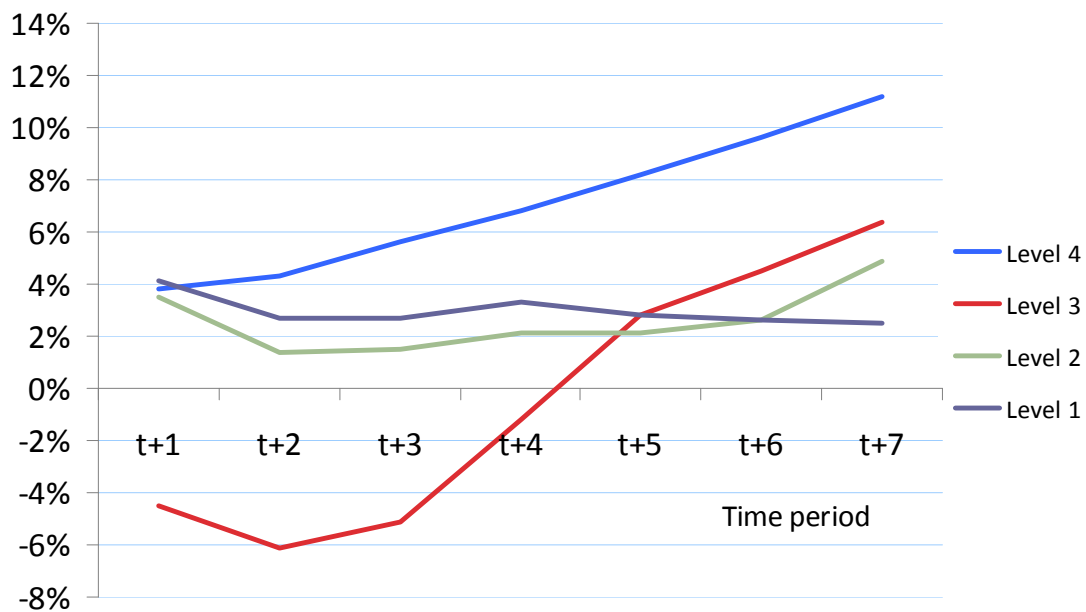


¹ Department for Business, Innovation and Skills Research Report 47, “Estimating the long term impact of vocational qualifications on earnings, employment and benefit dependency outcomes using DWP/ILR/HMRC data”, July 2011 ([here](#))

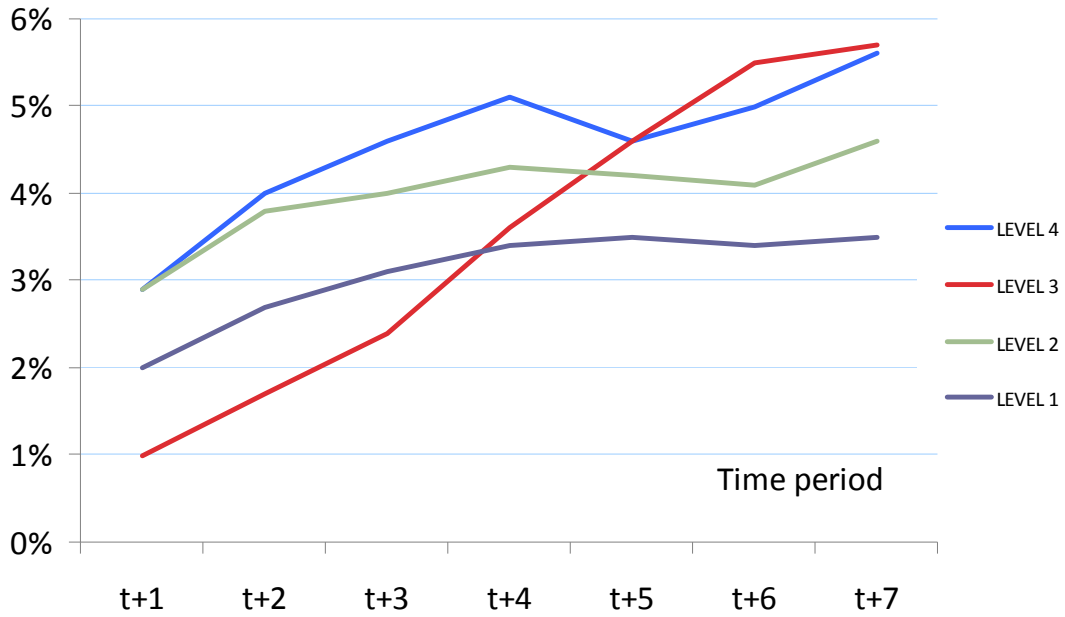
Employment: Learners aged 16+ academic and vocational qualifications



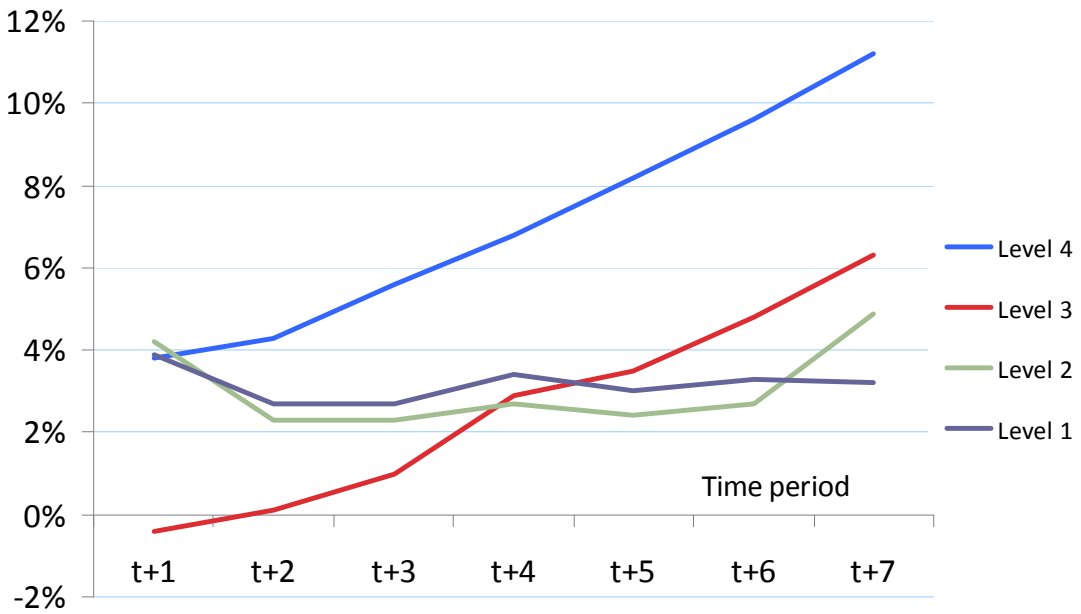
Earnings: Learners aged 19+, academic and vocational qualifications



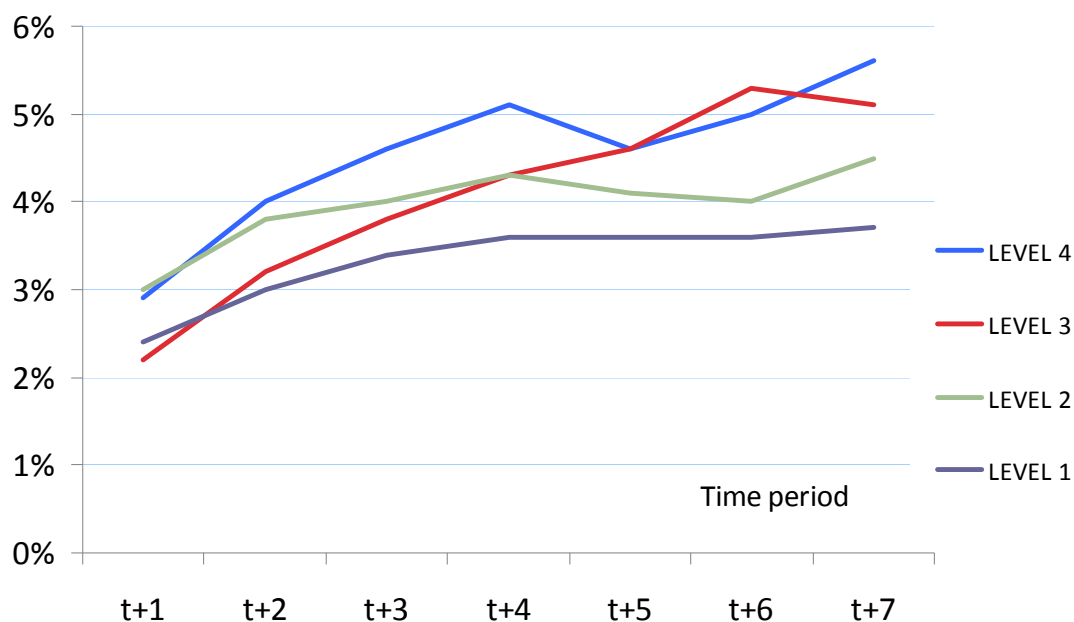
Employment Learners aged 19+, academic and vocational qualifications



Earnings: Learners aged 19+, vocational qualifications only



Employment Learners aged 19+, vocational qualifications only



Source: London Economics

The previous analysis (presented in the top panels) illustrates that when considering the population of learners aged between 16 and 59, the relative effect (between completers and non-completers) of attaining either academic or vocational qualifications had a strong, significant and increasing impact on earnings and employment outcomes over time. The anomaly related to the attainment of qualifications at Level 3, where there was an initial reduction in the earnings premium relative to non-completers (which was eliminated after 5 years), as well as a limited impact on employment outcomes in the first few years post attainment. This was originally explained by the sample of learners - the inclusion of learners aged between 16 and 18 - and the fact that academic qualifications were incorporated into the analysis. In particular, individuals undertaking GCE 'A' Levels were included in the analysis, so it is unsurprising that following the completion of these qualifications and the consequent high probability of going on to complete higher education qualifications, there would appear to be limited or delayed earnings and employment effects.

Therefore, in the middle panels, we present the identical model specifications with a sample of learners aged between 19 and 59 (though retaining both academic and vocational qualifications), which clearly removes some of the delayed impact associated with GCE 'A' Level attainment. Furthermore, in the bottom panel, we restrict the analysis further to those aged 19-59, however, only compare those individuals completing vocational qualifications with those individuals failing to complete vocational qualifications. As expected, this refinement of the analysis entirely eliminates the anomalies presented in the top panel generated as part of the original research. The analysis indicates that there are positive and increasing earnings and employment returns over time associated with the completion of vocational qualifications.

3.1.1 Earnings outcomes

Presented in Table 4 in greater detail, the analysis demonstrates that the average hourly earnings associated with vocational attainment at Level 1 and Level 2 range between 2.5% and 5.0% compared to non-completers and demonstrate a flat gradient over the period of analysis. In contrast, at Level 3, although there is a relatively limited earnings return in the first two to three years post completion, the earnings premium increases quickly in subsequent years. A similar outcome is illustrated in relation to Level 4 qualifications; with completers achieving an immediate 4% earnings premium, increasing to almost 12% seven years post completion.

	t+1	t+2	t+3	t+4	t+5	t+6	t+7
Level 4 vocational qualifications	0.039***	0.044***	0.058***	0.070***	0.085***	0.101***	0.119***
Level 3 vocational qualifications	-0.004	0.001	0.010**	0.029	0.036***	0.049***	0.065***
Level 2 vocational qualifications	0.043***	0.023***	0.023***	0.027***	0.024***	0.027***	0.050***
Level 1 vocational qualifications	0.040***	0.027***	0.027***	0.035***	0.030***	0.034***	0.033***

Source: London Economics. Note: * $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The coefficients presented in this table do not represent the original coefficients from the regression analysis, but an exponential transformation of the original coefficients (undertaken because the original regression model considers the impact of qualifications on the logarithm of hourly earnings). This allows for a more routine interpretation of the coefficients presented. For instance, the shaded blue cell indicates that a learner achieving a Level 4 vocational qualification achieved a 3.9% hourly earnings premium compared to a learner that failed to complete a Level 4 vocational qualification.**

Turning to Table 5, we also present the impact of vocational qualification at Level 2 and Level 3 further broken down according to the specific qualifications (National Vocational Qualifications, City & Guilds, BTECs and 'other'). The analysis suggests that the enhanced earnings profiles do vary according to the qualification in question. For instance, at Level 3, City & Guilds qualifications are associated with a relatively flat 6% earnings premium across the entire period of analysis, while National Vocational Qualifications are associated with a relatively small premium in the immediate aftermath of completion (2.8%); however, this earnings premium increases substantially over time, reaching approximately 15% seven years post completion. In contrast, at Level 2, there appears to be a relatively flat gradient for both City & Guilds and National Vocational Qualifications with the earnings premium standing at approximately 12% and 6% respectively over the seven years post completion.

Table 5: Impact of vocational qualifications on earnings outcomes (disaggregated)							
	t+1	t+2	t+3	t+4	t+5	t+6	t+7
NVQ Level 3	0.028***	0.043***	0.053***	0.074***	0.080***	0.122***	0.150***
BTEC Level 3	0.009	-0.015	0.009	0.091***	0.139***	0.124***	0.150**
C&G Level 3	0.060*	0.054**	0.061**	0.044*	0.038	0.054**	0.059*
Other Level 3	-0.008	-0.007	-0.002	0.013*	0.011	0.013	0.027*
NVQ Level 2	0.116***	0.094***	0.093***	0.093***	0.095***	0.075***	0.120***
BTEC Level 2	0.022	0.088**	0.050	0.158***	0.034	0.223**	0.053
C&G Level 2	0.077***	0.042**	0.026*	0.055***	0.068***	0.068***	0.052**
Other Level 2	0.028***	0.007	0.007*	0.012***	0.007	0.016**	0.035***

Source: London Economics.

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The coefficients presented in this table do not represent the original coefficients from the regression analysis, but an exponential transformation of the original coefficients (undertaken because the original regression model considers the impact of qualifications on the logarithm of hourly earnings).

3.1.2 Employment outcomes

Turning to employment, we present the comparable results relating to employment at an aggregated and disaggregated level in Table 6 and Table 7. The analysis indicates that there are consistently strong employment effects associated with qualification completion. At Level 1, completers are approximately 2.4% more likely to be in employment in the year post completion (i.e. an individual is expected to be employed for approximately 2.4% more in the first financial year following completion), increasing to approximately 3.7% in the seventh year post completion. At Level 2, the positive employment effect increases from 3.0% to 4.5% over the seven years, compared to an increase from 2.2% to 5.1% at Level 3.

Table 6: Impact of vocational qualifications on employment outcomes							
	t+1	t+2	t+3	t+4	t+5	t+6	t+7
Level 4 vocational qualifications	0.029***	0.040***	0.046***	0.051***	0.046***	0.050***	0.056***
Level 3 vocational qualifications	0.022***	0.032***	0.038***	0.043***	0.046***	0.053***	0.051***
Level 2 vocational qualifications	0.030***	0.038***	0.040***	0.043***	0.041***	0.040***	0.045***
Level 1 vocational qualifications	0.024***	0.030***	0.034***	0.036***	0.036***	0.036***	0.037***

Source: London Economics

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

As with the analysis relating to earnings premiums, when looking at the impact of specific qualifications on employment outcomes, National Vocational Qualifications at Level 3 offer their holders increasing employment returns over time compared to other Level 3 qualifications (3.5% rising to 8.2% compared to a flat 5% for City & Guilds at Level 3). Both NVQs and City & Guilds qualifications at Level 2 offer gradually increasing returns over time (5.5% rising to 7.2% and 3.3% rising to 6.0% respectively).

Table 7: Impact of vocational qualifications on employment outcomes (disaggregated)							
	t+1	t+2	t+3	t+4	t+5	t+6	t+7
NVQ Level 3	0.035***	0.044***	0.053***	0.057***	0.057***	0.071***	0.082***
BTEC Level 3	0.056***	0.067***	0.079***	0.082***	0.087***	0.095***	0.090***
C&G Level 3	0.048***	0.059***	0.057***	0.062***	0.060***	0.064***	0.053***
Other Level 3	0.012***	0.023***	0.027***	0.031***	0.035***	0.039***	0.036***
NVQ Level 2	0.055***	0.061***	0.066***	0.067***	0.065***	0.062***	0.072***
BTEC Level 2	0.062***	0.069***	0.069***	0.070***	0.121***	0.103***	0.052
C&G Level 2	0.033***	0.042***	0.039***	0.044***	0.045***	0.043***	0.060***
Other Level 2	0.025***	0.033***	0.035***	0.038***	0.036***	0.038***	0.040***

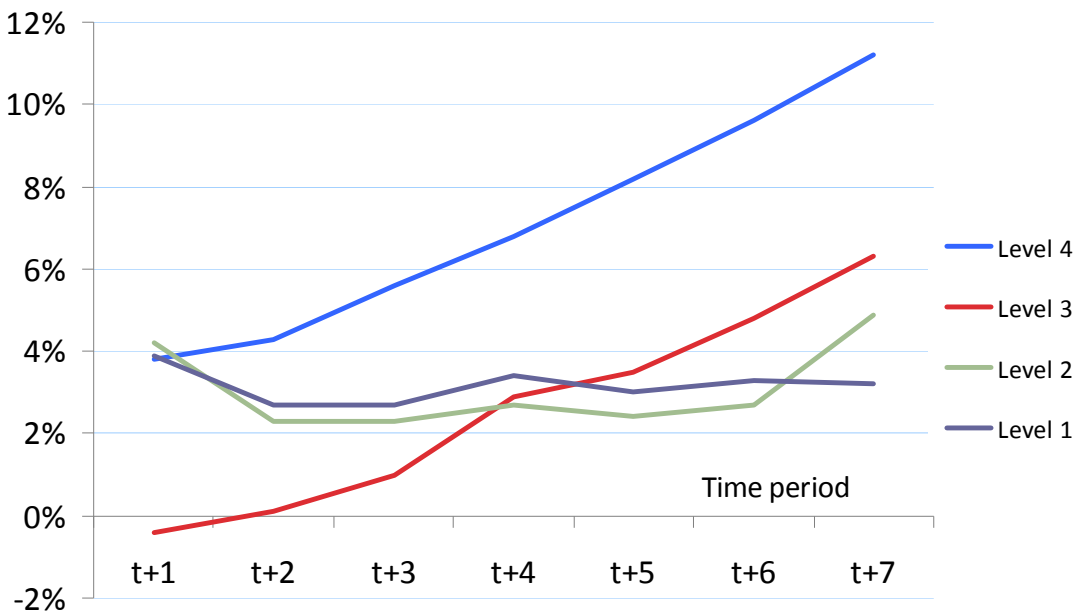
Source: London Economics
 Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

3.2 Age of attainment

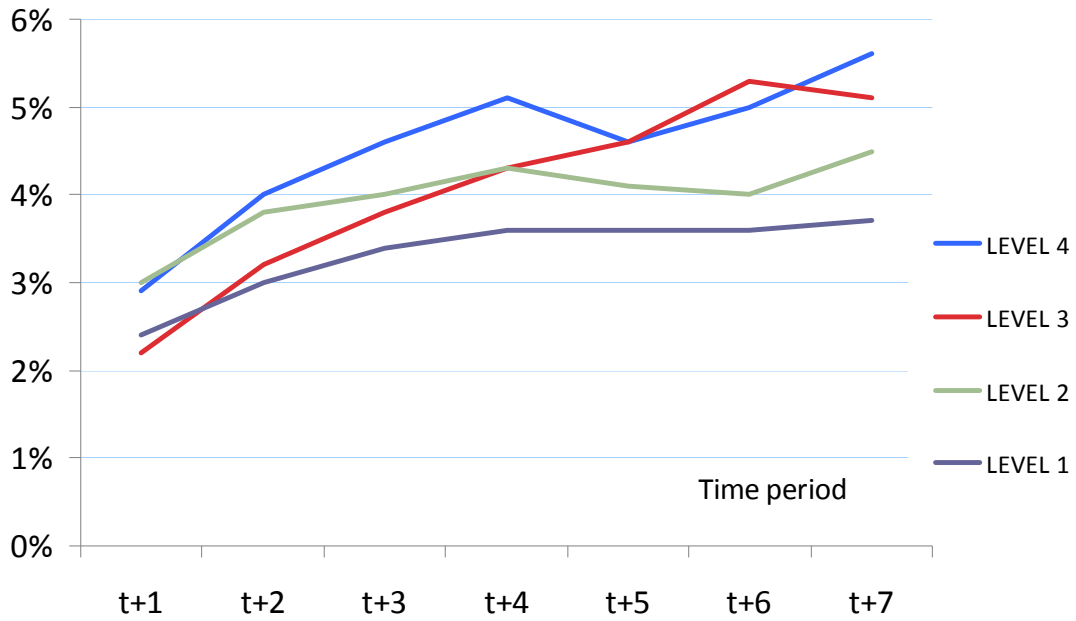
In Figure 3, we provide additional information on the returns to vocational qualifications disaggregated by age. The top panel repeats the results presented in Figure 2 covering all learners aged between 19 and 59 undertaking vocational qualifications, while the middle panel illustrates the earnings and employment returns for those aged between 19 and 24, with the bottom panel illustrating the equivalent outcomes for older learners aged 25 and above.

Figure 2: Earnings and employment returns by age of attainment

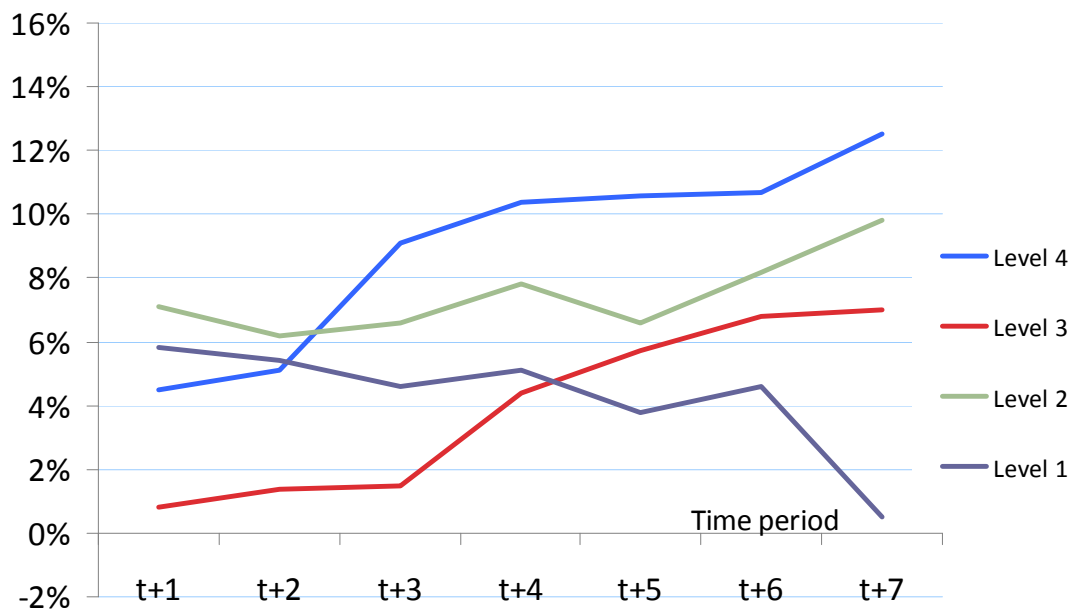
Earnings: Learners aged 19-59 vocational qualifications only



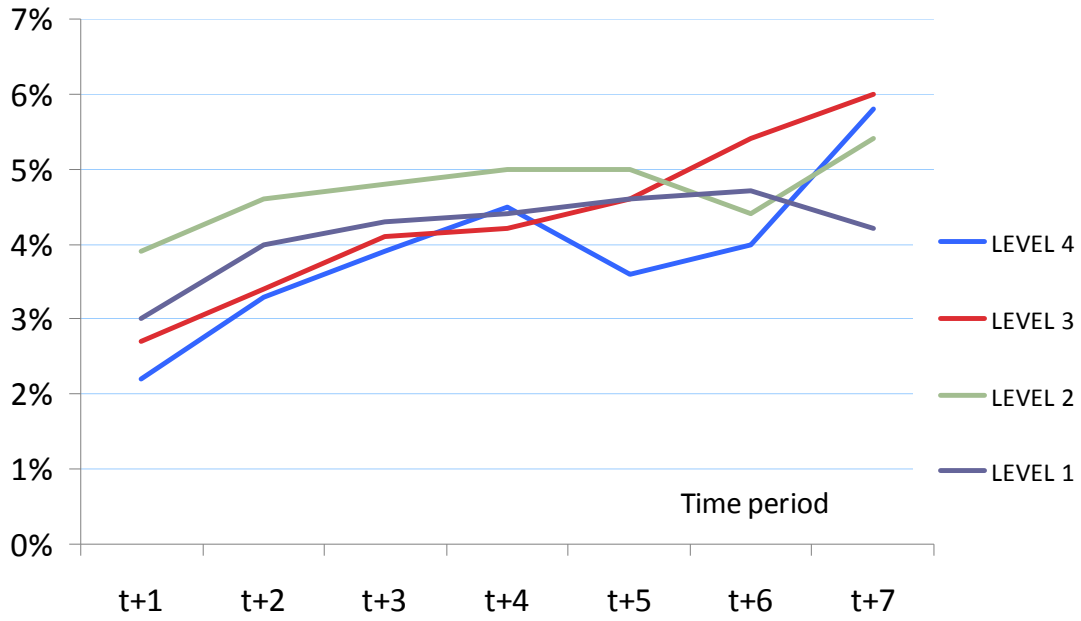
Employment: Learners aged 19-59 vocational qualifications only



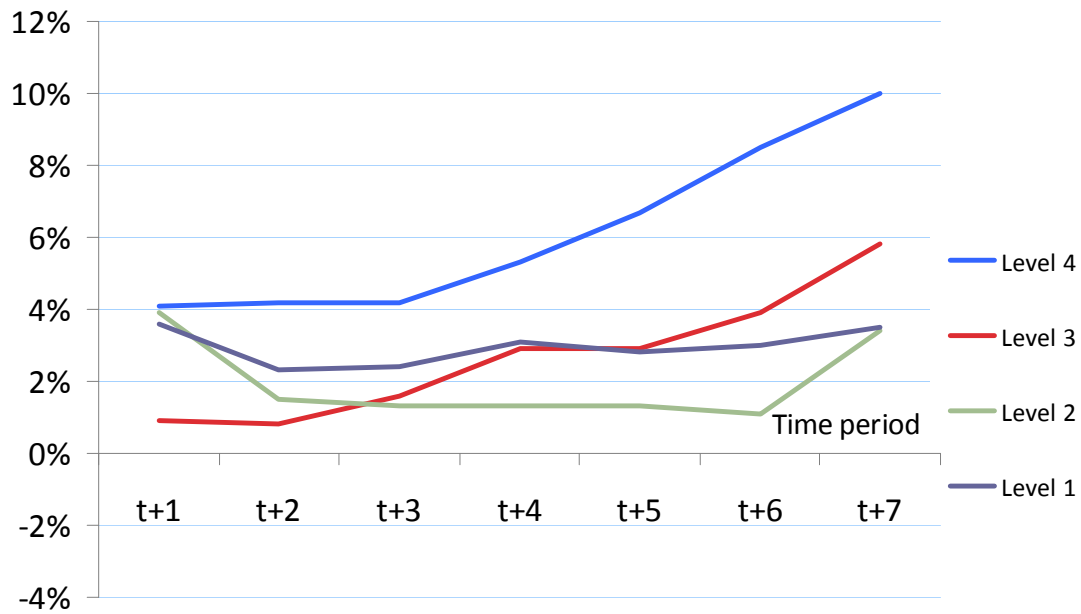
Earnings: Learners aged 19-24, vocational qualifications only



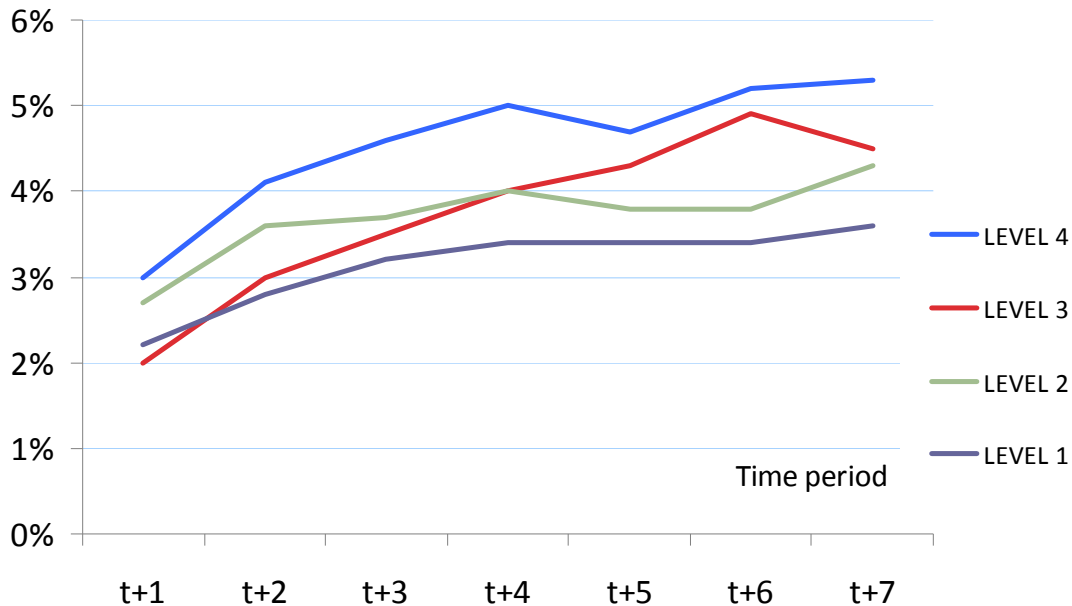
Employment: Learners aged 19-24, vocational qualifications only



Earnings: Learners aged 25+, vocational qualifications only



Employment: Learners aged 25+, vocational qualifications only



Source: London Economics

In terms of earnings, the findings demonstrate that younger workers achieving qualifications at Level 1 and Level 2 outperform individuals achieving these levels of qualifications later in life, although there does appear to be some erosion of the earnings returns for younger completers at Level 1. Specifically, individuals aged between 19 and 24 achieve a 5-6% earnings premium in the first four years post attainment compared to a premium of between 2% and 4% for older workers. However, the earnings premium for older workers persists over the entire period of analysis, while the earnings premium for younger workers steadily erodes and is only marginally above zero in the seventh year. In contrast, at Level 2 and Level 3, the earnings premium achieved by individuals attaining the qualification between the ages of 19 and 24 is greater than the premium achieved by older workers and increases over time. Specifically, at level 2, an individual aged between 19 and 24 completing a qualification achieves an earnings premium of approximately 7.4% in the first year post completion (compared to 4.0% for an older worker), which increases to 10.3% after seven years (compared to 3.5% for an older worker). A similar outcome occurs for completers aged between 19 and 24 at Level 3.

Level	Age	t+1	t+2	t+3	t+4	t+5	t+6	t+7
Level 4	19-24	0.046***	0.052***	0.095***	0.110***	0.112***	0.113***	0.133***
	25+	0.042***	0.043***	0.043***	0.054***	0.069***	0.089***	0.105***
Level 3	19-24	0.008	0.014	0.015	0.045***	0.059***	0.070***	0.073***
	25+	0.009	0.008	0.016***	0.029***	0.029***	0.040***	0.060***
Level 2	19-24	0.074***	0.064***	0.068***	0.081***	0.068***	0.085***	0.103***
	25+	0.040***	0.015***	0.013***	0.013***	0.013**	0.011*	0.035***
Level 1	19-24	0.060***	0.055***	0.047***	0.052***	0.039***	0.047***	0.005***
	25+	0.037***	0.023***	0.024***	0.031***	0.028***	0.030***	0.036***

Source: London Economics.

Note: * $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The coefficients presented in this table do not represent the original coefficients from the regression analysis, but an exponential transformation of the original coefficients (undertaken because the original regression model considers the impact of qualifications on the logarithm of hourly earnings).**

In terms of employment, outcomes over time appear to be relatively independent of age for all levels. The analysis demonstrates the persistence and (relative) improvement in the employment outcomes achieved over time by completers (irrespective of age), with the only difference between the two sub-groups relating to the starting point. At Levels 1, 2 and 3, younger completers are approximately 1 percentage point more likely to be employed (compared to a non-completer) relative to an individual attaining the qualification after the age of 25.

Level	Age	t+1	t+2	t+3	t+4	t+5	t+6	t+7
Level 4	19-24	0.022***	0.033***	0.039***	0.045***	0.036***	0.040***	0.058***
	25+	0.030***	0.041***	0.046***	0.050***	0.047***	0.052***	0.053***
Level 3	19-24	0.027***	0.034***	0.041***	0.042***	0.046***	0.054***	0.060***
	25+	0.020***	0.030***	0.035***	0.040***	0.043***	0.049***	0.045***
Level 2	19-24	0.039***	0.046***	0.048***	0.050***	0.050***	0.044***	0.054***
	25+	0.027***	0.036***	0.037***	0.040***	0.038***	0.038***	0.043***
Level 1	19-24	0.030***	0.040***	0.043***	0.044***	0.046***	0.047***	0.042***
	25+	0.022***	0.028***	0.032***	0.034***	0.034***	0.034***	0.036***

Source: London Economics.

Note: * $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.**

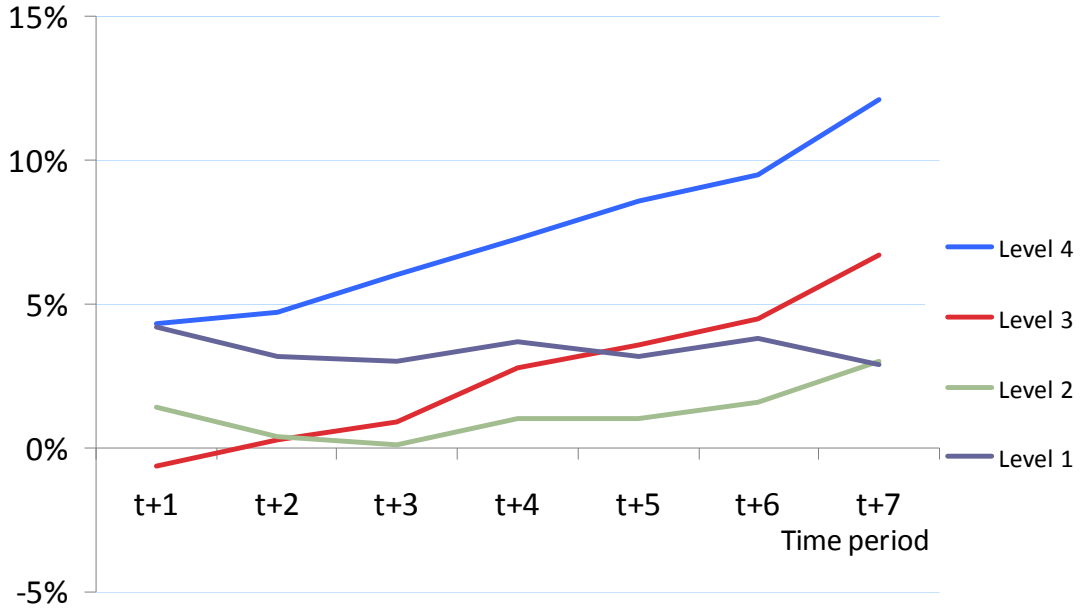
The gap in the employment outcomes between individuals completing the qualification between the ages of 19 and 24 and at 25 or above remains between a ½ and 1½ percentage points over the seven years of analysis.

3.3 Mode of attainment

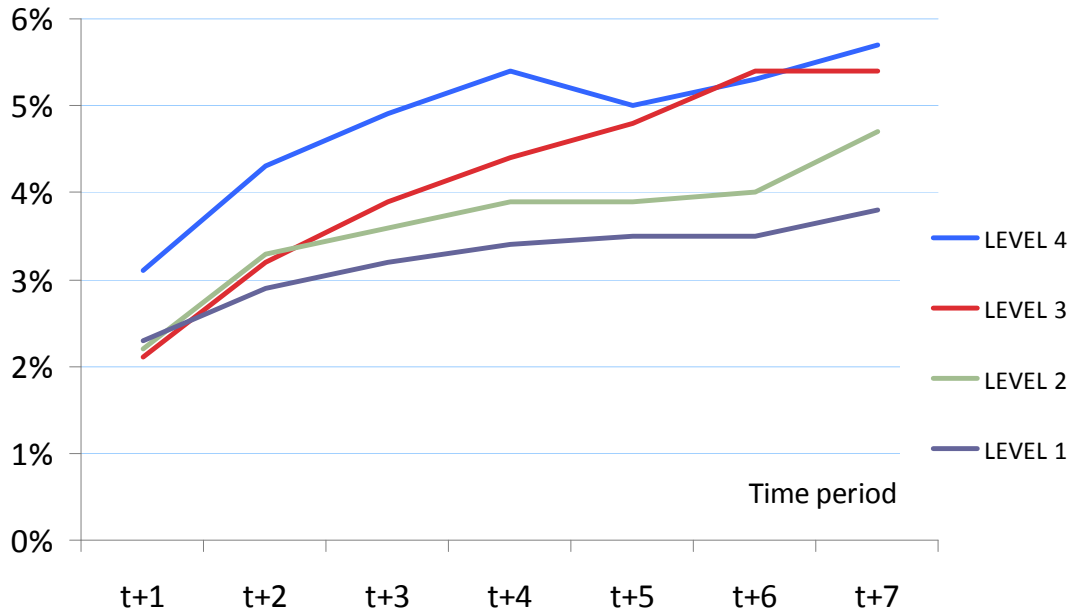
Figure 4 provides the disaggregated earnings and employment results by mode of attainment (i.e. predominantly classroom based or workplace based), alongside the results relating to apprenticeships.

Figure 3: Earnings and employment returns by mode of attainment

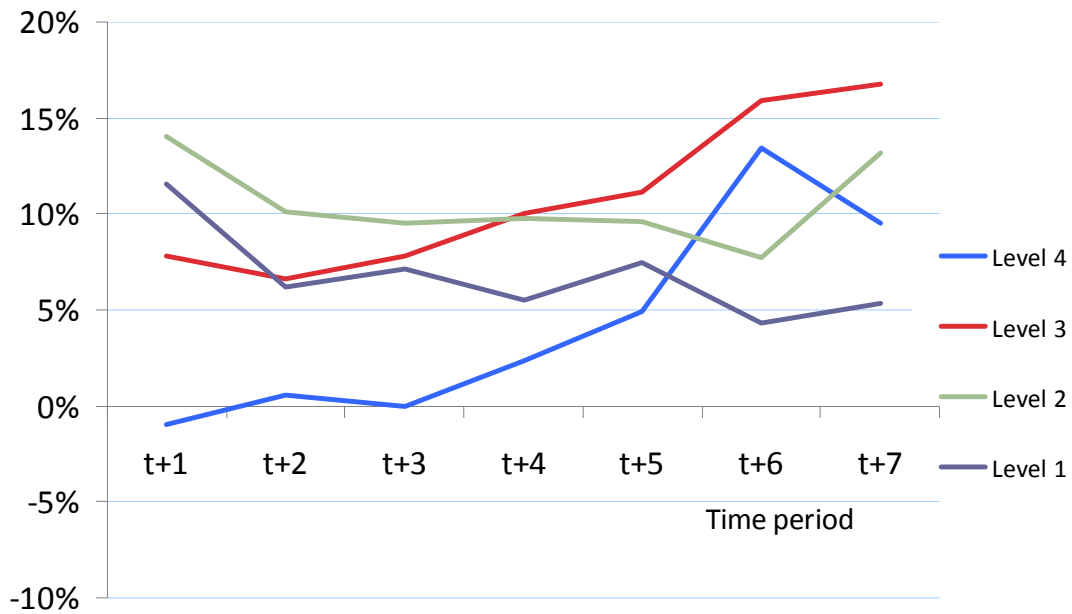
Earnings: Learners aged 19+, vocational qualifications only – classroom mode of attendance



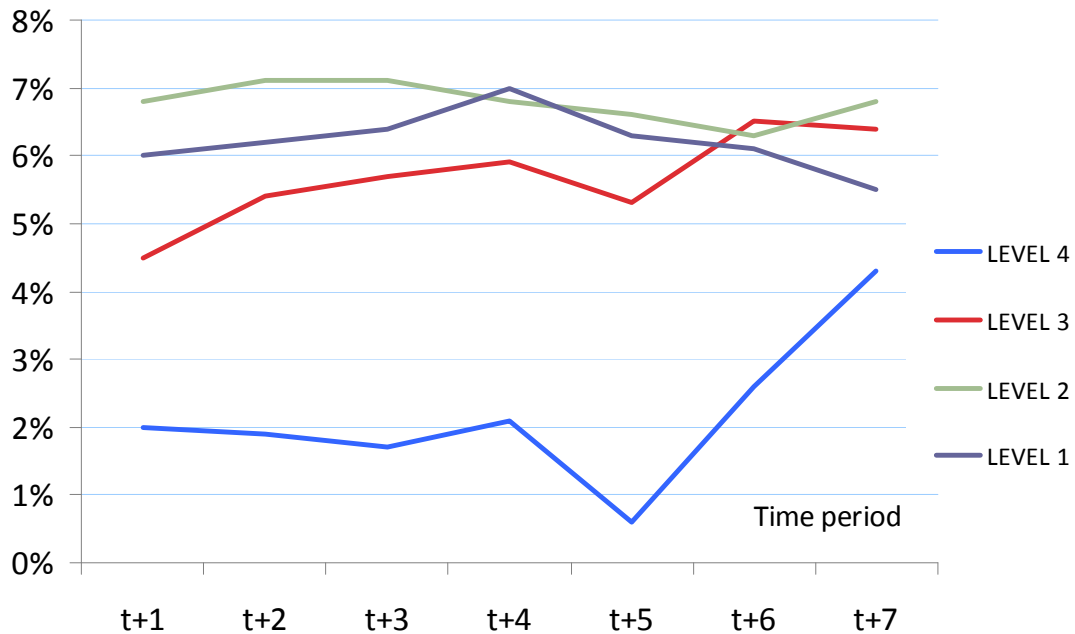
Employment: Learners aged 19+, vocational qualifications only – classroom mode of attendance



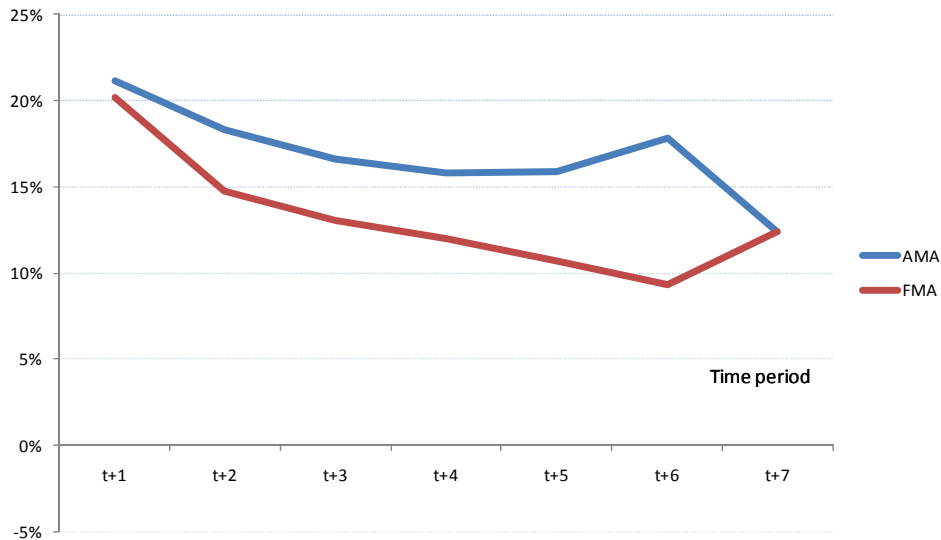
Earnings: Learners aged 19+, vocational qualifications only – workplace mode of attendance



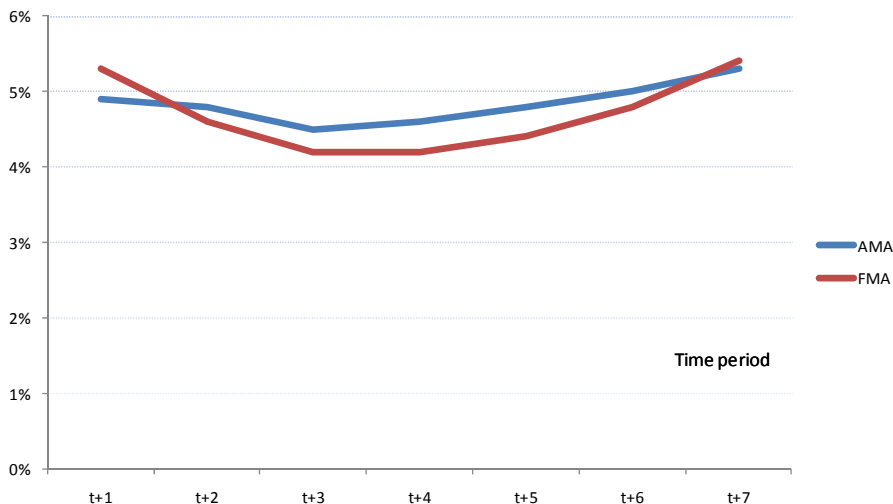
Employment: Learners aged 19+, vocational qualifications only – workplace mode of attendance



Earnings: Learners aged 19+, vocational qualifications only – Apprenticeships



Employment: Learners aged 19+, vocational qualifications only – Apprenticeships



Source: London Economics

In terms of earnings returns, the analysis suggests that there are greater returns associated with the completion of vocational qualifications when undertaken through the workplace route as opposed to the classroom route. The results presented in Table 10 indicate that individuals completing qualifications at Level 3 through the classroom route do not achieve an earnings premium over non-completers until four years post qualification attainment. In contrast, for those individuals attaining the qualification through the workplace route, the earnings returns are immediate and significant – standing at between 7% and 8% relative to non-completers in the first three years post attainment. These returns persist for the entire duration of the analysis and increase to between 17% and 18% in the sixth and seventh year post attainment. Of additional interest is the fact that apprenticeships at Level 3 appear to offer their holders the largest earnings benefits. In particular, an individual gaining a Level 3 apprenticeship achieves an annual earnings

benefit of between 15% and 20% in each of the first six years after the qualification is attained (relative to a non-completer)².

The results in relation to Level 2 are qualitatively similar to those in relation to Level 3 qualifications, with those individuals completing qualifications through the workplace route outperforming those achieving the qualification through the classroom route (compared to non-completers). Again, individuals undertaking and completing apprenticeships outperform both the classroom and workplace based completers over the entire time period. It is also noticeable that there is an erosion of the earnings premium associated with Level 2 apprenticeships over time. Although we did not assess the extent to which these changes in the earnings returns may have been as a result of the selection of the non-completers as the comparison group, we believe it to be more likely to have occurred as a result of the fact that there are exceptionally strong returns associated with the initial completion of the apprenticeship, which might be expected to revert to a more 'realistic' long run equilibrium in the market.

Level		t+1	t+2	t+3	t+4	t+5	t+6	t+7
Level 4	Classroom	0.044***	0.048***	0.062***	0.076***	0.090***	0.100***	0.129***
	Workplace	-0.010	0.006	0.000	0.024	0.050*	0.143***	0.100
Level 3	Classroom	-0.006	0.003	0.009	0.028***	0.037***	0.046***	0.069***
	Workplace	0.081***	0.068***	0.081***	0.105***	0.117***	0.172***	0.183***
	Apprenticeship	0.235***	0.201***	0.181***	0.171***	0.172***	0.195***	0.132***
Level 2	Classroom	0.014***	0.004	0.001	0.010**	0.010*	0.016**	0.030***
	Workplace	0.150***	0.106***	0.100***	0.103***	0.101***	0.080***	0.141***
	Apprenticeship	0.224***	0.158***	0.139***	0.127***	0.113***	0.097***	0.132***
Level 1	Classroom	0.043***	0.033***	0.030***	0.038***	0.033***	0.039***	0.029***
	Workplace	0.123***	0.064***	0.074***	0.057***	0.078***	0.044	0.054

Source: London Economics.

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The coefficients presented in this table do not represent the original coefficients from the regression analysis, but an exponential transformation of the original coefficients (undertaken because the original regression model considers the impact of qualifications on the logarithm of hourly earnings).

This element of the analysis is of particular interest given the fact that the recent work undertaken considering the returns associated with intermediate and low level vocational qualifications (London Economics (2011b)³) demonstrated that there has been a fundamental shift in the returns achieved by mode of attendance. The London Economics' analysis replicated the previous research undertaken by Dearden (2004) and demonstrated that (between 1996 and 2002), there was a positive return associated with attaining NVQ Level 2 qualifications solely through the work-based route (for men and women), while there was a negative return (for women) associated with attaining NVQ Level 2 qualifications through the classroom route. However, between 2003 and 2009, the analysis indicated that the return to NVQ Level 2 qualifications was essentially independent of the route of attainment, with men achieving a statistically insignificant

² As previously mentioned, a methodological issue concerns the use of the non-completer groups as a counterfactual. In the case of apprenticeships, apprentices may not complete their qualification as it may not be a formal requirement of their employment. This is a particular issue when considering the difference in the economic returns by sector of employment or subject area.

³ London Economics (2011b)

return and women achieving a return of approximately 5% (over individuals in possession of no formally recognised qualifications).

In Table 11, we have presented the returns to National Vocational Qualifications at Level 2 by mode of attainment further broken down by gender. The analysis indicates that there are higher returns associated with the workplace based route of attainment compared to the classroom based route.

In addition, for either route of attainment, the relative earnings returns for men are greater than for women; however, interestingly, there is some degree of convergence in the earnings premiums achieved by men across the different routes of attainment. Specifically, there is a 5 percentage point gap in the earnings premium between men undertaking NVQ Level 2 qualifications in the first year post qualification attainment, which narrows to ± 2 percentage points in the five subsequent years. For women, the earnings premium gap is large immediately upon completion for the qualification and persists for the entire seven years post attainment.

	NVQ Level 2	t+1	t+2	t+3	t+4	t+5	t+6	t+7
All	Classroom	0.061***	0.066***	0.080***	0.081***	0.087***	0.060***	0.095***
	Workplace	0.150***	0.107***	0.100***	0.104***	0.102***	0.080***	0.139***
Men	Classroom	0.113***	0.120***	0.120***	0.099***	0.083***	0.052*	0.044
	Workplace	0.161***	0.125***	0.107***	0.111***	0.108***	0.067***	0.104**
Women	Classroom	0.027	0.029*	0.052***	0.064***	0.079***	0.066***	0.122***
	Workplace	0.143***	0.088***	0.092***	0.099***	0.092***	0.097***	0.172***

Source: London Economics.

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The coefficients presented in this table do not represent the original coefficients from the regression analysis, but an exponential transformation of the original coefficients (undertaken because the original regression model considers the impact of qualifications on the logarithm of hourly earnings).

The employment outcomes associated with qualification attainment by mode of acquisition generally replicate the results relating to earnings. Unsurprisingly, individuals that attain qualifications through the workplace route spend between 4½% and 6½% of the financial year in employment compared to between 2% and 5½% for individuals attaining qualifications through the classroom based route.

Level		t+1	t+2	t+3	t+4	t+5	t+6	t+7
Level 4	Classroom	0.031***	0.043***	0.049***	0.054***	0.050***	0.053***	0.057***
	Workplace	0.020**	0.019**	0.017*	0.021**	0.006	0.026**	0.043**
Level 3	Classroom	0.021***	0.032***	0.039***	0.044***	0.048***	0.054***	0.054***
	Workplace	0.045***	0.054***	0.057***	0.059***	0.053***	0.065***	0.064***
	Apprenticeship	0.049***	0.048***	0.045***	0.046***	0.048***	0.050***	0.053***
Level 2	Classroom	0.022***	0.033***	0.036***	0.039***	0.039***	0.040***	0.047***
	Workplace	0.068***	0.071***	0.071***	0.068***	0.066***	0.063***	0.068***
	Apprenticeship	0.053***	0.046***	0.042***	0.042***	0.044***	0.048***	0.054***
Level 1	Classroom	0.023***	0.029***	0.032***	0.034***	0.035***	0.035***	0.038***
	Workplace	0.060***	0.062***	0.064***	0.070***	0.063***	0.061***	0.055***

Source: London Economics. **Note:** *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Apprenticeship attainment at Level 3 results in completers being employed for approximately 5% more of the financial year compared to non-completers. The results associated with Level 2 qualification attainment are broadly equivalent.

In summary, the analysis demonstrates that the employment effects associated with qualification attainment are strongly positive, statistically significant, independent of qualification level completed and persistent over time.

3.4 Subject of attainment

In Table 13, we have presented the distribution of learners by subject of study at Levels 2, 3 and 4. The descriptive statistics indicate that the greatest proportions of learners are engaged in Health, Public Services and Care related subjects (approx 25%), Engineering and Manufacturing Technologies (11.2%), Retail and Commercial Enterprise (10.5%), Business Administration and Law (11.2%) and Construction, Planning and the Built Environment (5.4%). Given this, we have focused the current presentation of results to these subjects in the first instance, and have presented only the econometric results relating to Levels 2 and 3 for ease (Table 14).

	Level 4	NVQ 3	BTEC 3	C&G 3	Other 3	NVQ 2	BTEC 2	C&G 2	Other 2	Total	Prop
Health, Public Serv.	12,502	59,011	4,254	665	99,116	39,647	7,937	108	202,485	425,725	25.0%
Science/Math.	676	428	615	14	3,189	139	119	0	6,736	11,916	0.7%
Ag./Hort./Animal Care	1,744	3,748	2,620	130	6,864	3,275	681	1,659	22,484	43,205	2.5%
Eng/ Manufacturing	8,828	5,755	4,249	1,221	33,551	27,500	384	5,302	103,025	189,815	11.2%
Construction/Plannin g	5,605	7,088	2,232	549	20,410	25,589	49	6,796	23,123	91,441	5.4%
ICT	6,376	4,785	2,307	1,526	24,900	2,888	531	8,548	137,851	189,712	11.2%
Retail/Commercial	1,297	39,275	732	481	32,281	37,261	55	1,796	65,811	178,989	10.5%
Leis., travel/ tourism	2,492	1,689	1,883	91	14,405	4,426	1,167	264	41,650	68,067	4.0%
Arts, Media	11,462	4,347	10,151	2,317	20,869	756	1,436	4,608	41,554	97,500	5.7%
Hist., Phil./ Theology	482	0	0	0	2,145	0	0	0	2,155	4,782	0.3%
Social Sciences	353	9	0	0	5,468	12	0	0	6,683	12,525	0.7%
Languages, Lit./Culture	682	242	0	3	10,023	2,052	0	4	26,701	39,707	2.3%
Education and Training	38,910	6,755	297	14,847	42,807	4,814	368	1,089	21,825	131,712	7.7%
Prep. for Life and Work	53	3,054	0	85	4,635	1	1	153	14,679	22,661	1.3%
Business Admin./ Law	37,901	23,957	1,347	20	43,431	31,543	343	4	52,081	190,627	11.2%
Total	129,529	160,188	30,687	21,949	365,231	179,976	13,071	30,331	769,357	1,700,319	100%

Source: London Economics.

Note: Full titles as follows: Health, Public Services and Care; Science and Mathematics; Agriculture, Horticulture and Animal Care; Engineering and Manufacturing Technologies; Construction, Planning and Built Environment; Information and Communication Technology; Retail and Commercial Enterprise; Leisure, Travel and Tourism; Arts, Media and Publishing; History, Philosophy and Theology; Social Sciences; Languages, Literature and Culture; Education and Training; Preparation for Life and Work; Business, Administration and Law.

The analysis presented in Table 14 indicates that there is some degree of variation in the returns by subject area, though again it needs to be remembered that the use of non-completers as the comparison group may impact the results relating to a number of sectors of employment or subject areas, especially in relation to apprenticeships where completion of the portfolio of training and qualifications is not always a pre-requisite for on-going employment.

The most popular subject (Health, Public Services and Care) is associated with the relatively low and stable returns at Level 3 (ranging between 3% and 6½% over the period of analysis), while the returns at Level 2 are stronger (ranging between 8% and 15% over the period). The subjects appearing to offer the strongest returns at Level 3 are Engineering and Manufacturing Technologies and Construction, Planning and the Built Environment.

Level 3 completers in Engineering and Manufacturing Technologies achieve an 8.3% increase in annual earnings in the first year post qualification relative to non-completers, which increases steadily to approximately 15% in the fourth year post completion and beyond. At Level 2, qualification completers in Engineering and Manufacturing Technologies also see strong and significant returns, again standing at between 8% and 9% in the first few years post completion, although eroding marginally as time from attainment passes.

		t+1	t+2	t+3	t+4	t+5	t+6	t+7
Level 3	Health public services	0.035***	0.029***	0.044***	0.040***	0.065***	0.061***	0.048**
	Engineering/manufacturing	0.083***	0.111***	0.124***	0.143***	0.133***	0.142***	0.145***
	Construction and planning	0.200***	0.161***	0.141***	0.215***	0.160***	0.186***	0.208***
	ICT	-0.097***	-0.080***	-0.052***	-0.025	-0.036*	-0.019	-0.016
	Retail and commercial	0.030	0.080***	0.075***	0.091***	0.108***	0.116***	0.160***
	Business administration	0.025**	0.028***	0.031***	0.073***	0.053***	0.057***	0.112***
Level 2	Health public services	0.138***	0.081***	0.094***	0.090***	0.094***	0.087***	0.153***
	Engineering/manufacturing	0.093***	0.083***	0.078***	0.078***	0.055***	0.075***	0.090***
	Construction and planning	0.149***	0.124***	0.113***	0.131***	0.101***	0.096***	0.133***
	ICT	0.000	0.000	-0.002	0.004	0.003	0.018*	0.013
	Retail and commercial	0.026**	0.015	0.021*	0.033**	0.044***	0.045**	0.070**
	Business administration	0.119***	0.089***	0.083***	0.085***	0.085***	0.058***	0.082***

Source: London Economics.

Note: * $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The coefficients presented in this table do not represent the original coefficients from the regression analysis, but an exponential transformation of the original coefficients (undertaken because the original regression model considers the impact of qualifications on the logarithm of hourly earnings).**

Completers in Construction, Planning and the Built Environment appear to achieve even stronger earnings outcomes. At Level 3, these individuals undertaking and completing qualifications in this subject area achieve returns that range between 15% and 20% in the seven years post attainment (relative to non-completers), while at Level 2, the returns are also significant though between 5 and 7 percentage points lower than at Level 3.

Retail and Commercial Enterprise and Business, Administration and Law also offer recipients enhanced earnings, however, of particular interest in relation to these subjects is that there appears to be no erosion of the annual earnings premium achieved, and if anything, the returns appear to increase steadily over time. The only popular subject area that does not provide strong and significant earnings returns to their recipients are those undertaking and completing qualifications in Information and Communications Technology. At Level 3, completers of these qualifications achieve a negative return, while at Level 2; the analysis suggests that there is no statistically significant earnings return.

		t+1	t+2	t+3	t+4	t+5	t+6	t+7
Level 3	Health public services	0.033***	0.045***	0.052***	0.060***	0.060***	0.064***	0.072***
	Engineering/manufacturing	0.039***	0.035***	0.042***	0.042***	0.047***	0.061***	0.068***
	Construction and planning	0.056***	0.049***	0.044***	0.050***	0.051***	0.061***	0.056***
	ICT	-0.004	0.011	0.017**	0.027***	0.040***	0.048***	0.051***
	Retail and commercial	0.022***	0.028***	0.031***	0.038***	0.038***	0.053***	0.040***
	Business administration	0.019***	0.032***	0.040***	0.038***	0.037***	0.042***	0.032***
Level 2	Health public services	0.056***	0.066***	0.068***	0.072***	0.072***	0.075***	0.072***
	Engineering/manufacturing	0.044***	0.046***	0.042***	0.048***	0.049***	0.043***	0.054***
	Construction and planning	0.045***	0.041***	0.035***	0.035***	0.032***	0.030***	0.043***
	ICT	0.006**	0.019***	0.025***	0.027***	0.030***	0.029***	0.037***
	Retail and commercial	0.040***	0.046***	0.049***	0.054***	0.053***	0.048***	0.061***
	Business administration	0.034***	0.044***	0.053***	0.052***	0.047***	0.052***	0.054***

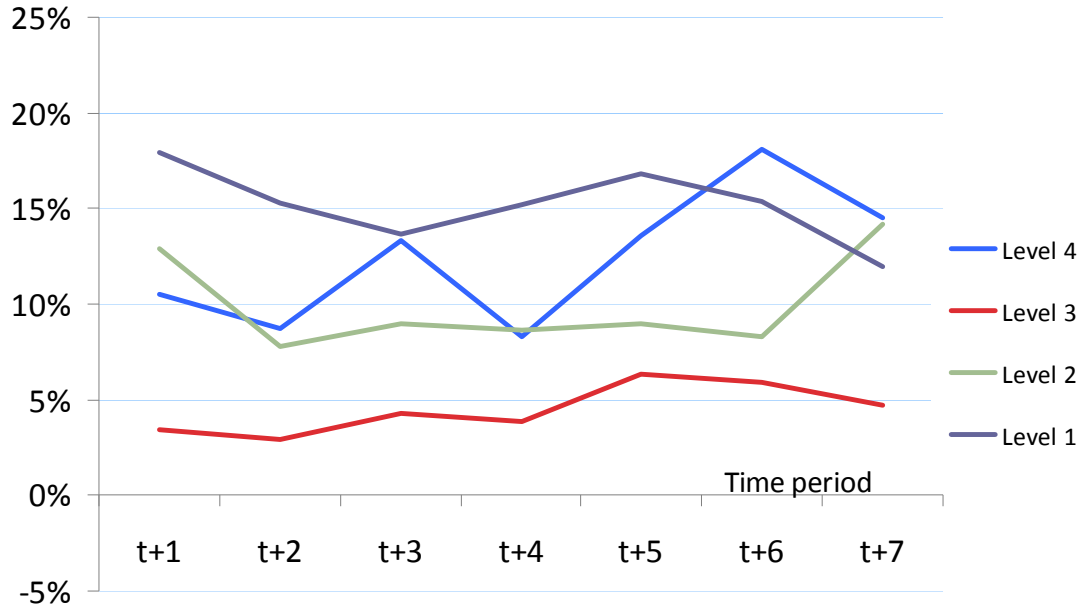
Source: London Economics.

Note: * $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The coefficients presented in this table do not represent the original coefficients from the regression analysis, but an exponential transformation of the original coefficients (undertaken because the original regression model considers the impact of qualifications on the logarithm of hourly earnings).**

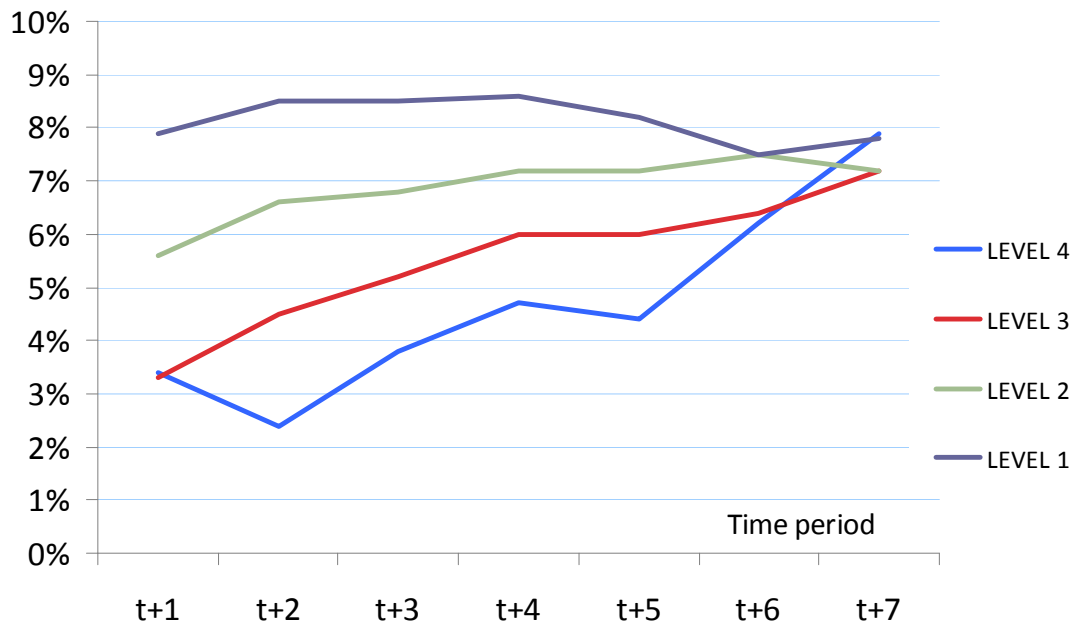
In terms of employment outcomes, completers of qualifications in all the most popular subject areas achieve positive and sustained employment outcomes. Individuals in the fields of Engineering and Manufacturing Technologies and Construction, Planning and the Built Environment increase the proportion of the financial year they are in employment for by between 4% and 5% at Level 2 and by between 5% and 6% at Level 3. The employment outcomes associated with Retail and Business Administration are a little lower, but still offer substantial positive benefits to holders, while the returns to ICT subjects are generally insignificant in the immediate post attainment period, but grow to between 4% and 5% by the end of the seven years.

Figure 4: Earnings and employment returns by subject of study (I)

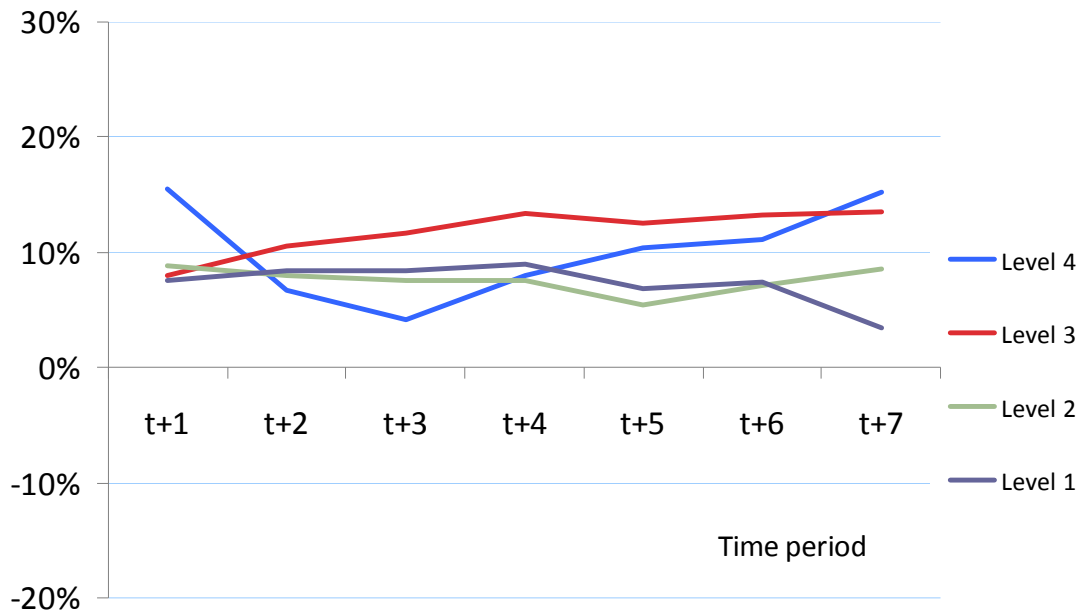
Earnings: Learners aged 19+, vocational qualifications only - Health and social care



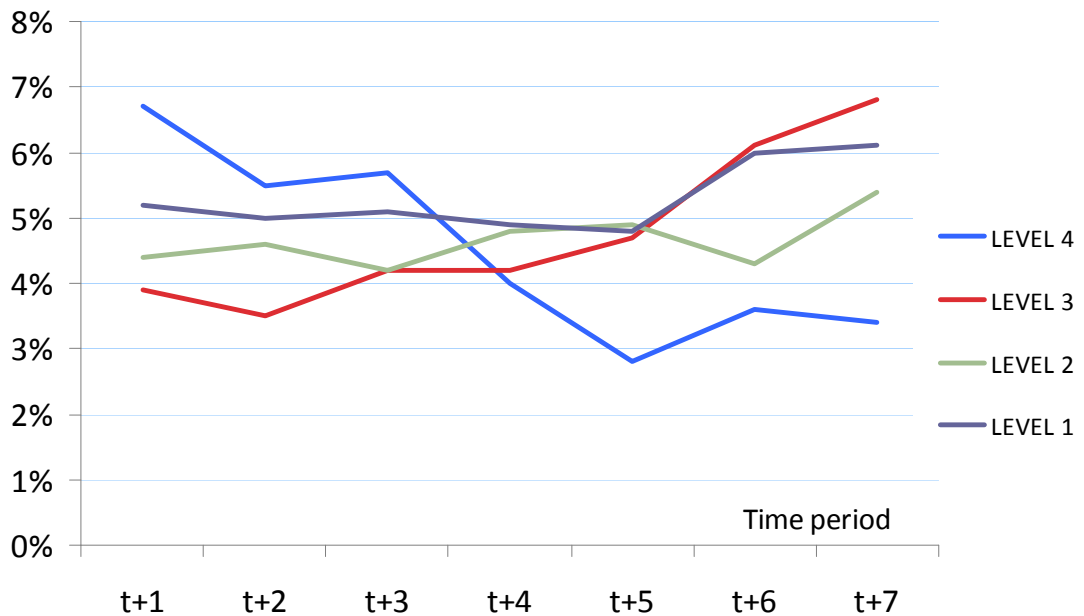
Employment: Learners aged 19+, vocational qualifications only - Health and social care



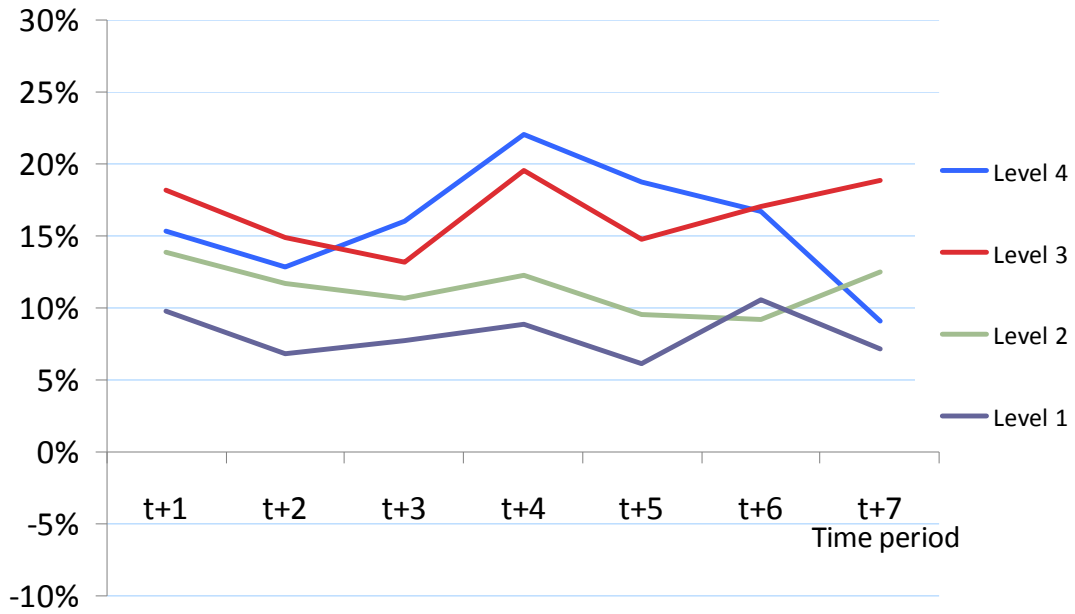
Earnings: Learners aged 19+, vocational qualifications only - Engineering and Manufacturing



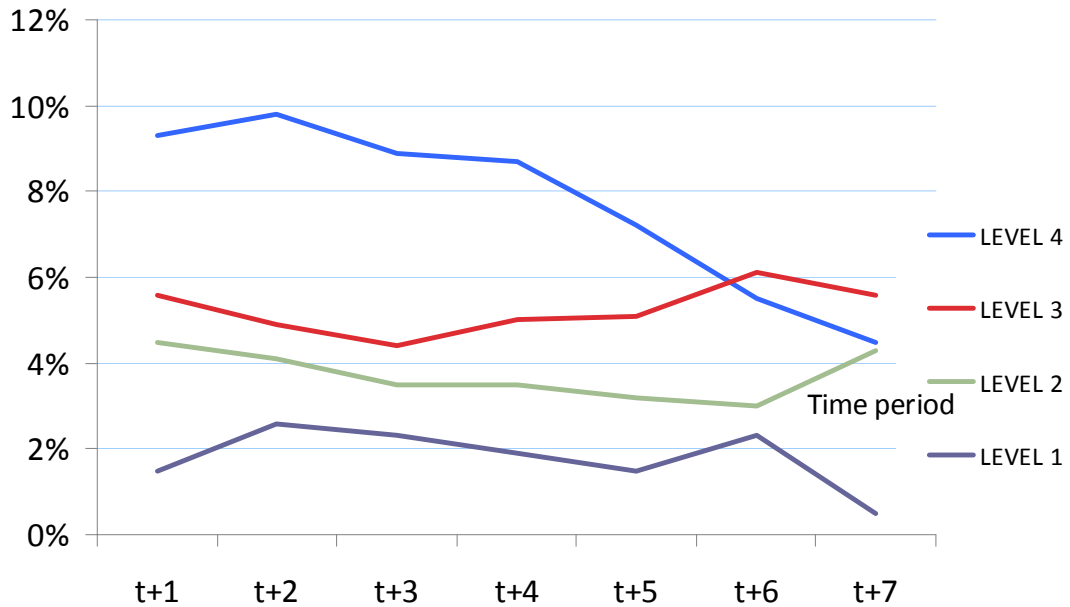
Employment: Learners aged 19+, vocational qualifications only - Engineering and Manufacturing



Earnings: Learners aged 19+, vocational qualifications only - Construction planning and built environment



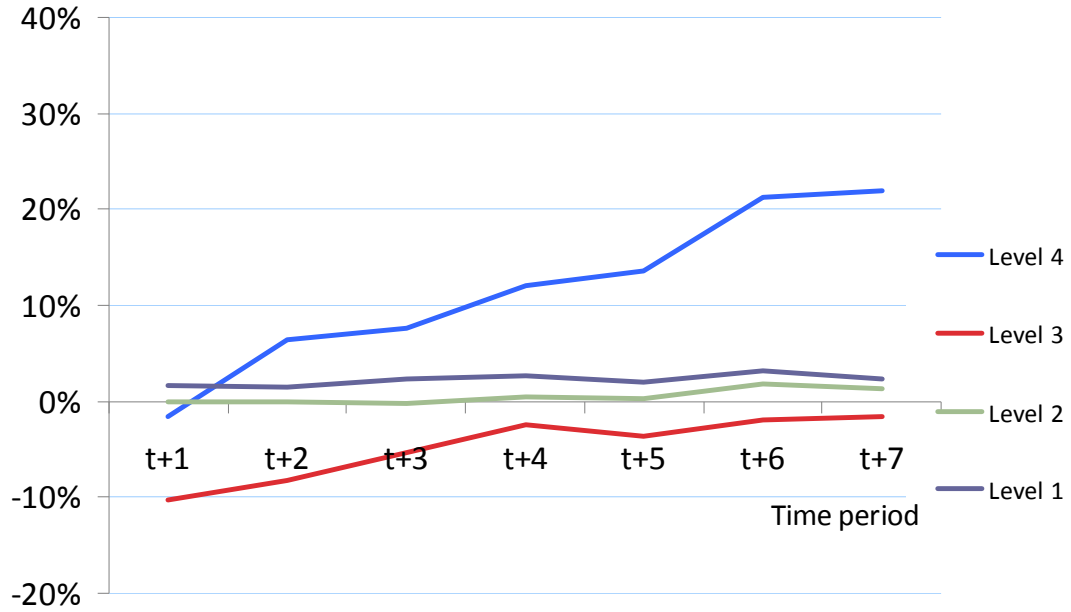
Employment: Learners aged 19+, vocational qualifications only - Construction planning and built environment



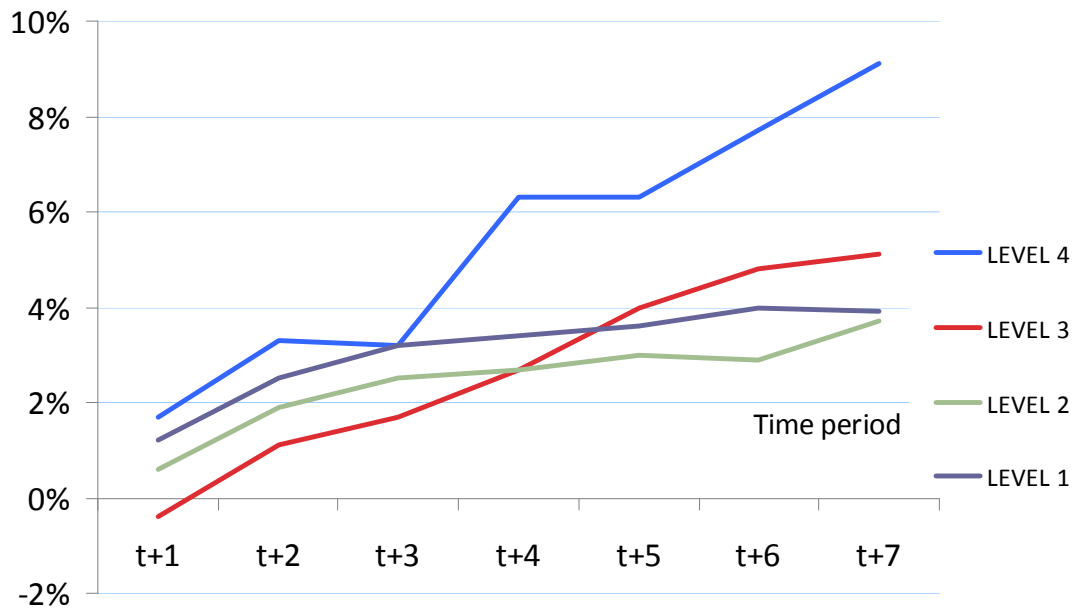
Source: London Economics

Figure 5: Earnings and employment returns by subject of study (II)

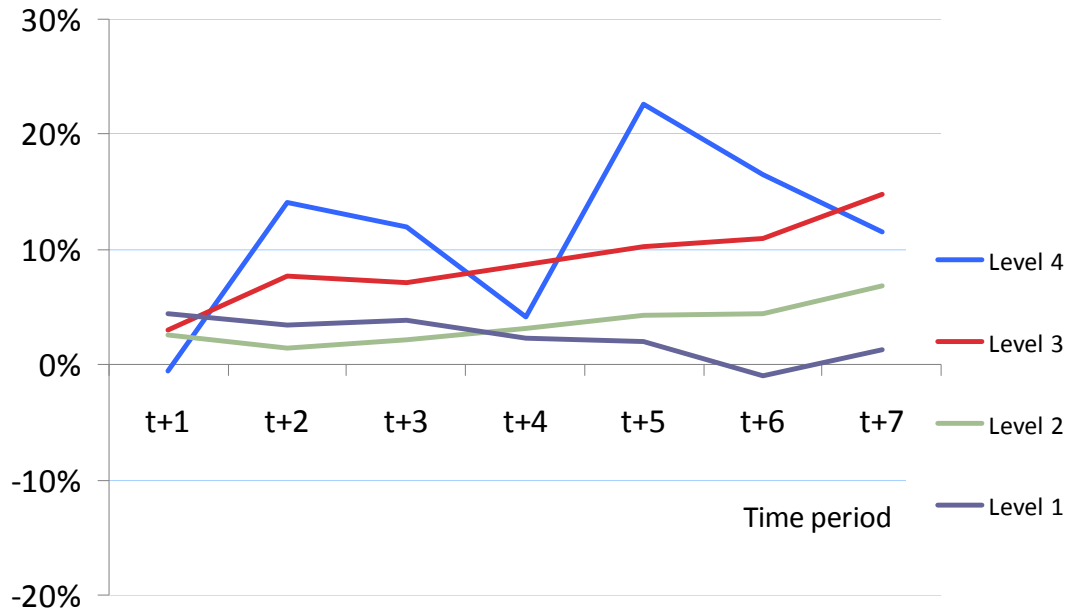
Earnings: Learners aged 19+, vocational qualifications only - ICT



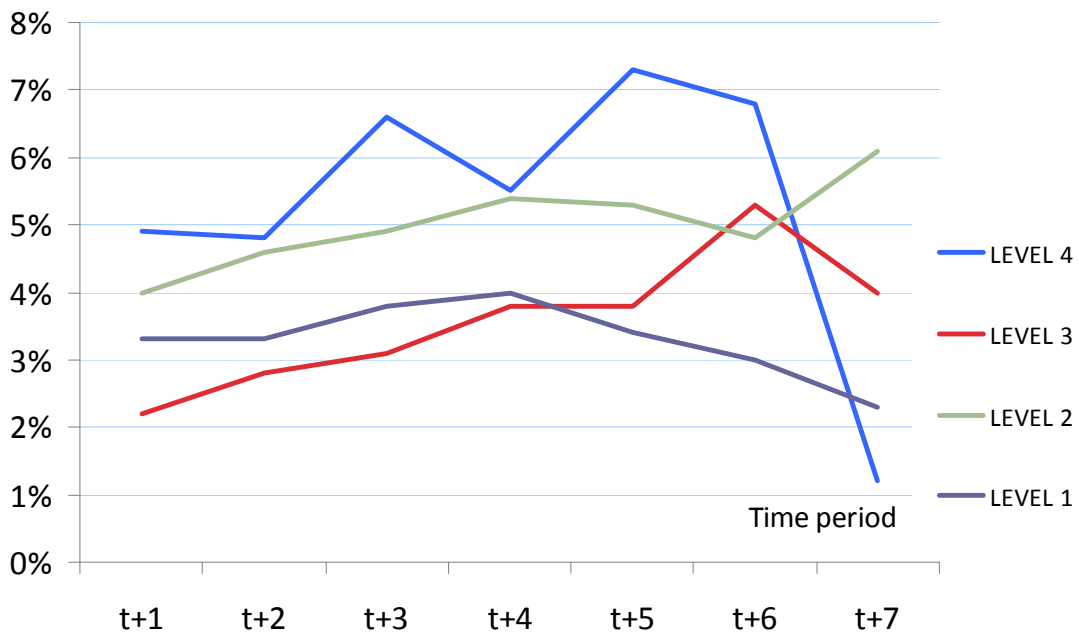
Employment: Learners aged 19+, vocational qualifications only - ICT



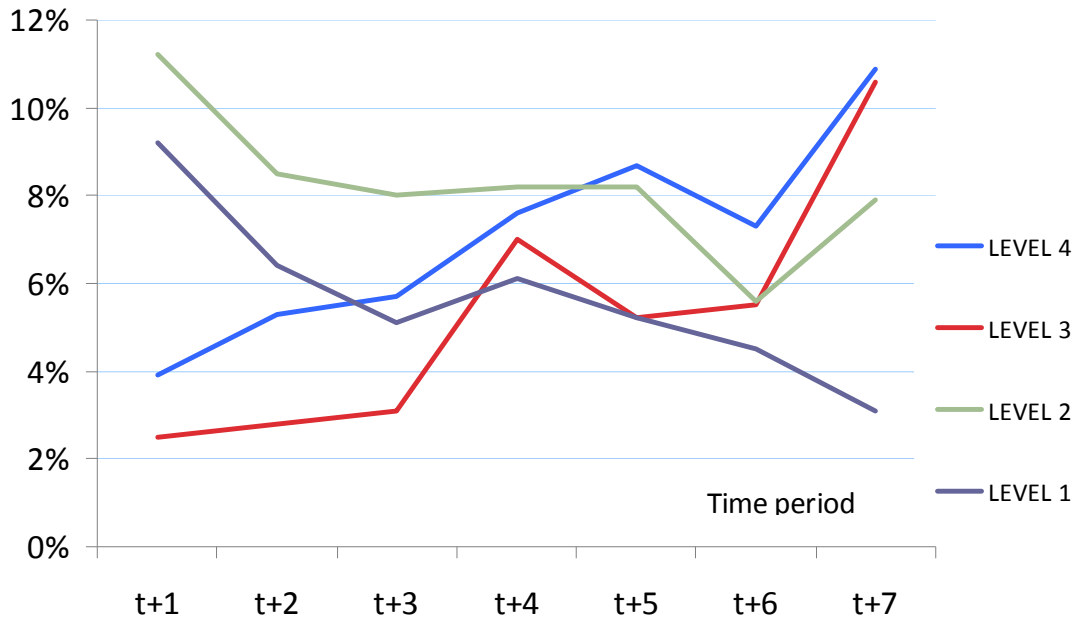
Earnings: Learners aged 19+, vocational qualifications only - Retail and commercial



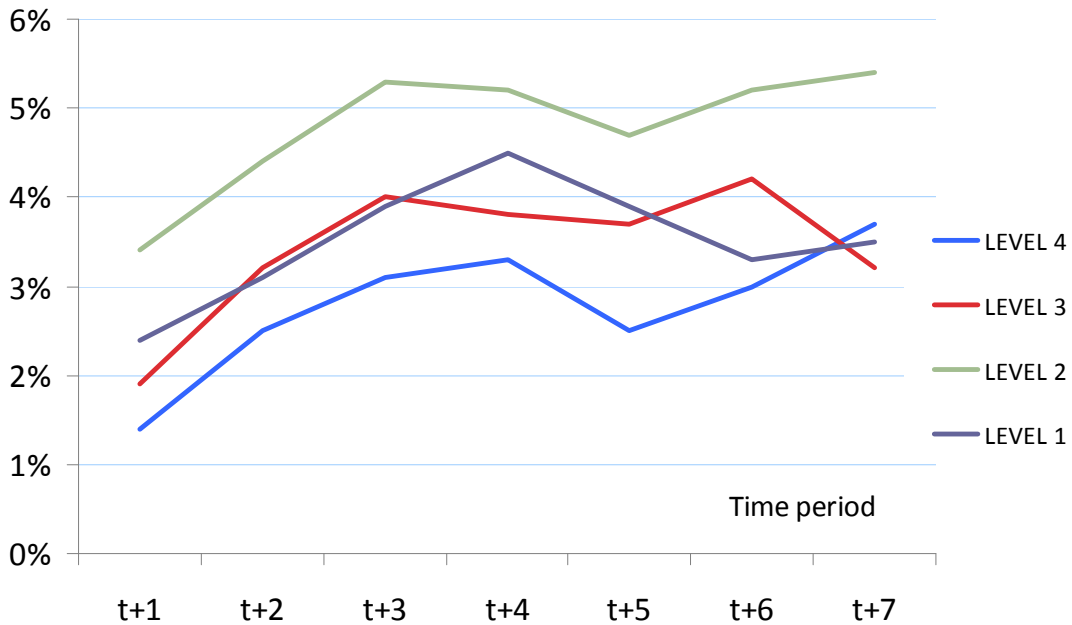
Employment: Learners aged 19+, vocational qualifications only - Retail and commercial



Earnings: Learners aged 19+, vocational qualifications only - Business administration and law



Employment: Learners aged 19+, vocational qualifications only - Business administration and law



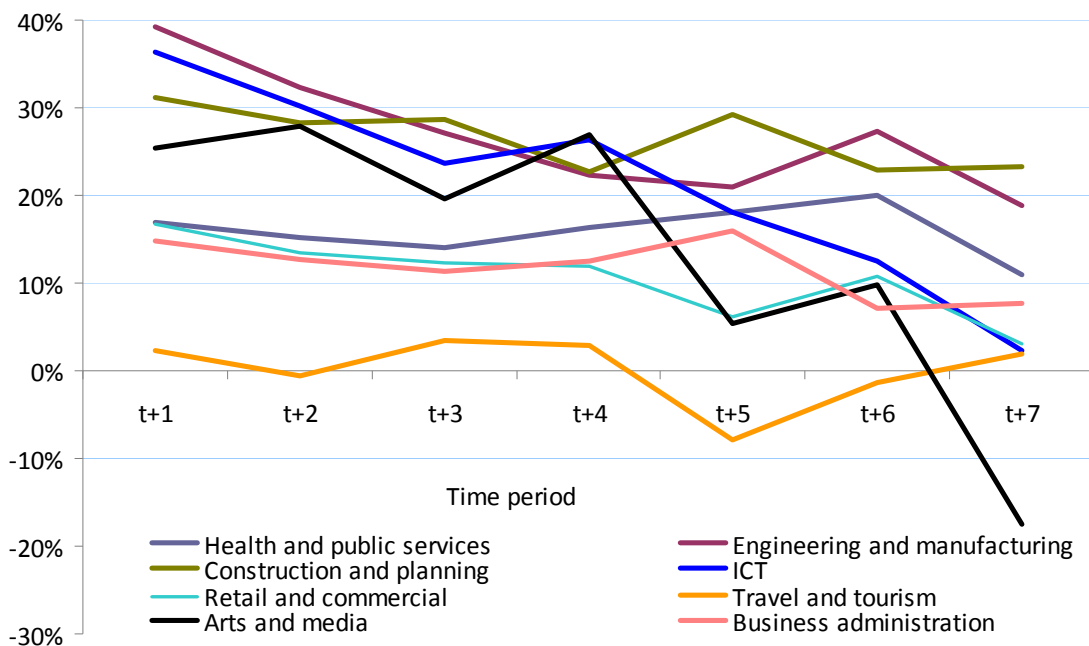
Source: London Economics

3.5 Subject of study - apprenticeships

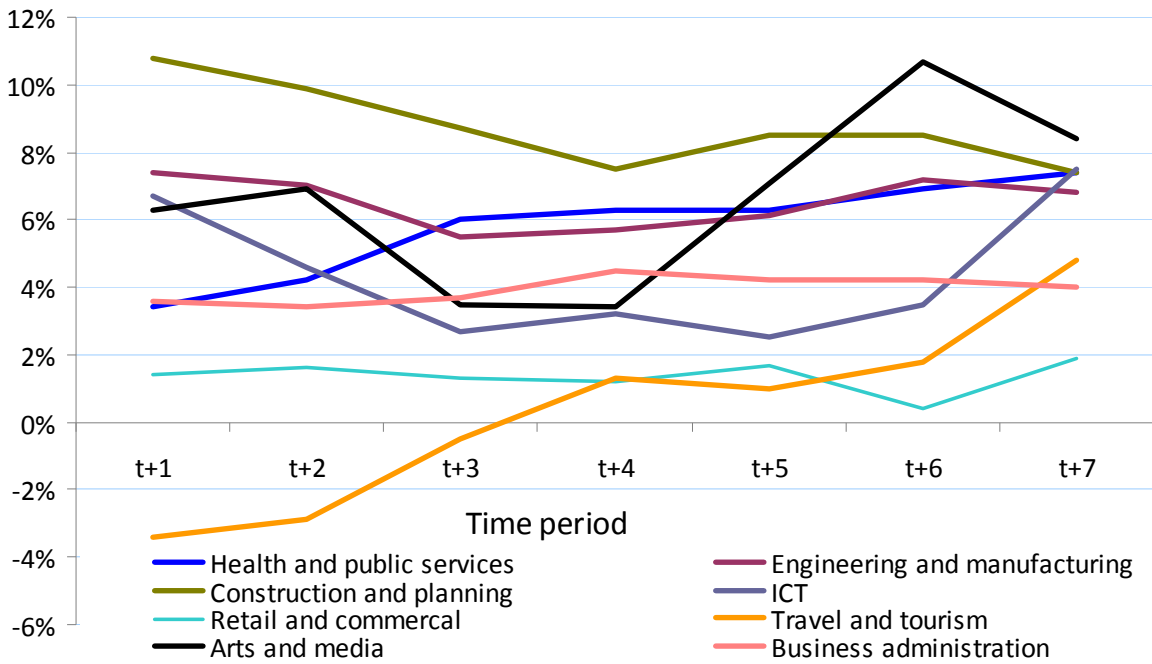
As with the analysis relating to the returns by subject of study for vocational qualifications more generally, and subject to the same caveats in relation to the appropriate use of non-completers as the comparison group, the returns by subject for apprenticeships are also relatively strong. Presented in Figure 7 and Table 16, the analysis illustrates that the annual earnings premium to the fields of Engineering and Manufacturing Technologies and Construction, Planning and the Built Environment at Level 3 offer recipients the greatest returns – essentially between 20% and 30% in the first six years post qualification attainment. In addition, and unlike qualification completion in vocational qualifications more generally, individuals completing qualifications in ICT also see a large earnings premium although this gradually erodes over the period of analysis.

Figure 6: Earnings and employment returns by subject of study – apprenticeships

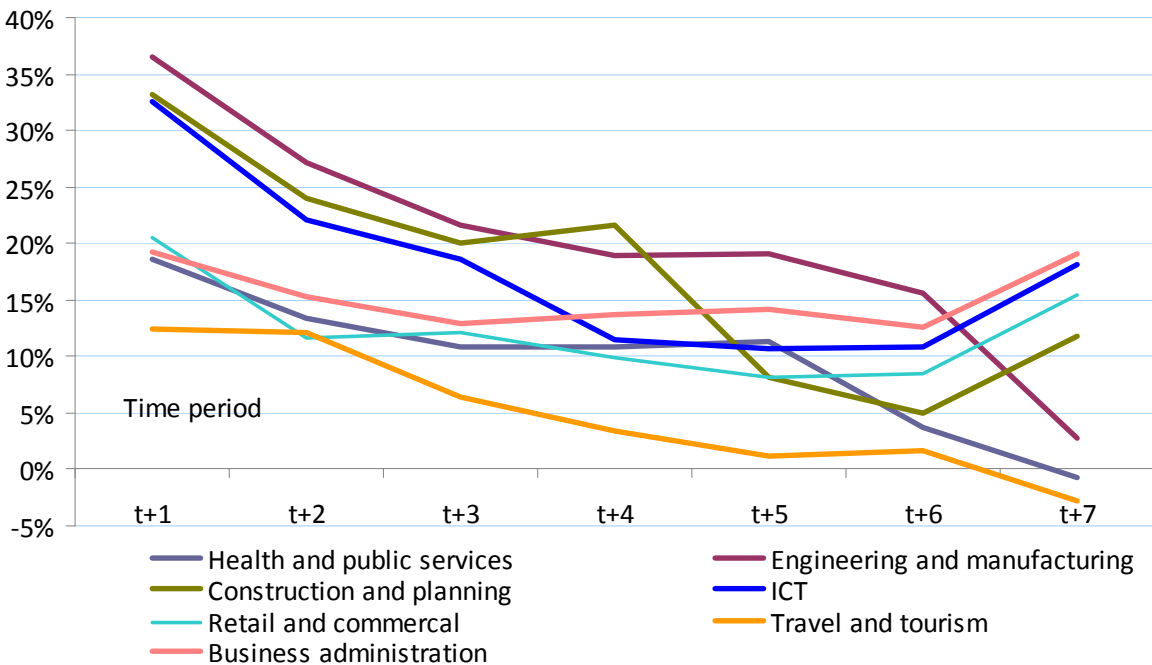
Earnings: Learners aged 19+ - Level 3 Apprenticeships



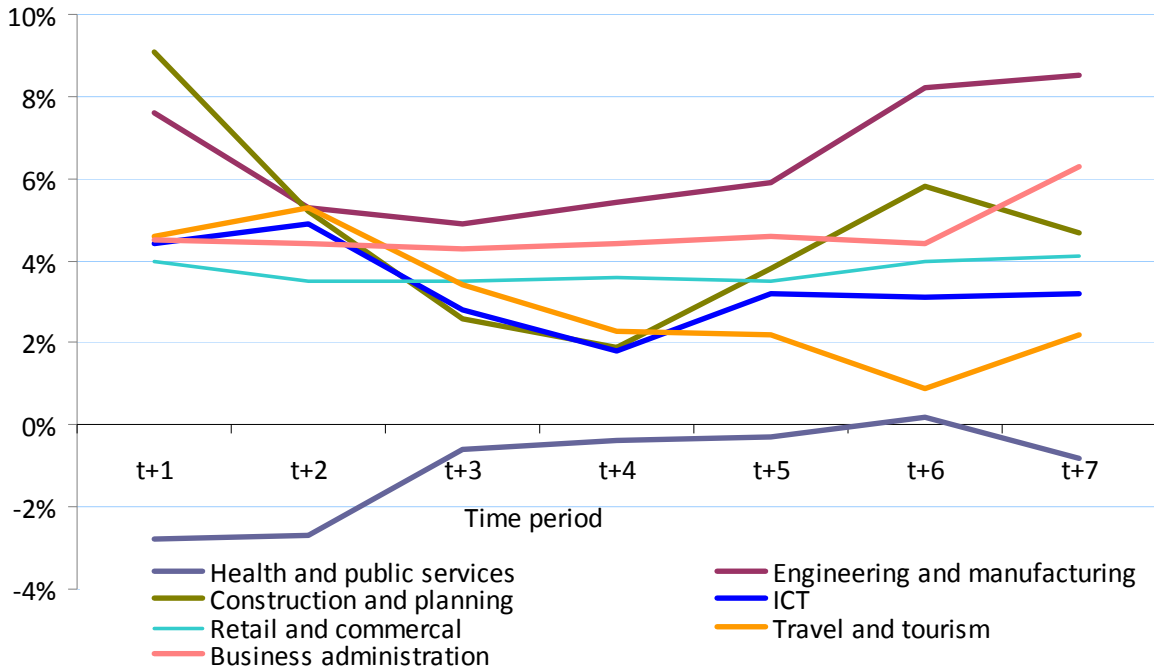
Employment: Learners aged 19+ - Level 3 Apprenticeships



Earnings: Learners aged 19+ - Level 2 Apprenticeships



Employment: Learners aged 19+ - Level 2 Apprenticeships



Source: London Economics

The earnings outcomes associated with other apprenticeship subjects also offer consistently strong returns over time relative to non-completers, with Health, Public Services and Care, Retail and Commercial Enterprise and Business, Administration and Law all offering their holders double digit earnings premiums compared to non-completers at Level 3. Only apprenticeships in Arts, Leisure, Travel and Tourism fail to offer equivalent returns. The outcomes achieved for those in possession of Level 2 apprenticeships by subject area are qualitatively equivalent, and as with the earnings returns for apprenticeships as a whole, are marginally lower than those achieved at Level 3 (by between 5 and 7 percentage points).

As stated previously, although there is a marginal erosion of the earnings premium associated with level 2 apprenticeships across most subject areas, this may simply be a reflection of the incredibly large earnings premiums achieved immediately post completion.

Table 16: Impact of apprenticeship attainment on earnings outcomes (by subject)								
		t+1	t+2	t+3	t+4	t+5	t+6	t+7
Level 3	Health public services	0.170***	0.153***	0.140***	0.164***	0.181***	0.201***	0.110*
	Engineering/manufacturing	0.392***	0.323***	0.271***	0.223***	0.209***	0.273***	0.188***
	Construction and planning	0.311***	0.283***	0.287***	0.228***	0.292***	0.229***	0.232***
	ICT	0.363***	0.302***	0.237***	0.264***	0.181***	0.124**	0.022
	Retail and commercial	0.166***	0.135***	0.123***	0.120***	0.062**	0.108***	0.030
	Travel and tourism	0.023	-0.006	0.035	0.029	-0.080	-0.014	0.019
	Arts and media	0.254***	0.279***	0.196**	0.270***	0.053	0.097	-0.175
	Business administration	0.148***	0.126***	0.114***	0.124***	0.160***	0.071***	0.077***
Level 2	Health public services	0.170***	0.125***	0.103***	0.103***	0.107***	0.036	-0.007
	Engineering/manufacturing	0.311***	0.240***	0.196***	0.173***	0.175***	0.145***	0.028
	Construction and planning	0.287***	0.215***	0.182***	0.196***	0.079***	0.048	0.111
	ICT	0.282***	0.200***	0.170***	0.108***	0.101*	0.103*	0.166
	Retail and commercial	0.187***	0.110***	0.115***	0.095***	0.079***	0.082***	0.143***
	Travel and tourism	0.117***	0.114***	0.062*	0.033	0.011	0.016	-0.028
	Arts and media	0.167	0.284	0.236	0.380	0.260	0.434	-
	Business administration	0.192***	0.153***	0.129***	0.137***	0.142***	0.125***	0.190***

Source: London Economics.

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The coefficients presented in this table do not represent the original coefficients from the regression analysis, but an exponential transformation of the original coefficients (undertaken because the original regression model considers the impact of qualifications on the logarithm of hourly earnings).

The analysis assessing the impact of apprenticeship qualification attainment on the proportion of the year in employment also demonstrates significant impacts, with individuals completing Construction related apprenticeships being employed by between 5% and 10% more of the financial year compared to non-completers. Only apprentices in the Arts, Media and Publishing fields fail to see any significant employment returns following the acquisition of their apprenticeship qualification. This is presented in Table 17.

Table 17: Impact of apprenticeship attainment on employment outcomes (by subject)								
		t+1	t+2	t+3	t+4	t+5	t+6	t+7
Level 3	Health public services	0.034***	0.042***	0.060***	0.063***	0.063***	0.069***	0.074***
	Engineering/manufacturing	0.074***	0.070***	0.055***	0.057***	0.061***	0.072***	0.068***
	Construction and planning	0.108***	0.099***	0.087***	0.075***	0.085***	0.085***	0.074***
	ICT	0.067***	0.046***	0.027**	0.032***	0.025*	0.035**	0.075***
	Retail and commercial	0.014*	0.016**	0.013*	0.012	0.017**	0.004	0.019
	Travel and tourism	-0.034**	-0.029**	-0.005	0.013	0.010	0.018	0.048*
	Arts and media	0.063*	0.069*	0.035	0.034	0.071*	0.107**	0.084
	Business administration	0.036***	0.034***	0.037***	0.045***	0.042***	0.042***	0.040***
Level 2	Health public services	-0.028*	-0.027*	-0.006	-0.004	-0.003	0.002	-0.008
	Engineering/manufacturing	0.076***	0.053***	0.049***	0.054***	0.059***	0.082***	0.085***
	Construction and planning	0.091***	0.052***	0.026***	0.019**	0.038***	0.058***	0.047
	ICT	0.044***	0.049***	0.028**	0.018	0.032*	0.031	0.032
	Retail and commercial	0.040***	0.035***	0.035***	0.036***	0.035***	0.040***	0.041***
	Travel and tourism	0.046***	0.053***	0.034***	0.023**	0.022*	0.009	0.022
	Arts and media	-0.091	-0.079	0.029	0.070	0.023	-0.122	-0.246
	Business administration	0.045***	0.044***	0.043***	0.044***	0.046***	0.044***	0.063***

Source: London Economics.

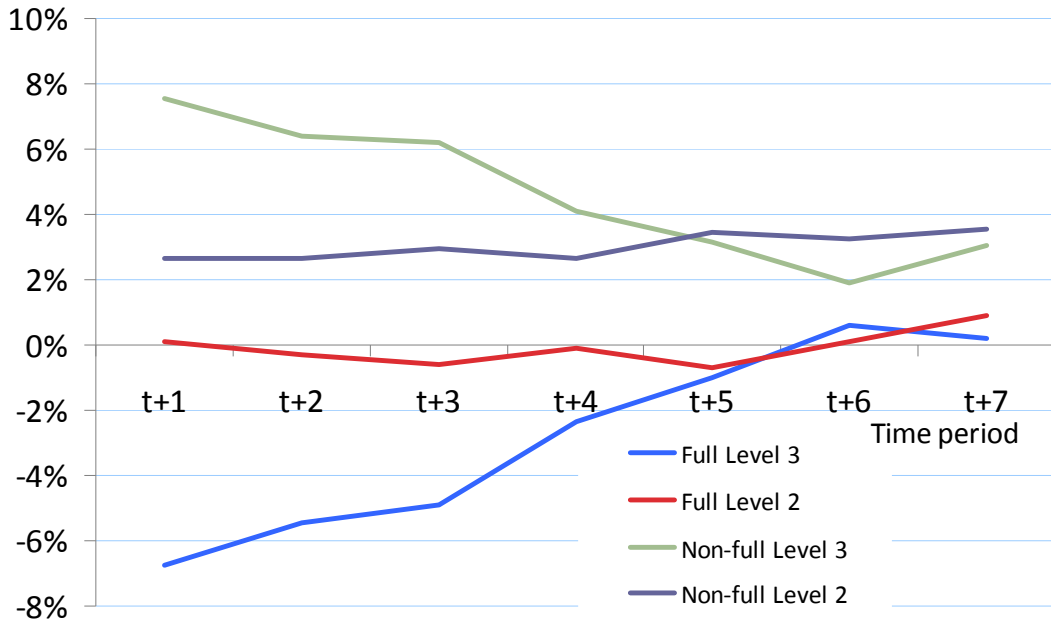
3.6 Full versus non-full qualifications

In terms of earnings, the analysis presented in Figure 8 and Table 18 suggests that when comparing the marginal earnings return associated with completion of a full qualification relative to non-completion of a full qualification, there are either negative or zero marginal returns associated with both Level 2 and Level 3 qualifications. Over time, the marginal returns associated with the completion of a full Level 3 qualification do improve and there is essentially no difference between full qualification completers and non completers by the end of the period of the analysis.

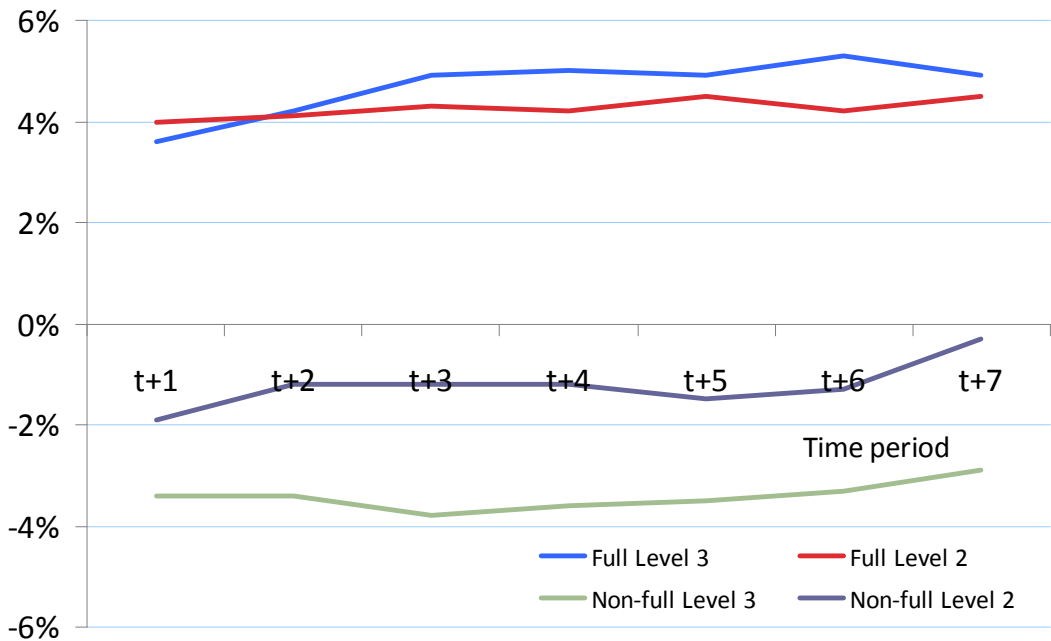
In contrast, when considering the completion of non-full qualifications compared to non completion of non full qualifications, the econometric analysis demonstrates that there are strong and consistent returns at both Level 2 and Level 3. Completion of non-full Level 2 qualifications offer an annual earnings return of between 2-3% over the 7 years, while at Level 3, the earnings premium over those not completing the qualifications stands at approximately 7% in the first few years post completion but partially erodes to approximately 3% by the end of the period.

Figure 7: Earnings and employment returns by whether qualification full or non-full

Earnings: Full qualification completers versus full qualification non-completers



Employment: Full qualification completers versus full qualification non-completers



Source: London Economics

There is some variation depending on gender. For full-level 3 qualifications, the results presented above are driven by the fact that women achieve a negative return (compared to non completers), while men achieve a zero return. In contrast, at full-level 2, women also see a significant negative return in the first five years post completion, which

compares to a strong positive effect for men (ranging between 2½% and 7% in the first five years post completion).

In contrast to the negative returns associated with full-level 2 and full-level 3 qualification completions for women, there are strong positive returns associated with the completion of non-full Level 2 and non-full Level 3 qualifications. At both levels, non-full qualification completion generates a 7% return in the immediate period post completion compared to non-completion (although this does erode by the end of the period of the analysis). For men, there are no identified earnings returns associated with the completion of non-full qualifications at Level 3, although there is a small earnings premium posted three years following the completion of non-full qualifications at Level 2.

		t+1	t+2	t+3	t+4	t+5	t+6	t+7
All	Full Level 3	-0.068***	-0.054***	-0.049***	-0.024***	-0.010*	0.006	0.002
	Full Level 2	0.001	-0.003	-0.006	-0.001	-0.007	0.001	0.009
	Non-full Level 3	0.076***	0.064***	0.062***	0.041***	0.031***	0.019**	0.030**
	Non-full Level 2	0.026***	0.026***	0.029***	0.026***	0.035***	0.033***	0.036***
Men	Full Level 3	-0.012	-0.002	0.000	0.011	0.026***	0.027**	0.011
	Full Level 2	0.069***	0.058***	0.041***	0.040***	0.024***	0.005	-0.020
	Non-full Level 3	0.015	0.007	0.012	0.012	-0.003	0.000	0.035
	Non-full Level 2	-0.040***	-0.031***	-0.014**	-0.010	0.001	0.029***	0.068***
Women	Full Level 3	-0.068***	-0.056***	-0.053***	-0.023***	-0.012*	0.008	0.013
	Full Level 2	-0.049***	-0.048***	-0.041***	-0.032***	-0.030***	-0.004	0.029*
	Non-full Level 3	0.073***	0.063***	0.061***	0.034***	0.030***	0.012	0.013
	Non-full Level 2	0.077***	0.070***	0.061***	0.054***	0.061***	0.033***	0.013

Source: London Economics.

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The coefficients presented in this table do not represent the original coefficients from the regression analysis, but an exponential transformation of the original coefficients (undertaken because the original regression model considers the impact of qualifications on the logarithm of hourly earnings).

The aggregate analysis on the marginal employment returns is in complete contrast to the findings in the previous section related to earnings. These findings suggest that following the completion of a full Level 3 (or full Level 2) qualification, individuals achieve a 3.6% (4.0%) increase in the proportion of the financial year in employment compared to those who did not complete a full Level 3 qualification (full Level 2). The employment effect associated with the completion of both full Level 3 and full Level 2 qualifications remains and actually increases over the seven years of the analysis. This employment benefit exists for both men and women, although women experience a slightly stronger impact over the period.

The opposite outcomes are identified for the completion of non-full qualifications at both Level 2 and Level 3 (Table 18 and Figure 8). Both men and women achieving a non-full qualifications see a 3-4% decline in the proportion of the year in employment, and although the relative employment outcomes of men either improves over time or are for the most-part statistically insignificant, women in possession of non-full qualifications continue to experience a negative employment outcome over the seven years (compared to non-completers of non-full qualifications).

Table 19: Impact of qualification attainment on employment outcomes (full versus non-full)								
		t+1	t+2	t+3	t+4	t+5	t+6	t+7
All	Full Level 3	0.036***	0.042***	0.049***	0.050***	0.049***	0.053***	0.049***
	Full Level 2	0.040***	0.041***	0.043***	0.042***	0.045***	0.042***	0.045***
	Non-full Level 3	-0.034***	-0.034***	-0.038***	-0.036***	-0.035***	-0.033***	-0.029***
	Non-full Level 2	-0.019***	-0.012***	-0.012***	-0.012***	-0.015***	-0.013***	-0.003
Men	Full Level 3	0.034***	0.031***	0.037***	0.038***	0.041***	0.038***	0.032***
	Full Level 2	0.037***	0.034***	0.032***	0.031***	0.033***	0.027***	0.029***
	Non-full Level 3	-0.026***	-0.019***	-0.023***	-0.022***	-0.024***	-0.015**	-0.011
	Non-full Level 2	-0.002	0.007	0.007	0.009**	0.005	0.014**	0.033***
Women	Full Level 3	0.037***	0.048***	0.055***	0.056***	0.051***	0.059***	0.058***
	Full Level 2	0.042***	0.047***	0.053***	0.054***	0.054***	0.054***	0.061***
	Non-full Level 3	-0.039***	-0.045***	-0.048***	-0.045***	-0.040***	-0.043***	-0.041***
	Non-full Level 2	-0.029***	-0.025***	-0.028***	-0.030***	-0.029***	-0.031***	-0.031***

Source: London Economics.

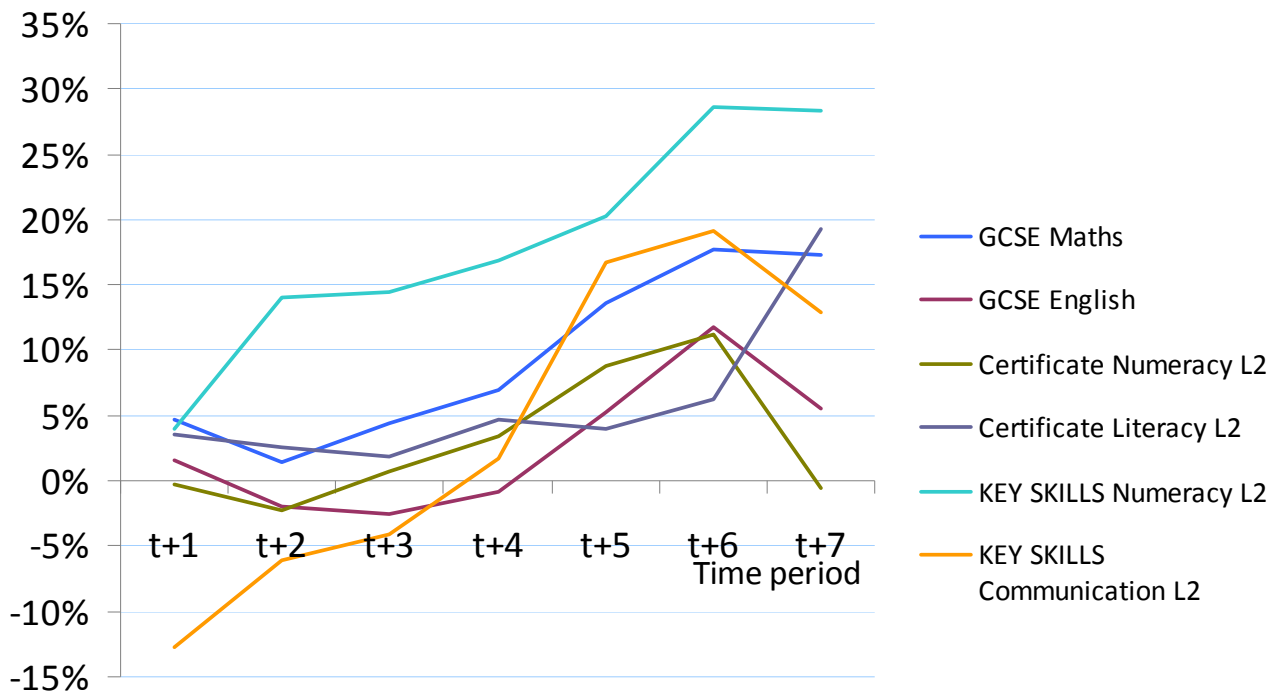
Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

3.7 Skills for Life

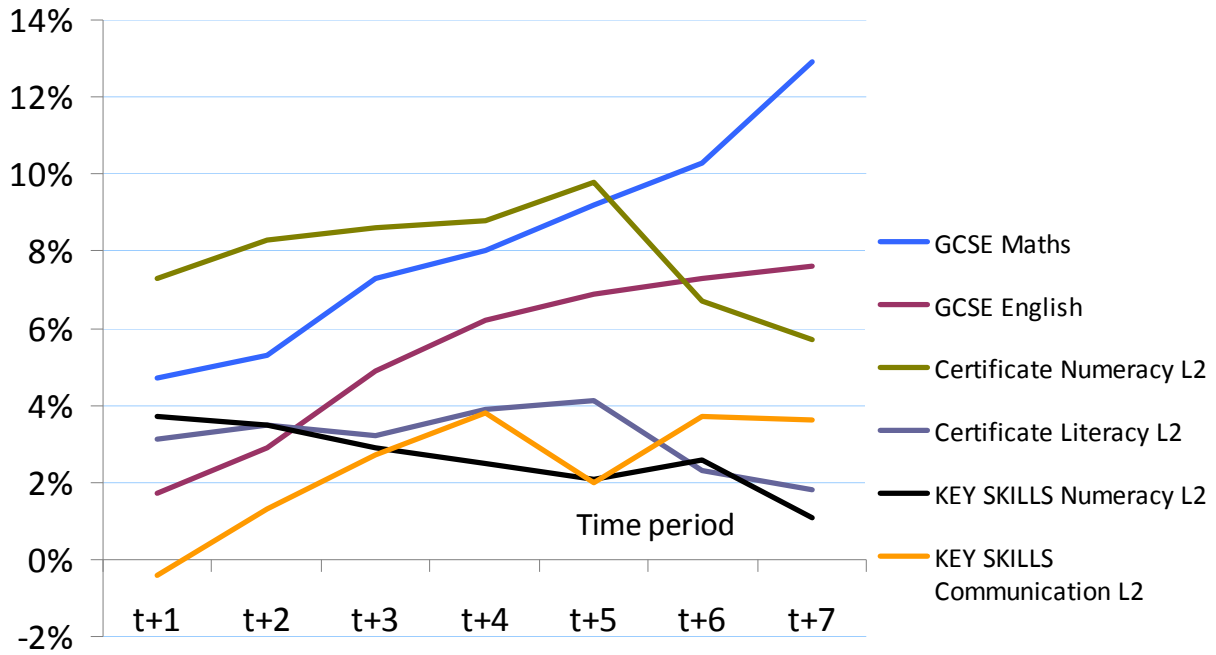
The estimates of the earning impact of Skills for Life qualifications, disaggregated by subject of study, are presented in Figure 9 and Table 20, while employment outcomes are presented in Table 21.

Figure 8: Earnings and employment returns – Skills for Life qualifications

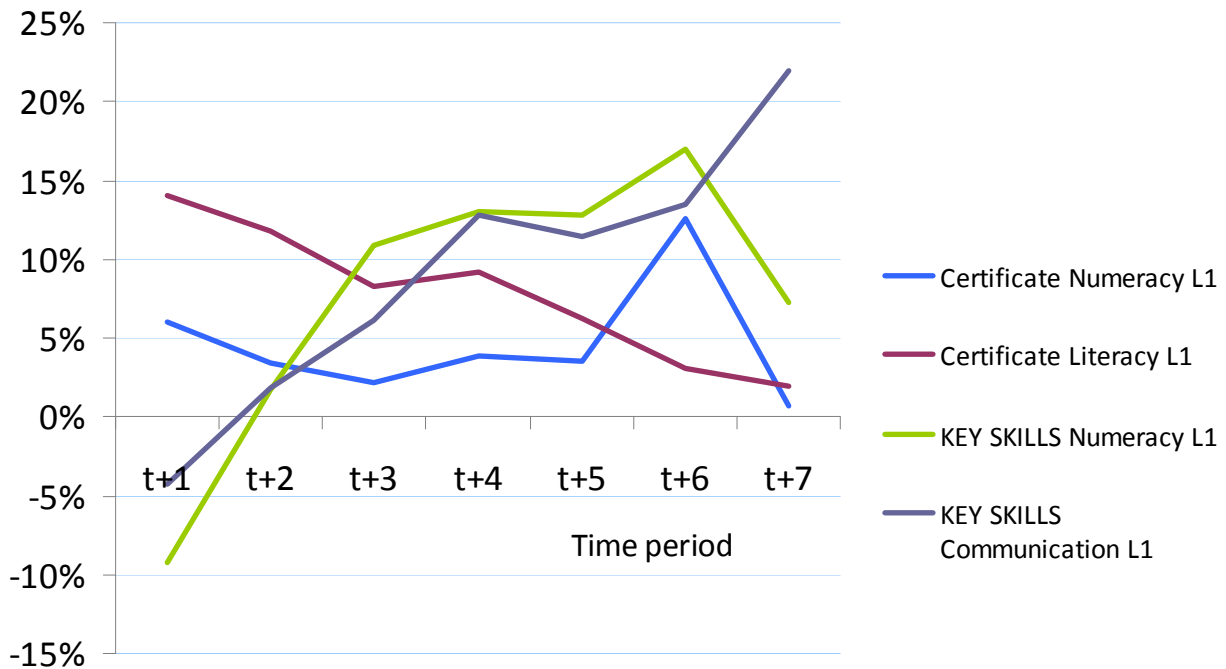
Earnings: Skills for Life Level 2



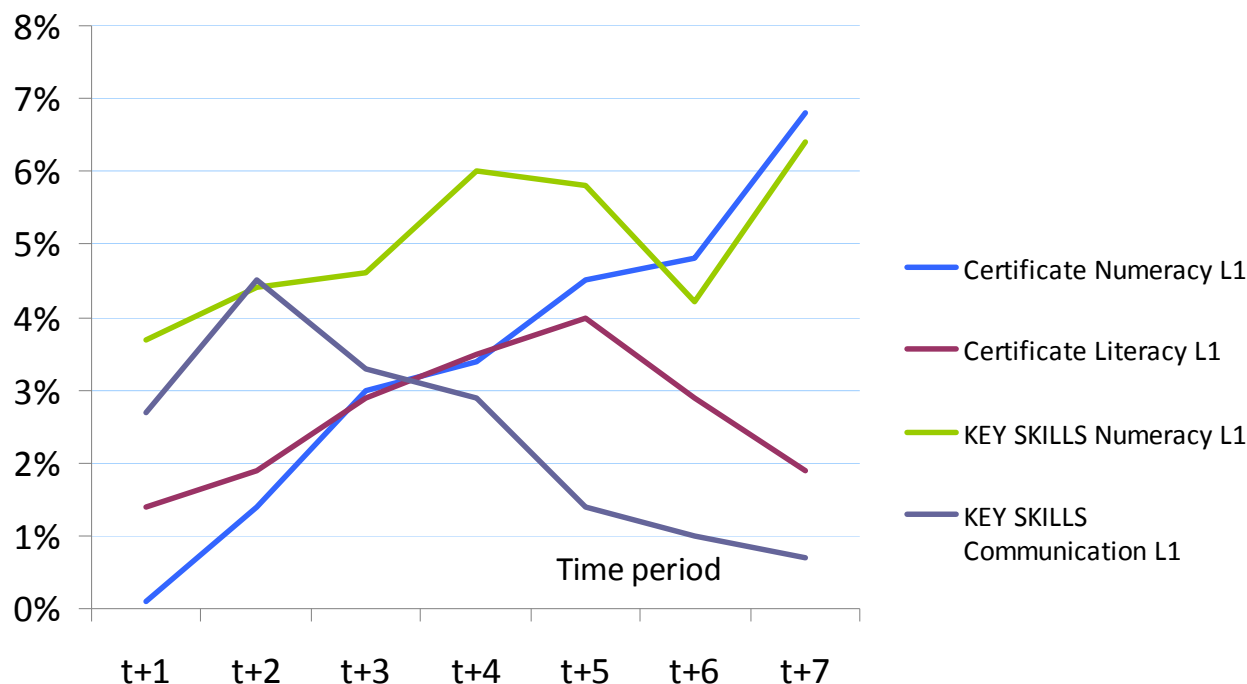
Employment: Skills for Life Level 2



Earnings: Skills for Life Level 1



Employment: Skills for Life Level 1



Source: London Economics

The results indicate that there is some degree of variation in the earning outcomes achieved by learners depending on the specific *Skills for Life* qualification completed; however, one consistent theme is the increasing returns that occur over time irrespective of the qualification attained.

Table 20: Impact of Skills for Life attainment on earnings outcomes (disaggregated)

		t+1	t+2	t+3	t+4	t+5	t+6	t+7
Level 2	GCSE Maths	0.048***	0.014	0.045***	0.073***	0.146***	0.194***	0.189***
	GCSE English	0.016	-0.019	-0.025	-0.009	0.054**	0.124***	0.058
	Certificate Numeracy L2	-0.003	-0.023	0.007	0.035**	0.092***	0.119**	-0.006
	Certificate Literacy L2	0.036**	0.025*	0.019	0.048***	0.041*	0.065	0.213*
	KEY SKILLS Numeracy L2	0.041	0.151***	0.155***	0.183***	0.225***	0.331***	0.328***
	KEY SKILLS Communication L2	-0.120***	-0.059***	-0.040*	0.017	0.182***	0.212***	0.138
Level 1	Certificate Numeracy L1	0.062***	0.035**	0.022	0.040**	0.036	0.134***	0.007
	Certificate Literacy L1	0.150***	0.125***	0.087***	0.096***	0.064***	0.031	0.020
	KEY SKILLS Numeracy L1	-0.088***	0.017	0.115***	0.139***	0.137***	0.185***	0.076
	KEY SKILLS Communication L1	-0.042	0.018	0.063**	0.137***	0.121***	0.145**	0.245***

Source: London Economics.

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The coefficients presented in this table do not represent the original coefficients from the regression analysis, but an exponential transformation of the original coefficients (undertaken because the original regression model considers the impact of qualifications on the logarithm of hourly earnings).

At the top end of the spectrum, individuals completing Key Skills Numeracy qualifications at Level 2 achieve a 15% earnings premium within the first 2 years post completion, rising further to approximately 33% by the sixth and seventh year. Although Key Skills Communication qualifications at Level 2 demonstrate the same increase in the relative

return over the seven year period of analysis, the results indicates that those in possession of these Key Skills qualifications earn significantly less than non-completers in the first three years post completion, and it is only in the fourth year post completion that the earnings returns turn positive. Certificates in Numeracy and Literacy at Level 2 are also associated with positive earnings returns (between 0 and 12% during the first six years post completion), while individuals undertaking and completing GCSE qualifications in Maths see a strong, significant and increasing return over time (increasing from 4.5% in the first year post completion to almost 19% by the end of the time period). As with Certificates in Literacy at Level 2, individuals completing GCSE qualifications in English achieve insignificant return in the first four years post completion and it is not until the fifth year post qualification attainment that earnings returns turn positive (although there may be a suggestion that this is in part because attainment of GCSEs might lead to further study and result in lower earnings).

For Skills for Life qualifications at Level 1, the results indicate that there are also consistently strong earnings returns associated with completion. Individuals achieving Certificates in Numeracy and Literacy at Level 1 achieve earnings returns of 0%-6% and 6%-15% (respectively) in the first five years post completion. Individuals completing Key Skills qualifications at Level 1 also achieved strong positive returns relative to non-completers, though these positive earnings outcomes do not materialise until the third year post completion. Holders of Key Skills Communication qualifications at Level 1 see a steadily increasing earnings outcome between the third and seventh year post completion (6.3% to 24.5%), while those in possession of a Key Skills Numeracy qualification see their earnings premium increase from 11.5% to 18.5% between the third and sixth year post completion.

Employment

Skills for Life qualifications generally offer their recipients strong employment returns. At Level 2, the more numerical qualifications (such as GCSE in Maths, Certificate in Numeracy and Key Skills Numeracy) result in their holders being employed for at least 3.7% more of the year immediately following completion. However, there is some variation in the extent to which these qualifications continue to offer their holders employment benefits over time. For those individuals in possession of a GCSE in Maths, the employment outcomes improve further (to almost 13% by the end of the period of analysis), while individuals in possession of Key Skills qualification witness an erosion of employment outcomes (compared to non-completers). Individuals in possession of Certificates in Numeracy at Level 2 maintain the initial positive employment benefits in the first six years of the analysis.

		t+1	t+2	t+3	t+4	t+5	t+6	t+7
Level 2	GCSE Maths	0.047***	0.053***	0.073***	0.080***	0.092***	0.103***	0.129***
	GCSE English	0.017***	0.029***	0.049***	0.062***	0.069***	0.073***	0.076***
	Certificate Numeracy L2	0.073***	0.083***	0.086***	0.088***	0.098***	0.067***	0.057
	Certificate Literacy L2	0.031***	0.035***	0.032***	0.039***	0.041***	0.023	0.018
	KEY SKILLS Numeracy L2	0.037***	0.035***	0.029***	0.025***	0.021	0.026	0.011
	KEY SKILLS Communication L2	-0.004	0.013*	0.027***	0.038***	0.020*	0.037**	0.036
Level 1	Certificate Numeracy L1	0.001	0.014**	0.030***	0.034***	0.045***	0.048***	0.068***
	Certificate Literacy L1	0.014***	0.019***	0.029***	0.035***	0.040***	0.029***	0.019
	KEY SKILLS Numeracy L1	0.037***	0.044***	0.046***	0.060***	0.058***	0.042**	0.064**
	KEY SKILLS Communication L1	0.027***	0.045***	0.033***	0.029***	0.014	0.010	0.007

Source: London Economics.

The analysis also suggests that there are positive employment outcomes associated with a number of the more Literacy/ Communication learning aims at level 2. Individuals undertaking and completing GCSEs in English achieve a small initial increase in the proportion of the year in employment (1.7% compared to non-completers) that rises continually over the period. As with the results relating to the more numerical learning aims, Level 2 Literacy Certificates offer reasonably consistent employment gains to their holder in the first five years post completion (between 3% and 4%) before tailing off.

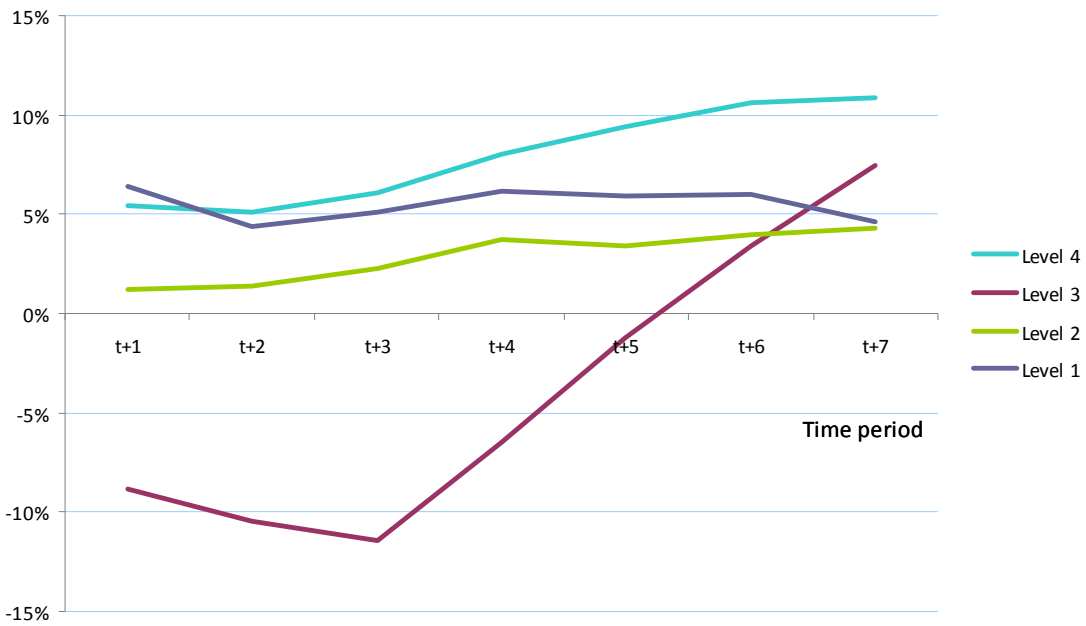
At Level 1, the employment outcomes are broadly replicated, with individuals completing Level 1 Certificates in Numeracy and Literacy increasing the proportion of the year in employment by between 0 and 2% in the first two years post completion rising to between 5% and 7% in the final two years of analysis (Numeracy Certificate) and 2%-3% for Literacy Certificate completers. Key Skills qualifications also demonstrate strong returns, especially in numeracy, with completers increasing the proportion of the year in employment (by between 4% and 7%) compared to zero and 4½ % for individuals completing Key Skills Communication qualifications at level 1.

Annex 1 Disaggregated results by gender

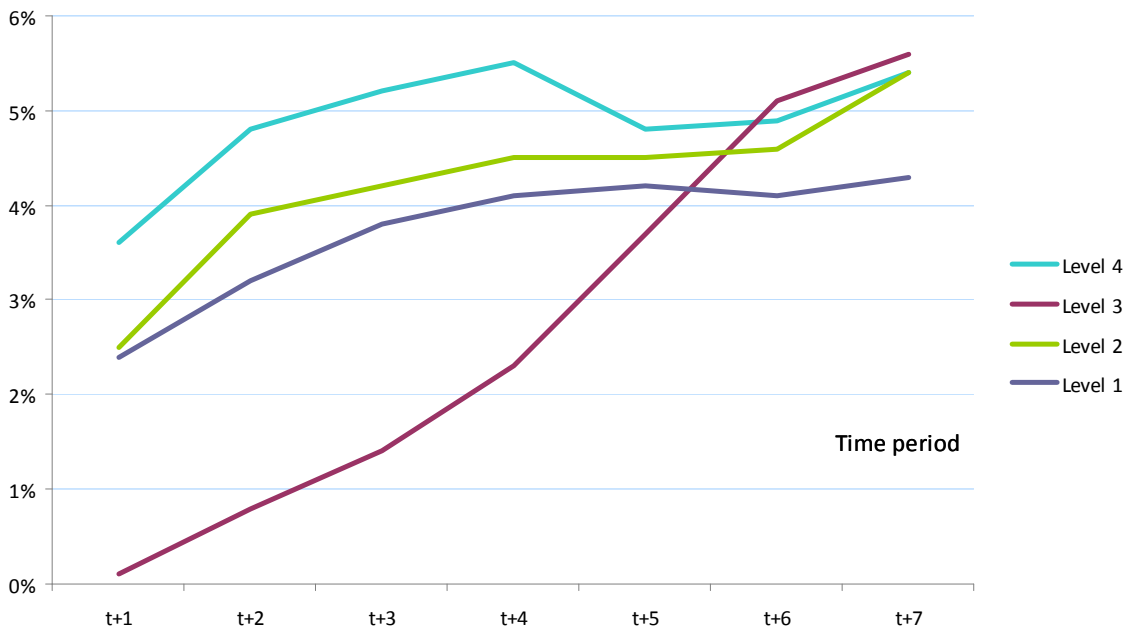
A1.1 Comparison with previous analyses – men

Figure 9: Comparison with previous analyses – men

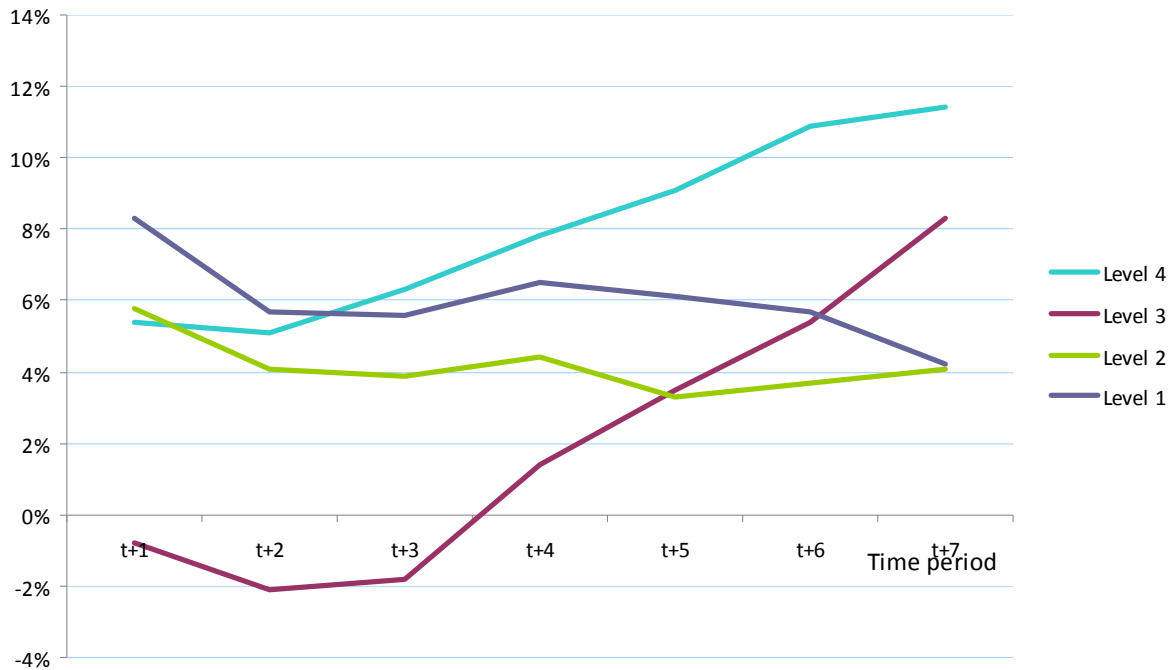
Earnings: Learners aged 16+, academic and vocational qualifications



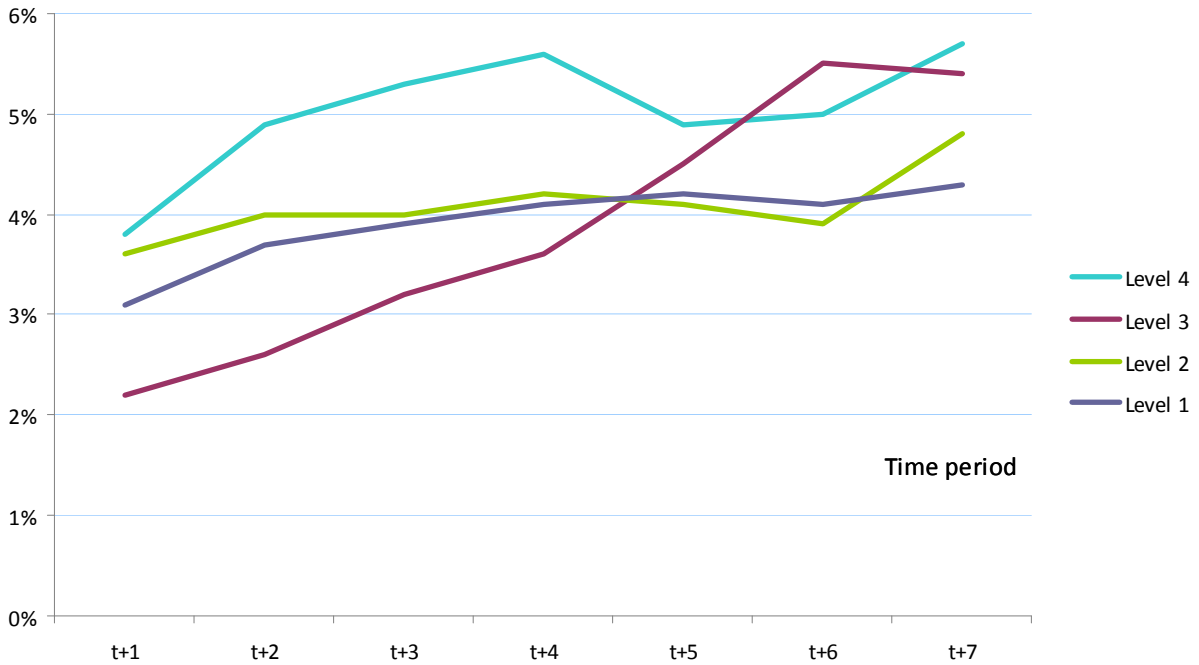
Employment: Learners aged 16+, academic and vocational qualifications



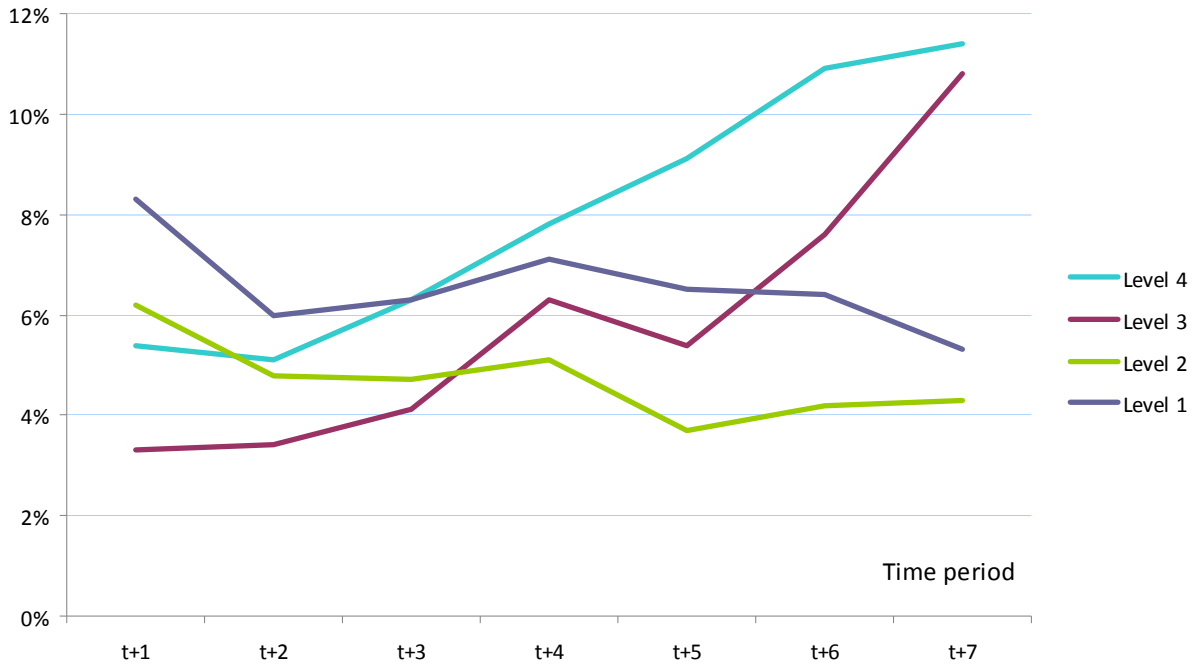
Earnings: Learners aged 19+, academic and vocational qualifications



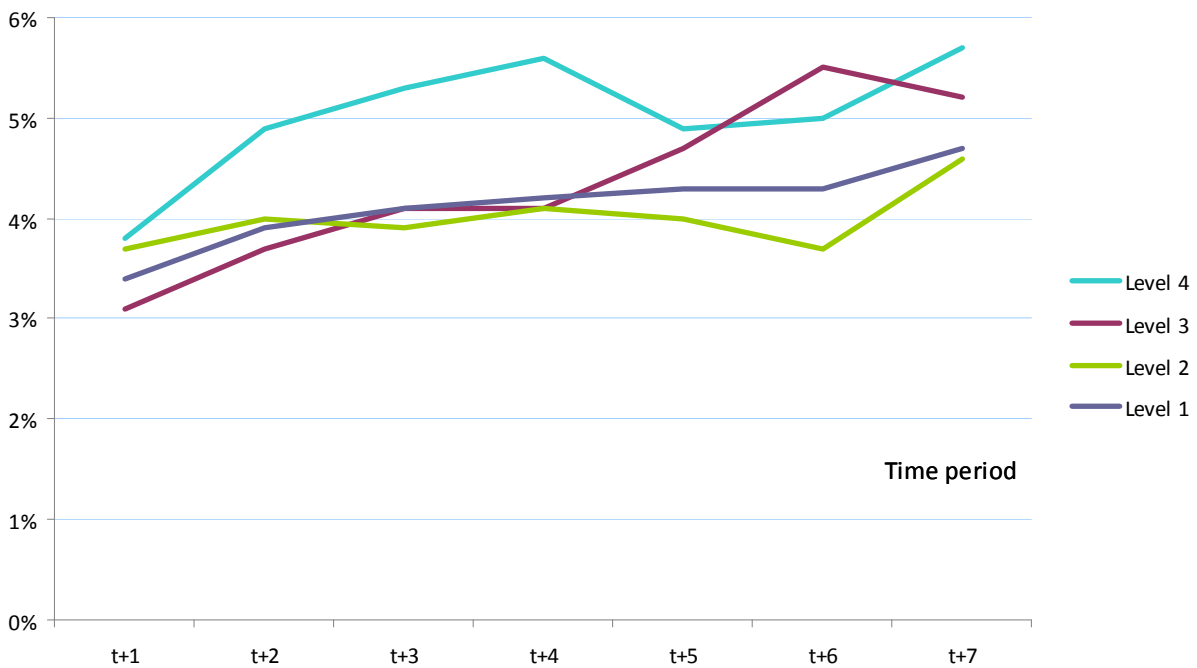
Employment: Learners aged 19+, academic and vocational qualifications



Earnings: Learners aged 19+, vocational qualifications only



Employment: Learners aged 19+, vocational qualifications only

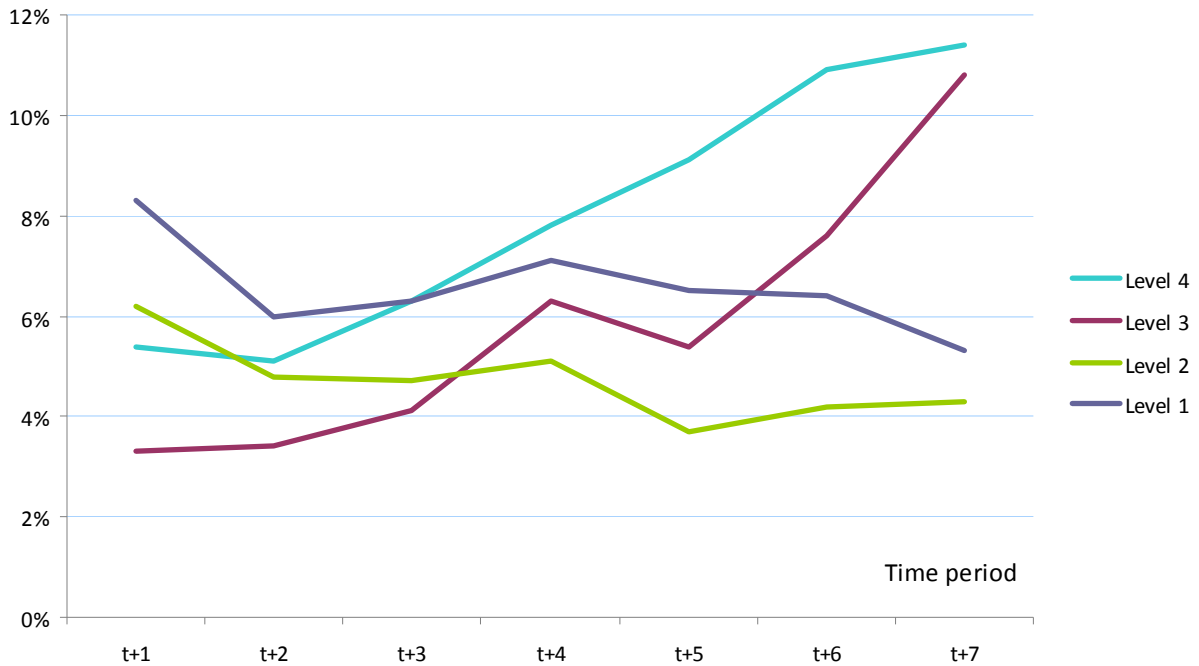


.Source: London Economics

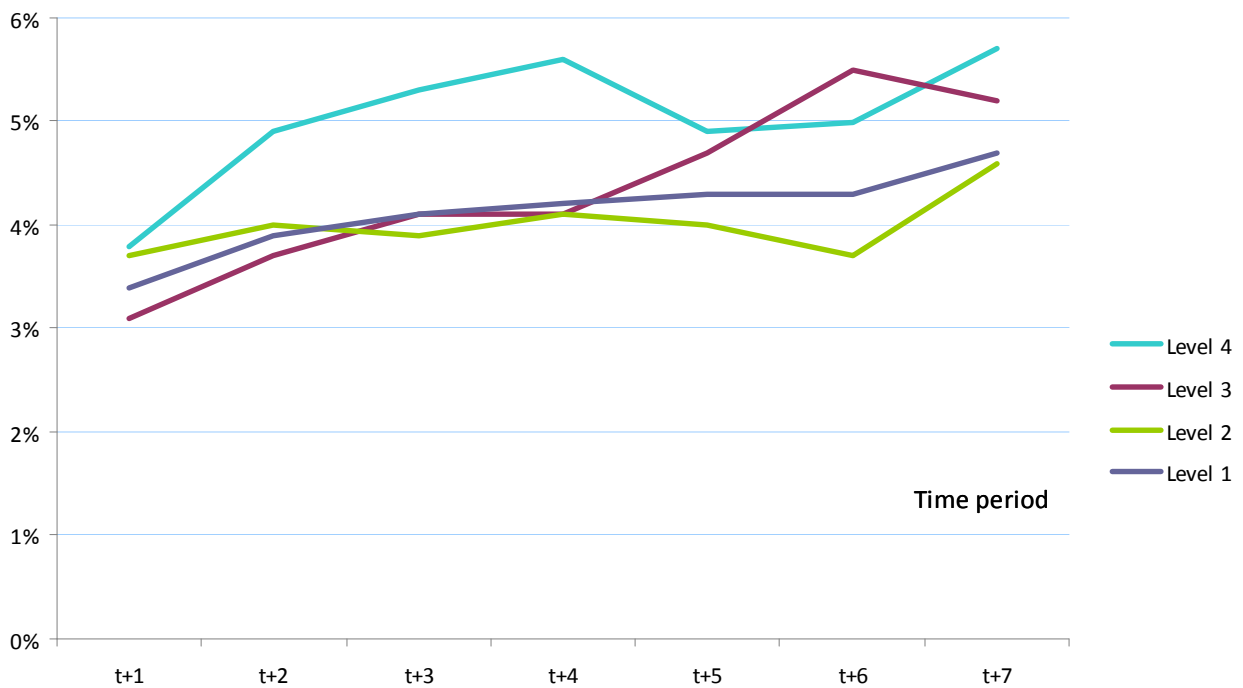
A1.2 Age of attainment - men

Figure 10: Earnings and employment returns by age of attainment – men

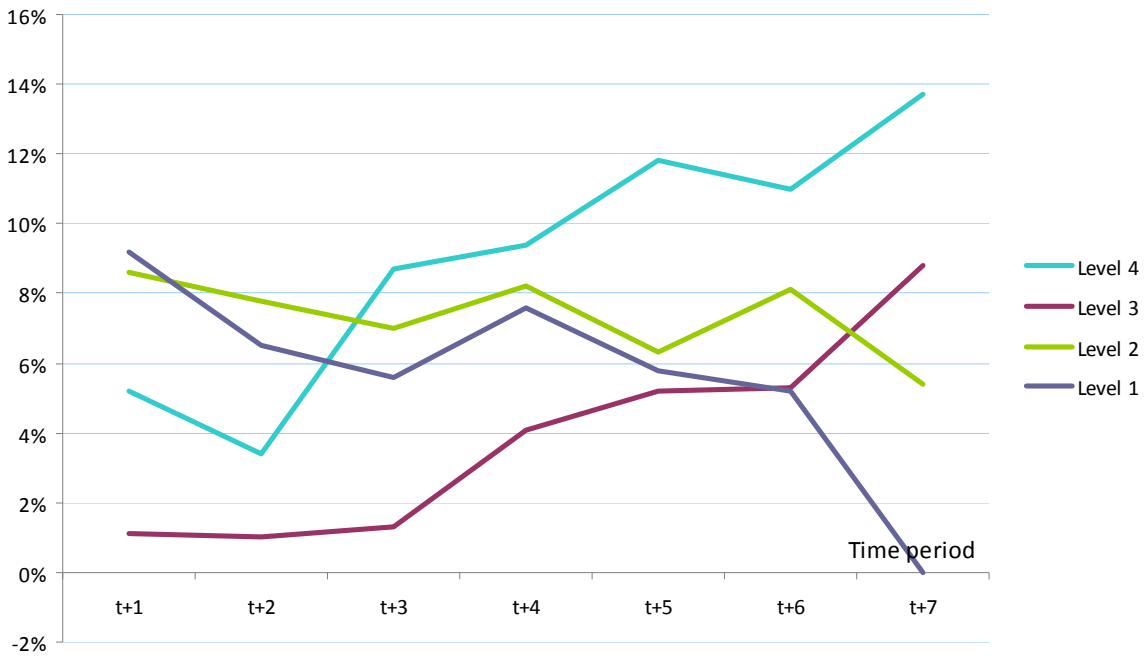
Earnings: Learners aged 19+, vocational qualifications only



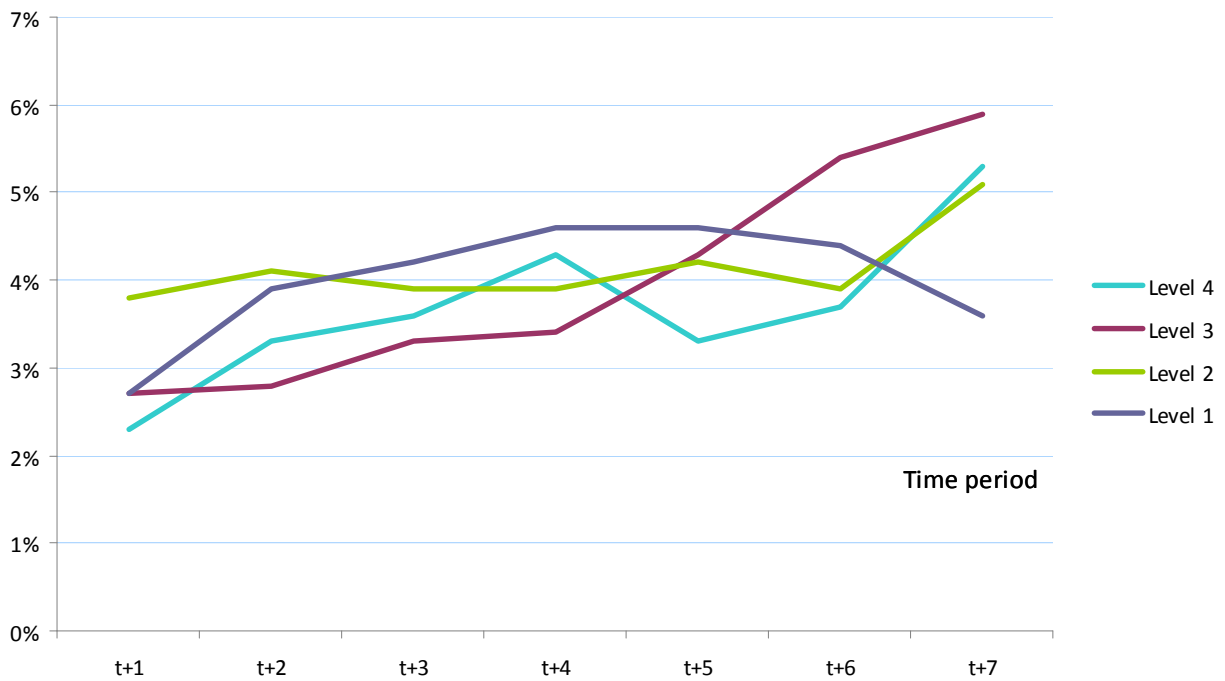
Employment: Learners aged 19+, vocational qualifications only



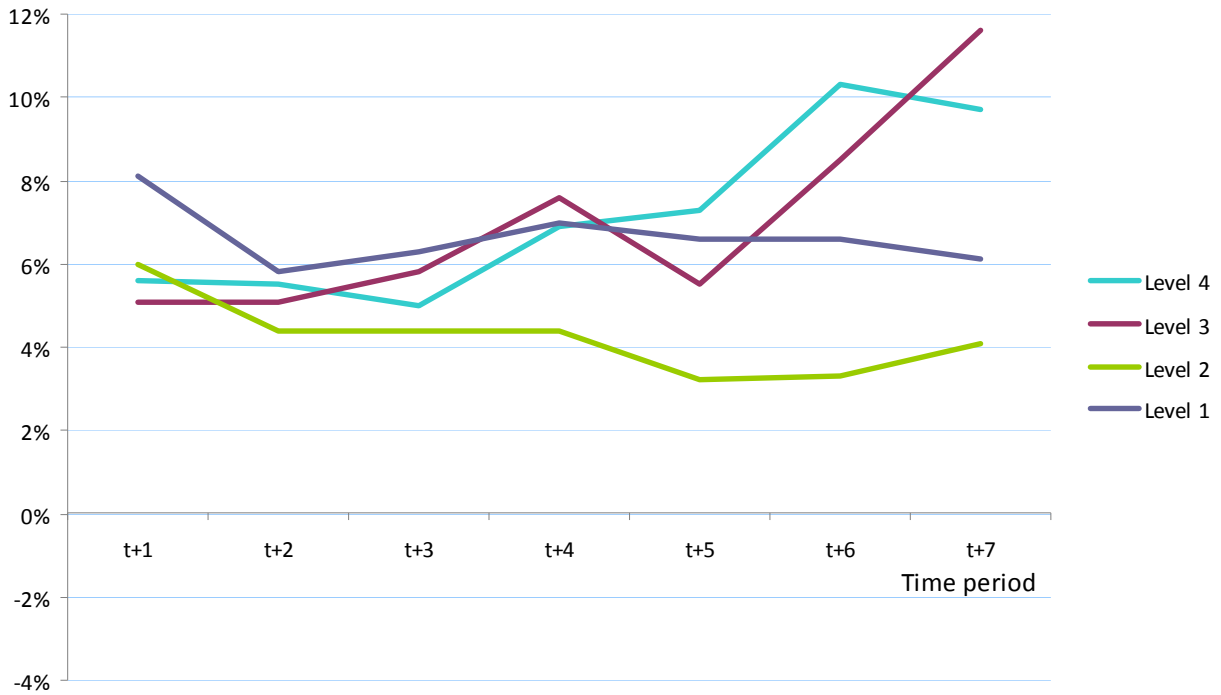
Earnings: Learners aged 19-25, vocational qualifications only



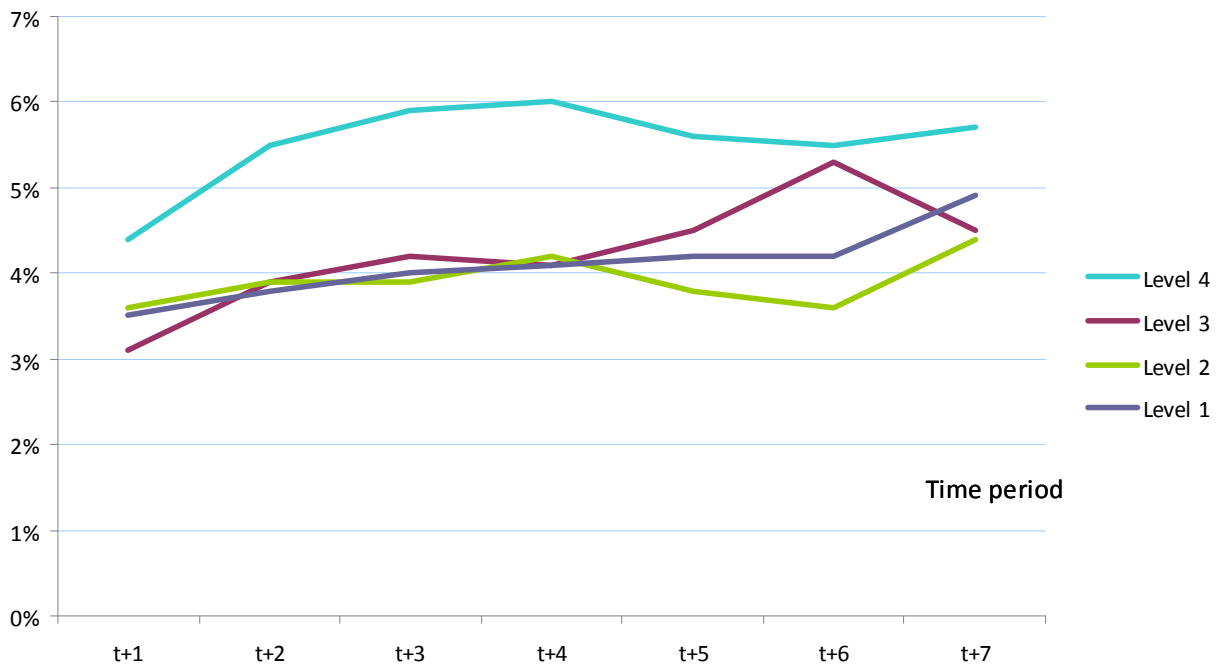
Employment: Learners aged 19-25, vocational qualifications only



Earnings: Learners aged 25+, vocational qualifications only.



Employment: Learners aged 25+, vocational qualifications only.

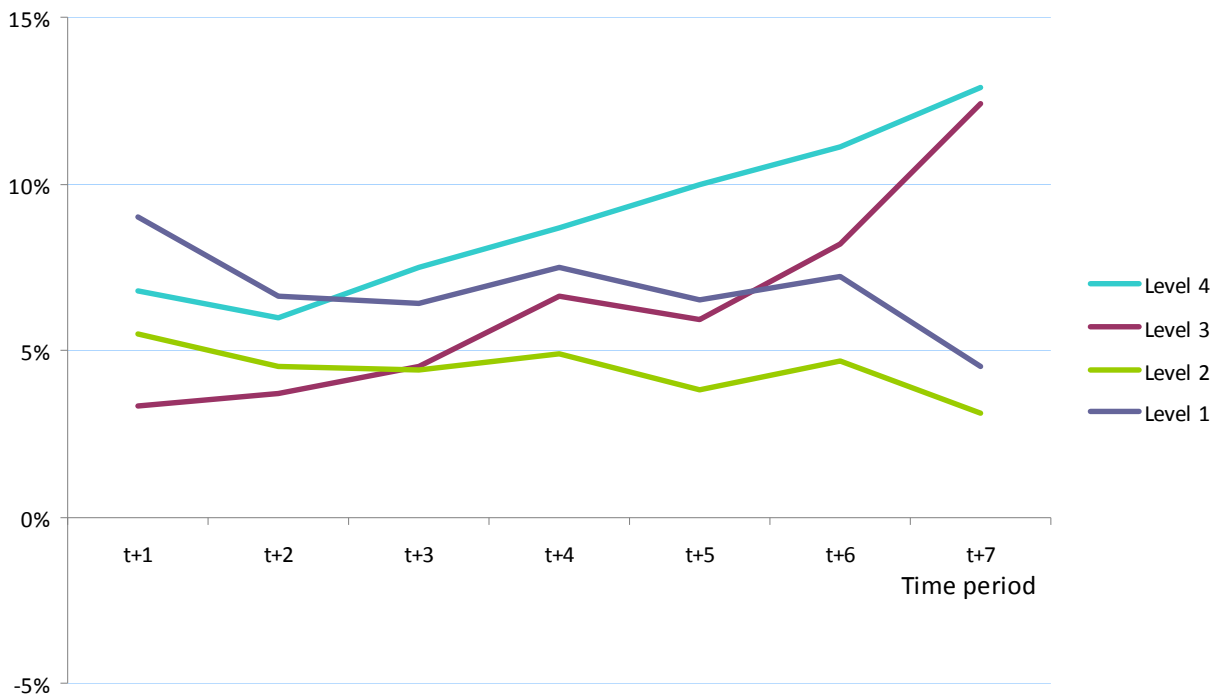


Source: London Economics

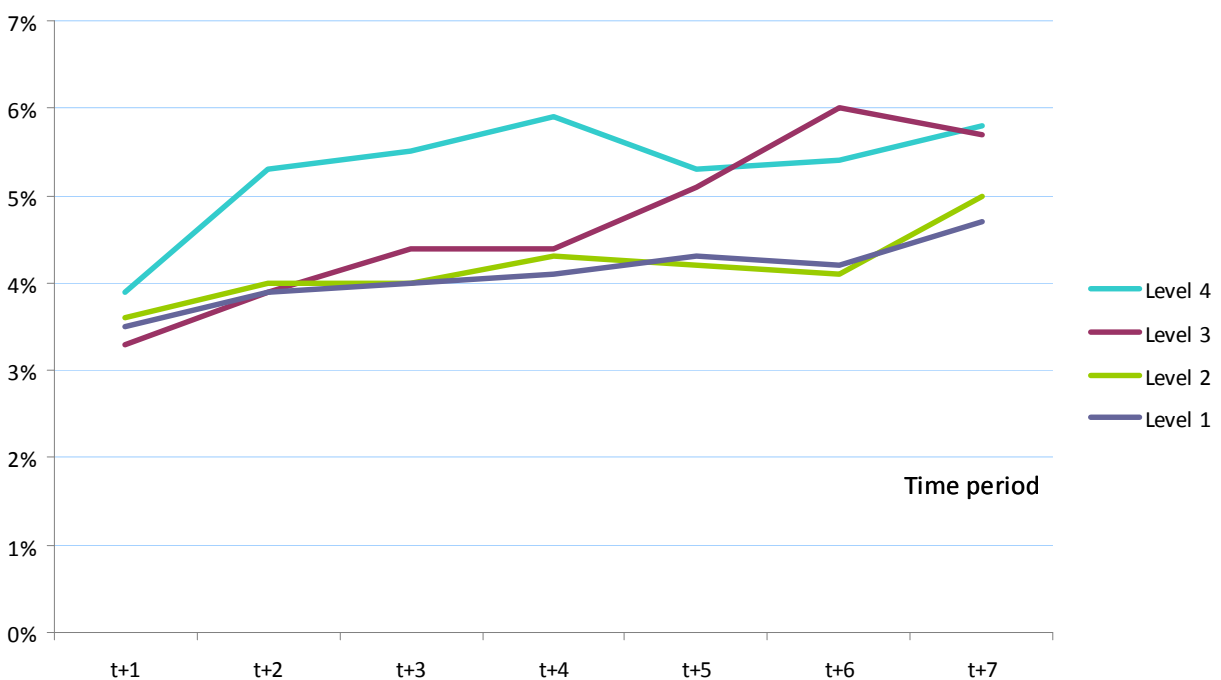
A1.3 Mode of attainment - men

Figure 11: Earnings and employment returns by mode of attainment – men

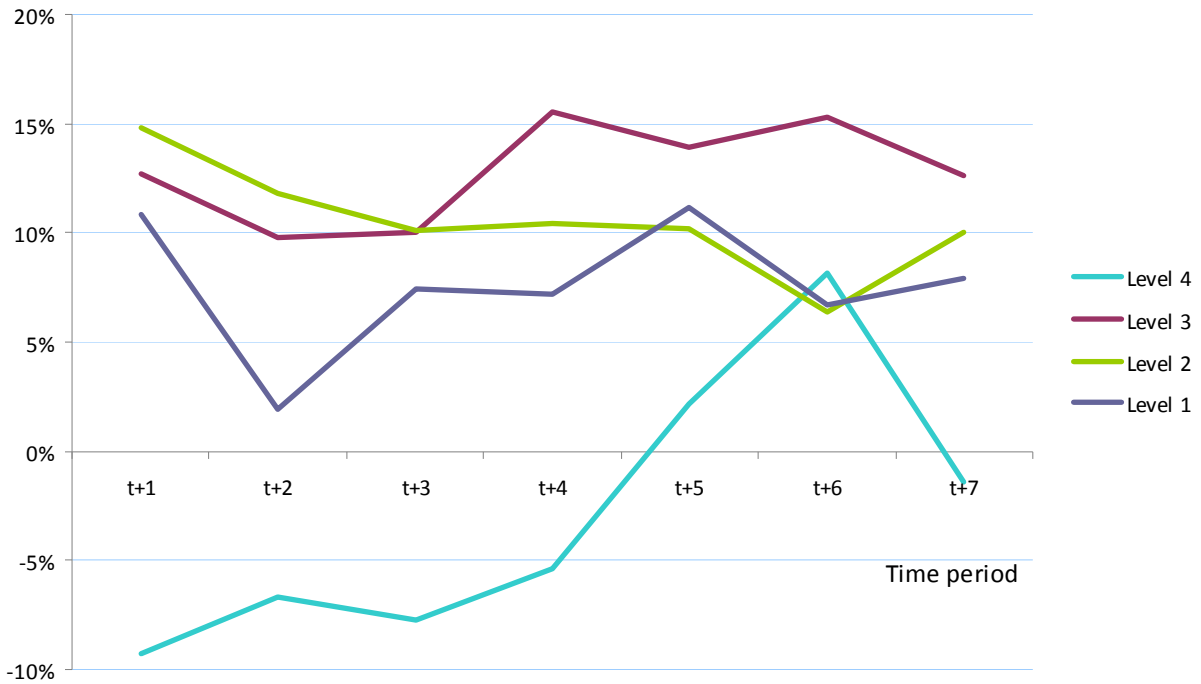
Earnings: Learners aged 19+, vocational qualifications only – classroom mode of attendance.



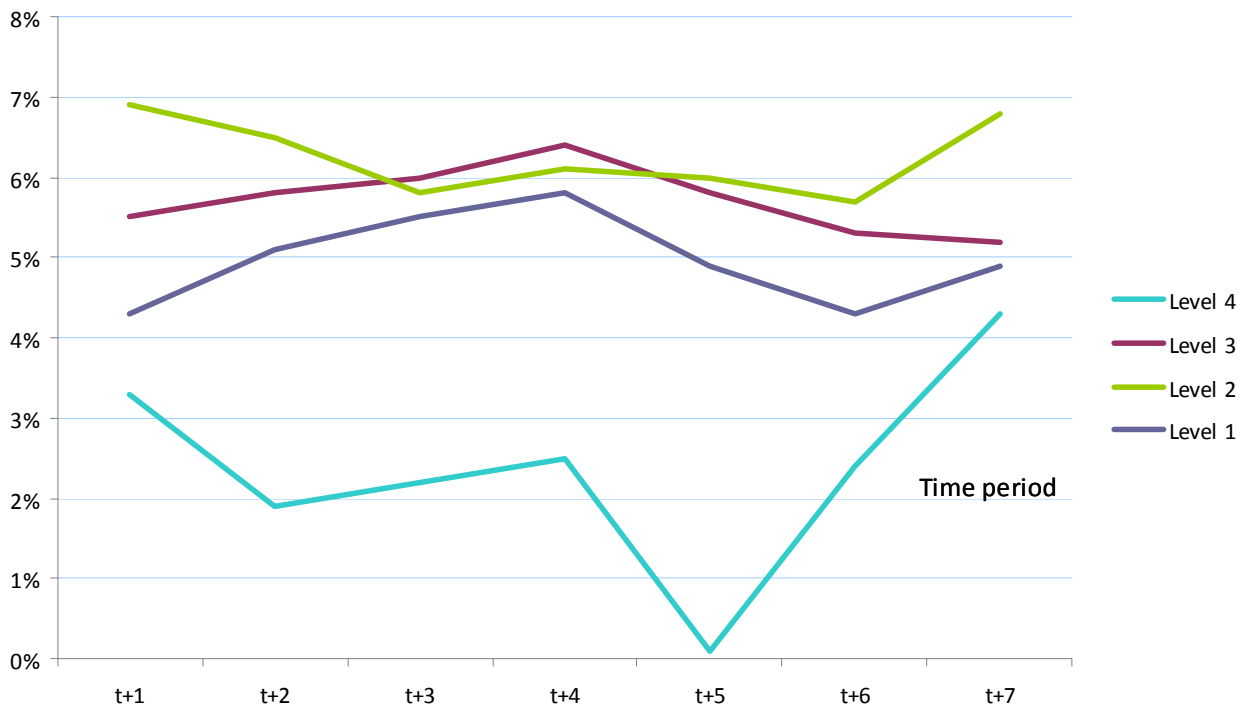
Employment: Learners aged 19+, vocational qualifications only – classroom mode of attendance.



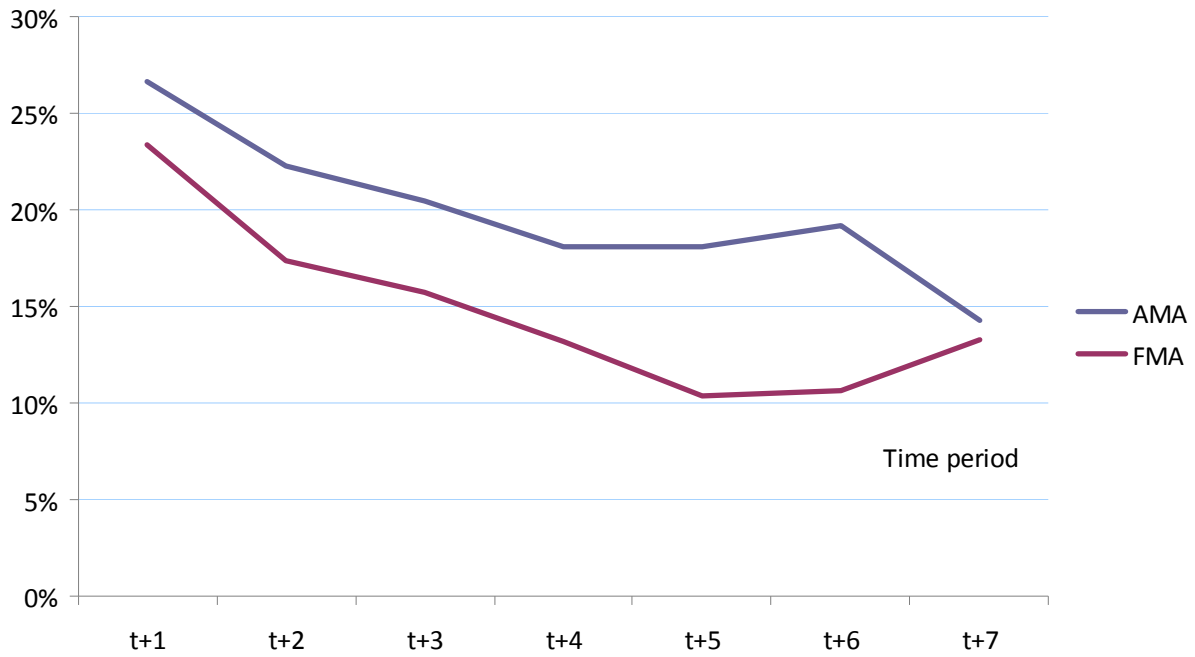
Earnings: Learners aged 19+, vocational qualifications only – workplace mode of attendance



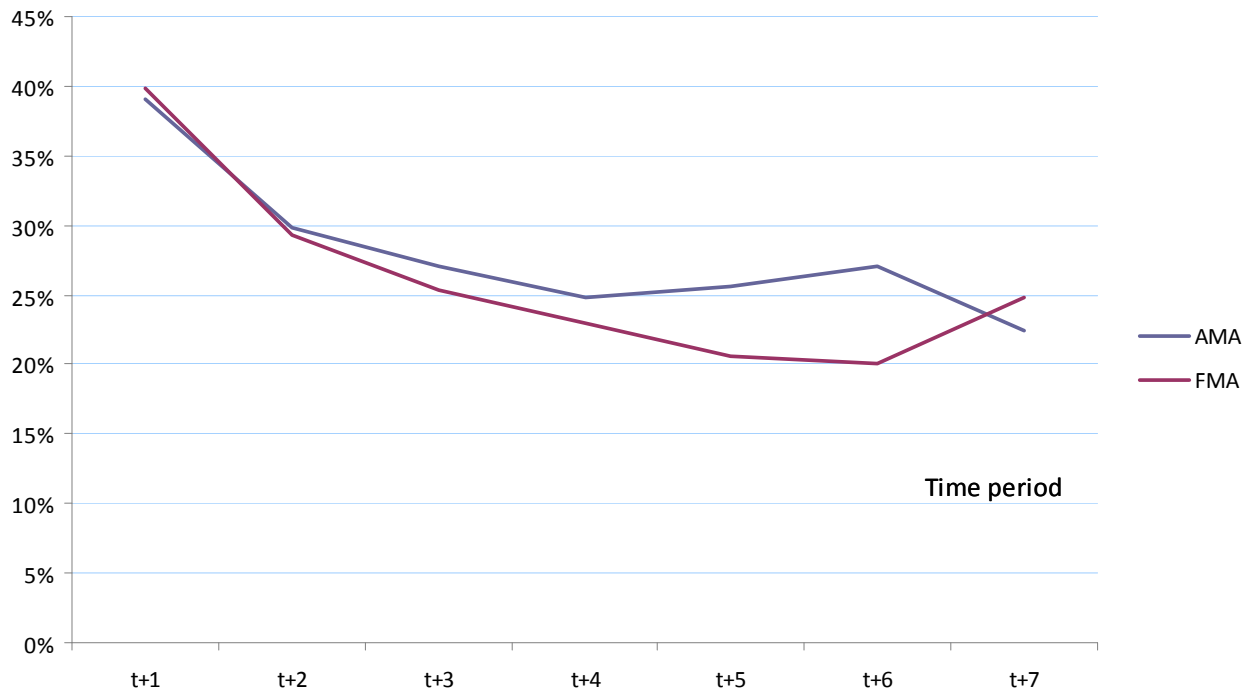
Employment: Learners aged 19+, vocational qualifications only – workplace mode of attendance



Earnings: Learners aged 19+, vocational qualifications only - apprenticeships.



Employment: Learners aged 19+, vocational qualifications only - apprenticeships.

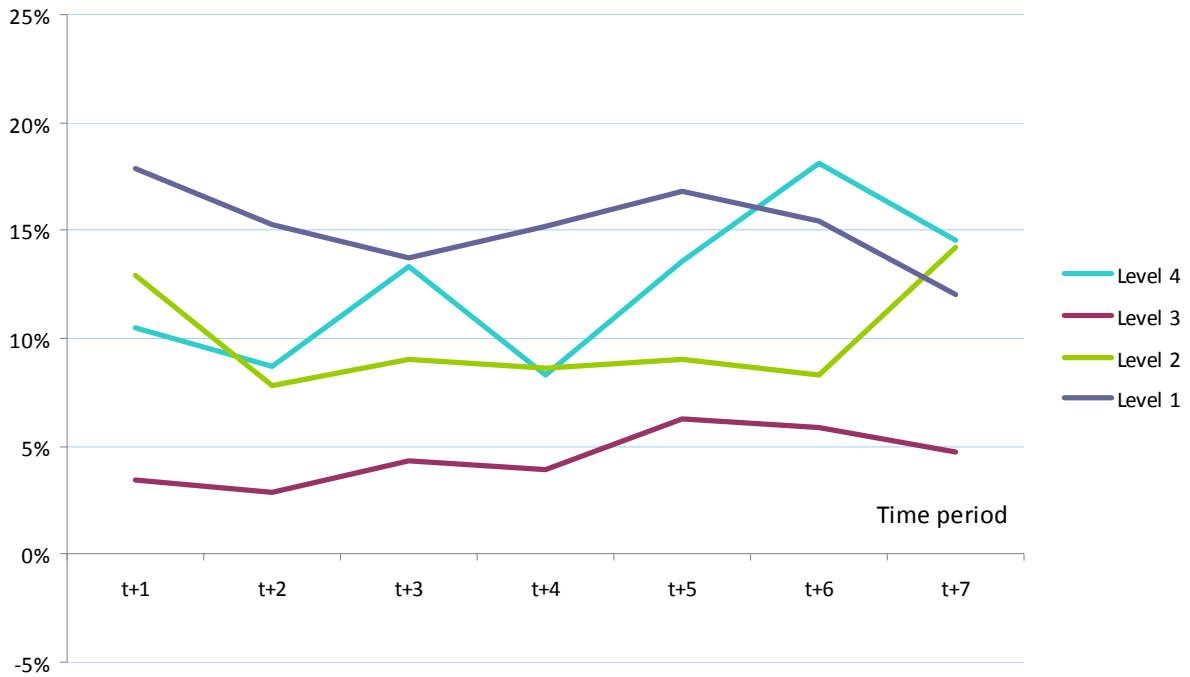


Source: London Economics

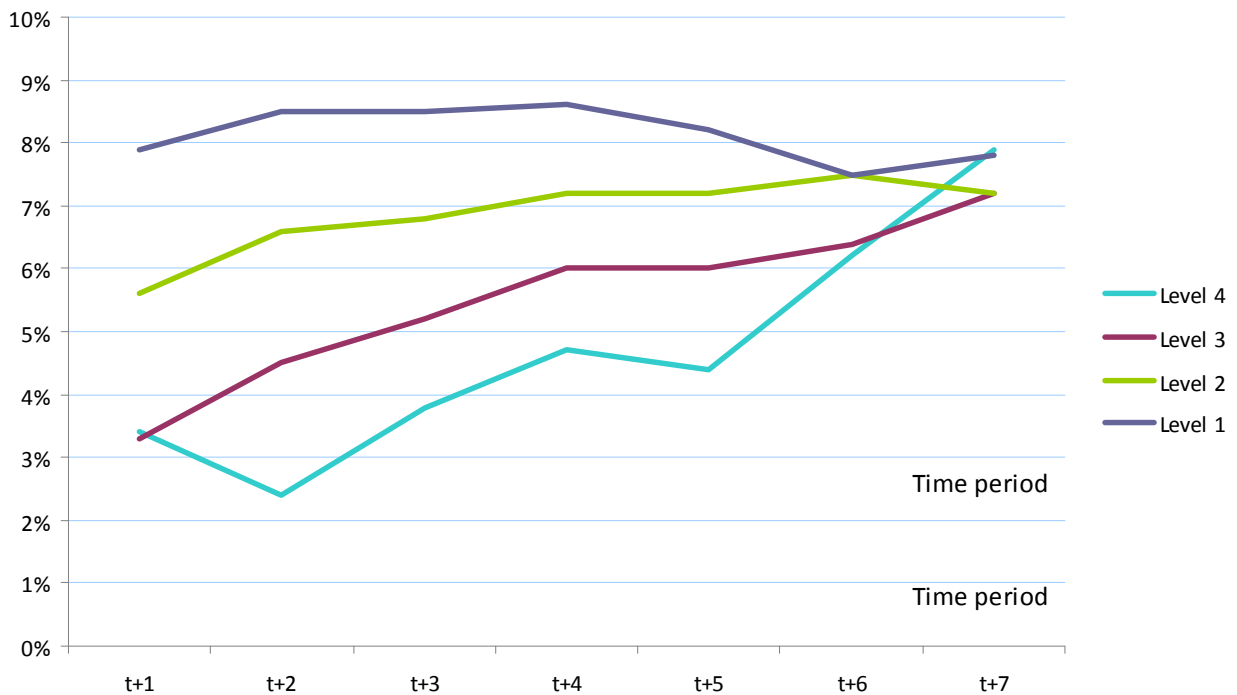
A1.4 Subject of attainment – all

Figure 12: Earnings and employment returns by subject of study (I)

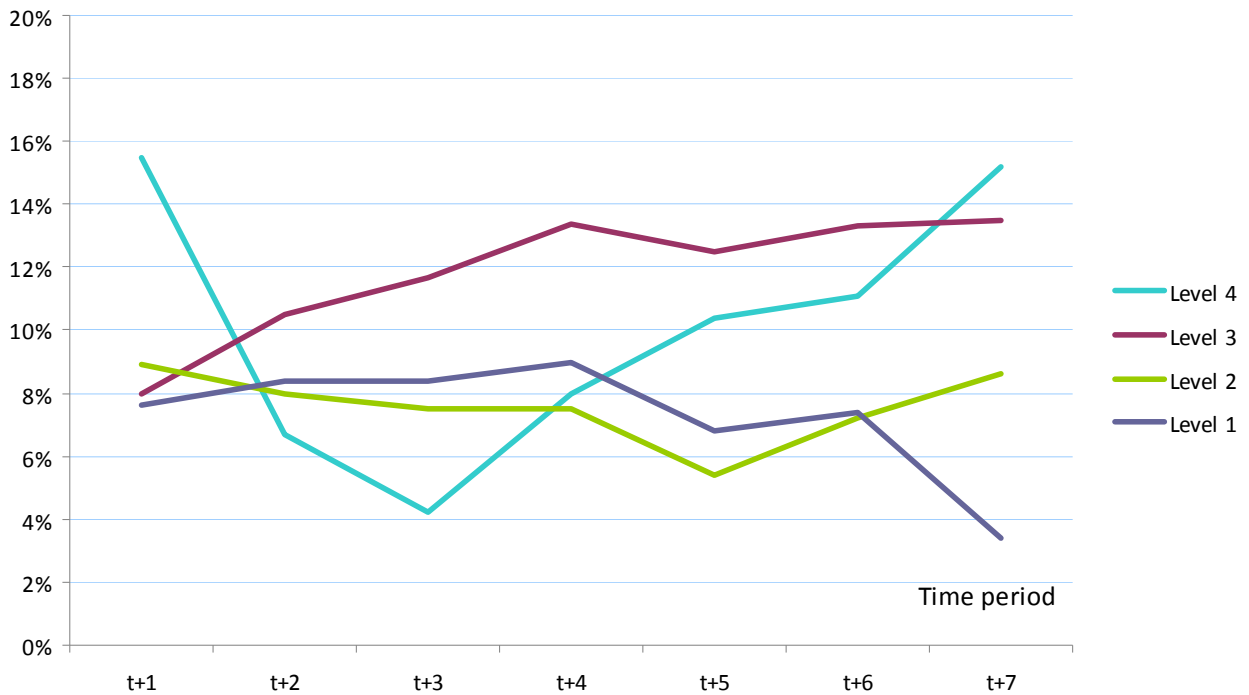
Earnings: Learners aged 19+, vocational qualifications only – health and social care.



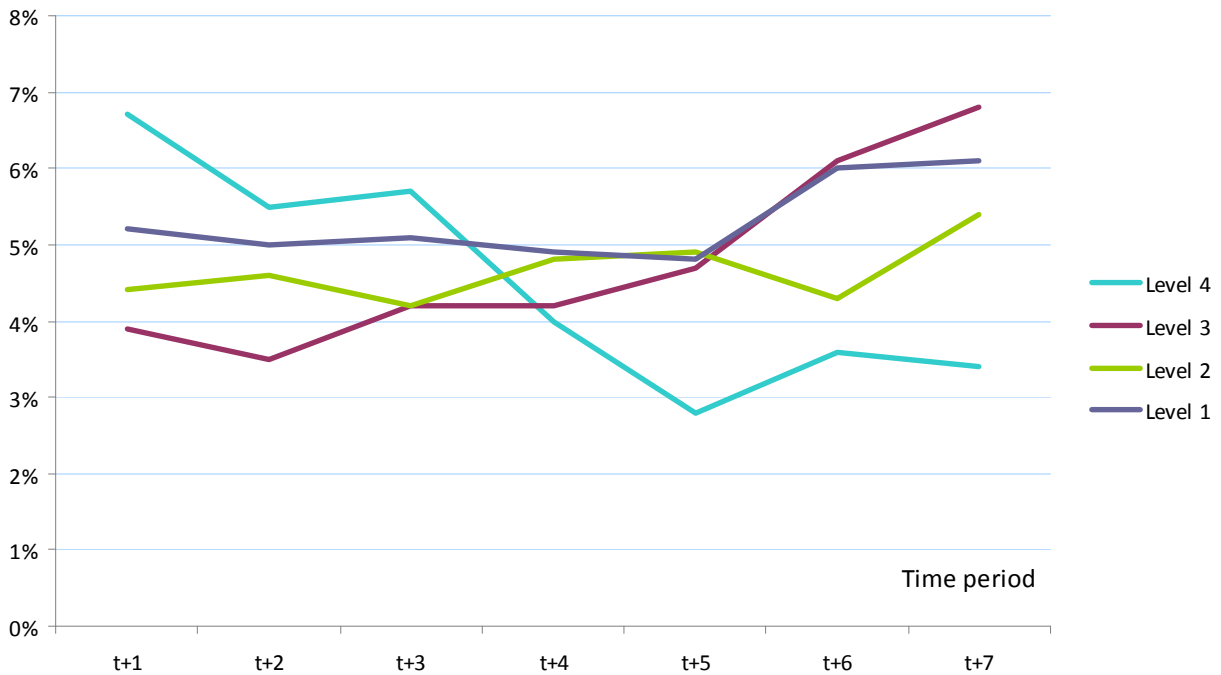
Employment: Learners aged 19+, vocational qualifications only – health and social care.



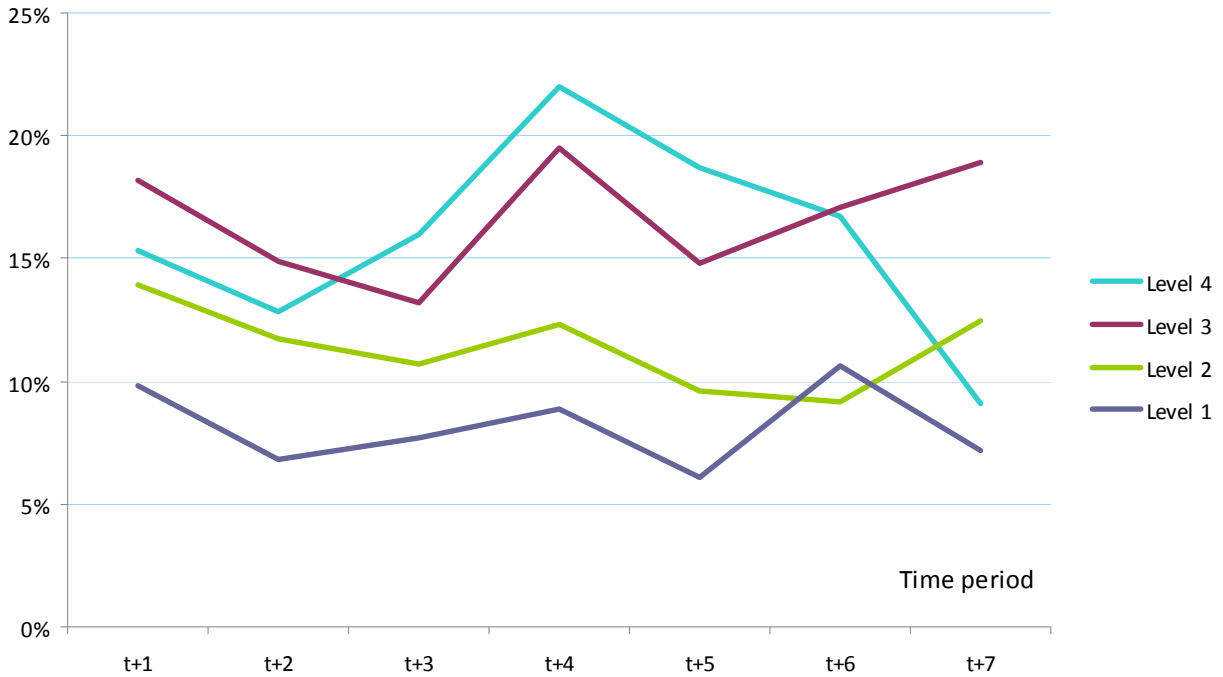
Earnings: Learners aged 19+, vocational qualifications only – engineering and manufacturing



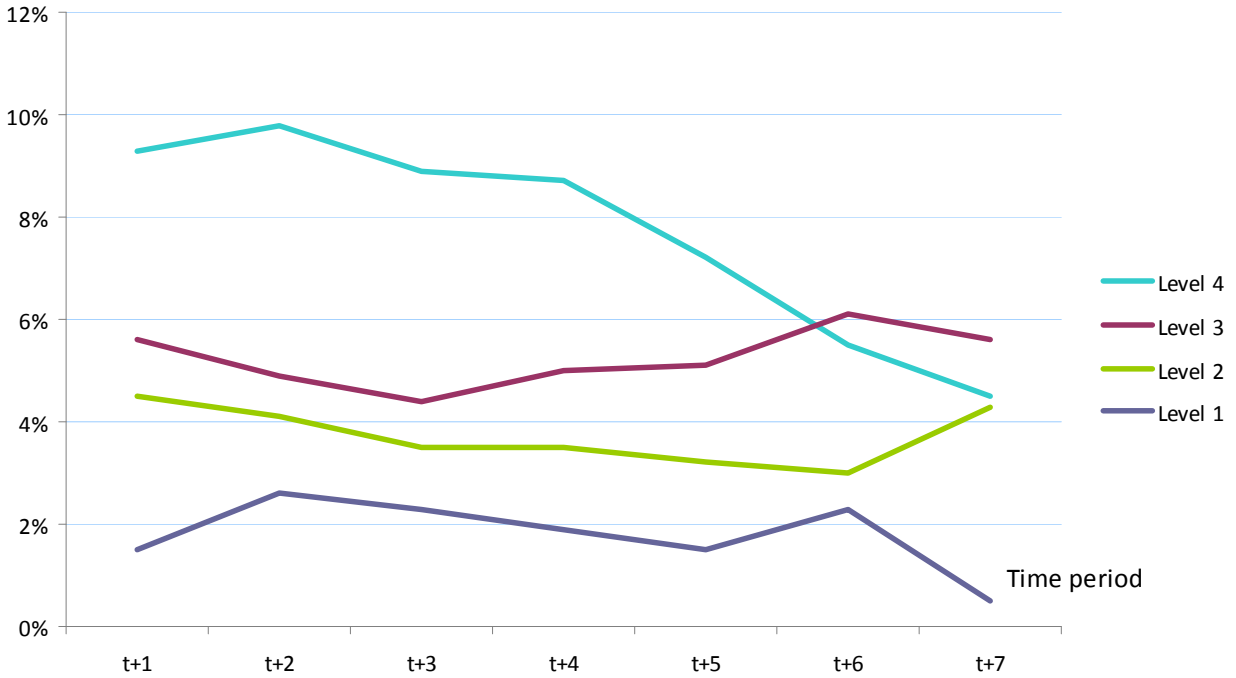
Employment: Learners aged 19+, vocational qualifications only – engineering and manufacturing



Earnings: Learners aged 19+, vocational qualifications only – construction, planning and built environment.



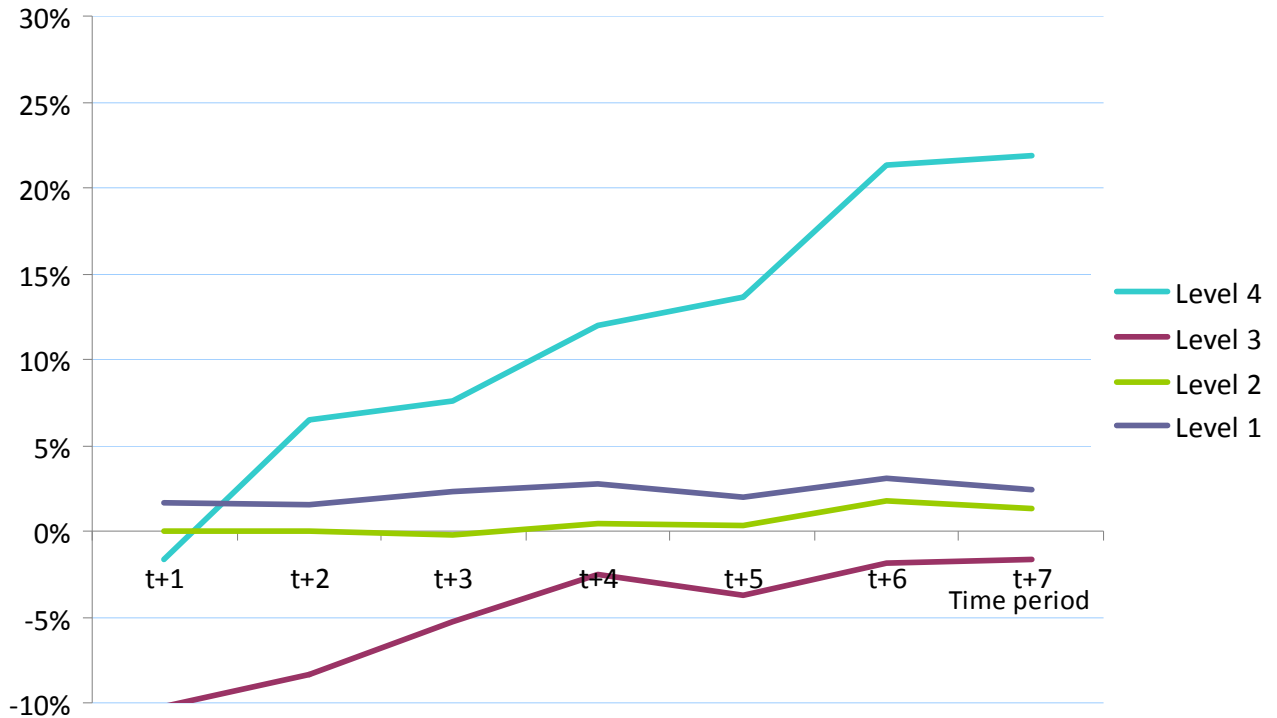
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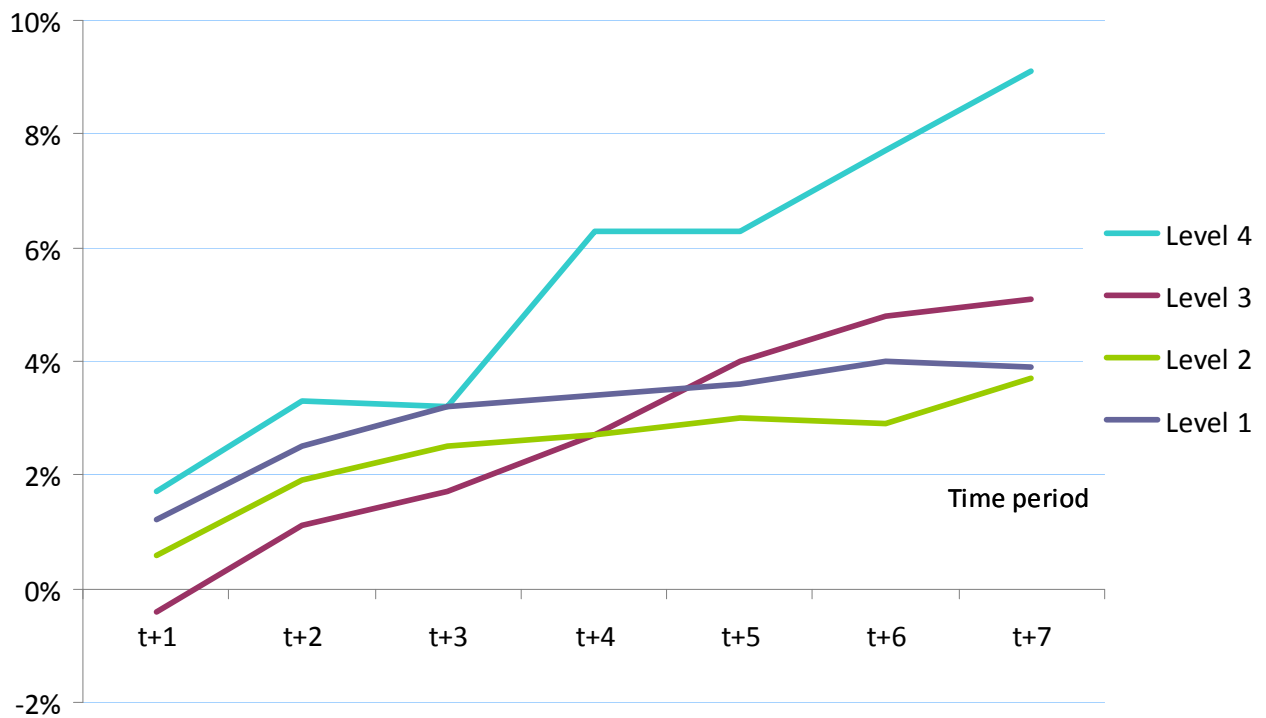
Source: London Economics

Figure 13: Earnings and employment returns by subject of study (II)

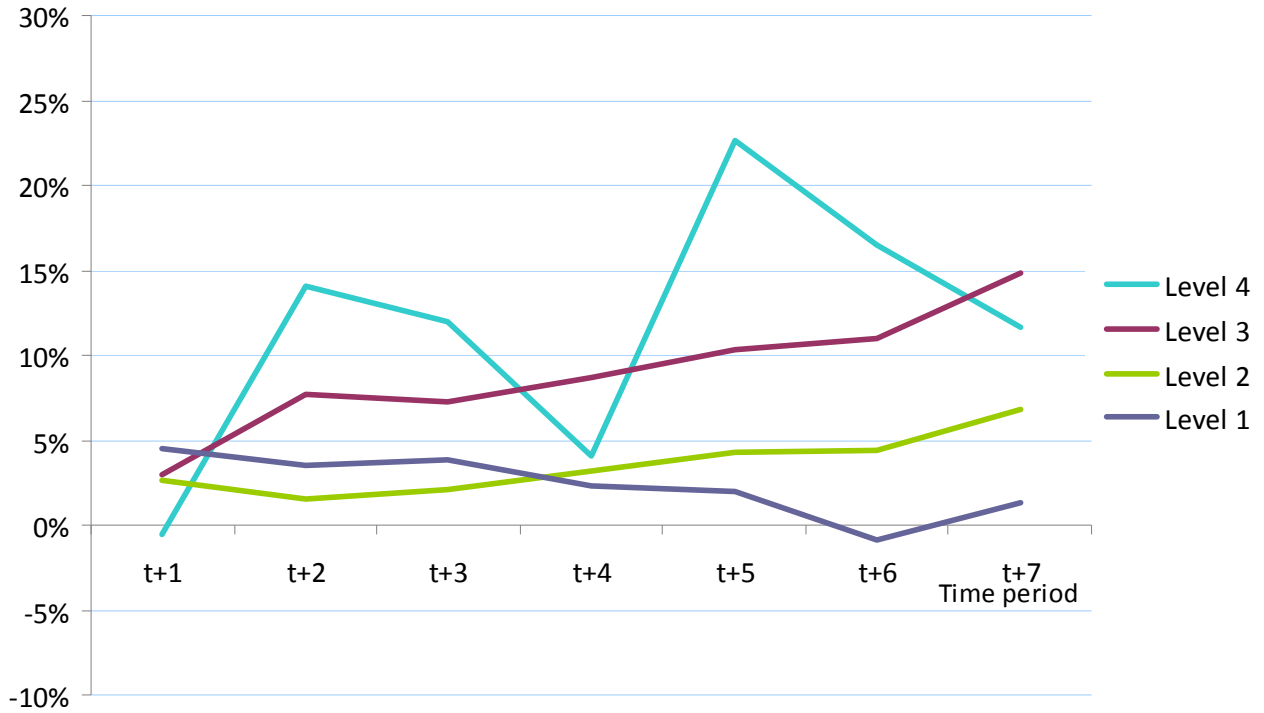
Earnings: Learners aged 19+, vocational qualifications only – ICT



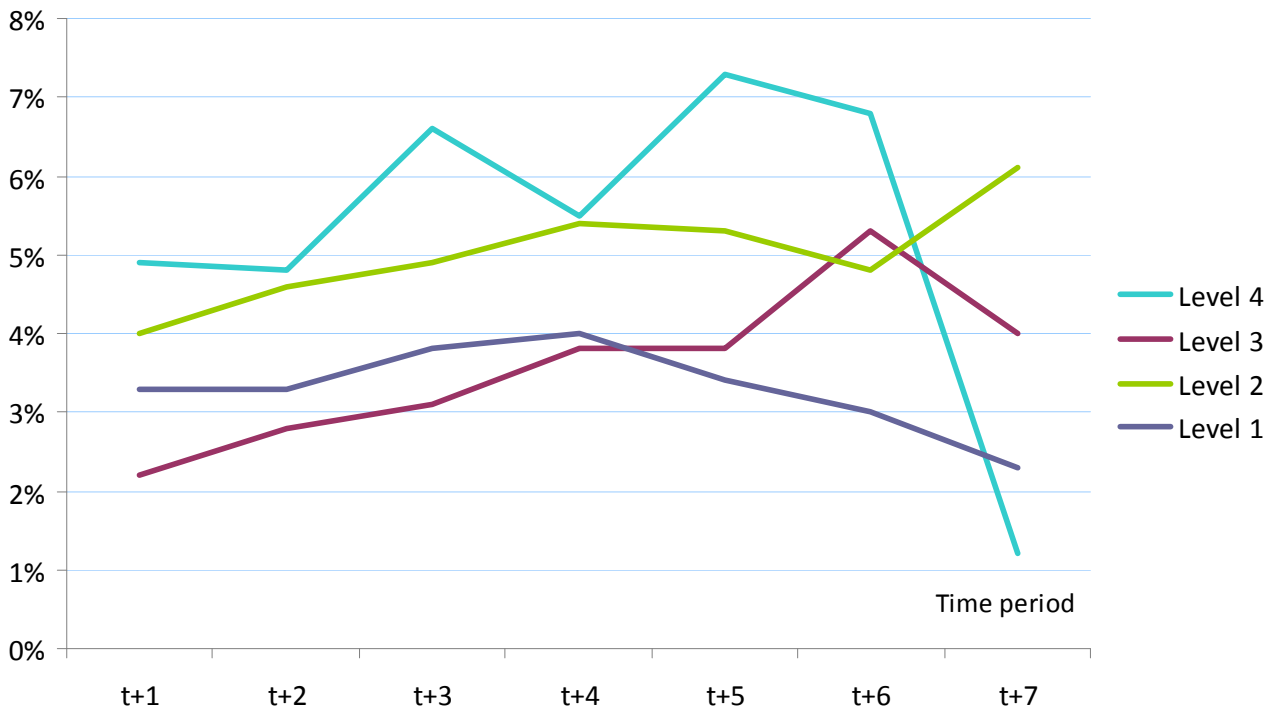
Employment: Learners aged 19+, vocational qualifications only – ICT



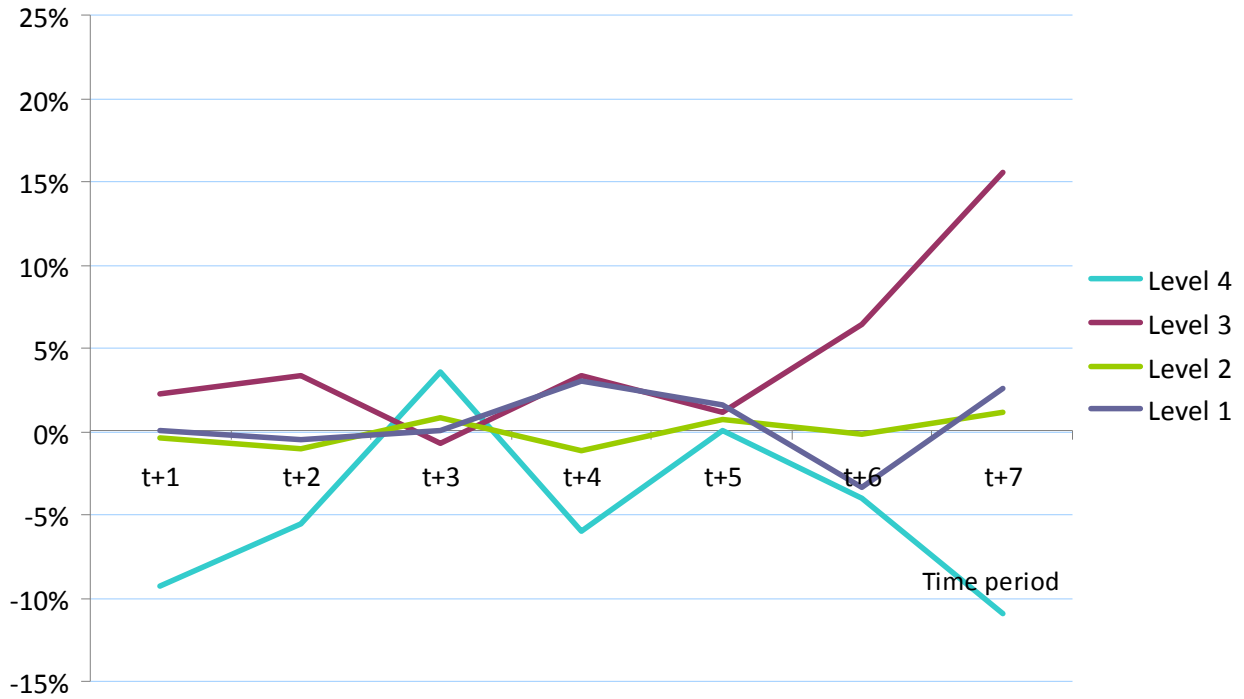
Earnings: Learners aged 19+, vocational qualifications only – Retail and Commercial



Employment: Learners aged 19+, vocational qualifications only – Retail and Commercial



Earnings: Learners aged 19+, vocational qualifications only – Travel and tourism



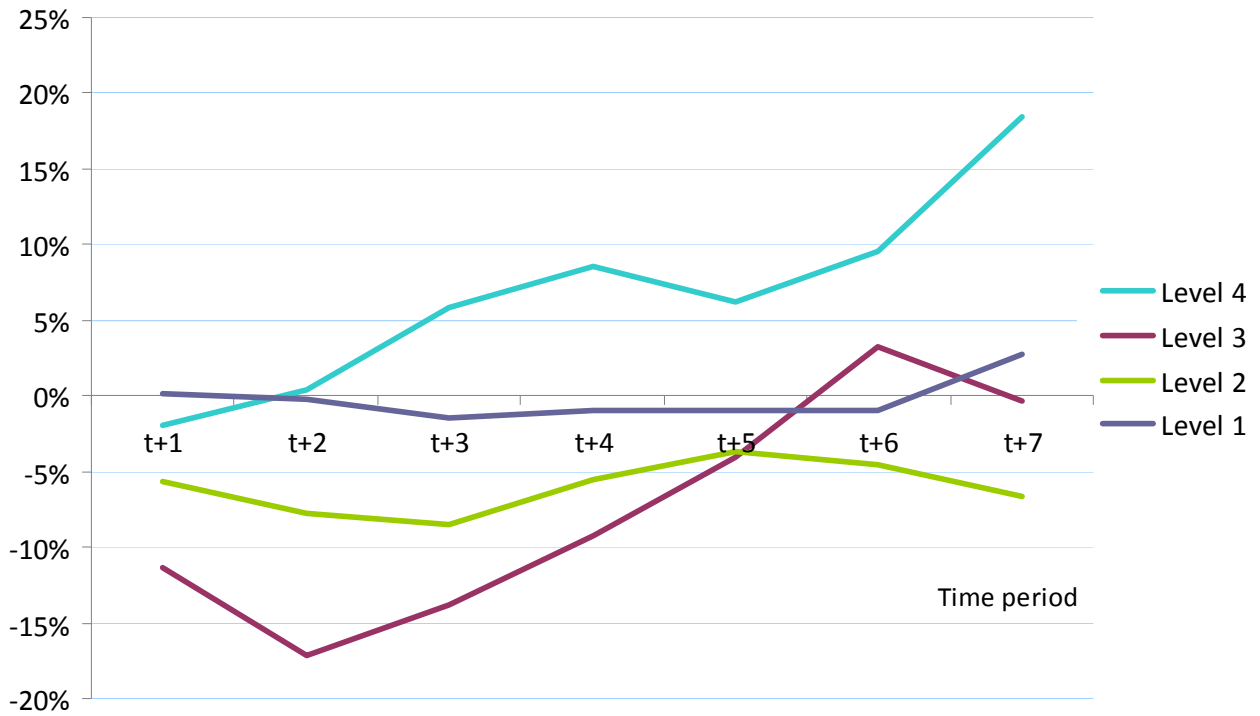
Employment: Learners aged 19+, vocational qualifications only – Travel and tourism



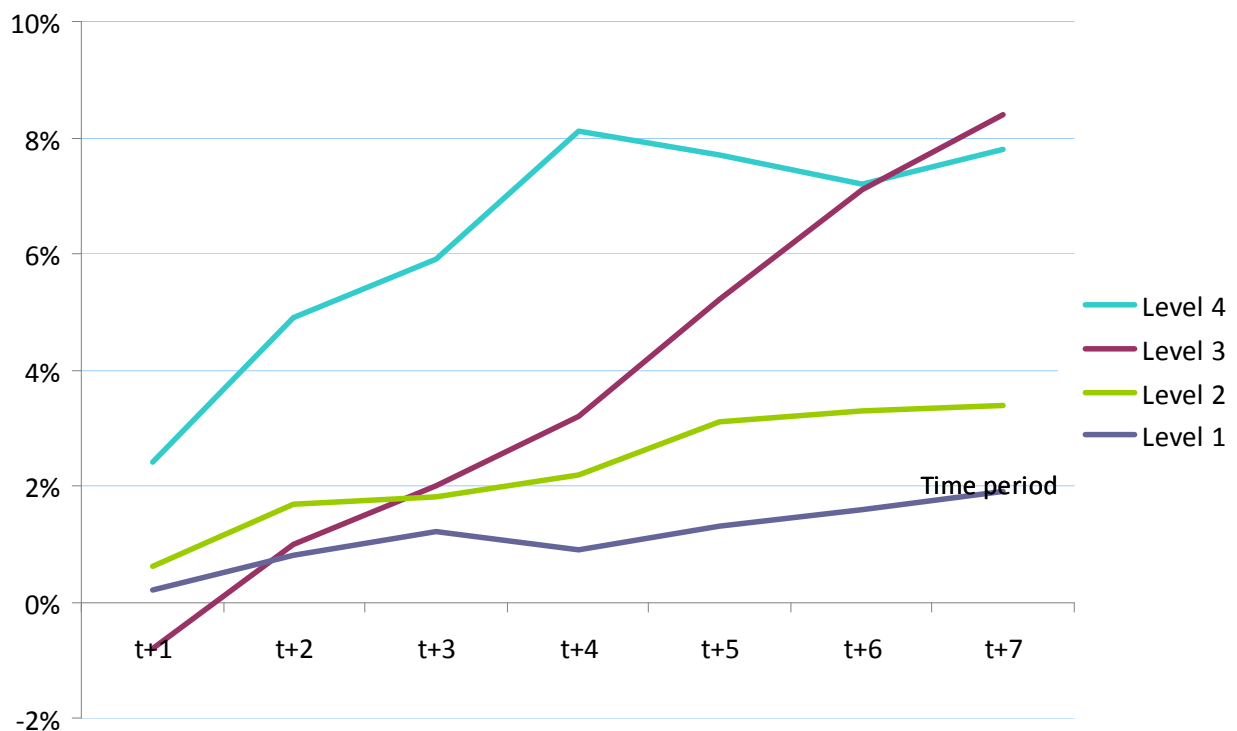
Source: London Economics

Figure 14: Earnings and employment returns by subject of study (III)

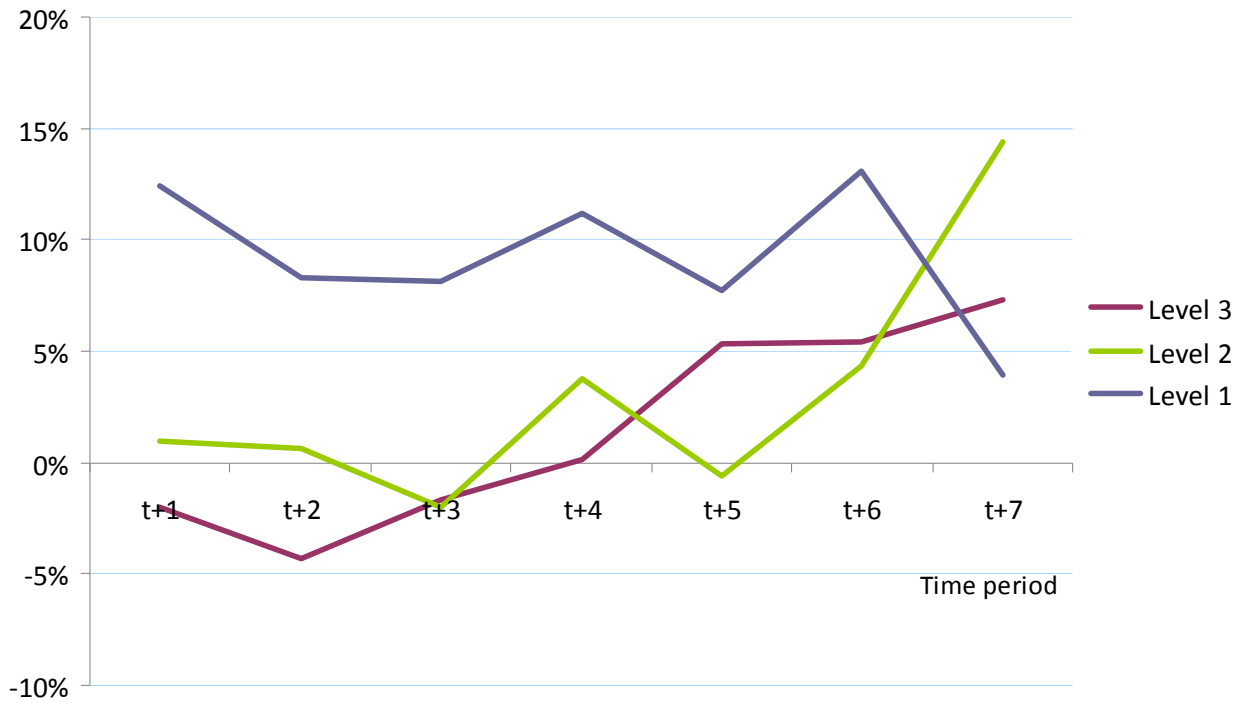
Earnings: Learners aged 19+, vocational qualifications only – Arts, media and publishing



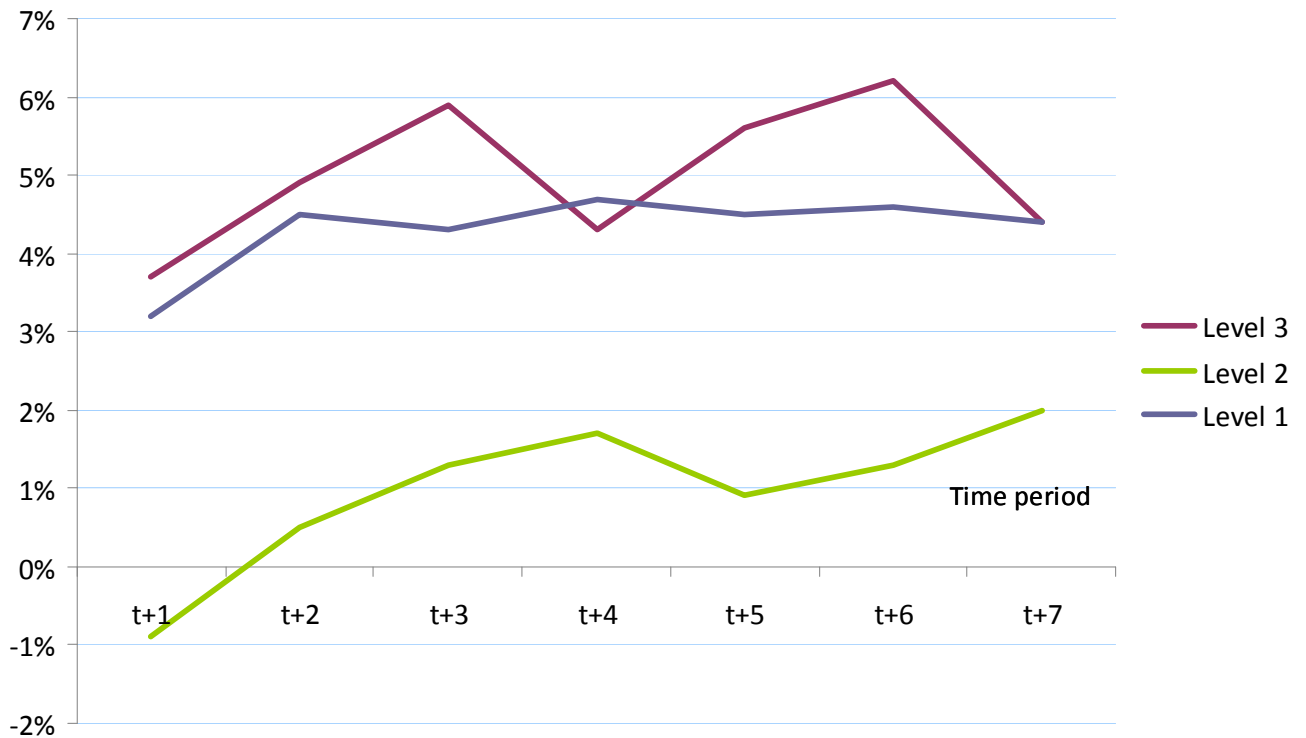
Employment: Learners aged 19+, vocational qualifications only – Arts, media and publishing



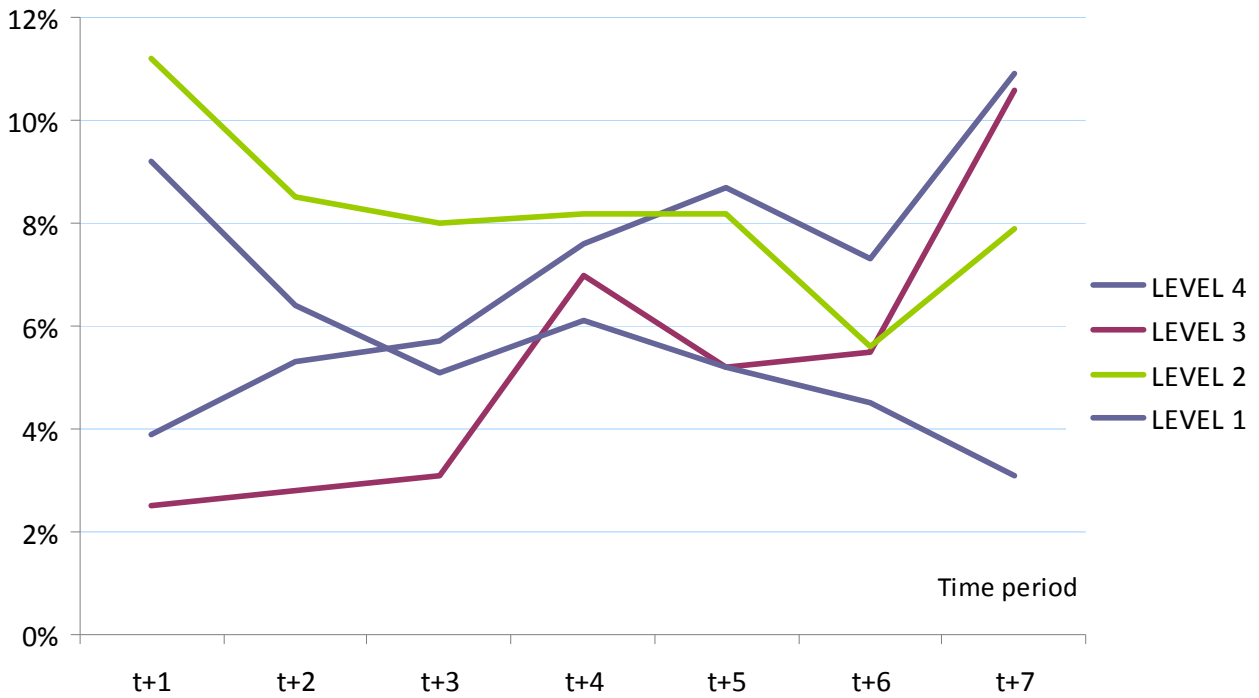
Earnings: Learners aged 19+, vocational qualifications only – Preparation for life and work



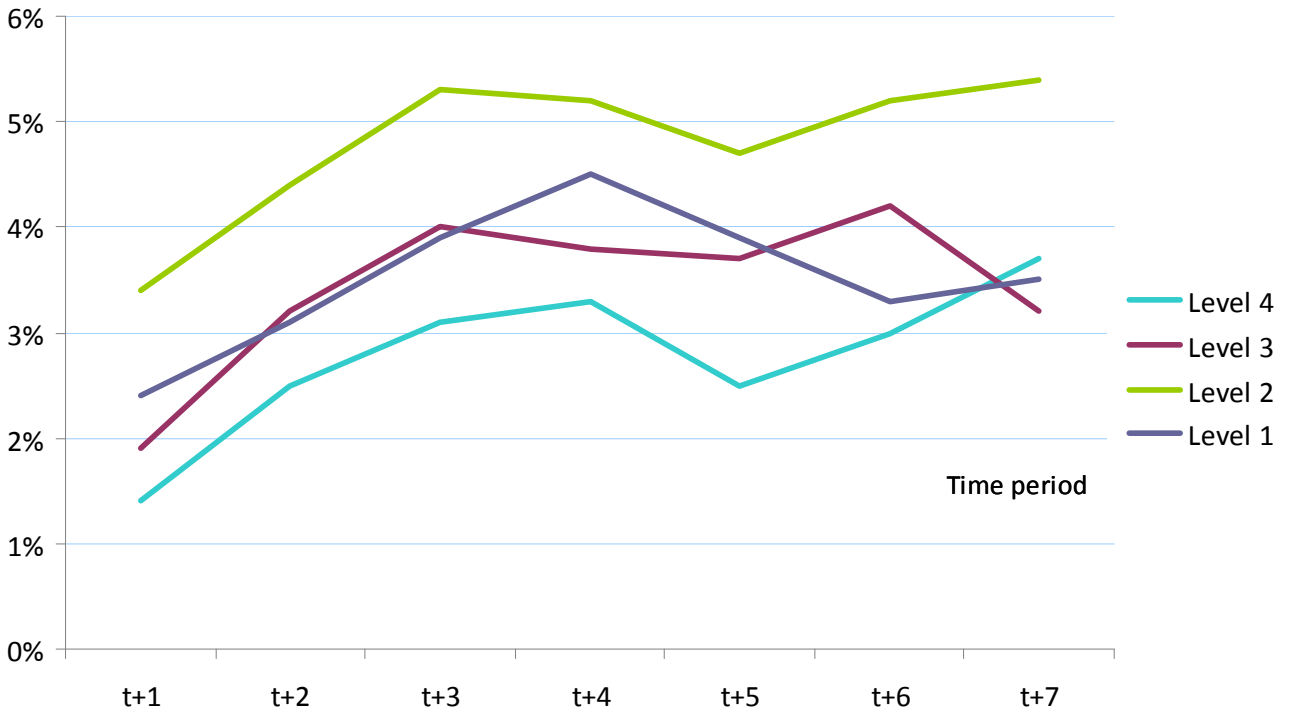
Employment: Learners aged 19+, vocational qualifications only – Preparation for life and work



Earnings: Learners aged 19+, vocational qualifications only – Business administration and law.



Employment: Learners aged 19+, vocational qualifications only – Business administration and law.

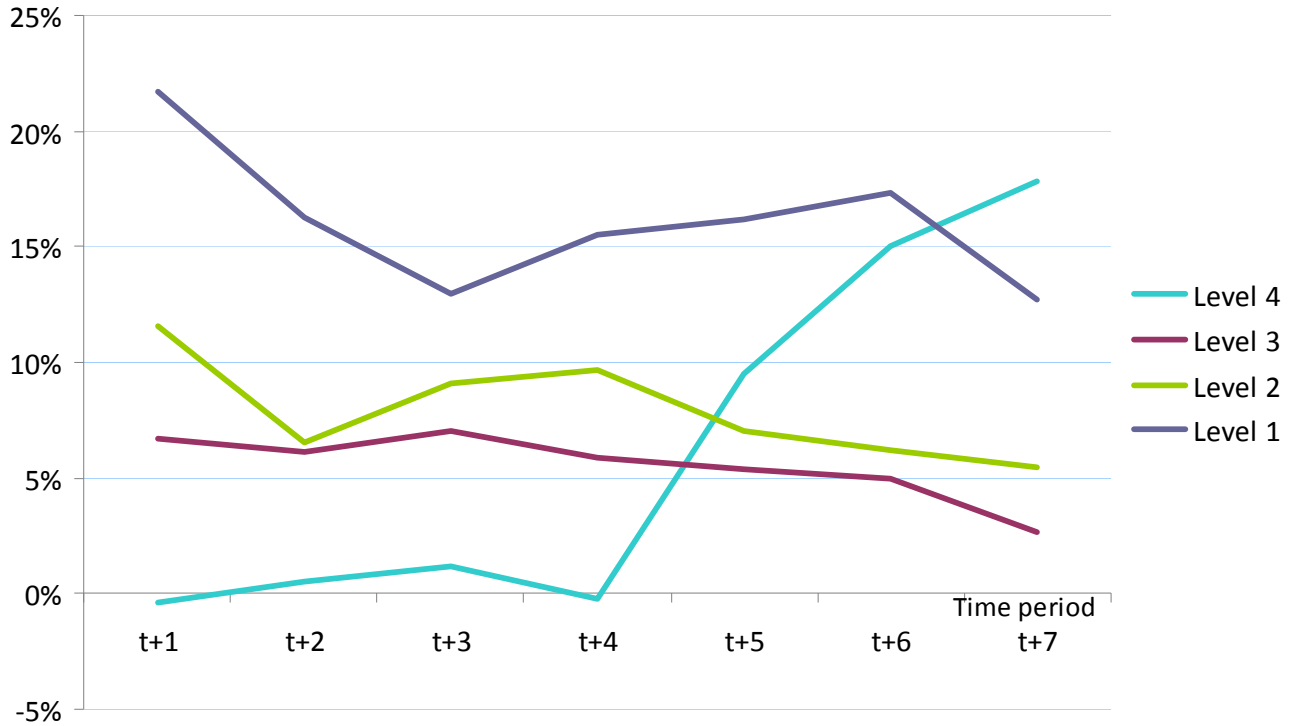


Source: London Economics

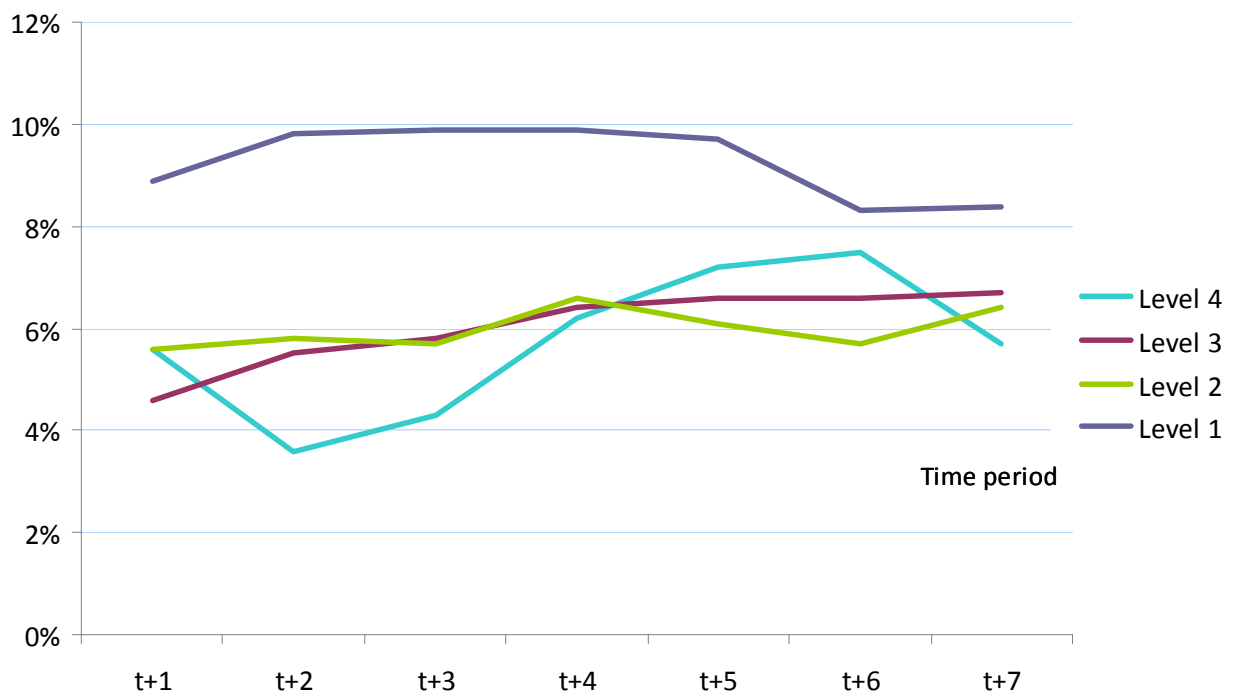
A1.5 Subject of attainment - men

Figure 15: Earnings and employment returns by subject of study (I) – men

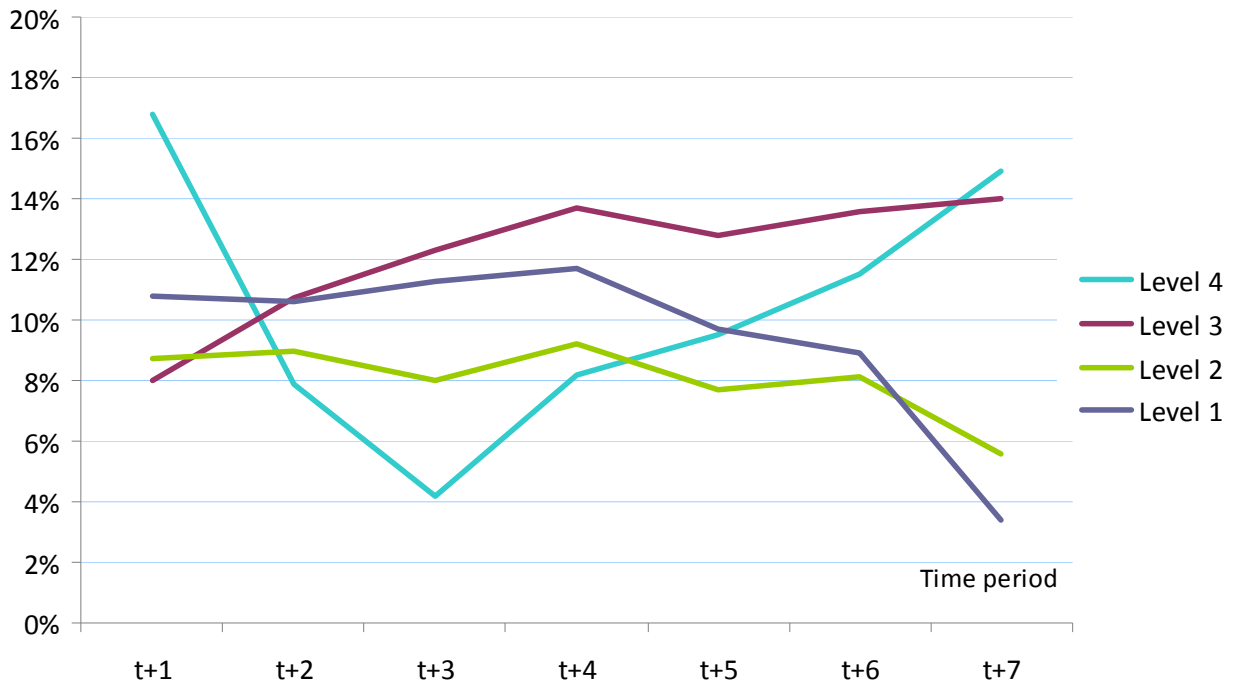
Earnings: Learners aged 19+, vocational qualifications only – health and social care



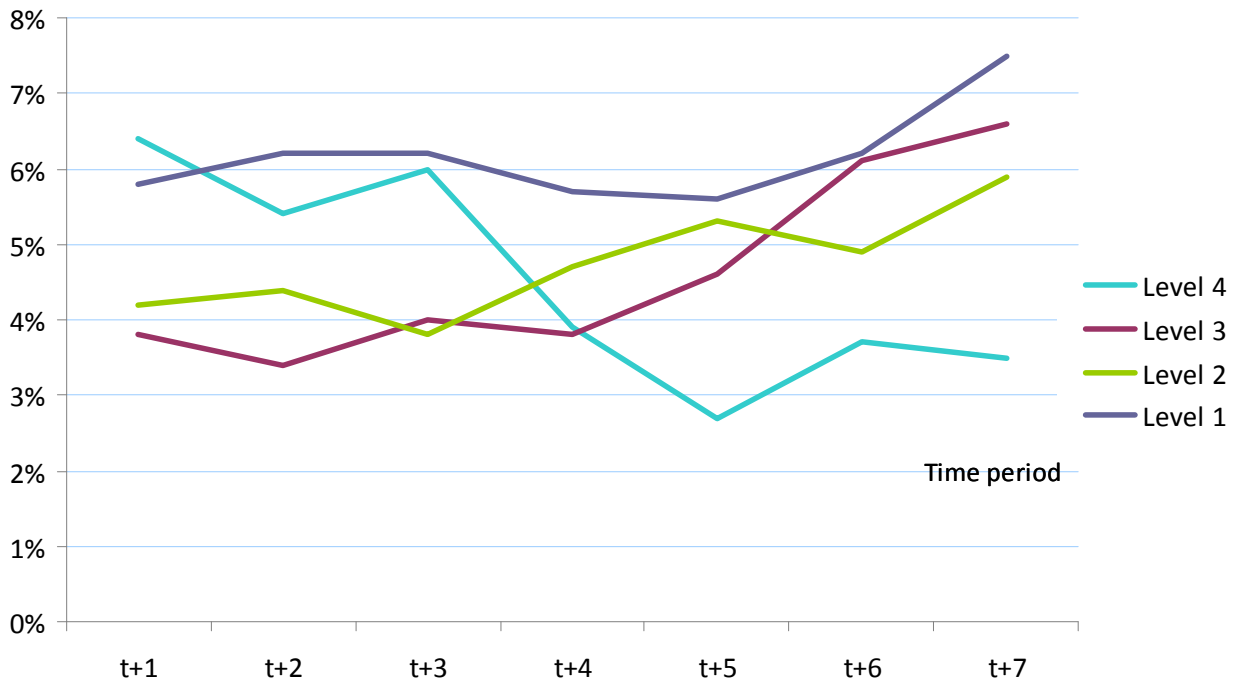
Employment: Learners aged 19+, vocational qualifications only – health and social care



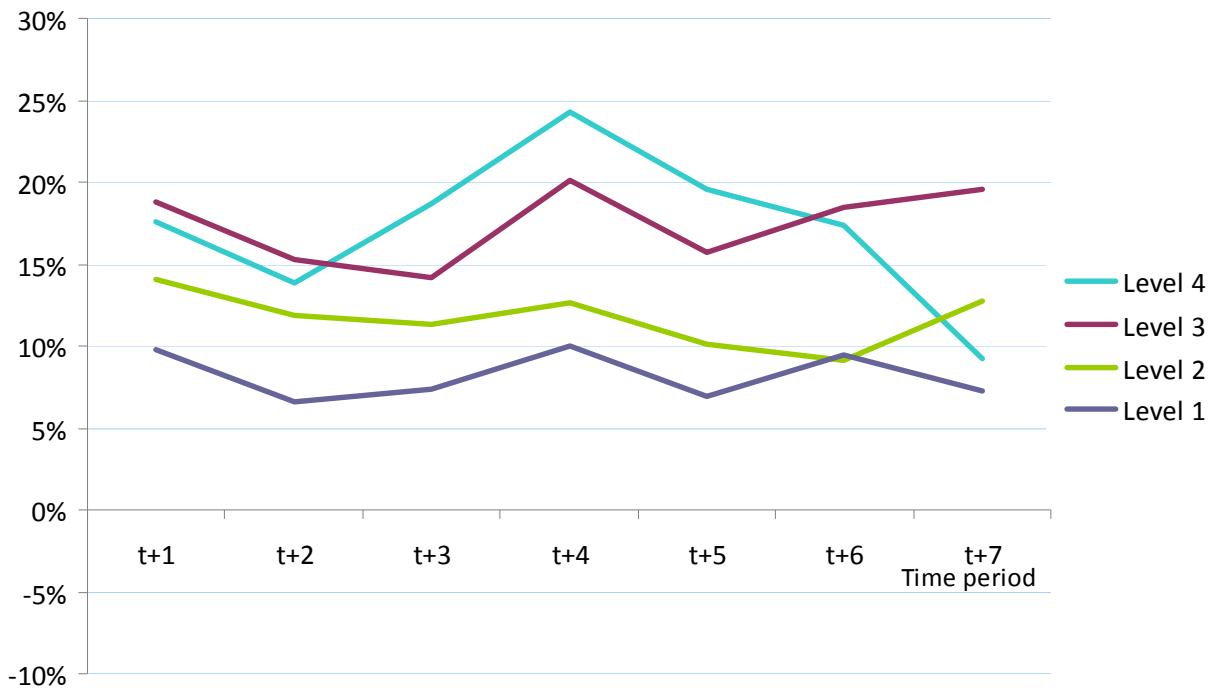
Earnings: Learners aged 19+, vocational qualifications only – engineering and manufacturing



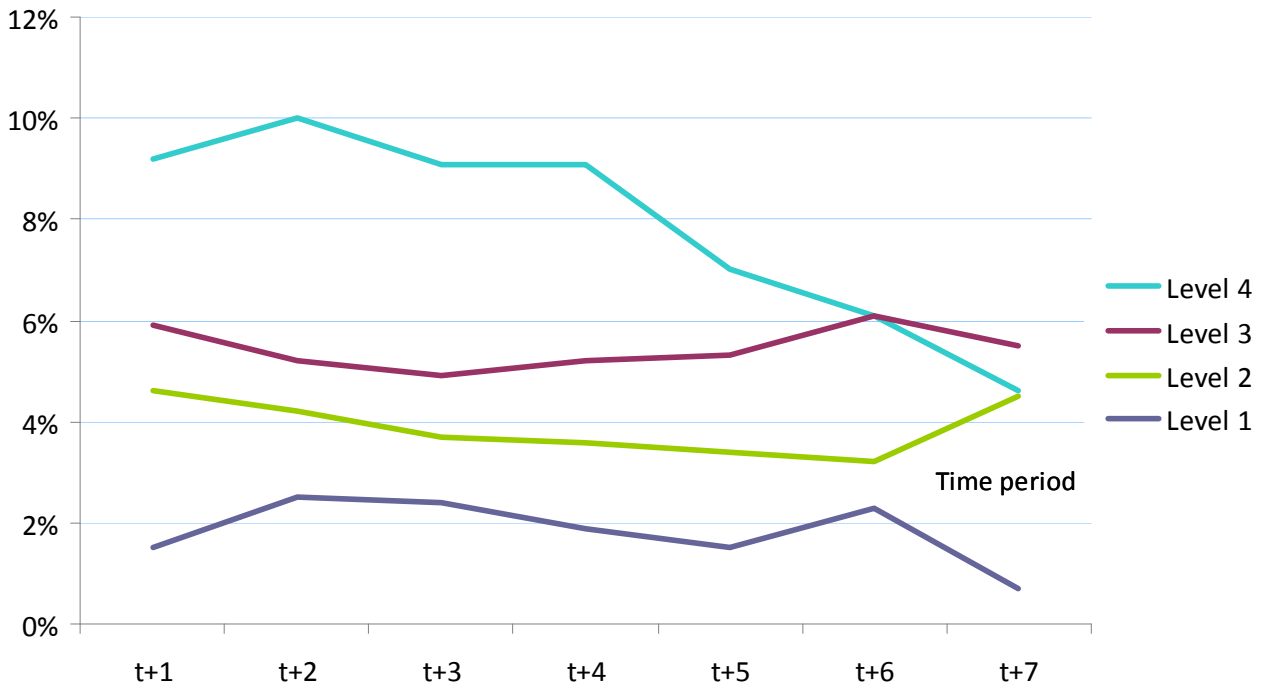
Employment: Learners aged 19+, vocational qualifications only – engineering and manufacturing



Earnings: Learners aged 19+, vocational qualifications only – construction, planning and built environment



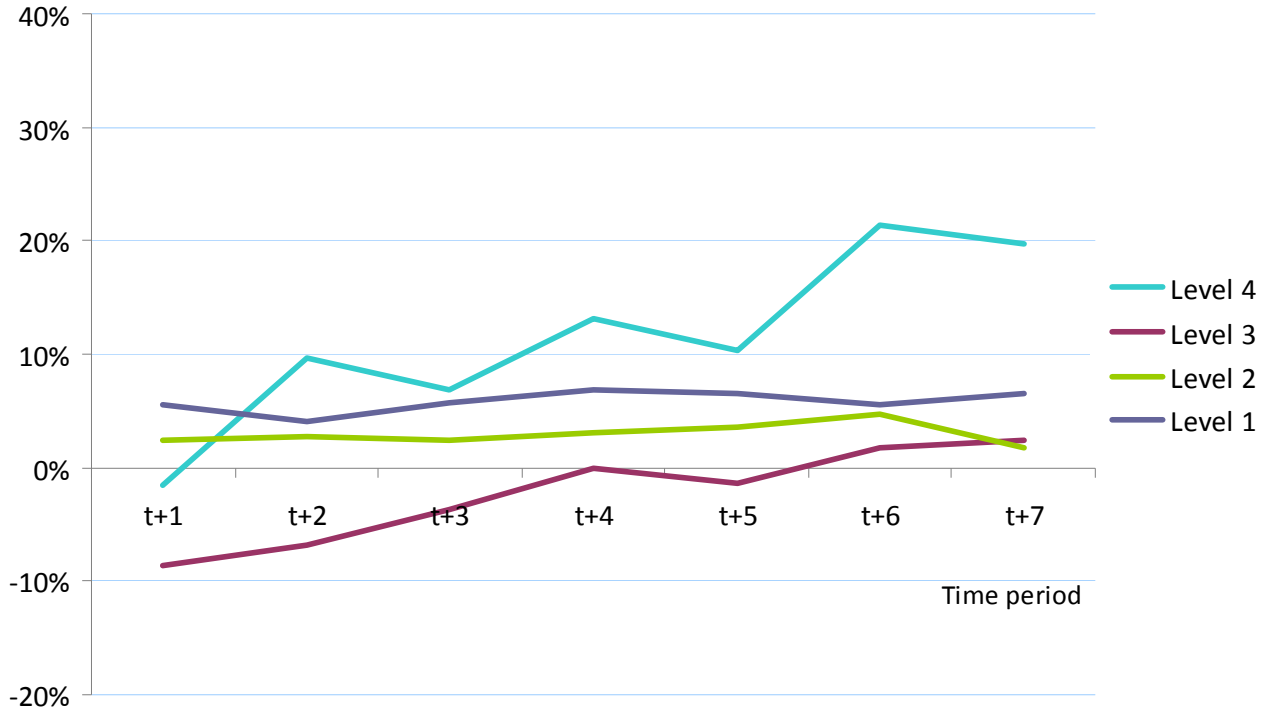
Employment: Learners aged 19+, vocational qualifications only – construction, planning and built environment



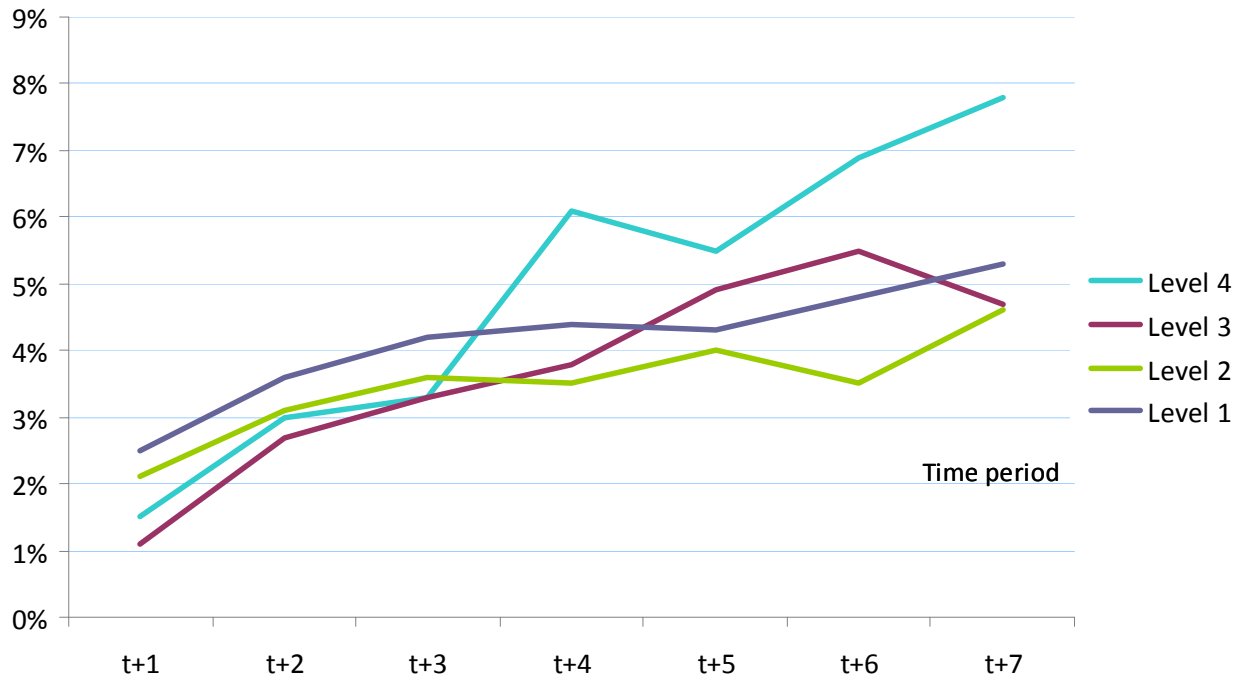
Source: London Economics

Figure 16: Earnings and employment returns by subject of study (II) – men

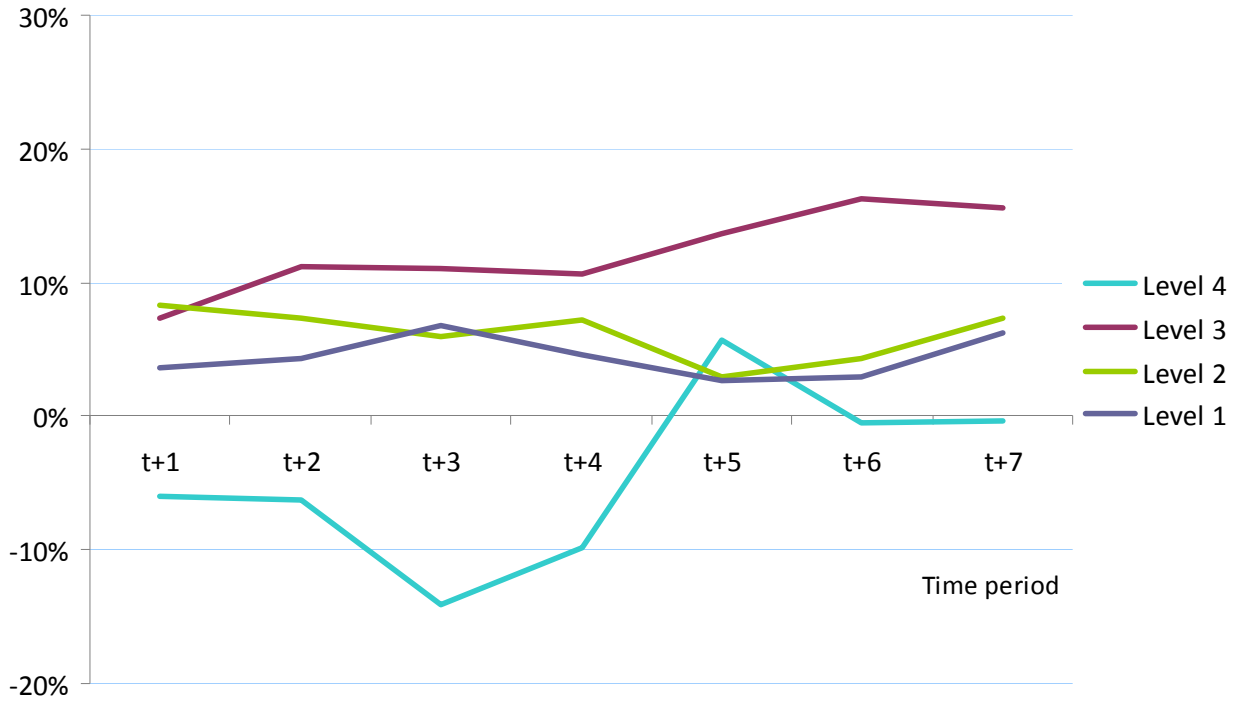
Earnings: Learners aged 19+, vocational qualifications only – ICT



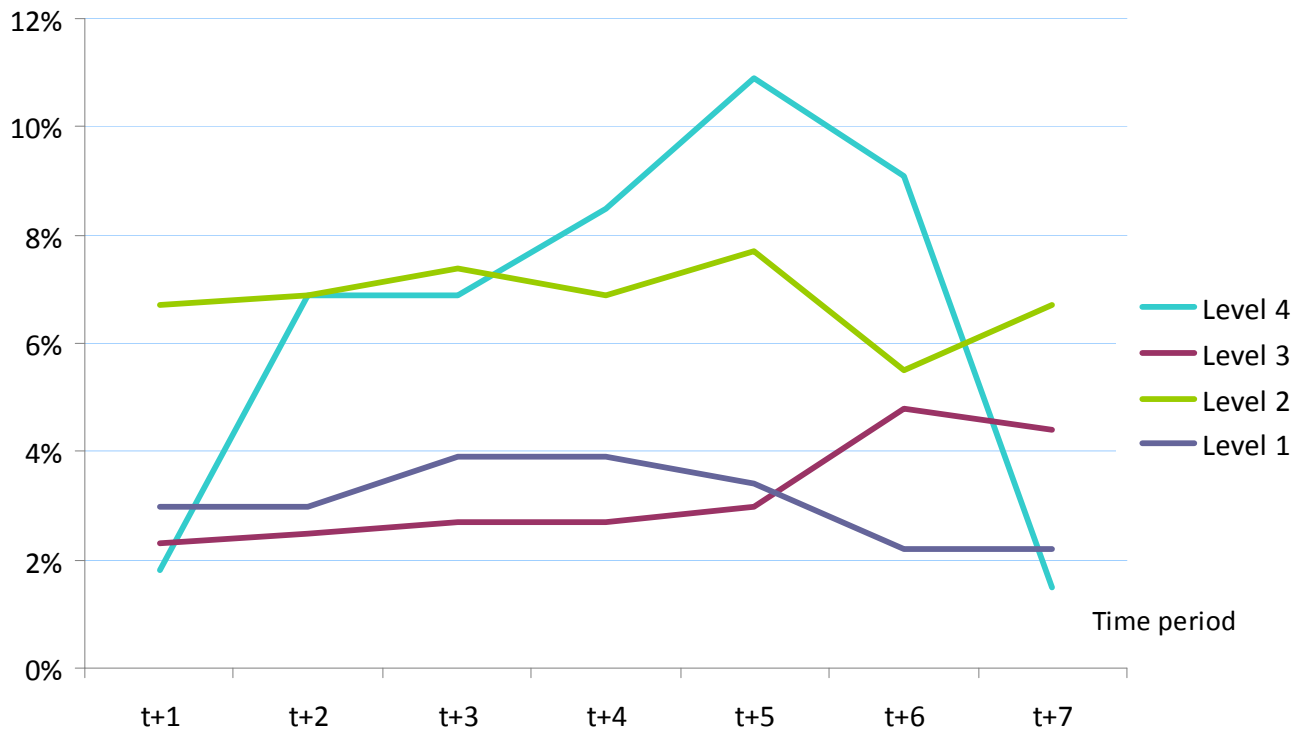
Employment: Learners aged 19+, vocational qualifications only – ICT



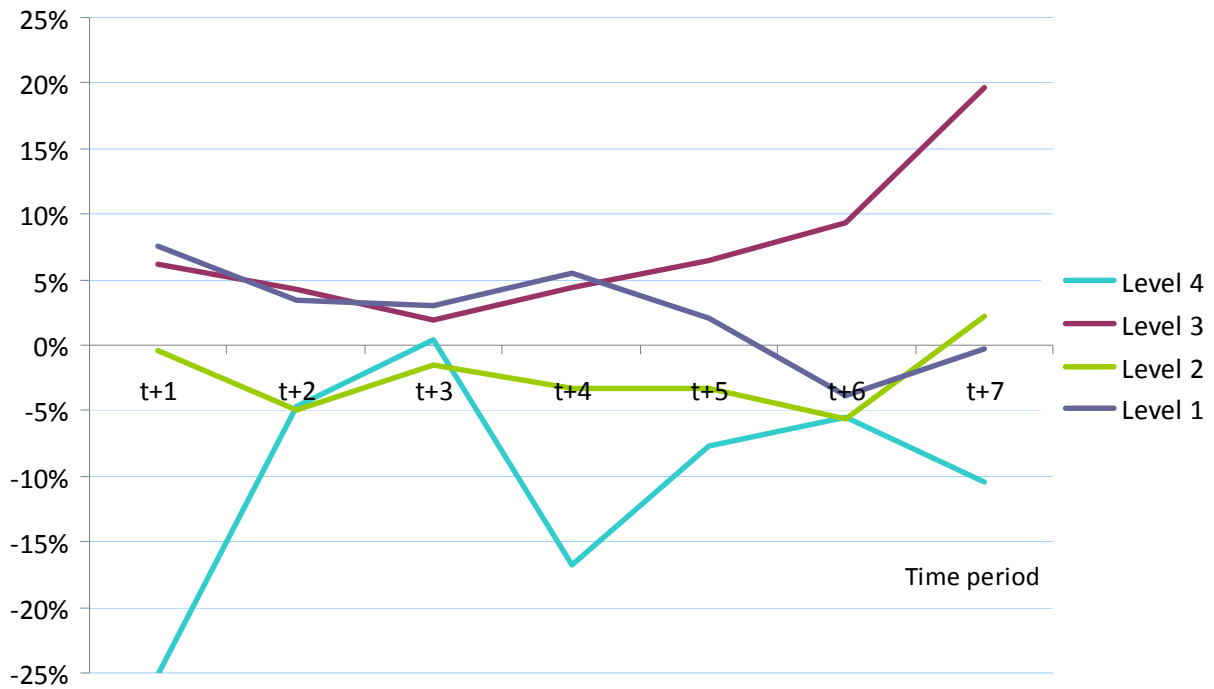
Earnings: Learners aged 19+, vocational qualifications only – Retail and Commercial



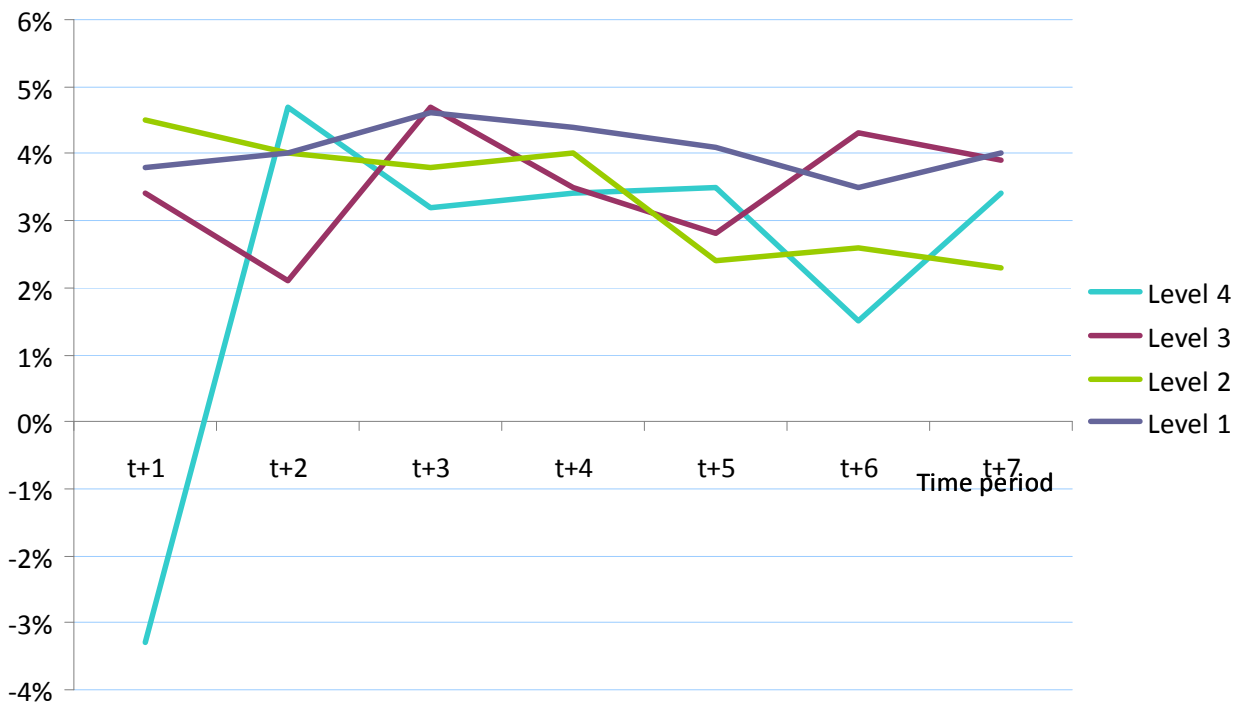
Employment: Learners aged 19+, vocational qualifications only – Retail and Commercial



Earnings: Learners aged 19+, vocational qualifications only – Travel and tourism



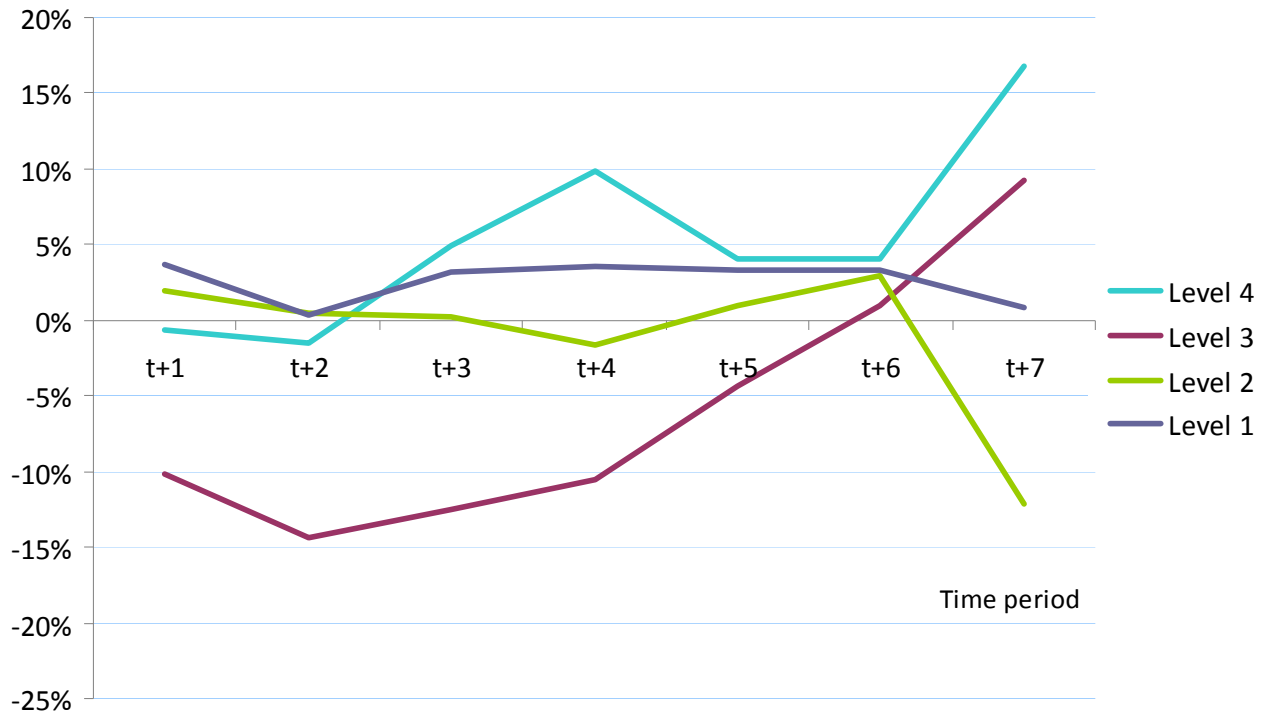
Employment: Learners aged 19+, vocational qualifications only – Travel and tourism



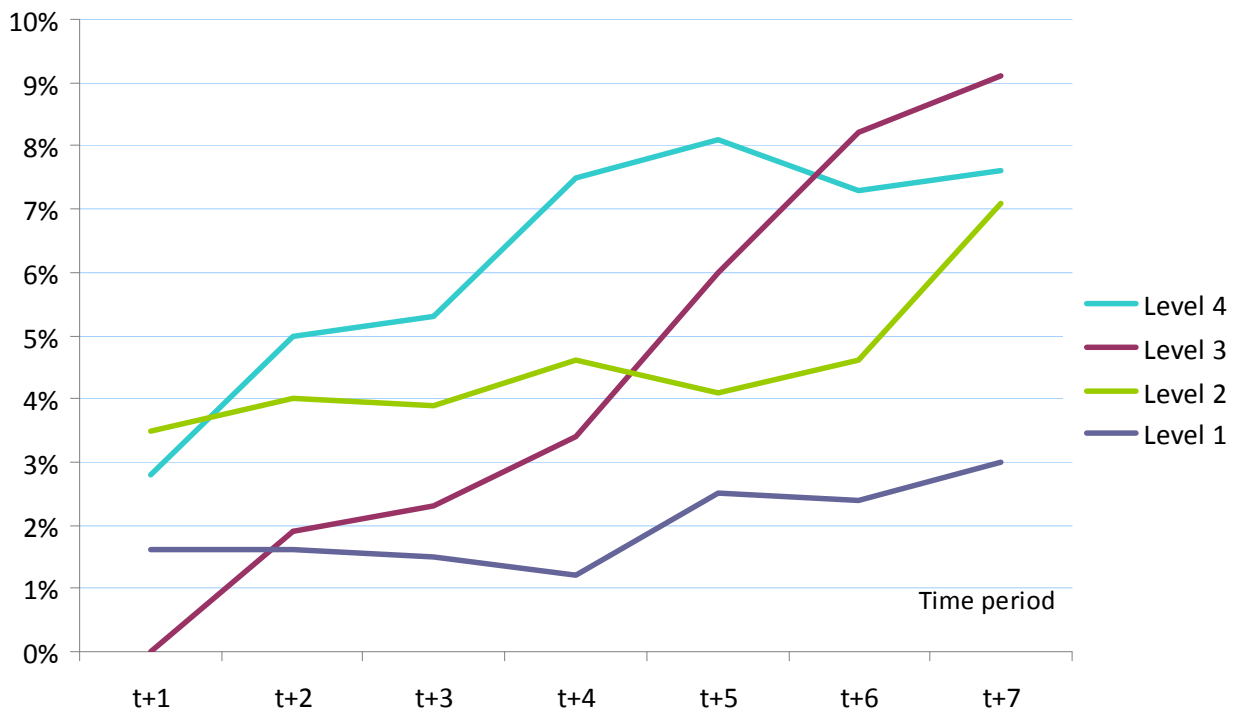
Source: London Economics

Figure 17: Earnings and employment returns by subject of study (III) – men

Earnings: Learners aged 19+, vocational qualifications only – Arts, media and publishing



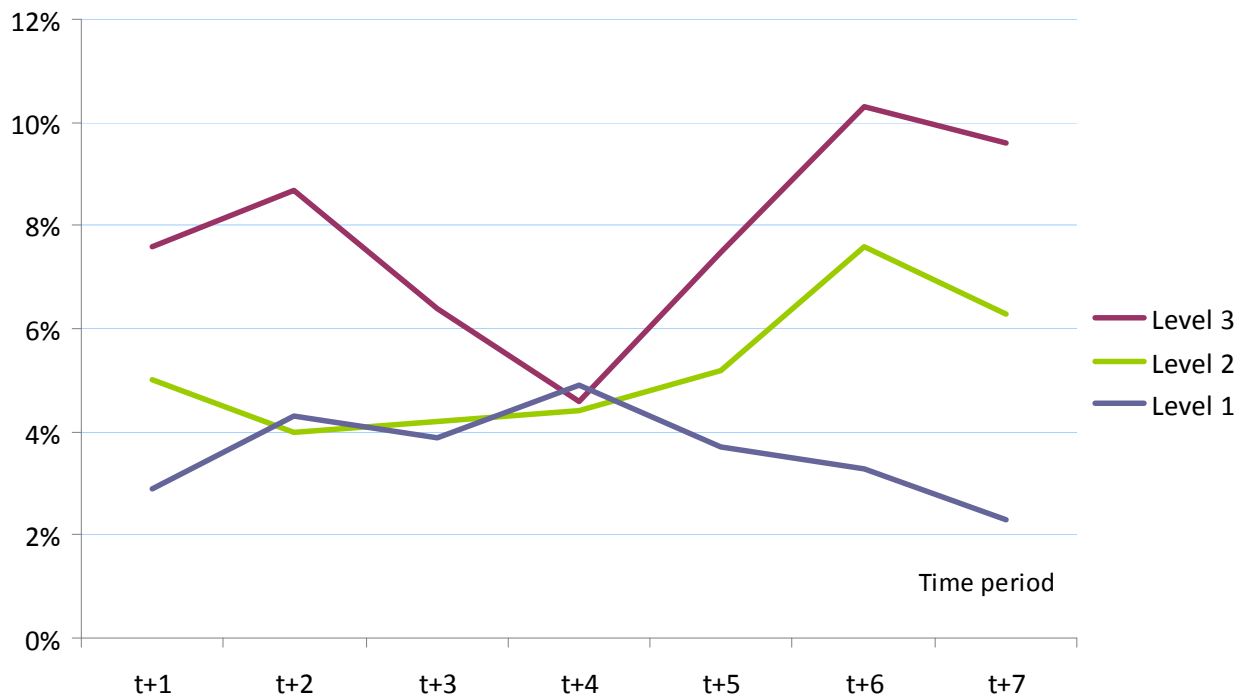
Employment: Learners aged 19+, vocational qualifications only – Arts, media and publishing



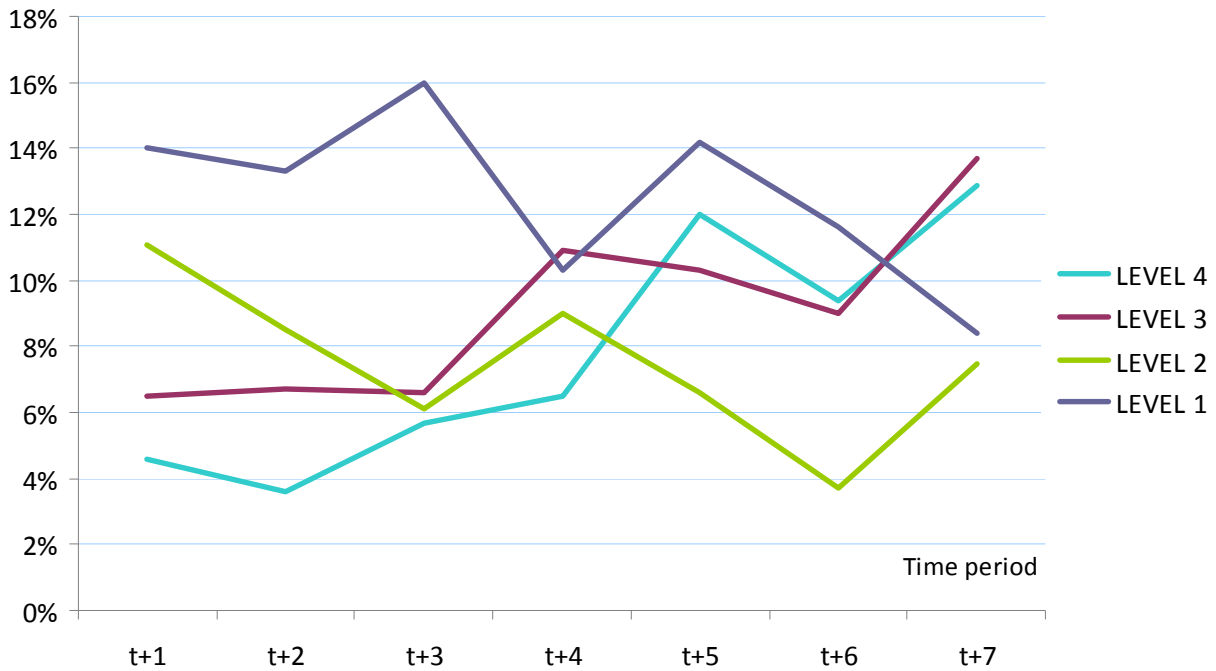
Earnings: Learners aged 19+, vocational qualifications only – Preparation for life and work



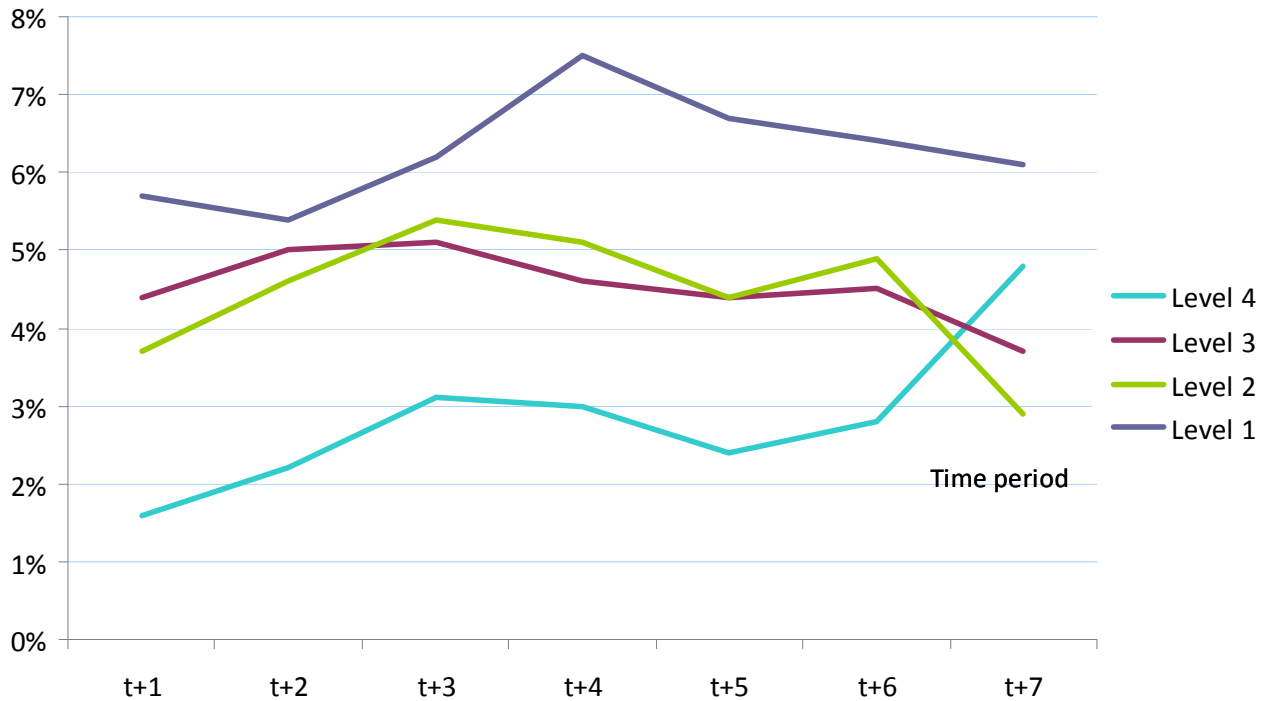
Employment: Learners aged 19+, vocational qualifications only – Preparation for life and work



Earnings: Learners aged 19+, vocational qualifications only – Business administration and law



Employment: Learners aged 19+, vocational qualifications only – Business administration and law

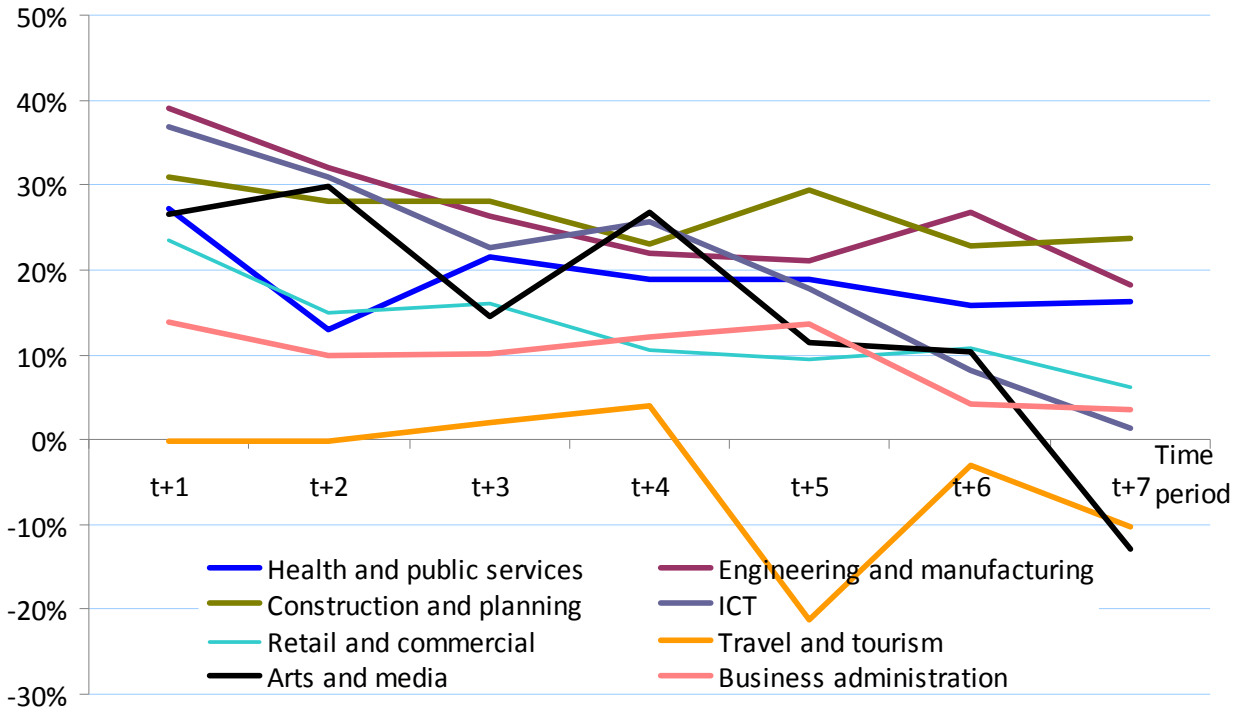


Source: London Economics

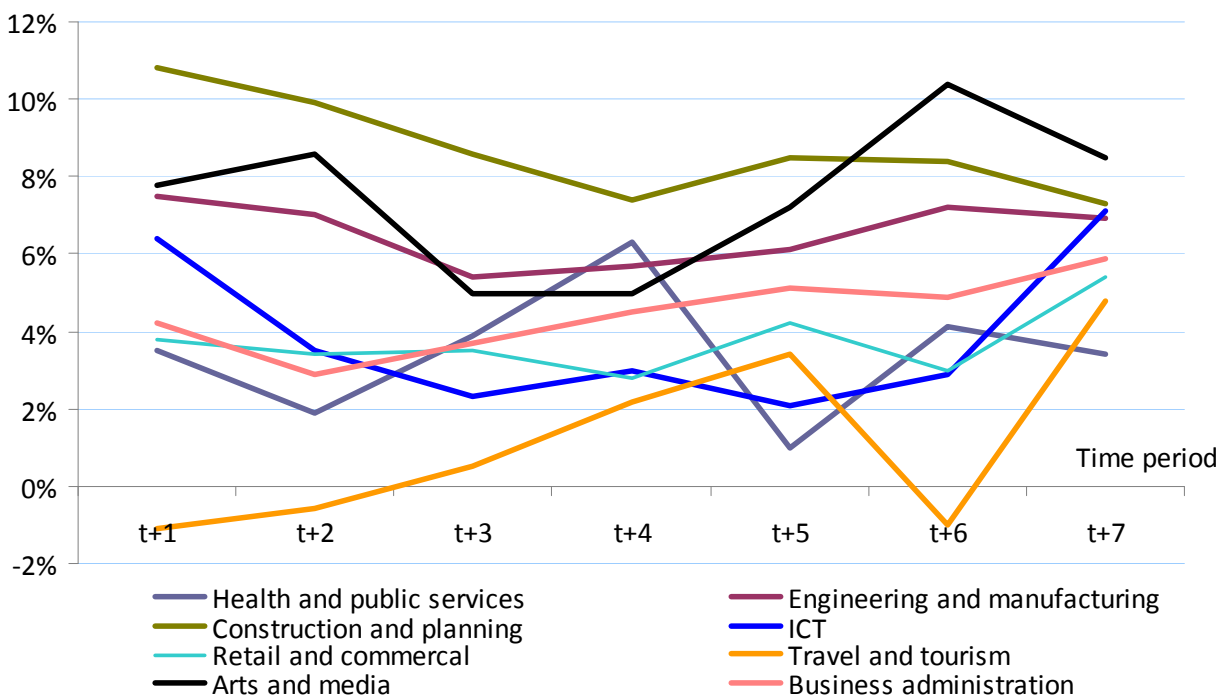
A1.6 Subject of study – apprenticeships - men

Figure 18: Earnings and employment returns by subject of study – apprenticeships

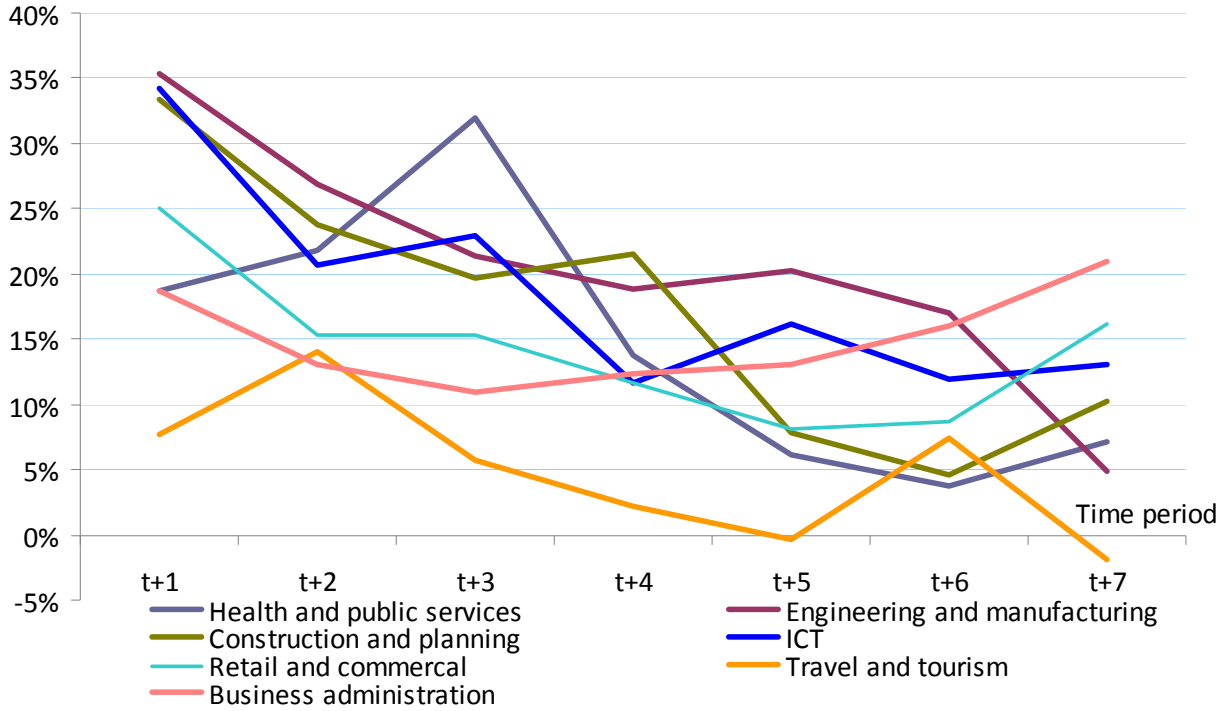
Earnings: Learners aged 19+ - Level 3 apprenticeships



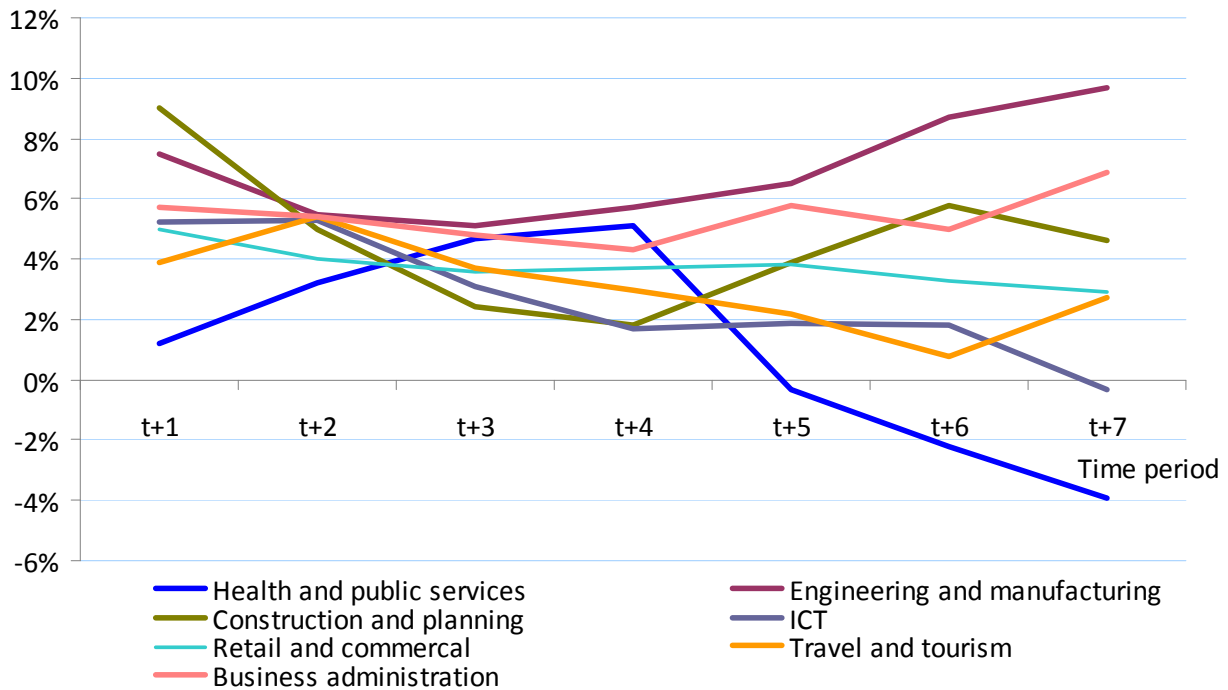
Employment: Learners aged 19+ - Level 3 apprenticeships



Earnings: Learners aged 19+ - Level 2 apprenticeships



Employment: Learners aged 19+ - Level 2 apprenticeships

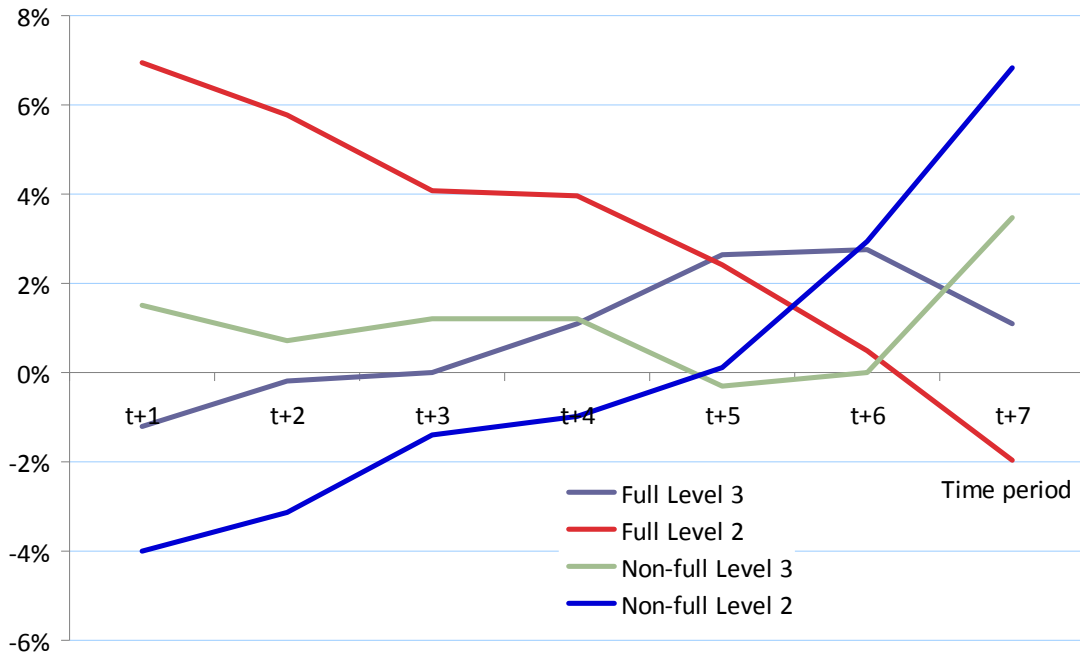


Source: London Economics

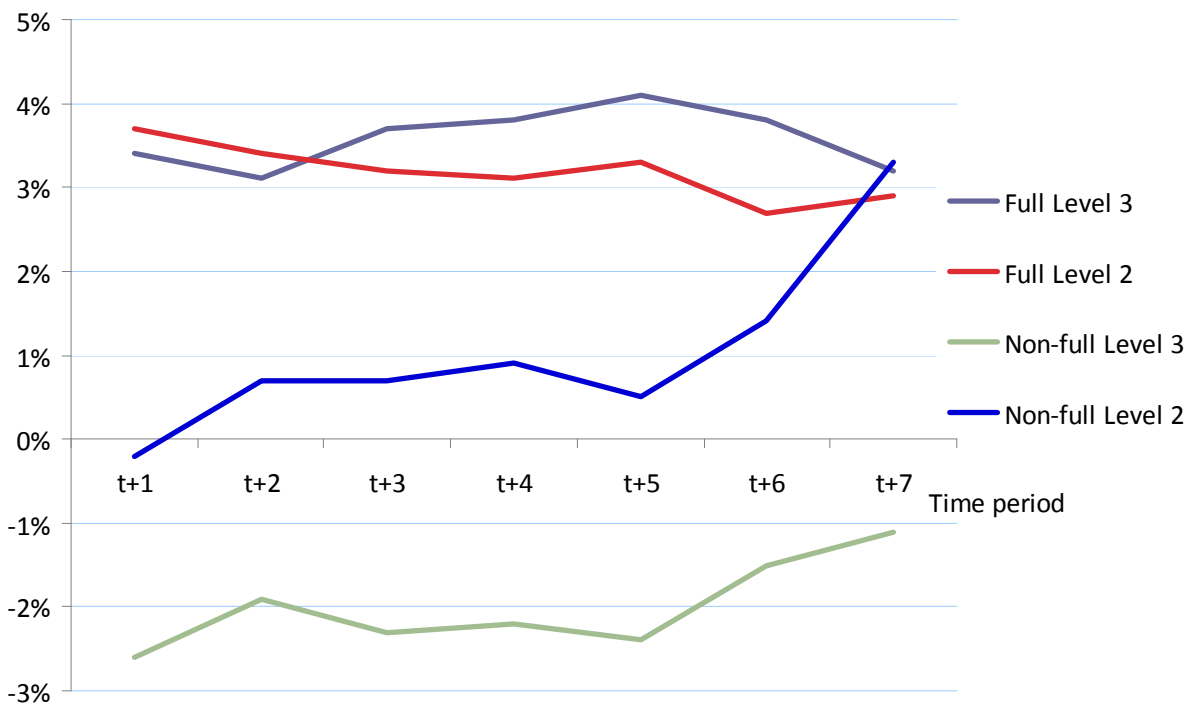
A1.7 Full versus non-full qualifications – men

Figure 19: Earnings and employment returns by whether qualification full or non-full – men

Earnings



Employment

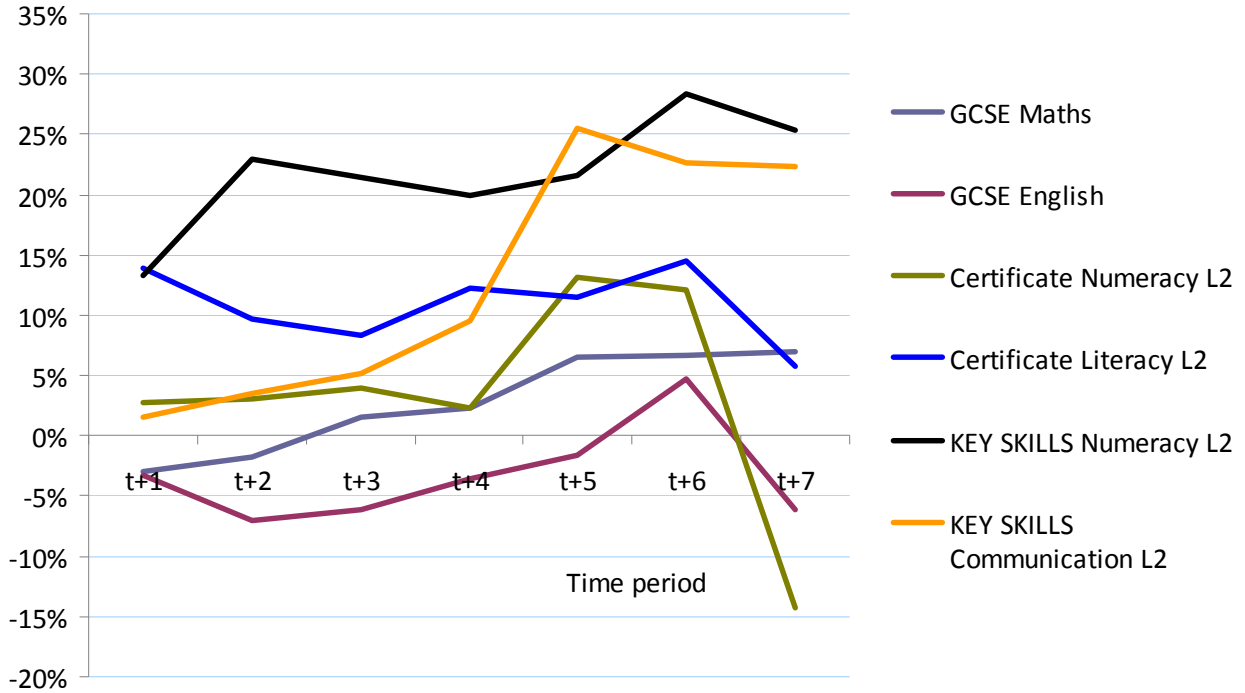


Source: London Economics

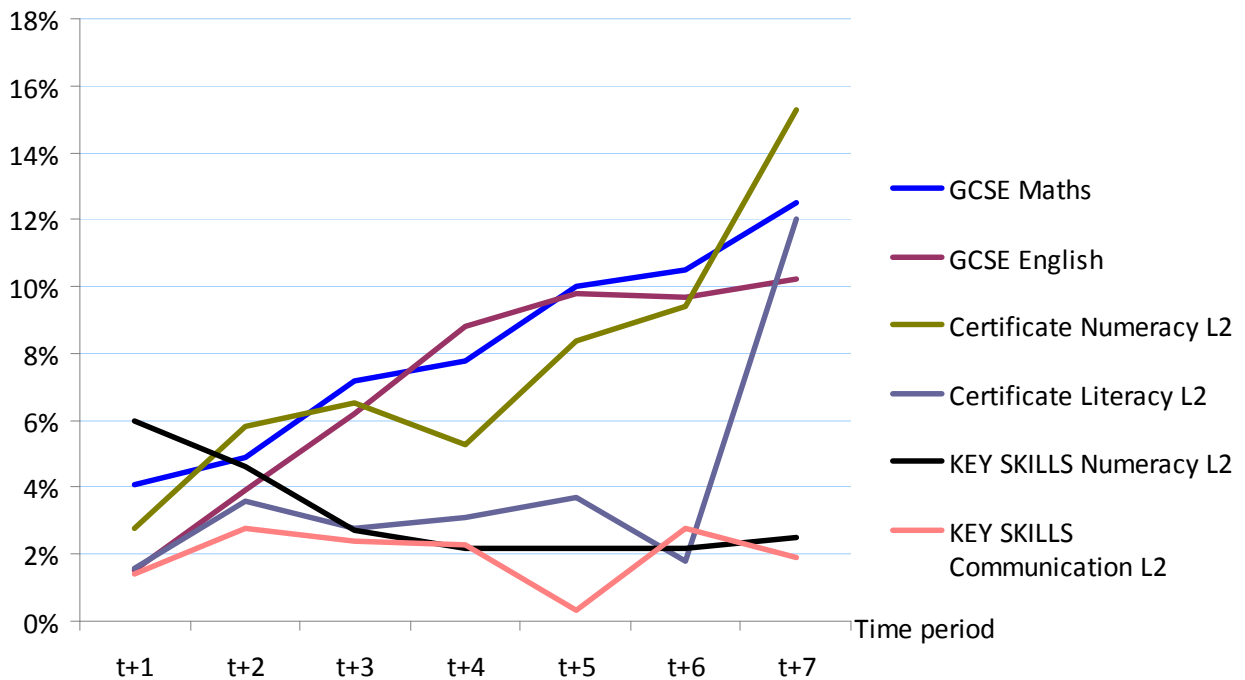
A1.8 Skills for Life - men

Figure 20: Earnings and employment returns – Skills for Life qualifications – men

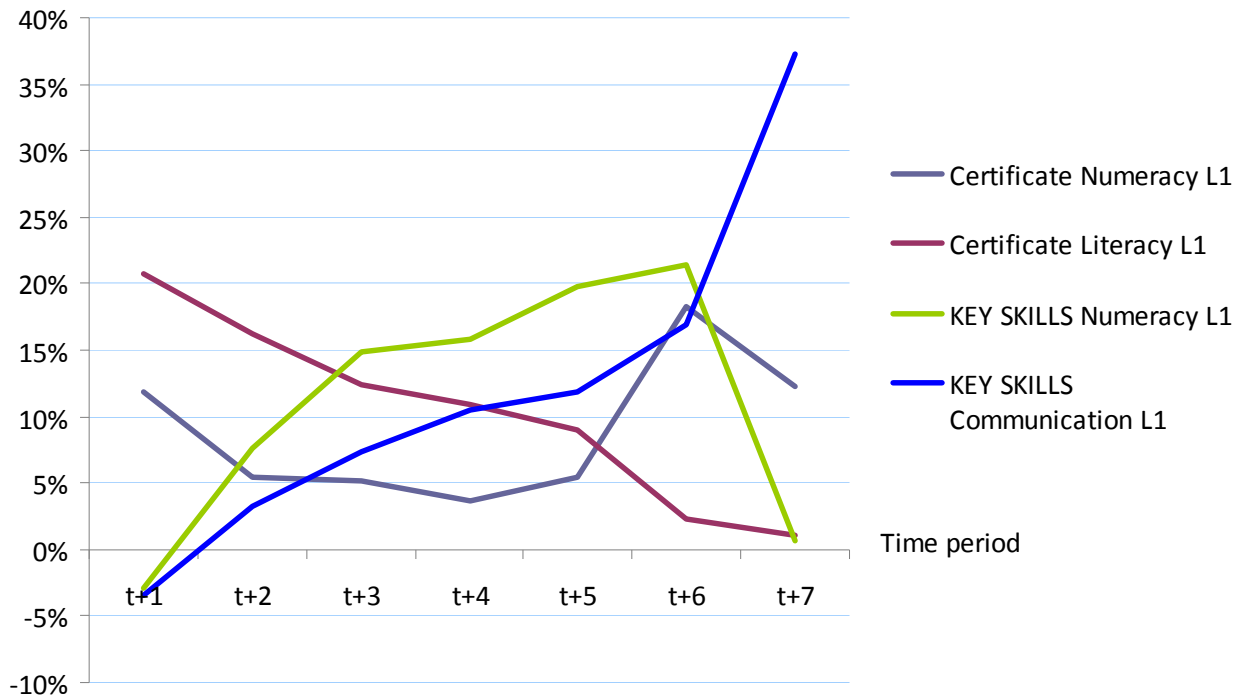
Earnings: Learners aged 19+ - Level 2 Skills for Life



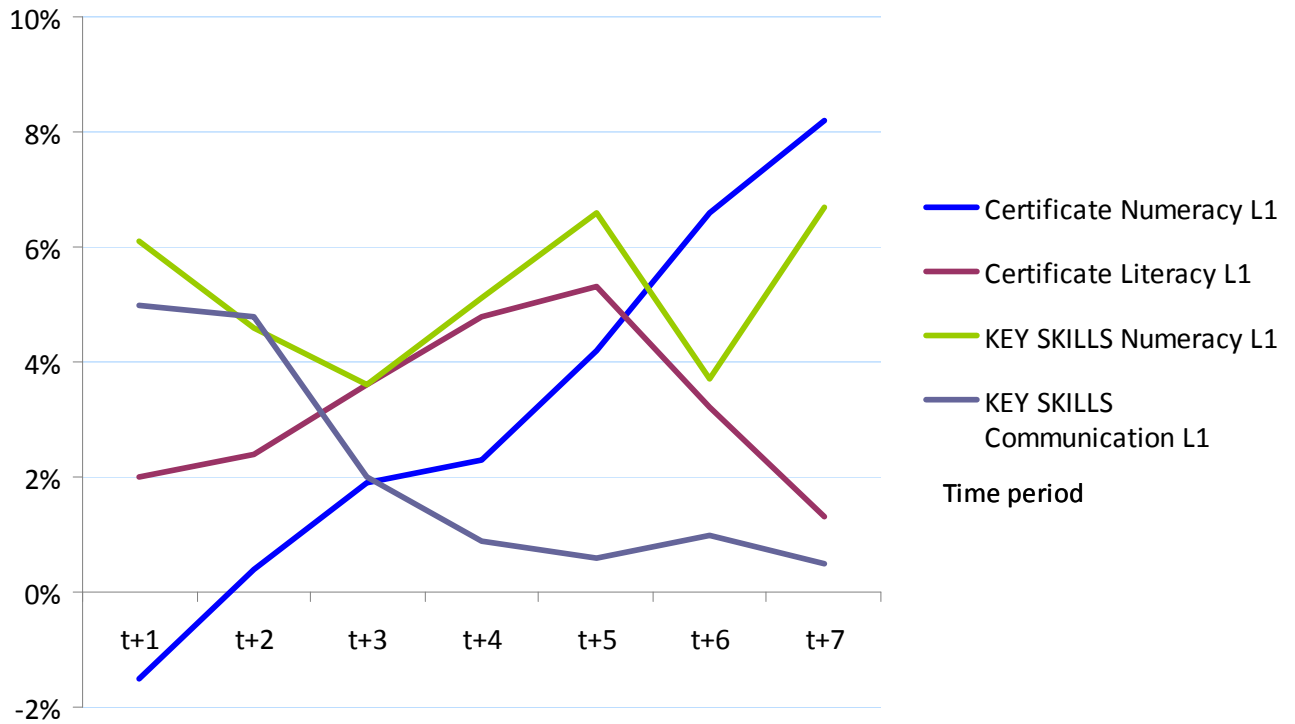
Employment: Learners aged 19+ - Level 2 Skills for Life



Earnings: Learners aged 19+ - Level 1 Skills for Life



Employment: Learners aged 19+ - Level 1 Skills for Life

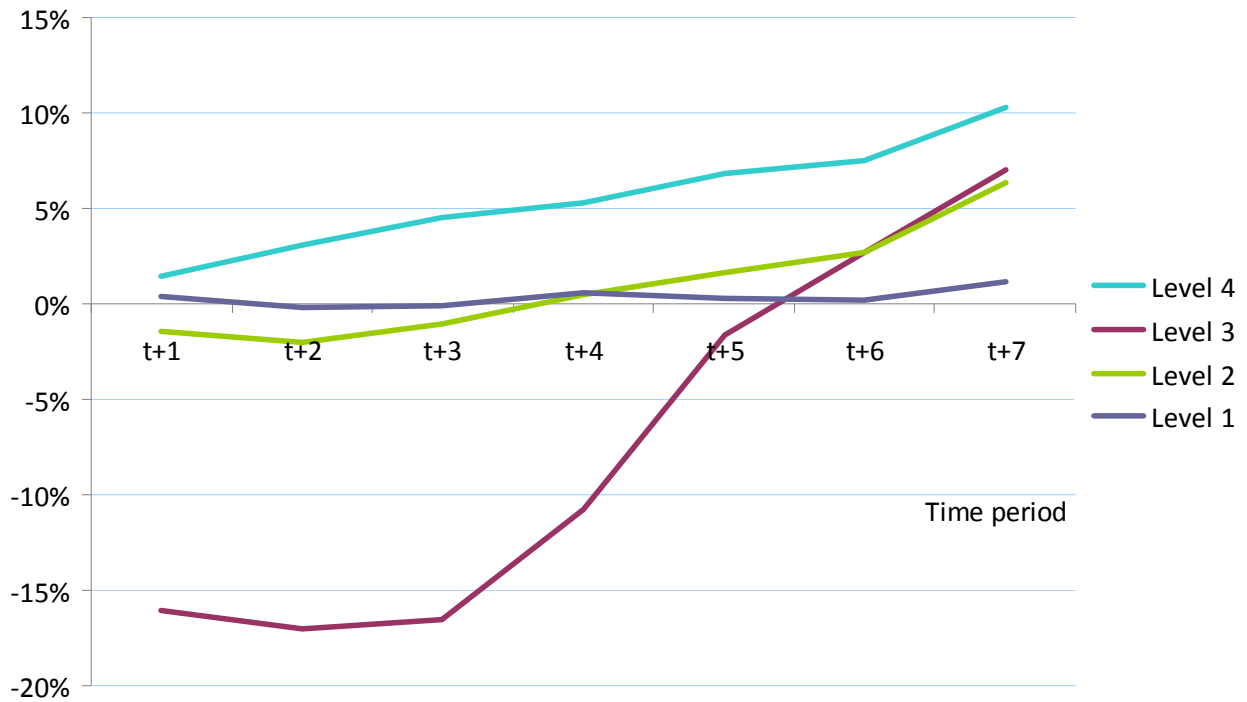


Source: London Economics

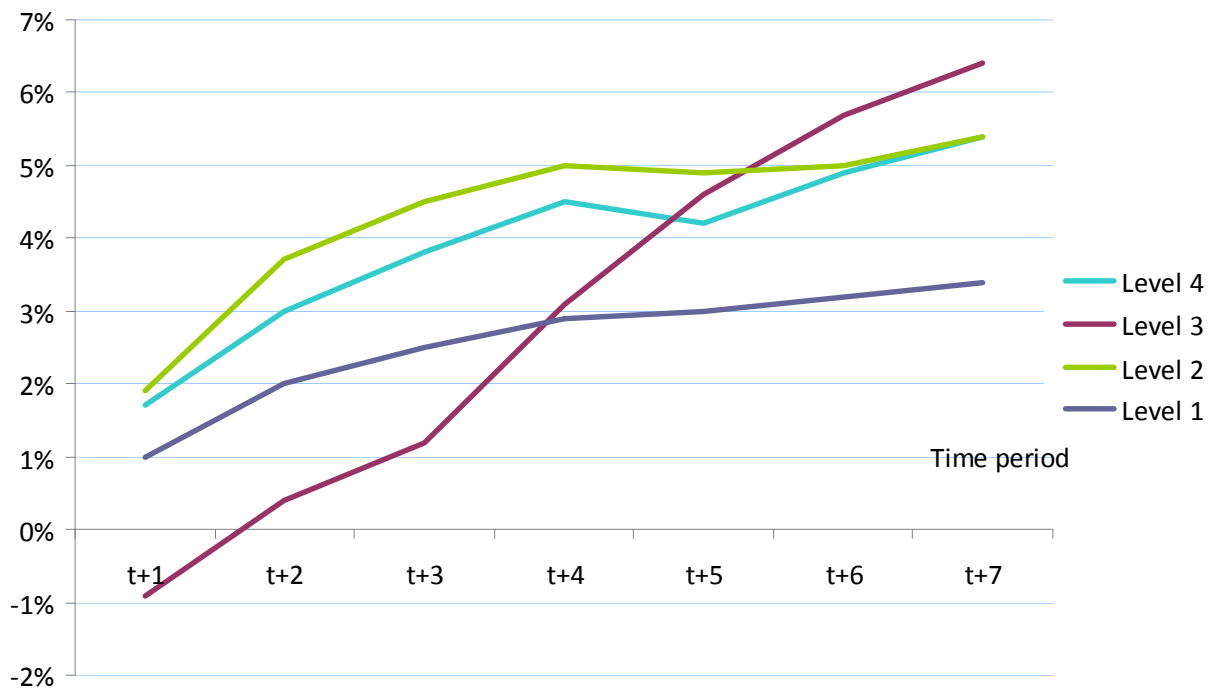
A1.9 Comparison with previous analyses - women

Figure 22: Comparison with previous analysis – women

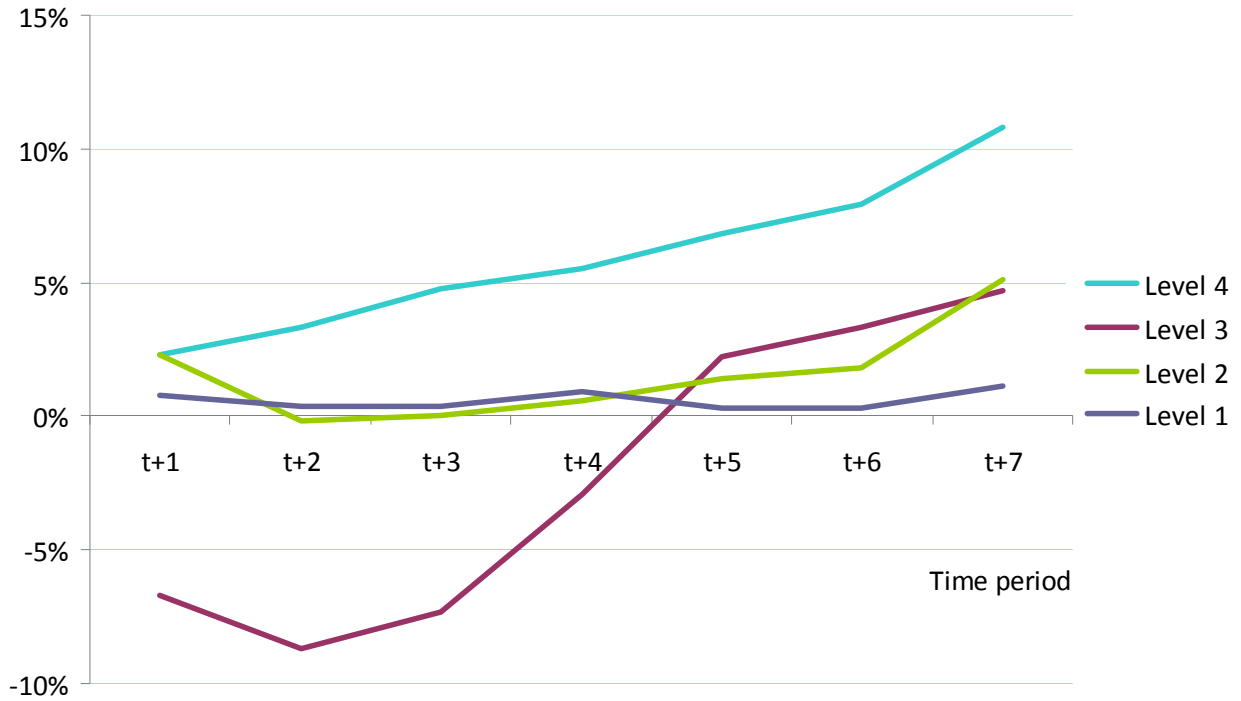
Earnings: Learners aged 16+, academic and vocational qualifications



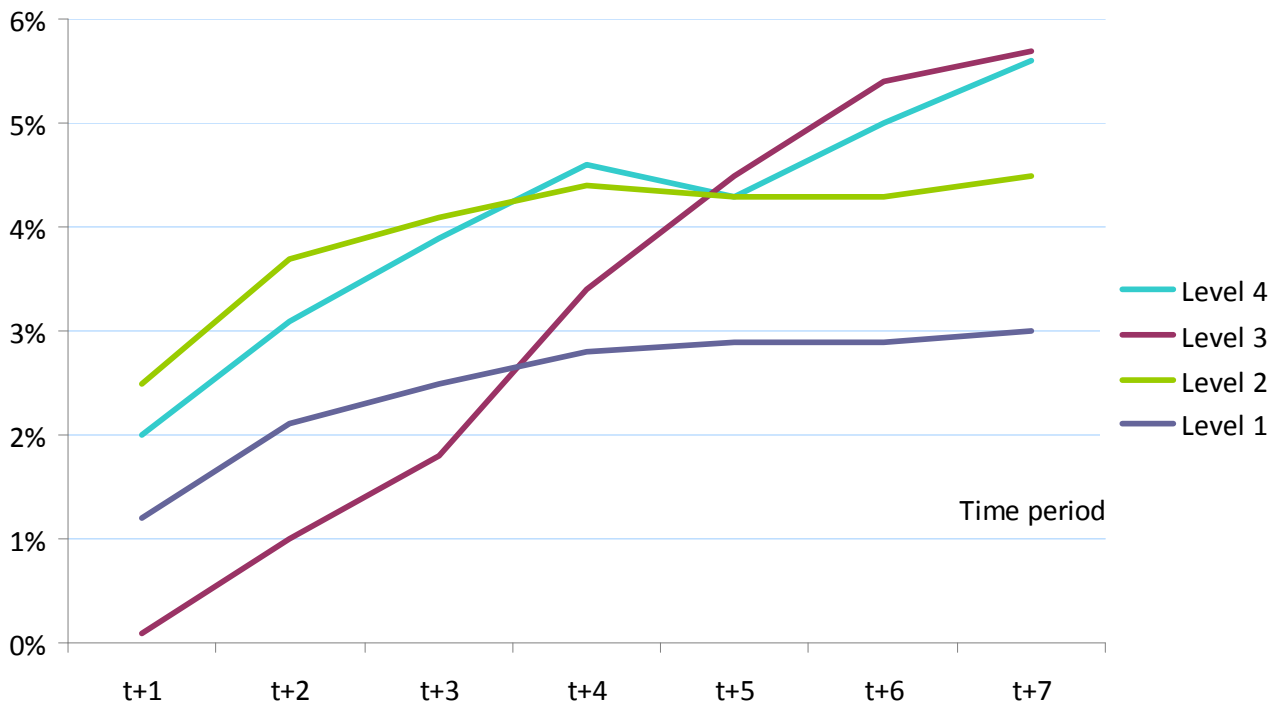
Employment: Learners aged 16+, academic and vocational qualifications



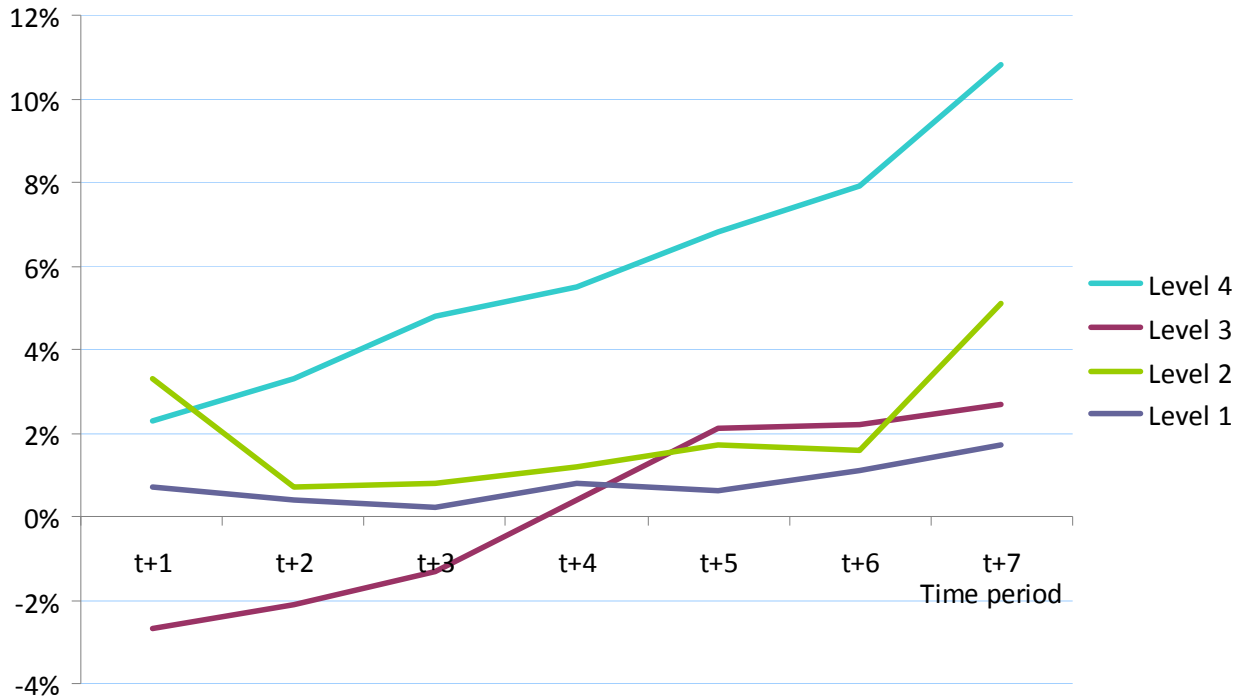
Earnings: Learners aged 19+, academic and vocational qualifications



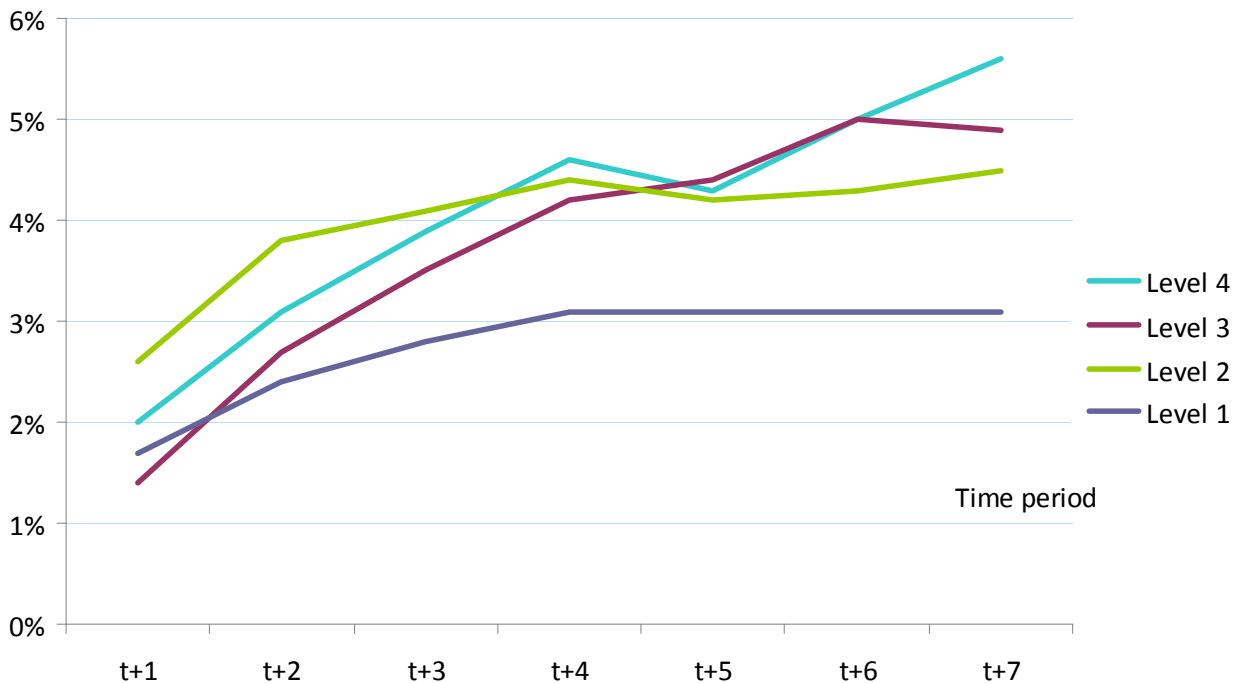
Employment: Learners aged 19+, academic and vocational qualifications



Earnings: Learners aged 19+, vocational qualifications only



Employment: Learners aged 19+, vocational qualifications only

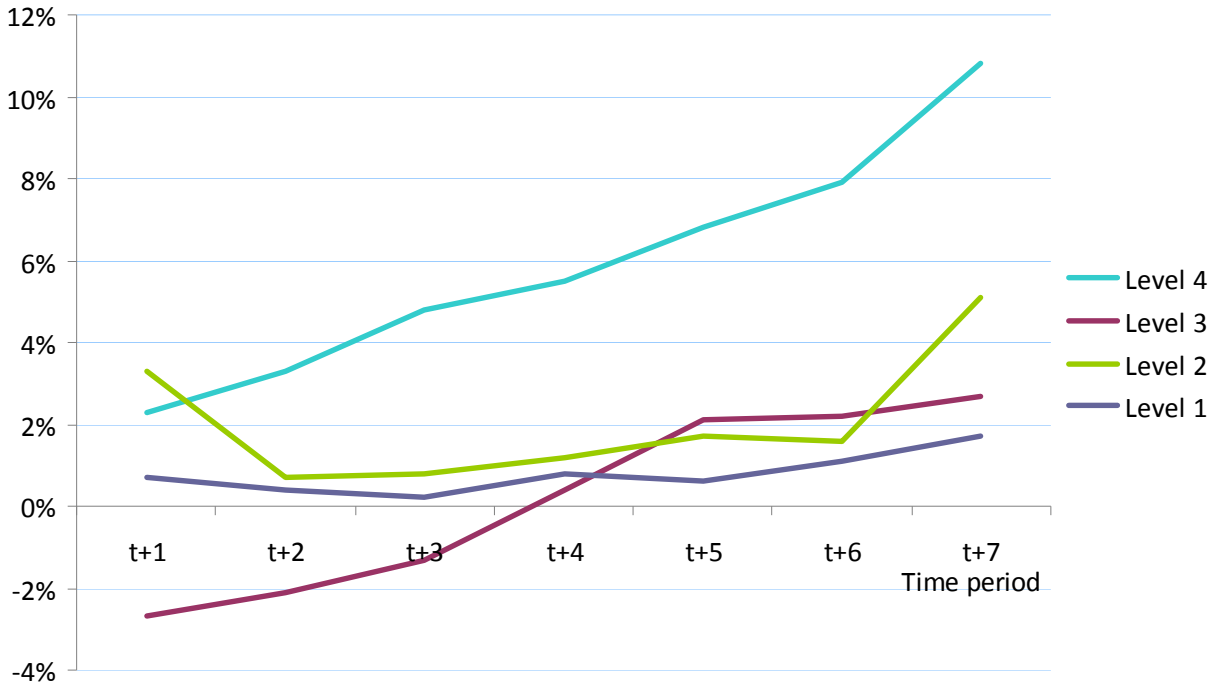


Source: London Economics

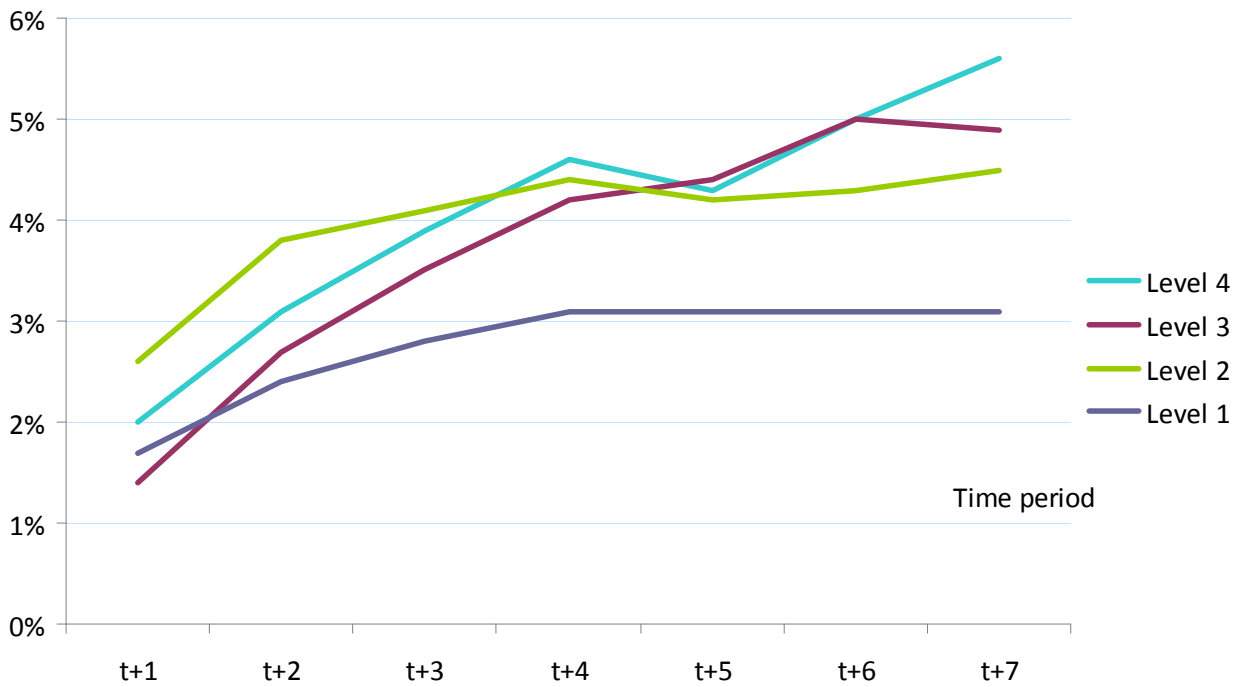
A1.10 Age of attainment - women

Figure 21: Earnings and employment returns by age of attainment – women

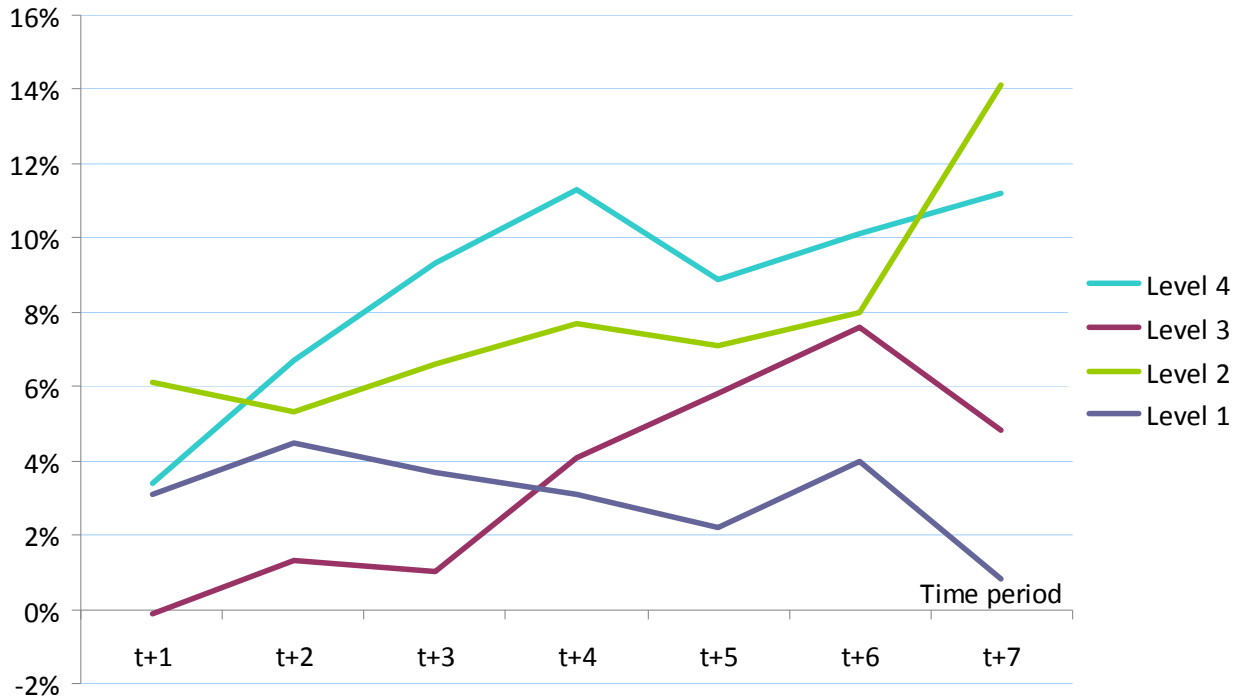
Earnings: Learners aged 19+, vocational qualifications only



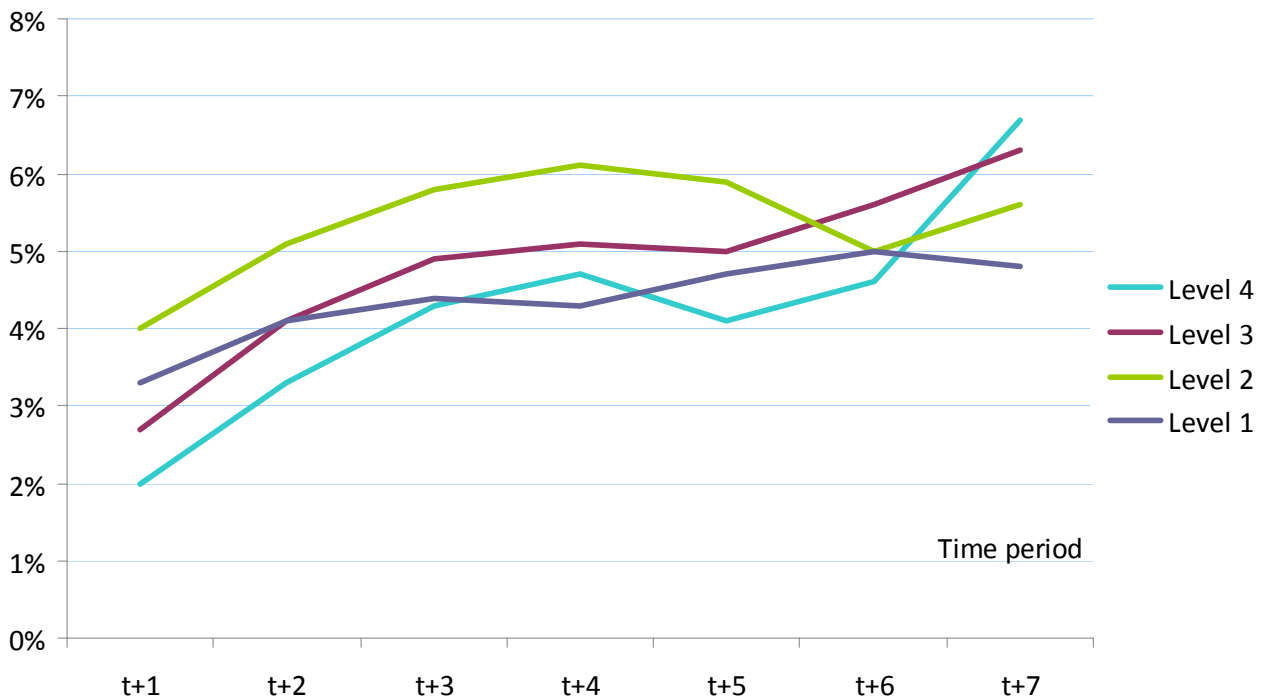
Employment: Learners aged 19+, vocational qualifications only



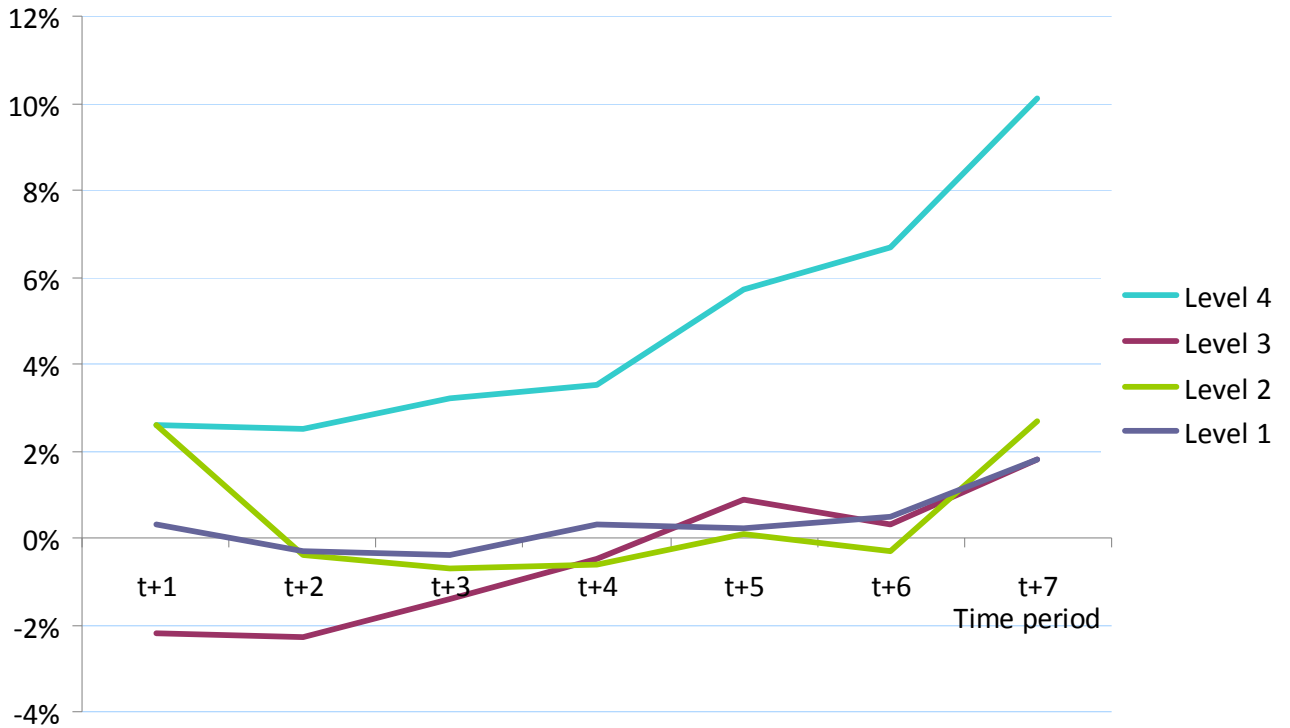
Earnings: Learners aged 19-25, vocational qualifications only



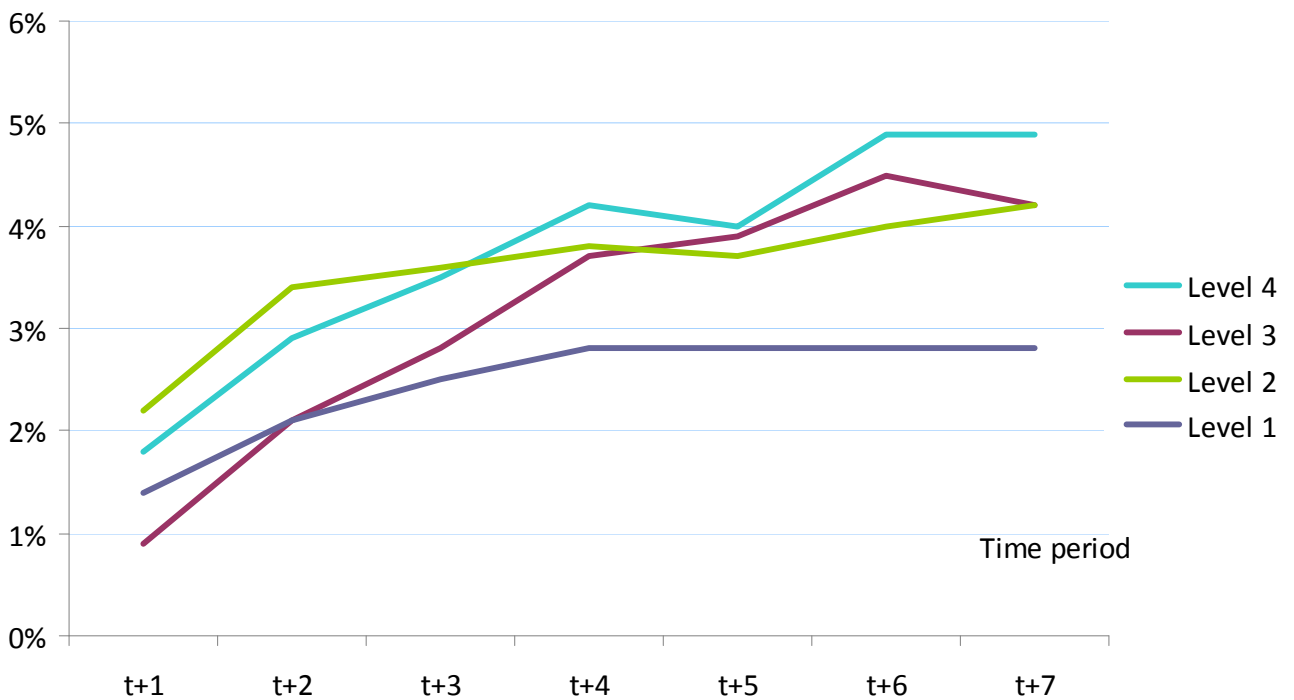
Employment: Learners aged 19-25, vocational qualifications only



Earnings: Learners aged 25+, vocational qualifications only



Employment: Learners aged 25+, vocational qualifications only

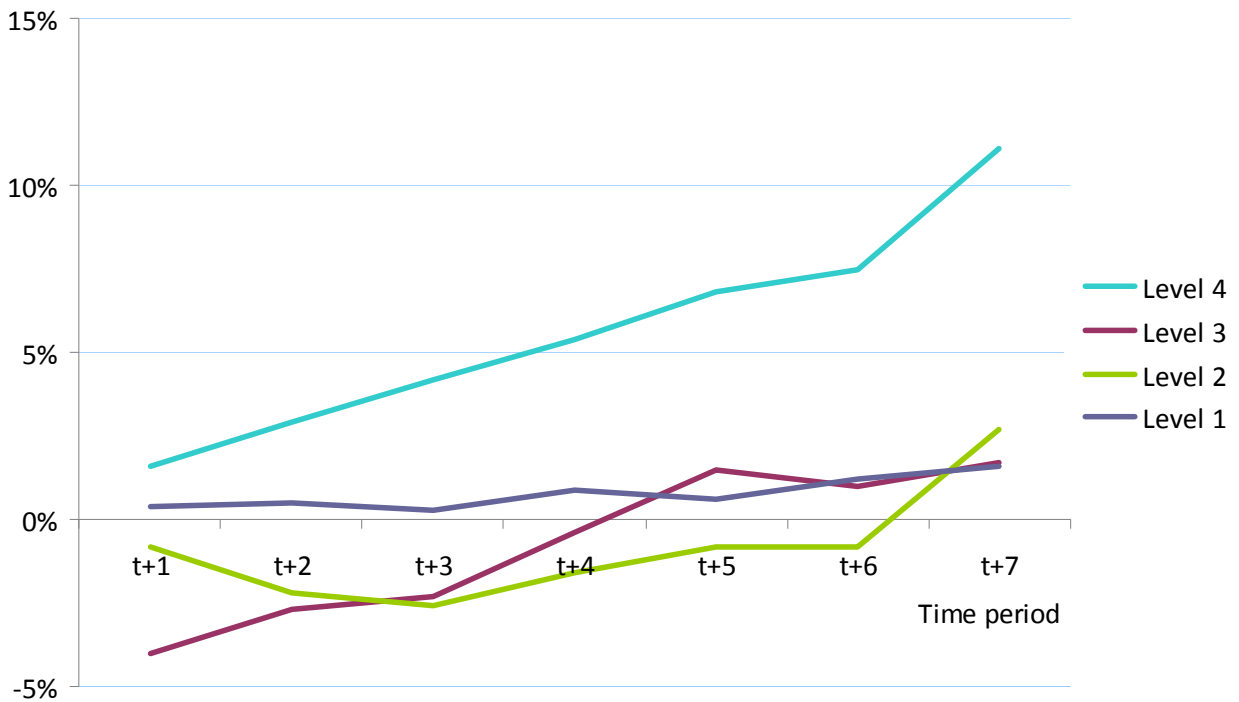


Source: London Economics

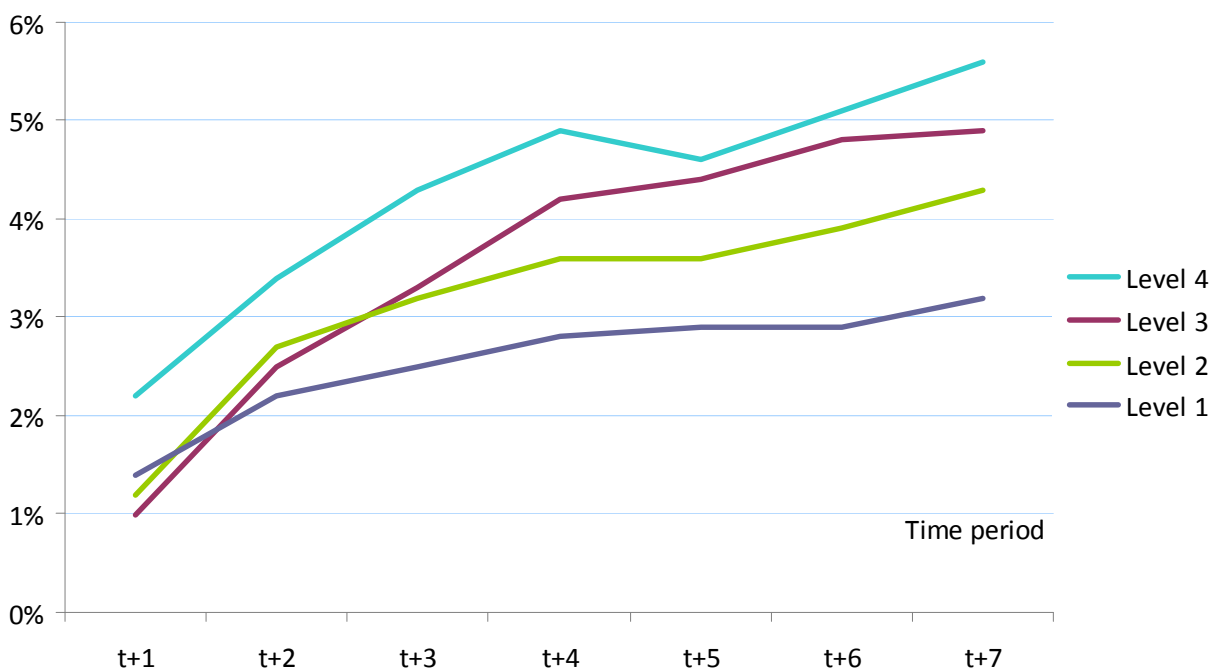
A1.11 Mode of attainment - women

Figure 22: Earnings and employment returns by mode of attainment – women

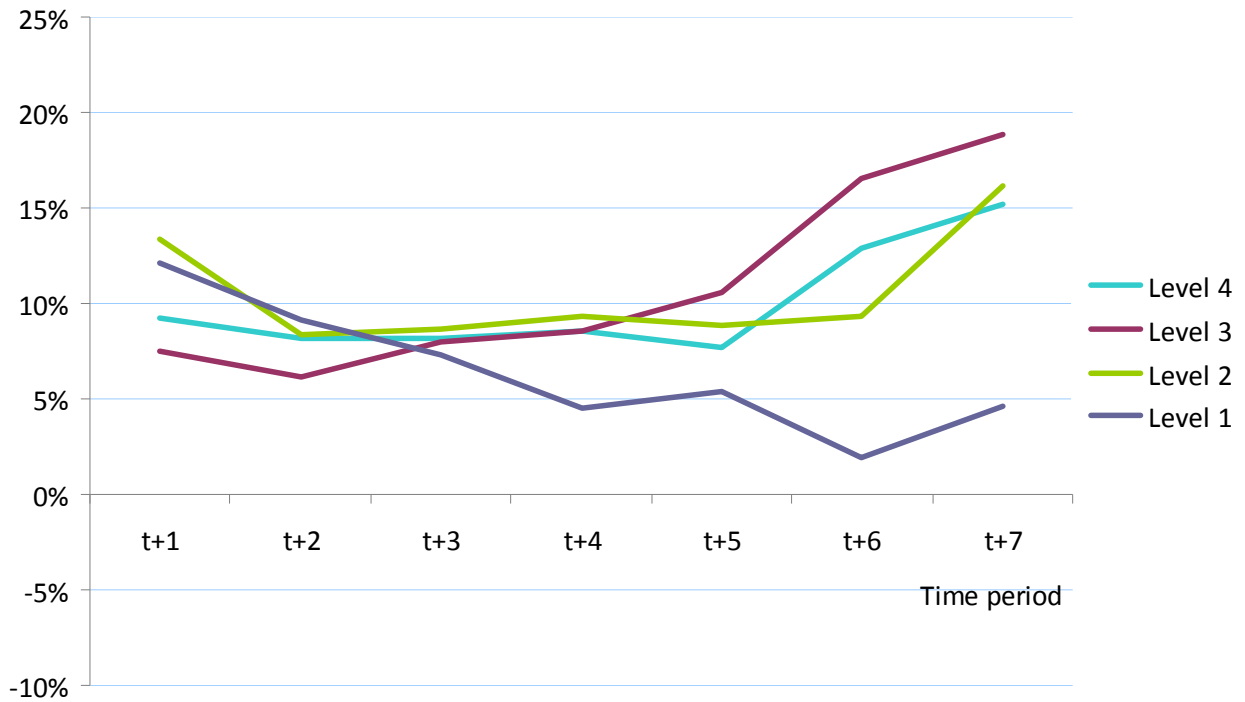
Earnings: Learners aged 19+, vocational qualifications only – classroom mode of attendance



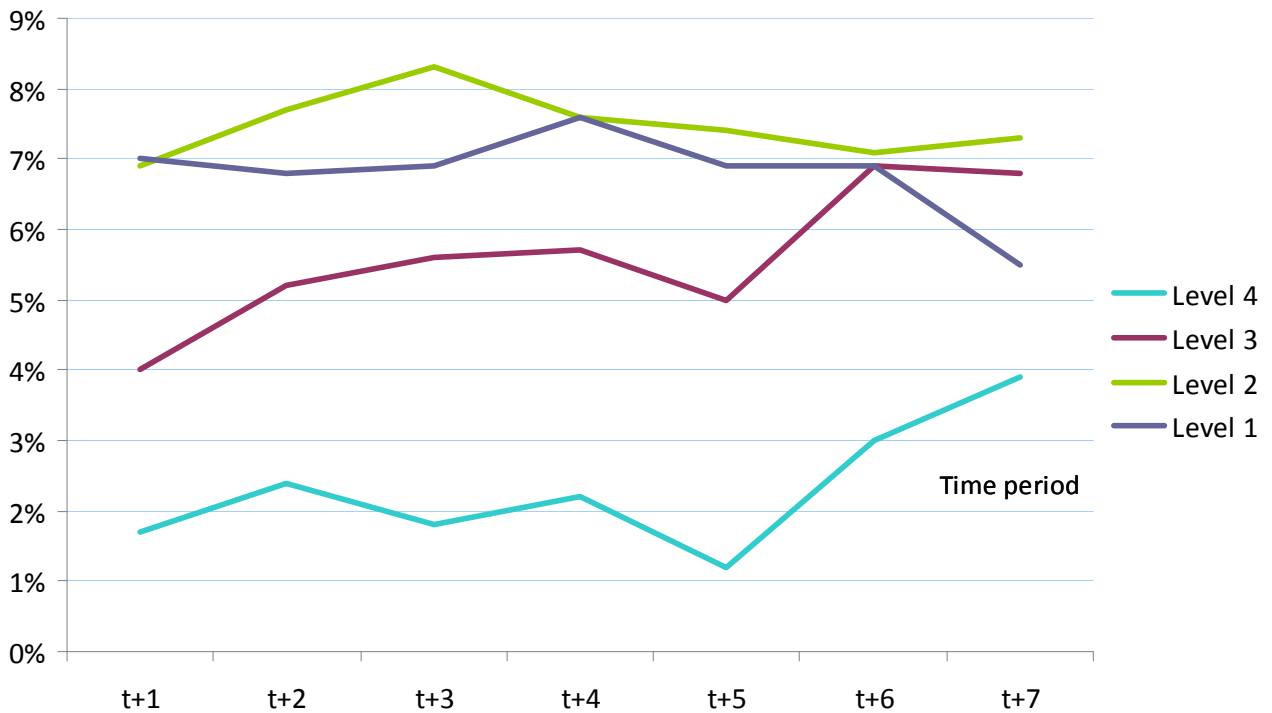
Employment: Learners aged 19+, vocational qualifications only – classroom mode of attendance



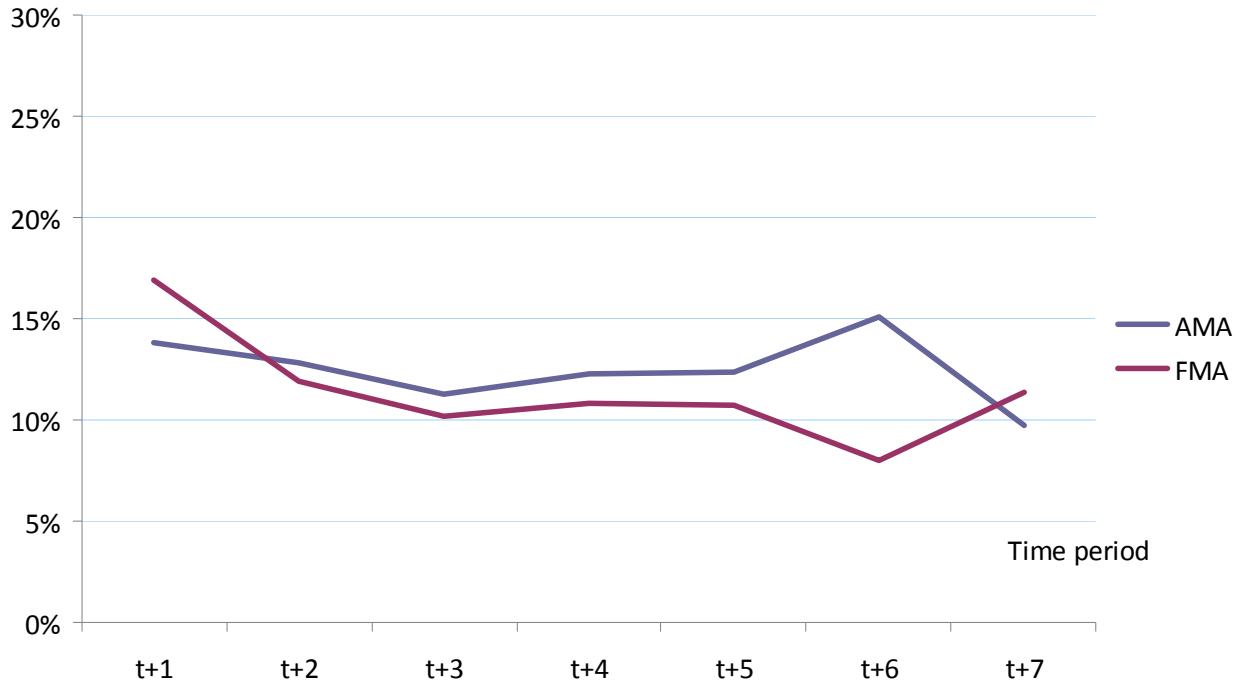
Earnings: Learners aged 19+, vocational qualifications only – workplace mode of attendance



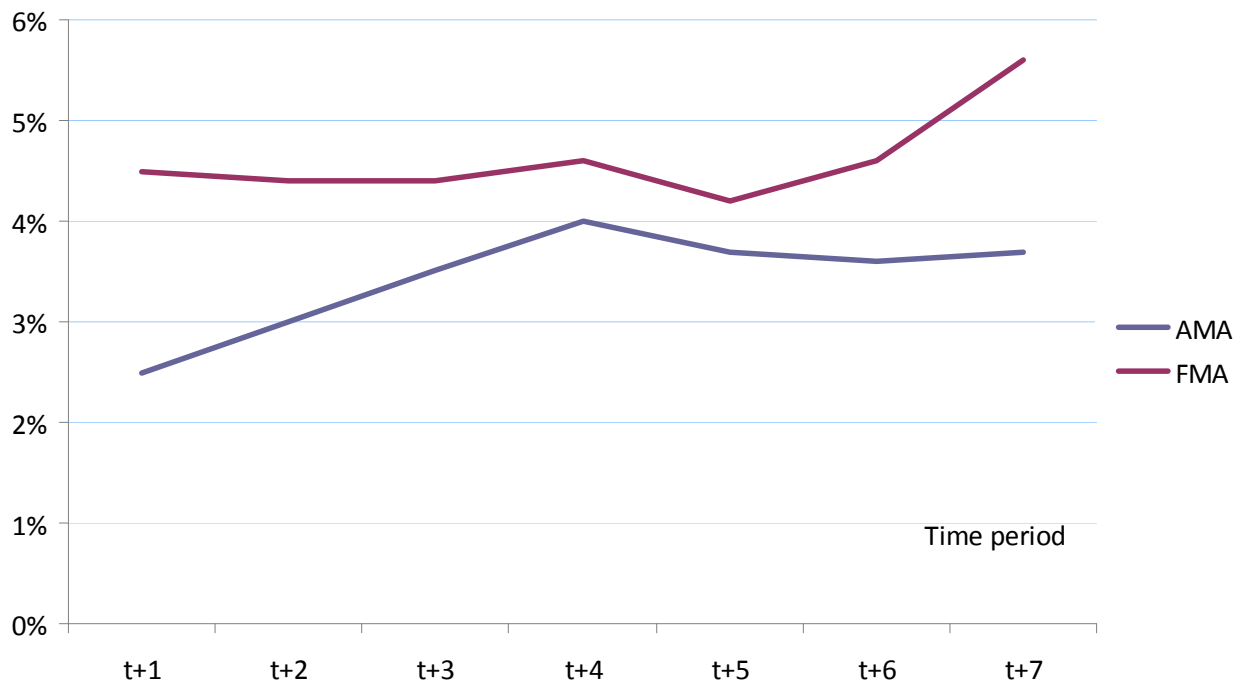
Employment: Learners aged 19+, vocational qualifications only – workplace mode of attendance



Earnings: Learners aged 19+, vocational qualifications only – apprenticeships



Employment: Learners aged 19+, vocational qualifications only – apprenticeships

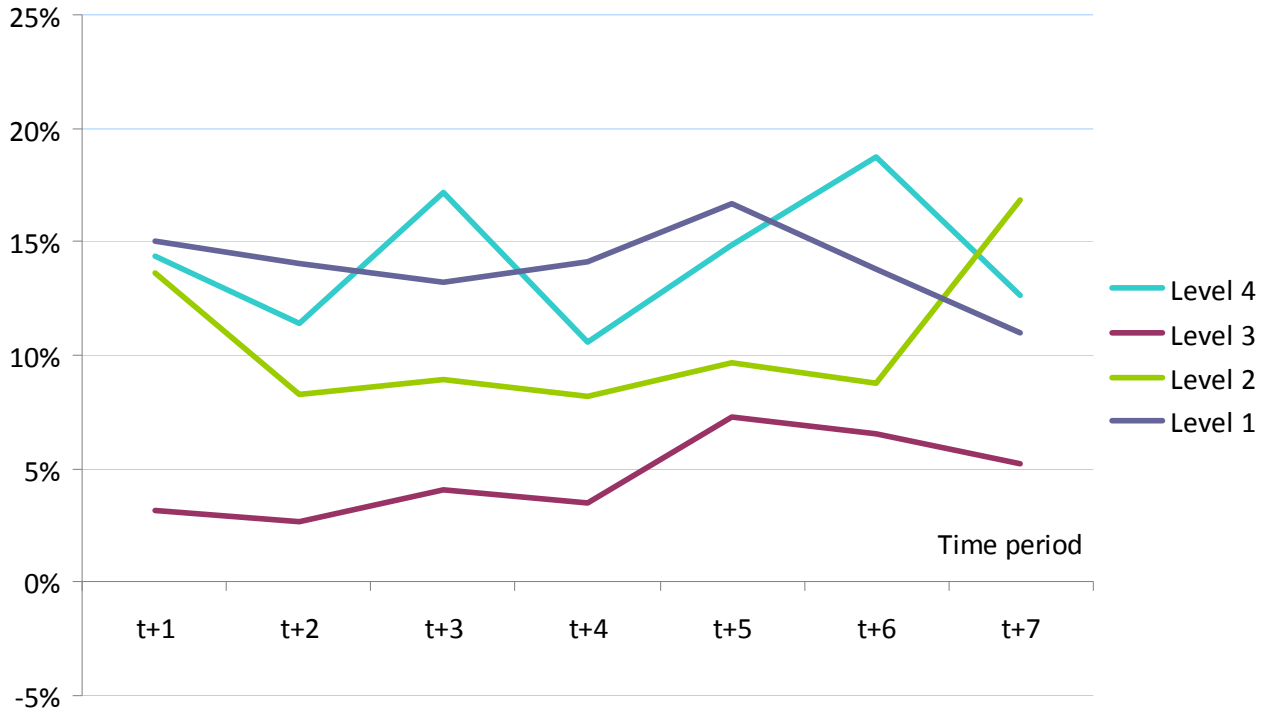


Source: London Economics

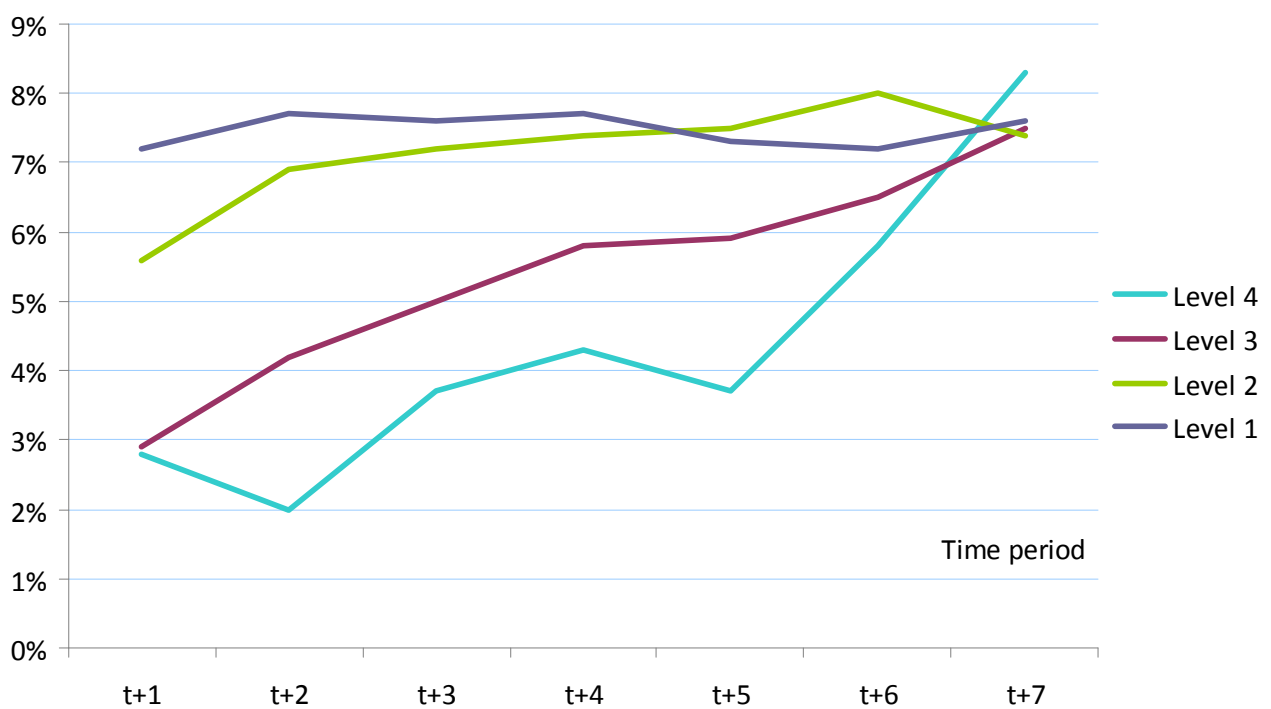
A1.12 Subject of attainment - women

Figure 23: Earnings and employment returns by subject of study (I) – women

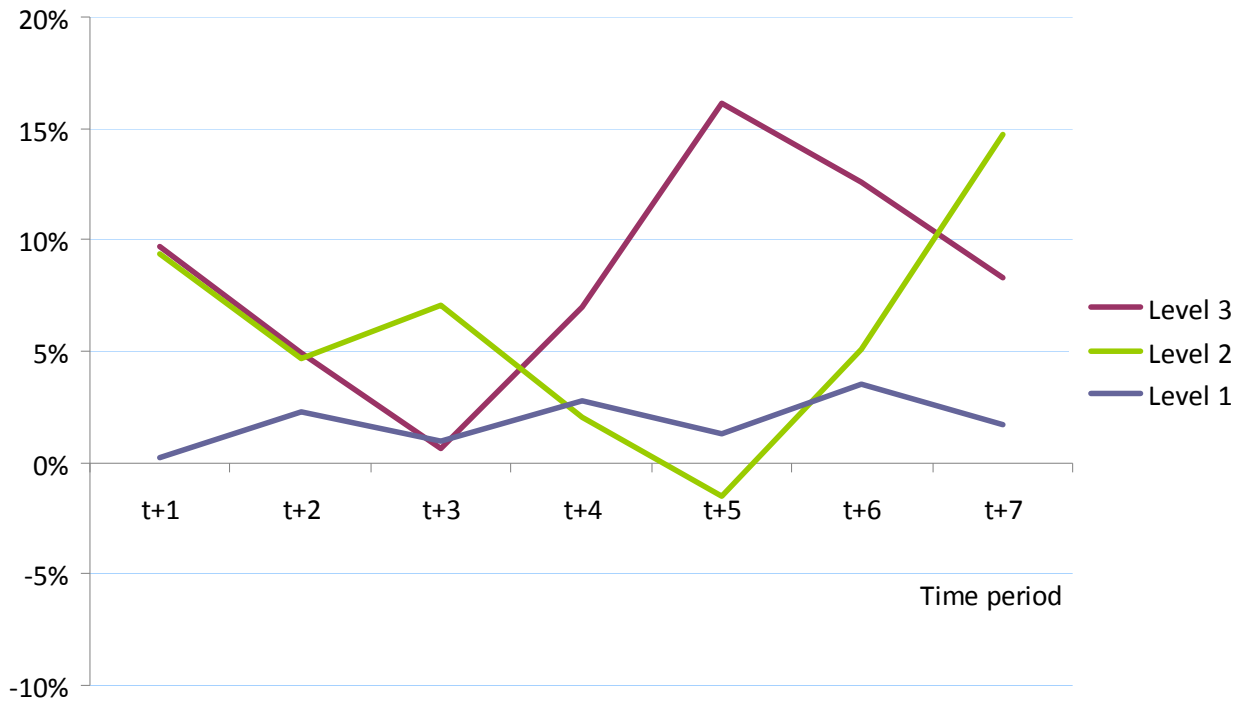
Earnings: Learners aged 19+, vocational qualifications only – health and social care



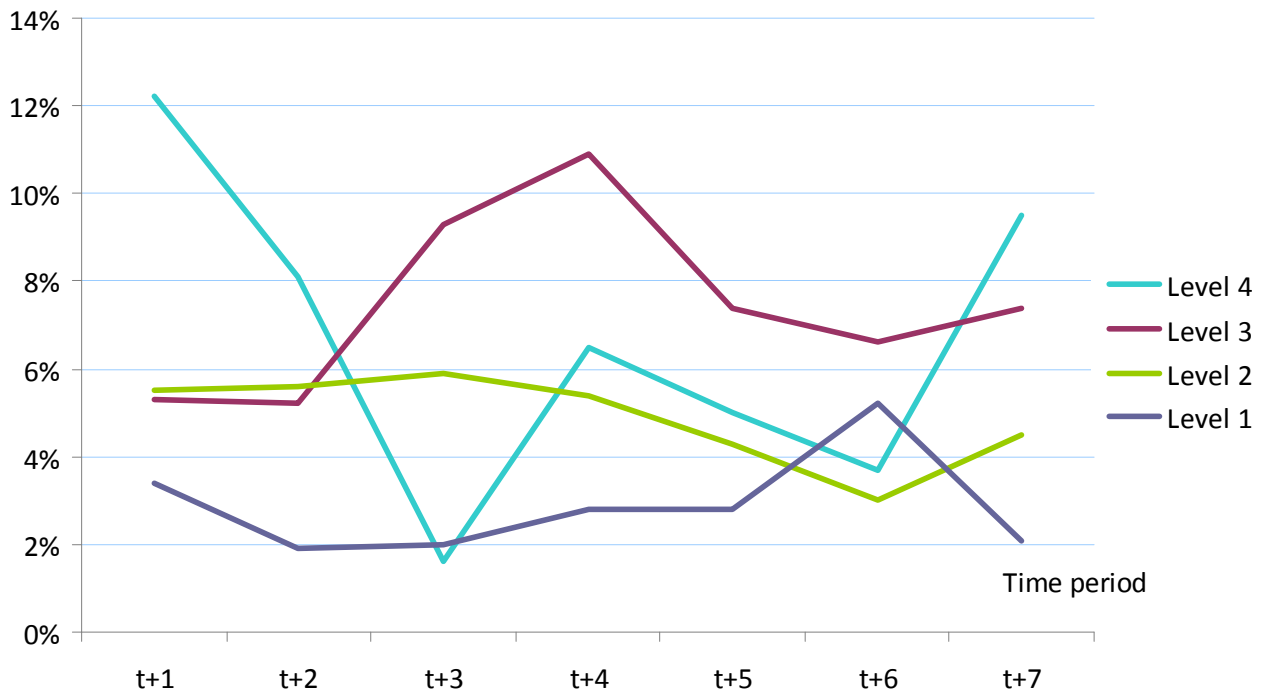
Employment: Learners aged 19+, vocational qualifications only – health and social care



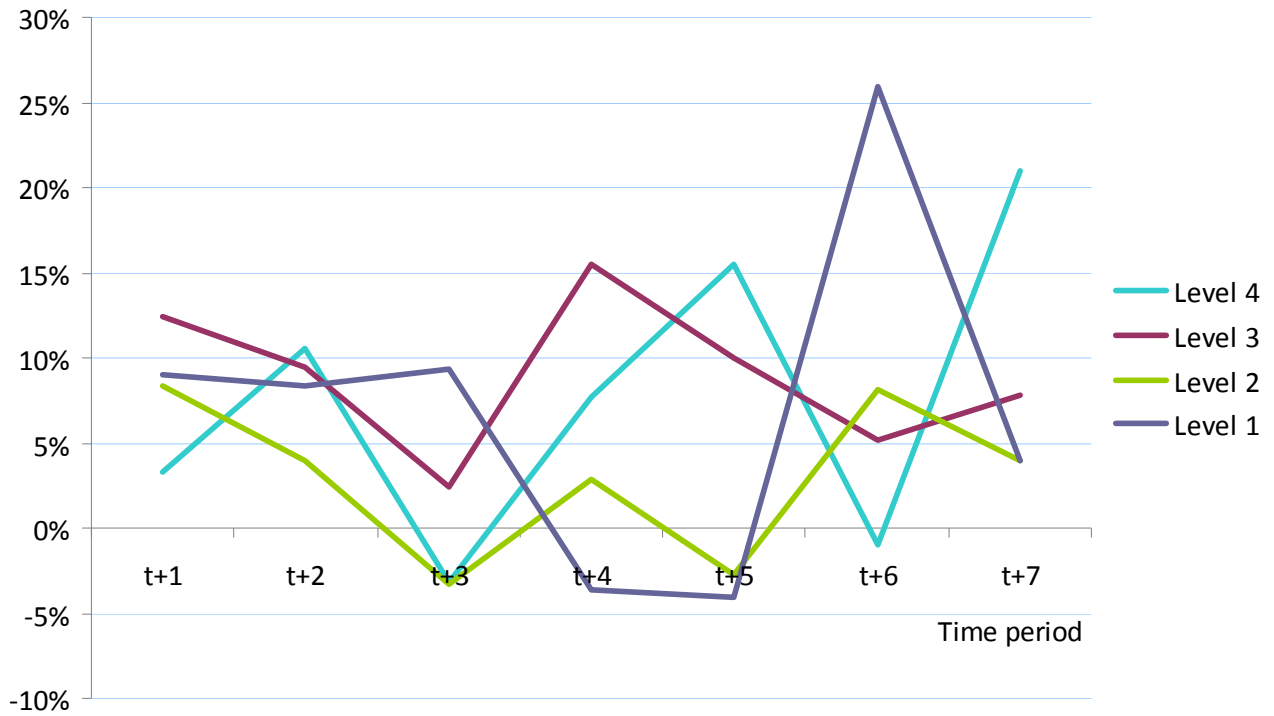
Earnings: Learners aged 19+, vocational qualifications only – engineering and manufacturing



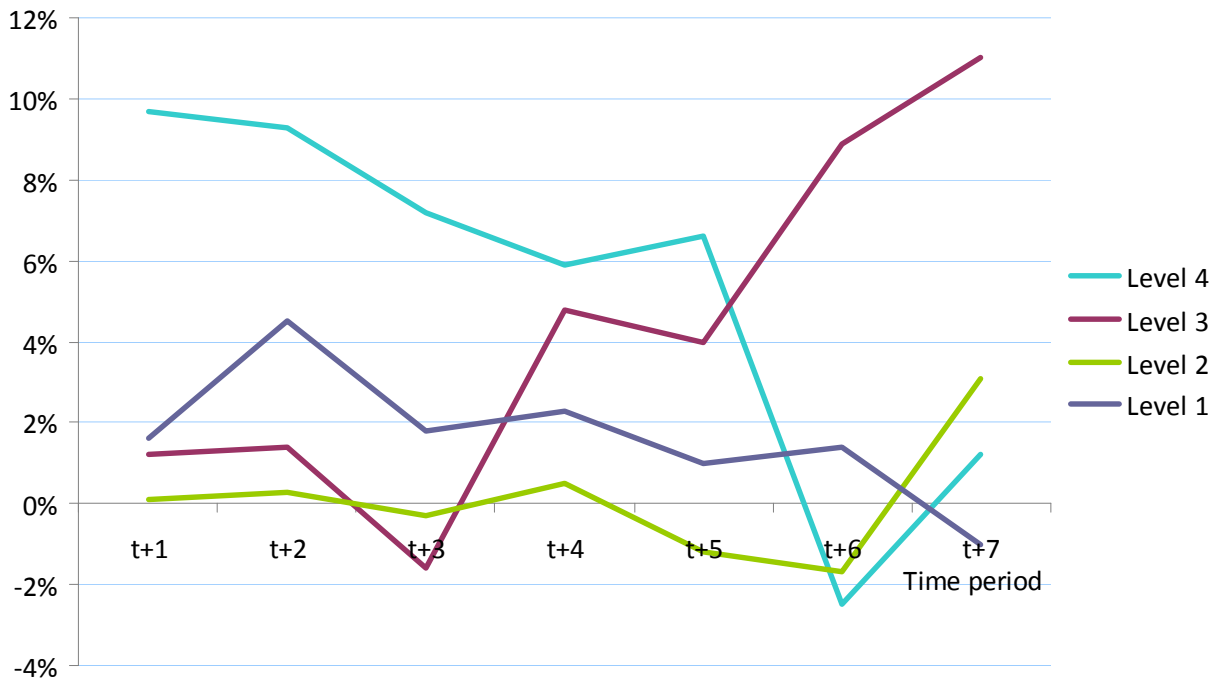
Employment: Learners aged 19+, vocational qualifications only – engineering and manufacturing



Earnings: Learners aged 19+, vocational qualifications only – construction, planning and built environment



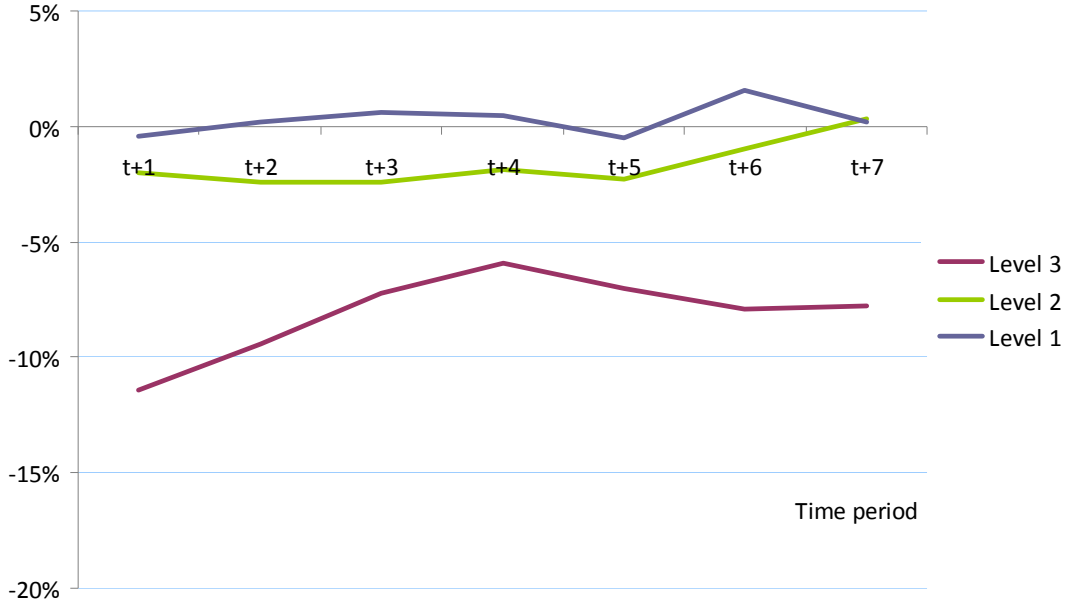
Employment: Learners aged 19+, vocational qualifications only – construction, planning and built environment



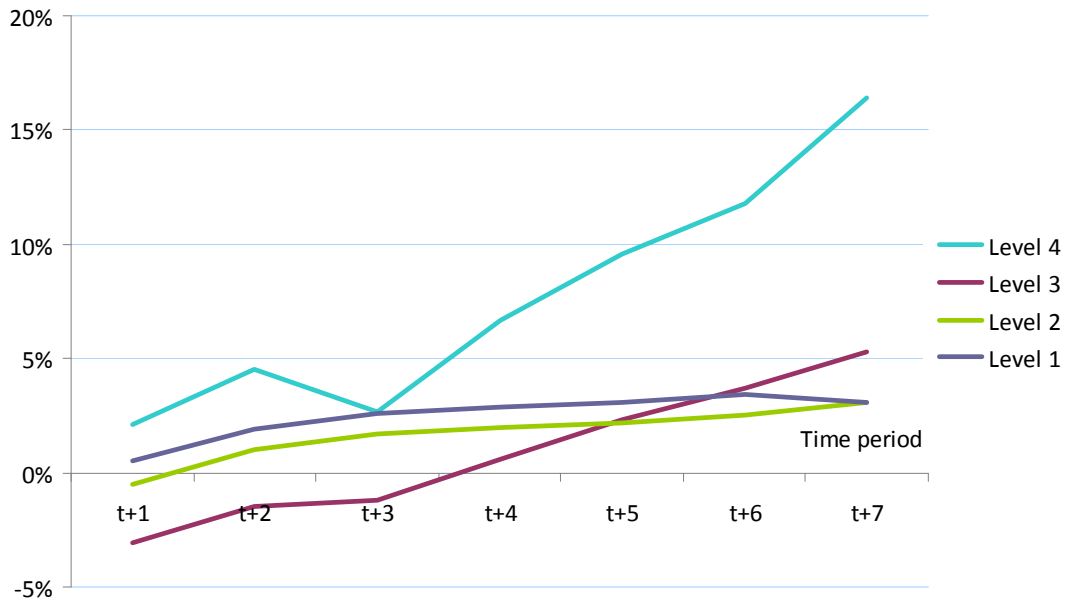
Source: London Economics

Figure 24: Earnings and employment returns by subject of study (II) – women

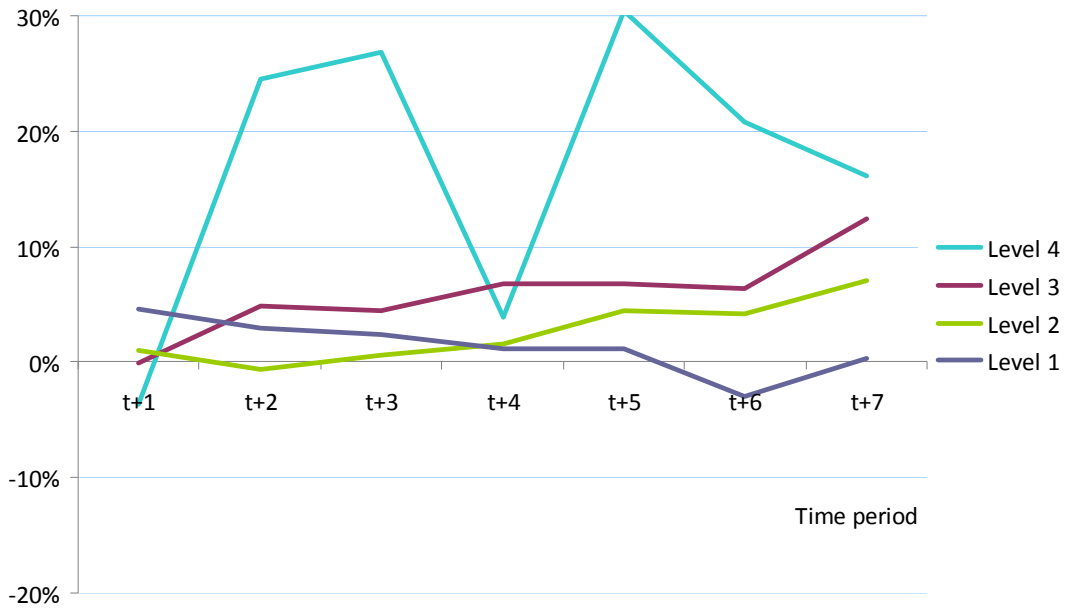
Earnings: Learners aged 19+, vocational qualifications only – ICT



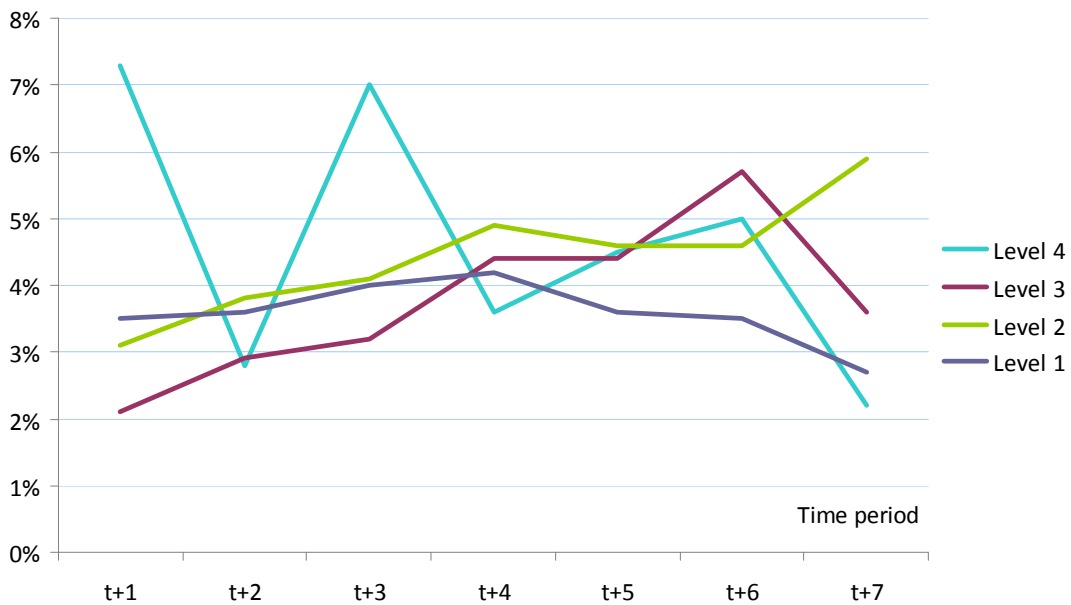
Employment: Learners aged 19+, vocational qualifications only – ICT



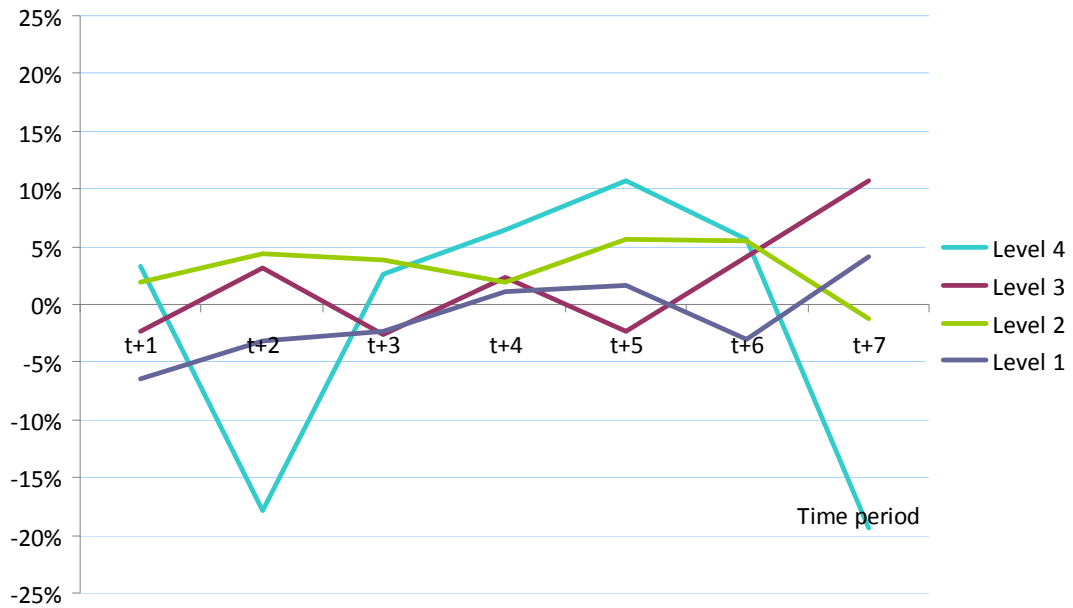
Earnings: Learners aged 19+, vocational qualifications only – Retail and Commercial



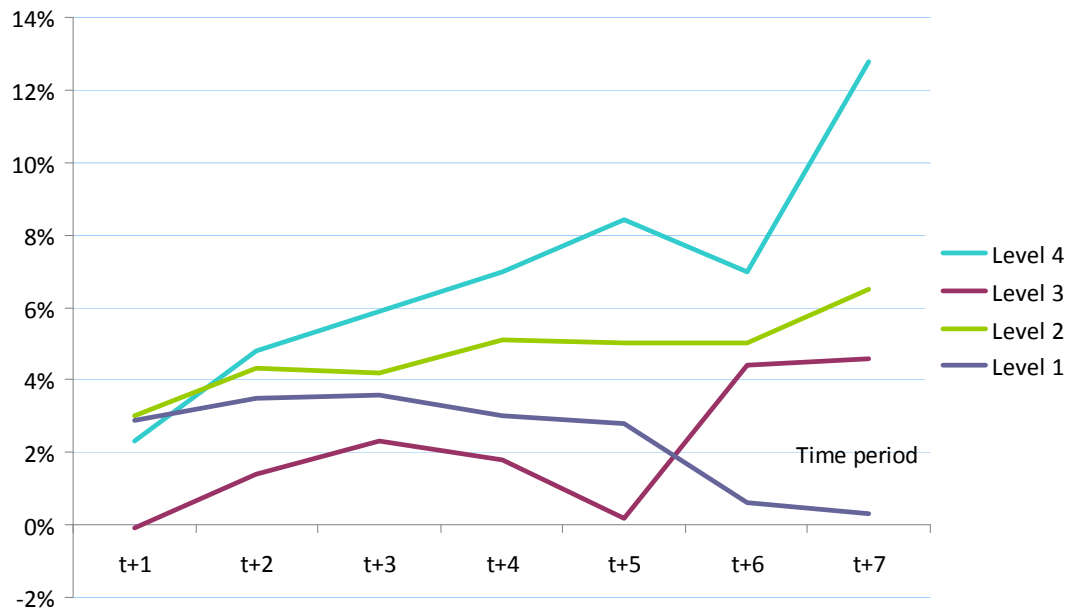
Employment: Learners aged 19+, vocational qualifications only – Retail and Commercial



Earnings: Learners aged 19+, vocational qualifications only – Travel and tourism



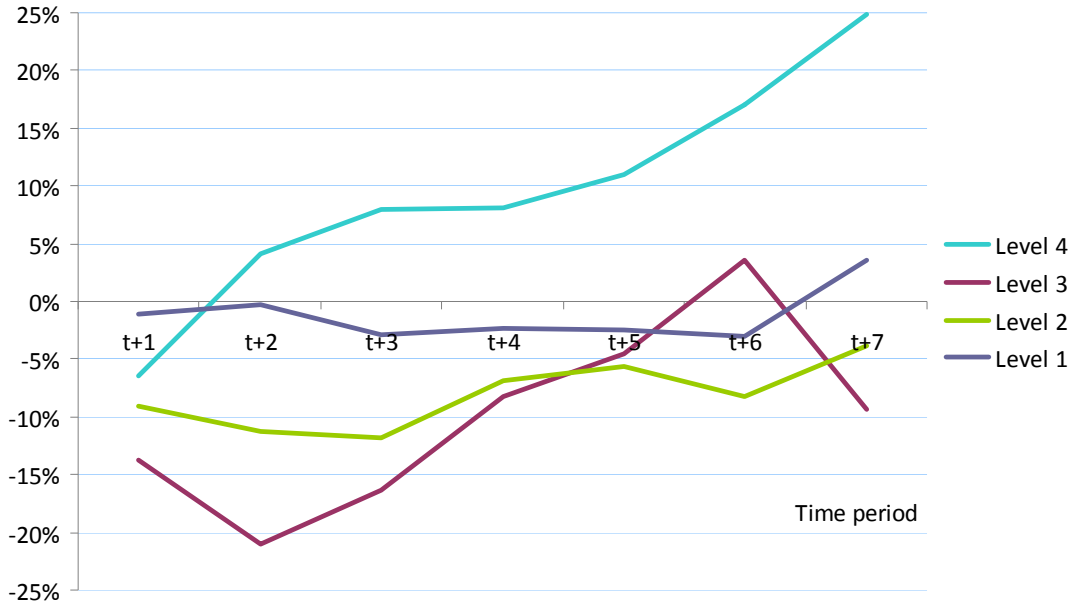
Employment: Learners aged 19+, vocational qualifications only – Travel and tourism



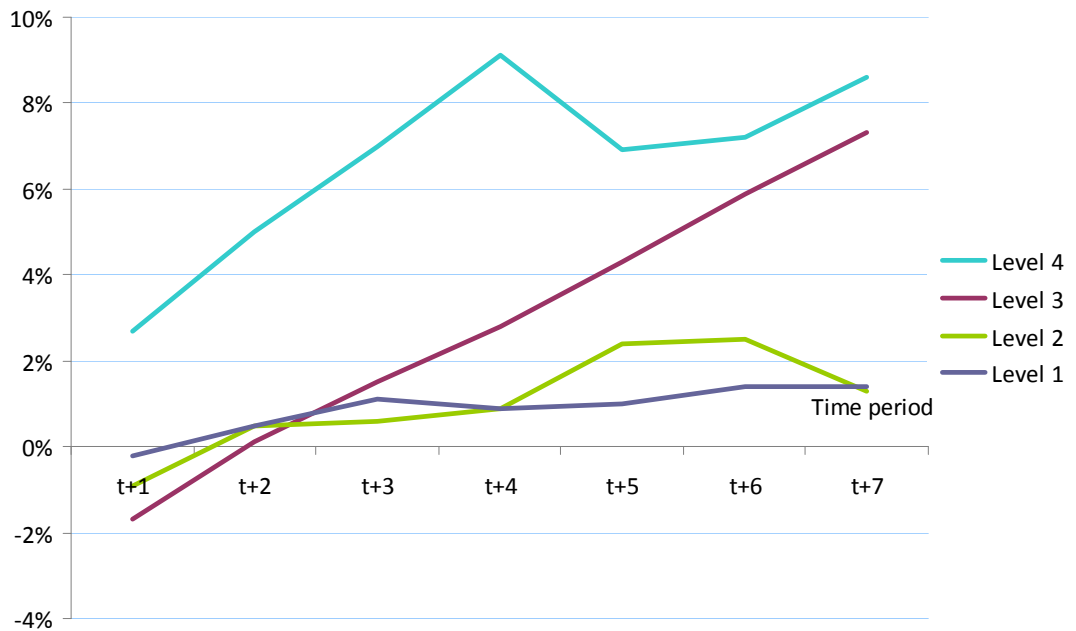
Source: London Economics

Figure 25: Earnings and employment returns by subject of study (III) – women

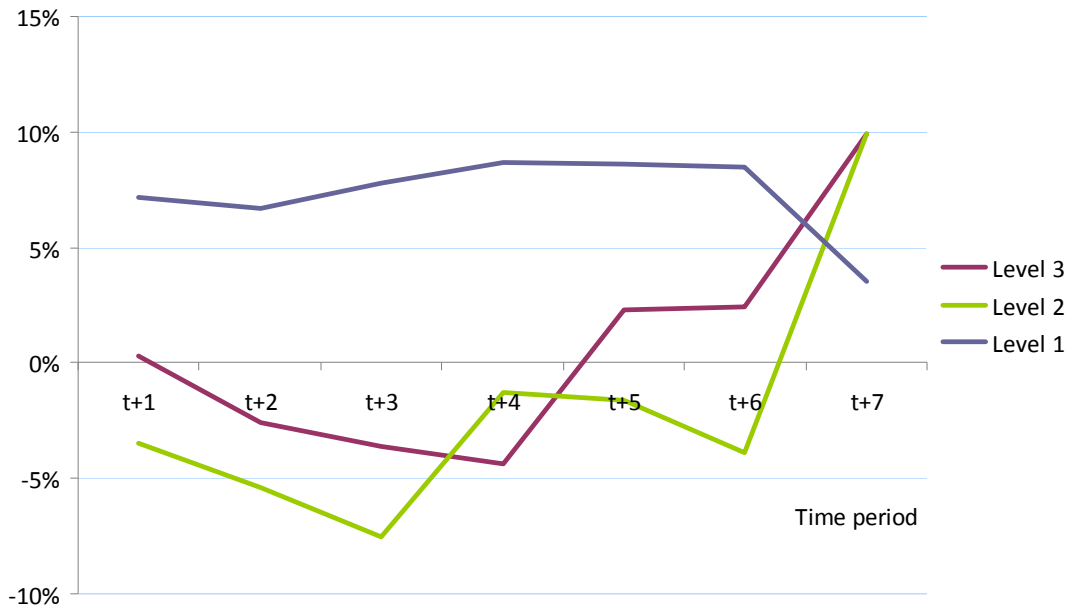
Earnings: Learners aged 19+, vocational qualifications only – Arts, media and publishing



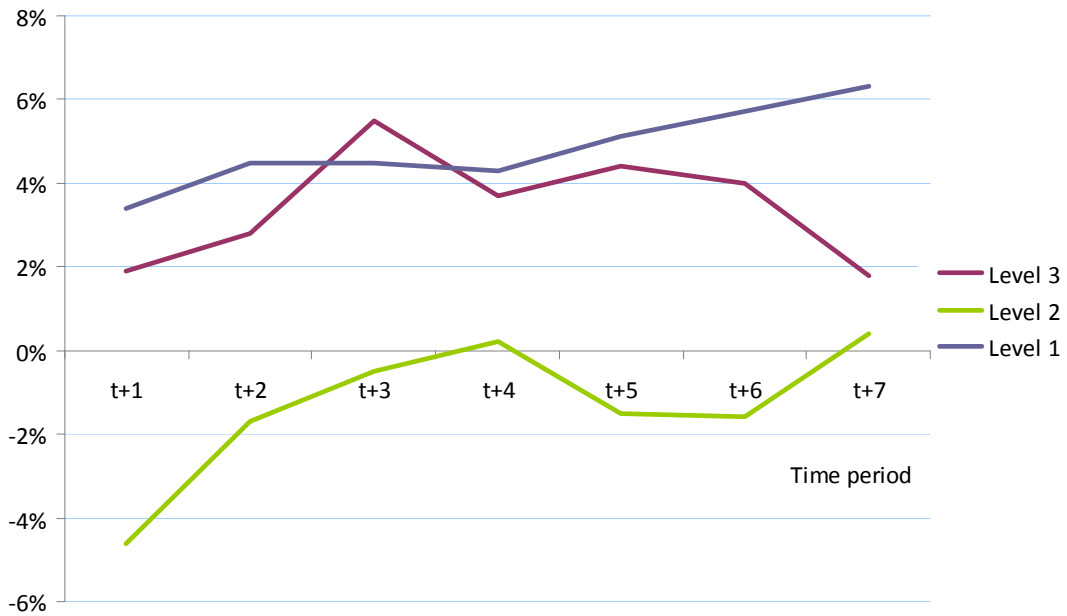
Employment: Learners aged 19+, vocational qualifications only – Arts, media and publishing



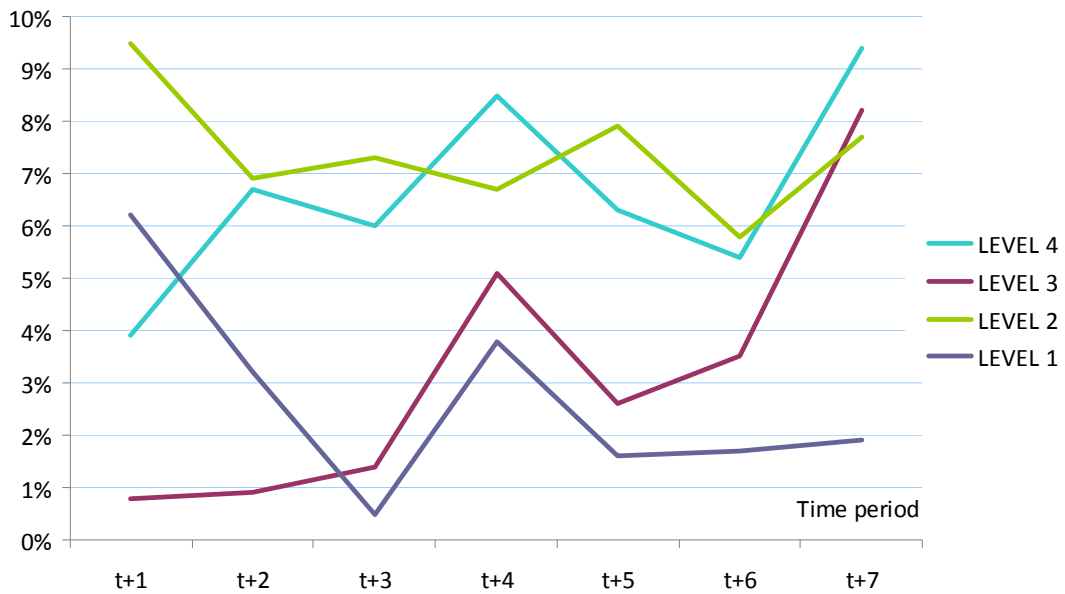
Earnings: Learners aged 19+, vocational qualifications only – Preparation for life and work



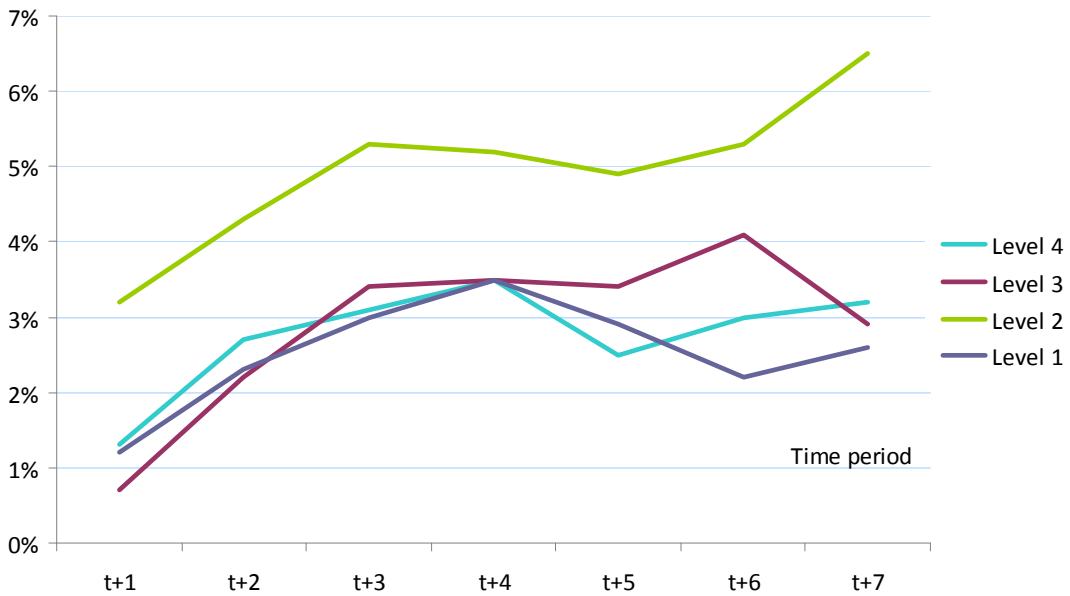
Employment: Learners aged 19+, vocational qualifications only – Preparation for life and work



Earnings: Learners aged 19+, vocational qualifications only – Business administration and law



Employment: Learners aged 19+, vocational qualifications only – Business administration and law

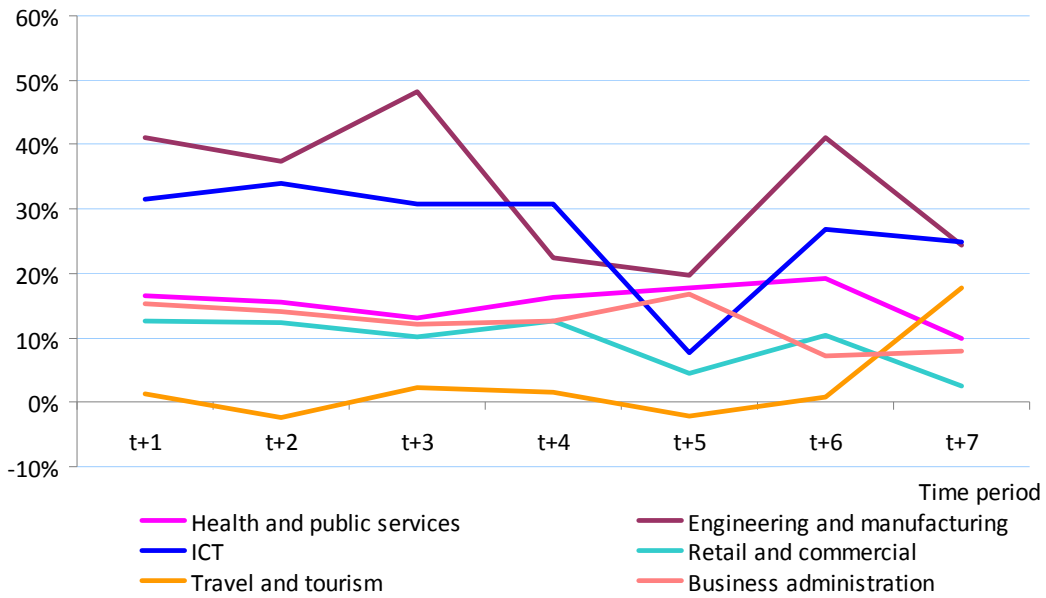


Source: London Economics

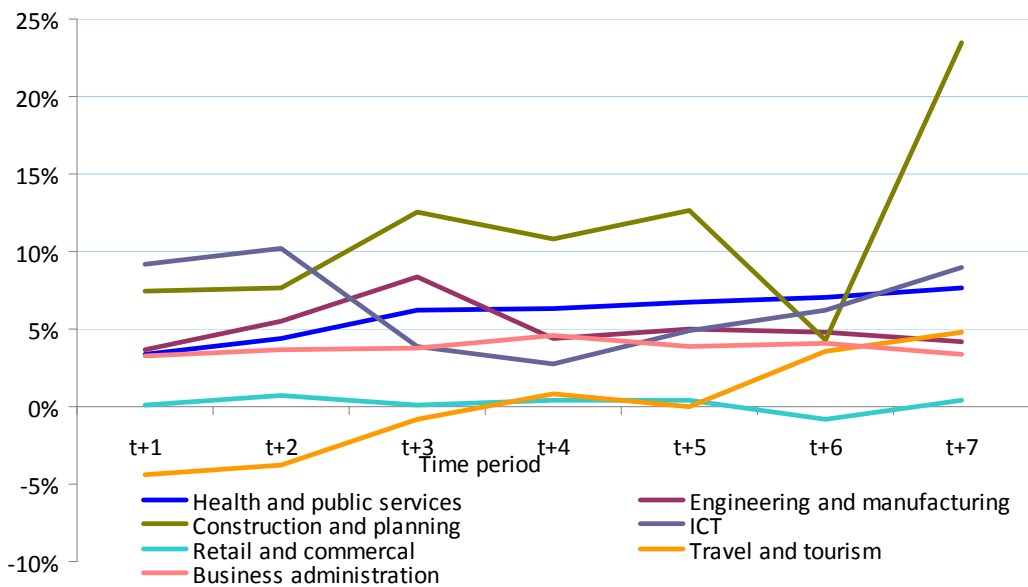
A1.13 Subject of study – apprenticeships - women

Figure 26: Earnings and employment returns by subject of study – apprenticeships

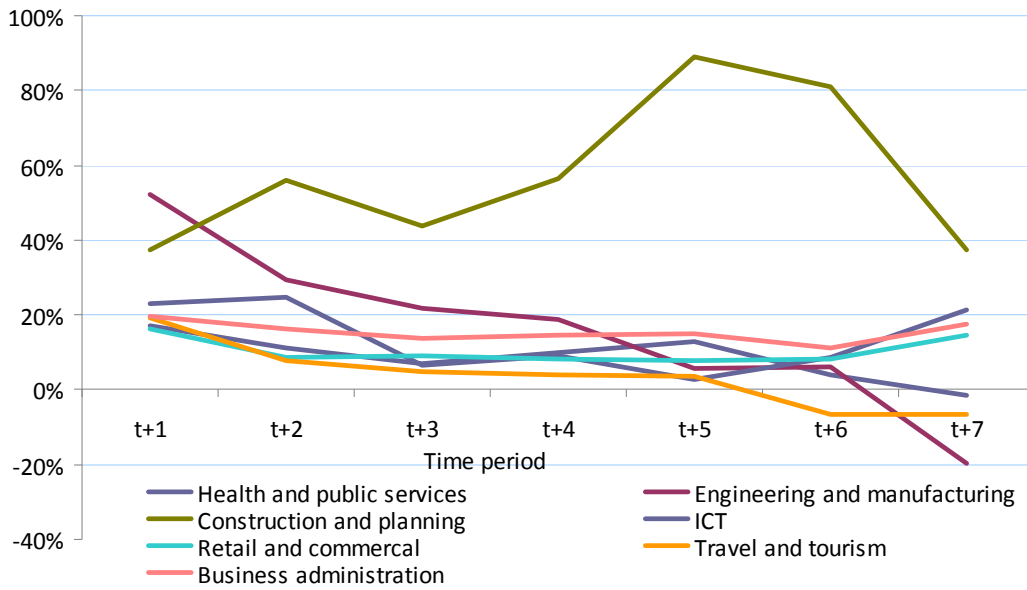
Earnings: Learners aged 19+ - Level 3 apprenticeships



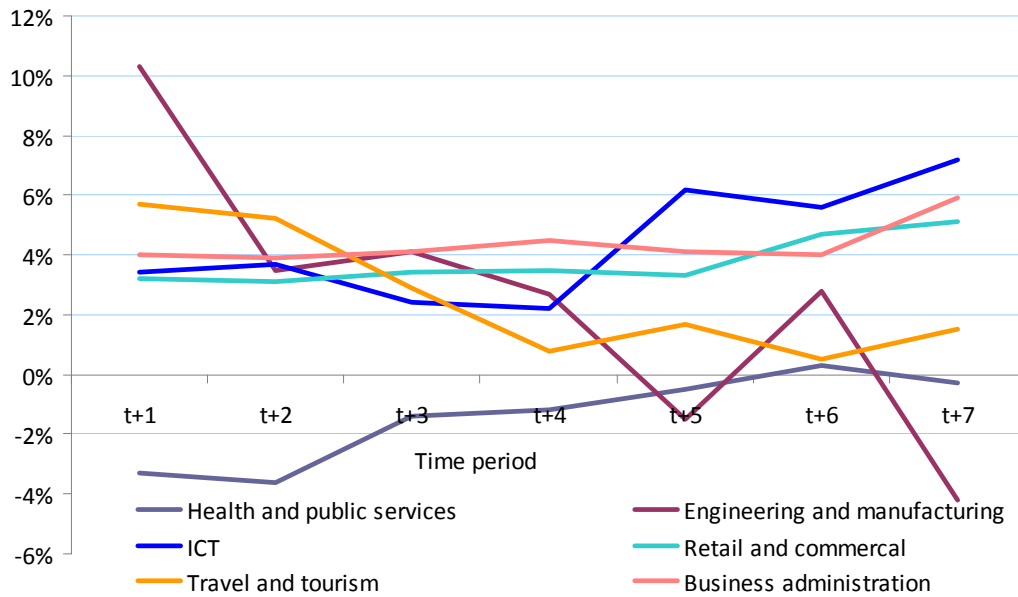
Employment: Learners aged 19+ - Level 3 apprenticeships



Earnings: Learners aged 19+ - Level 2 apprenticeships



Employment: Learners aged 19+ - Level 2 apprenticeships

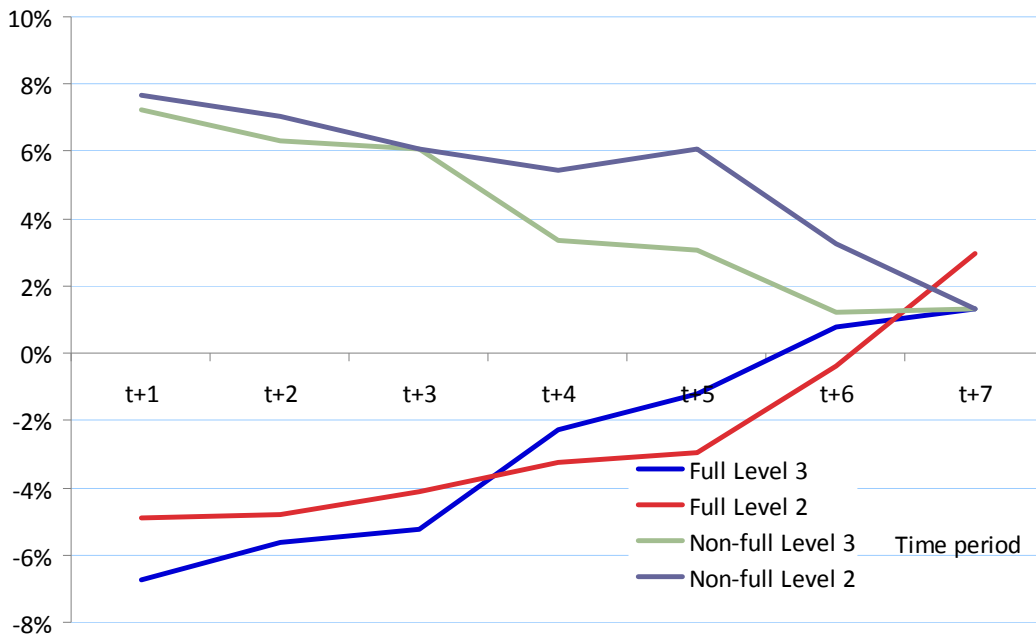


Source: London Economics

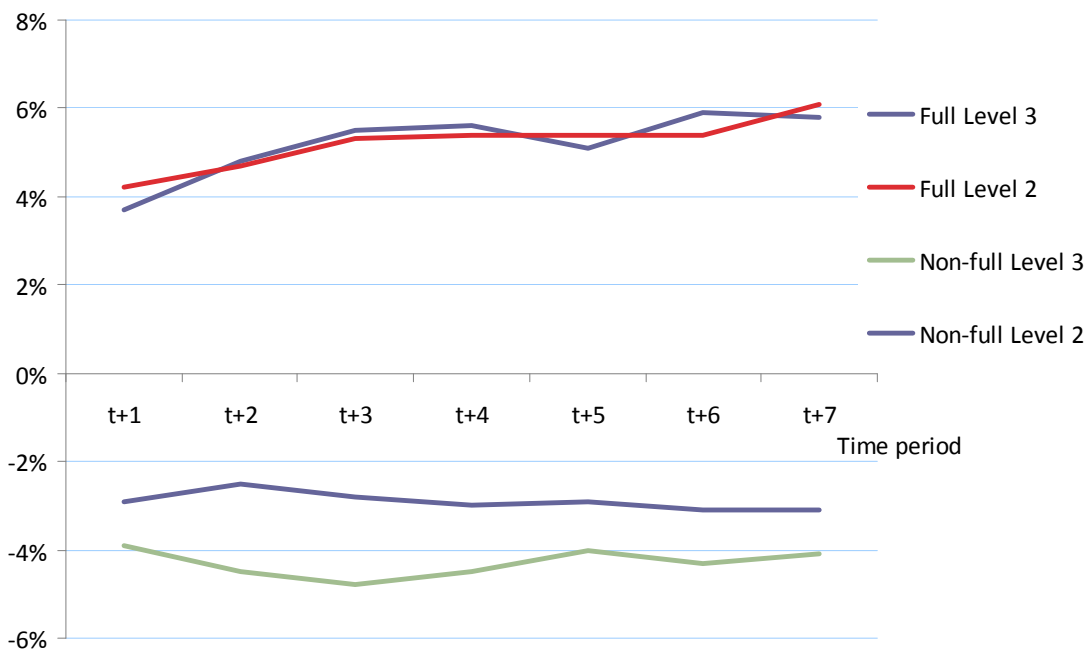
A1.14 Full versus non-full qualifications - women

Figure 27: Earnings and employment returns by whether qualification full or non-full – women

Earnings



Employment

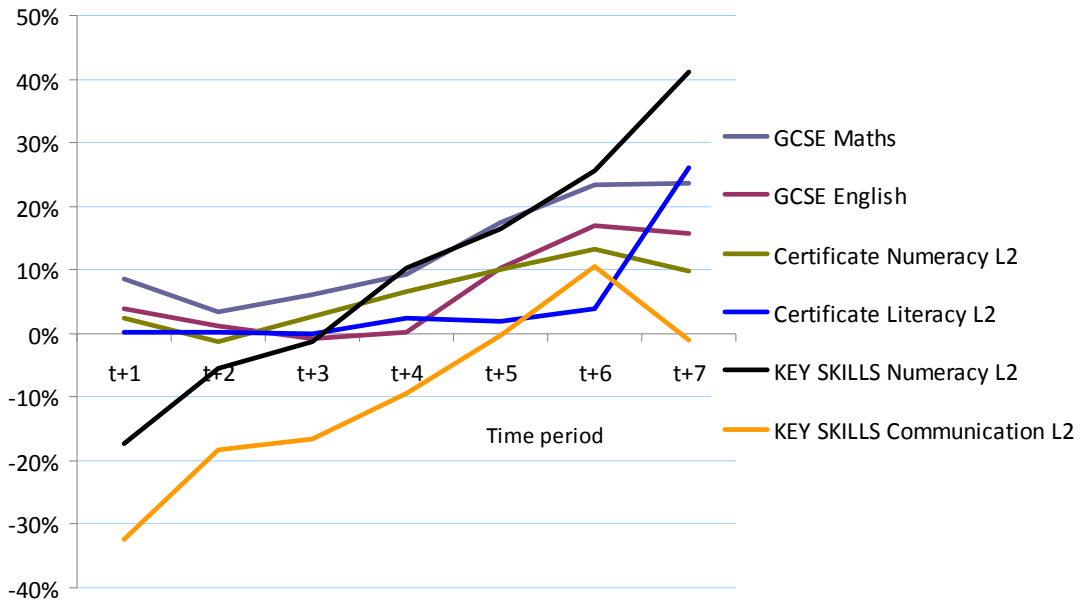


Source: London Economics

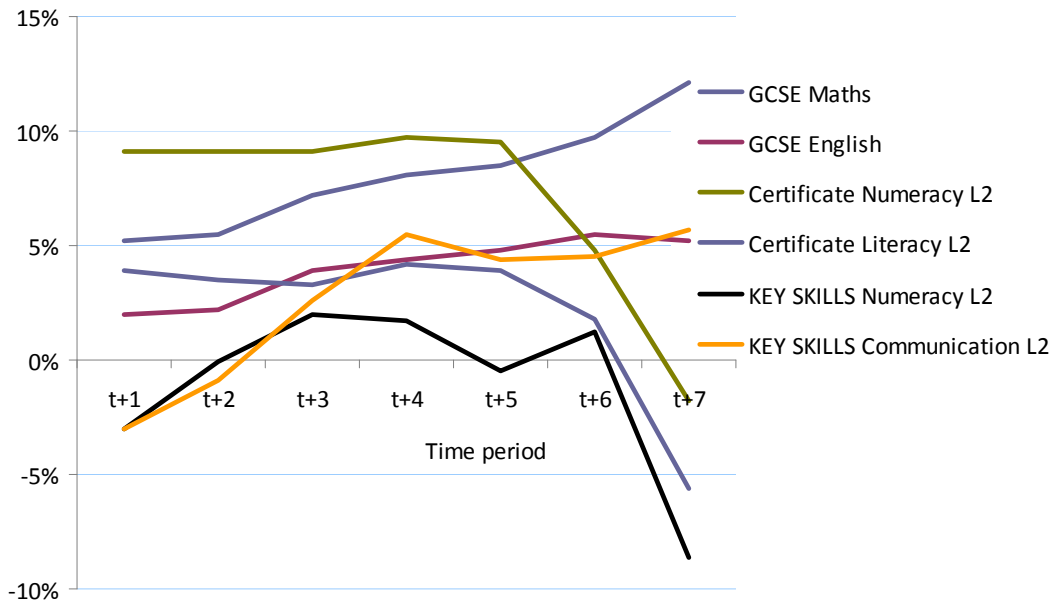
A1.15 Skills for Life - women

Figure 28: Earnings and employment returns – Skills for Life qualifications – women

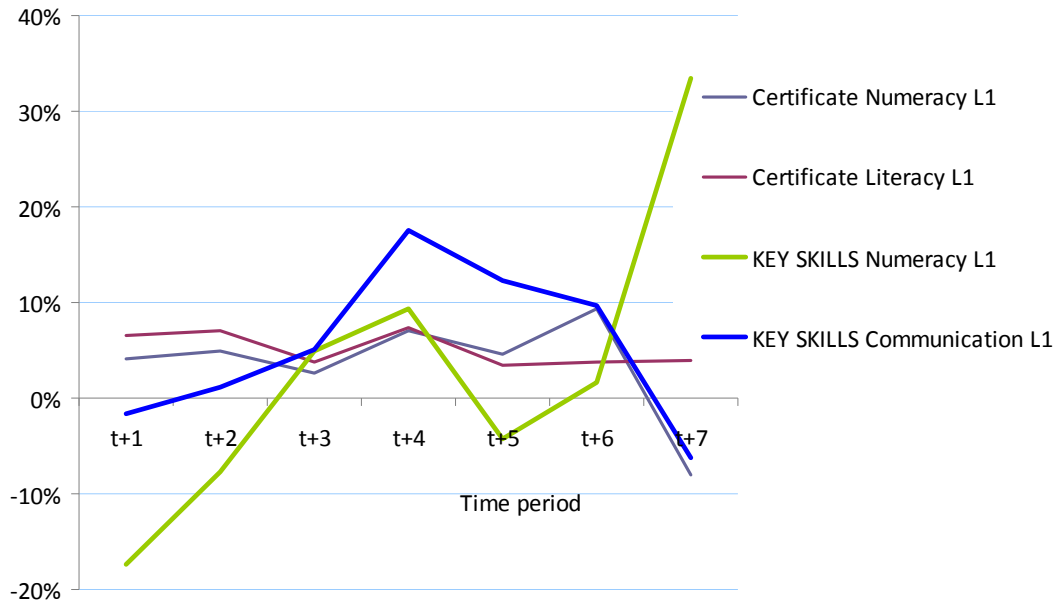
Earnings: Learners aged 19+ - Level 2 Skills for Life



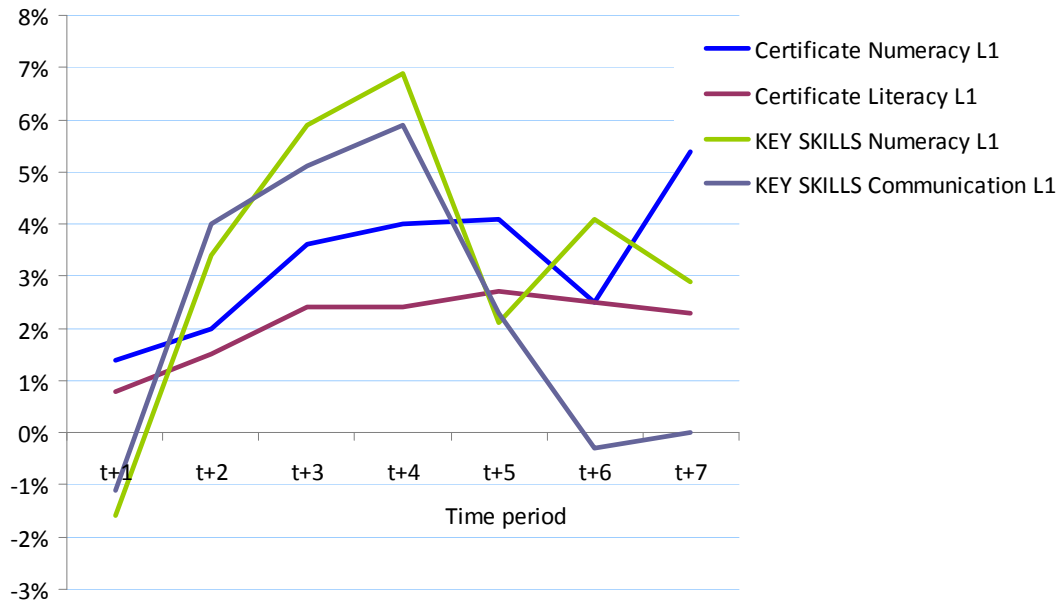
Employment: Learners aged 19+ - Level 2 Skills for Life



Earnings: Learners aged 19+ - Level 1 Skills for Life



Employment: Learners aged 19+ - Level 1 Skills for Life



Source: London Economics

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