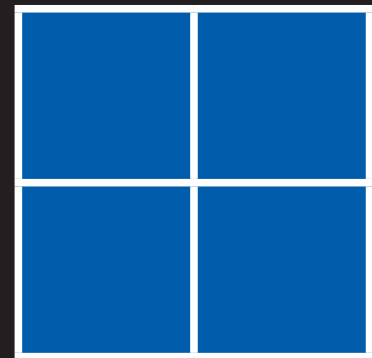


Adult Learning in Decline? Recent Evidence at UK National and City-region Level

Geoff Mason

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Adult Learning in Decline? Recent Evidence at UK National and City-region Level

Geoff Mason

**National Institute of Economic and Social Research,
London, and Centre for Learning and Life-Chances
in Knowledge Economies and Societies (LLAKES)**

LLAKES Research Paper

May 2010

Abstract

This paper draws on analysis of Labour Force Survey data and a newly-constructed dataset for 44 British city-regions to examine recent trends in adult learning, including participation in a wide variety of education activities – both vocational and leisure-related in nature – as well as in job-related training.

It finds that in 2002 some 33% of all people aged 25-59 participated in formal education, job-related training or leisure education, or some combination of these activities. This represented an increase from 29% in 1999. However, by 2009 this proportion had declined to 31%. All three components of the combined measure of adult learning contributed to this decline but the steepest fall occurred in the proportion engaged in leisure or similar education.

Falling participation in different forms of adult learning represents a setback for recent government policy aimed at promoting lifelong learning. The decline has primarily involved people aged between 30 and 49 and those classified as unemployed or economically inactive. Although better-qualified people are still more likely than low-qualified people to engage in adult learning, the probability of engaging in such learning has also declined for all qualification groups at NVQ2 and above in recent years.

The analysis also reveals sharp regional inequalities in adult participation in training. In some city-regions job-related training rates for 25-59 year olds are three times higher than in other areas. These disparities in adult training rates are mirrored by equally large gaps between city-regions in employment rates and skill levels.

Adult training rates at city-region level are strongly positively related to the proportion of the workforce with high-level skills (NVQ Level 4 or above). Adult training is also positively influenced by the share of financial and business services in employment and the annual growth rate in the population of working age (which captures the net effects of changes in age structure and migration into city-regions). By contrast, adult training rates at city-region level tend to be lower, the larger is the share of older people (aged 50-retirement) in the total workforce.

The large differences in adult training rates between city-regions have not diminished in recent years even though gaps in employment rates and skill levels have narrowed to some extent. These regional disparities in training rates compound the problems faced by government policy-makers in their efforts to encourage adult skills upgrading.

1. Introduction ¹

In spite of the emphasis placed on lifelong learning by UK policy-makers in the last decade, recent evidence suggests that several indicators of adult participation in education and training activities have turned down since the early 2000s (Aldridge and Tuckett, 2008, 2009; Mason and Bishop, 2010).

Possible explanations for this overall decline in adult learning include the ‘rebalancing’ of government spending on adult learning towards Train to Gain and Skills for Life (basic skills training) since 2005 (Aldridge and Tuckett, 2008; IFLL, 2009); the ways in which funding systems incentivise colleges and training providers to focus primarily on courses for 16-19 year olds leading to accredited qualifications (Mason et al, 2005); reduced provision of vocational and leisure-related courses outside the National Vocational Qualification (NVQ) framework; and increases in course fees at further education level, including a reduction in the proportion of adult learners who are eligible for fee remission (London Economics, 2009; Davies and Hughes, 2009).

This decline in education and training participation has not been uniform across the adult population. For example, focussing on job-related training data derived from the Labour Force Survey, Mason and Bishop (2010) report that training rates for employees aged 25-49 fell by 2-3 percentage points between 2002-09. By contrast, training rates for those aged 50-64 rose slightly against the declining trend in the 2000s, albeit from relatively low starting points (Figure 1.1). It is also notable that the decline in training rates has not been confined to the 25-49 age group. Since vocational training is heavily concentrated in the early years of most people’s careers, it is to be expected that the proportion of 25-49 year olds receiving job-related training is markedly lower than those in the 16-24 age group. However, since 2002 16-24 year old employees have actually experienced sharper declines in job-related training rates than have those aged 25-49 (ibid).

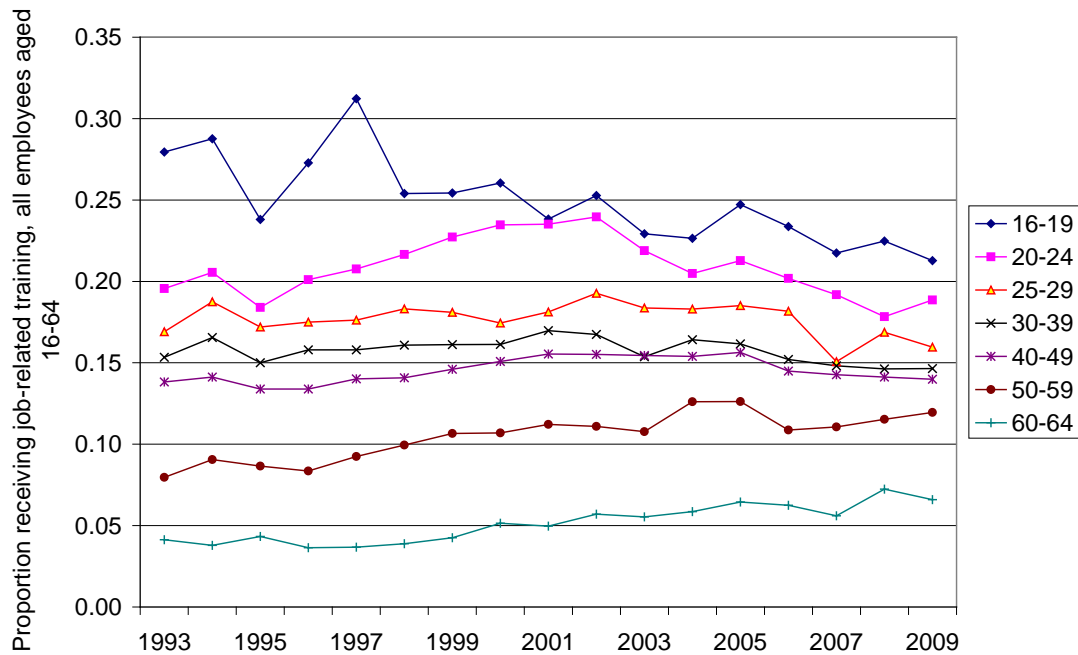
¹ This paper is based on research carried out with the support of the Economic and Social Research Council (ESRC) Centre for Research on Learning and Life Chances in Knowledge Economies and Societies (LLAKES), ESRC grant reference RES-594-28-0001. The ESRC is not responsible for views expressed in this paper. I am grateful to NIESR and LLAKES colleagues for helpful comments on previous drafts of this paper. Responsibility for any remaining errors is mine alone.

A key aim of this paper is to undertake a comprehensive analysis of recent trends in adult learning including participation in a wide variety of education activities – both vocational and leisure-related in nature – as well as in job-related training. It also draws on a newly-constructed dataset for 44 British city-regions, covering 80% of total employment in Great Britain, to examine recent trends in regional inequalities in adult skills and training. The key questions addressed by the paper are:

1. How has adult participation in different forms of learning evolved in recent years?
2. Have some categories of adults – defined in terms of gender, age, economic activity status and educational level – fared better or worse than others in terms of participation in learning?
3. To what extent do regional inequalities arise in adult participation in education and training activities?
4. Have regional inequalities in adult skills and training increased or diminished in recent years?

The paper is ordered as follows. Section 2 discusses measurement issues that arise in efforts to assess the extent and nature of adult learning. Section 3 reports on trends in different kinds of adult learning in the UK between 1993 and 2009 and how participation has varied between different categories of people. Sections 4 and 5 examine city-region differences in employment rates, skill levels and the incidence of job-related training for adult employees, and the factors contributing to inequalities between city-regions on these measures. Section 6 summarises our main findings.

Figure 1.1: Proportion of employees aged 16-64 who received job-related training in previous four weeks, analysed by age-group, UK, 1993-2009 (population-weighted)



Source: Mason and Bishop, 2010; derived from Labour Force Survey (Spring quarters)

Notes:

(a) Refers to March-May quarters from 1993 to 2004 and April-June quarters from 2005 to 2009

(b) Employees include both full-time and part-time workers. Self-employed persons are excluded from the analysis.

2. Measuring adult learning

International organisations such as the OECD and Eurostat typically distinguish between three types of adult participation in education and training:

- 1) Formal education: education and training provided in formal diploma-based education systems (for example, schools, universities and colleges)
- 2) Non-formal education and training: all types of structured learning activities which are not part of a formal education, for example, on-the-job training provided by employers and short courses of education and training which may be either work-related or taken for personal reasons
- 3) Informal learning: self-learning which is not part of either formal or non-formal education and training, for example, using methods such as books, computers, learning centres or educational broadcasting (Kailis and Pilos, 2005, Boateng, 2009)

Within the UK the quarterly Labour Force Survey (LFS) provides time series of data on several different forms of participation in formal and non-formal education and training, for example, working or studying towards formal qualifications; attendance or enrolment on education courses; receipt of job-related training; and participation in leisure or other courses which are not job- or work-related. In recent years questions have been added which gather information on activities designed to improve skills or knowledge which may fall outside traditional conceptions of education and training (for example, seminars and workshops). However, these new questions do not as yet form part of any time series of any length and they do not capture informal self-learning activities as defined above.

For the purposes of the present paper, we identify three types of adult learning for which consistent time series are available from the 1990s onwards:

1. Formal education: defined as either working or studying towards a qualification or being enrolled on an education course, or both ²
2. Job-related training, defined as having taken part in some job-related education or training in the last 13 weeks (prior to LFS interviews) ³

² In terms of the LFS variables concerned, this equates to *qulnow* = 1 (data available since Spring 1993) and/or *enroll* = 1 (data available since Spring 1992)

3. Leisure or other education classes, defined as having taken part in other leisure or education classes (not job-related) in the last 4 weeks ⁴

Data on job-related training and participation in leisure or similar education classes are available for all persons aged 16-69. However, data on formal education, by the above definition, are only available for persons defined as 'working age', ie, males aged 16-64 and females aged 16-59. Therefore, in order to standardise on a definition of adult learning which covers all males and females in the age group concerned, we focus in this analysis solely on persons aged 25-59.

As shown in Table 2.1, Part A, in 2008 an estimated 22% of people in the 25-59 age group reported participating in one of the three types of adult learning described above. A further 8% had participated in two or more different types of learning. It is interesting to compare these findings with the replies of survey respondents to a separate question about whether, in the previous 12 months, they had engaged in any of the following activities in order to improve their knowledge or skills: lessons or courses, open/distance education, seminars/workshops and/or on-the-job training. ⁵

Some 35% of 25-59 year olds said that they had engaged in at least one such knowledge- or skill-improving activity (Table 2.1, Part B). However, there is a considerable lack of overlap between these responses and the data on education and training participation. Only an estimated 19% of all 25-59 year olds reported engaging in at least one form of education and training as well as one type of skill-improving activity (Table 2.2, Part A). Another 16% had been involved in skill-improving activity but were not captured by any of the three components of our measure of education and training participation. A further 11% of 25-59 year olds reported involvement in some form of education and training but did not report any knowledge- or skill-improving activity. In order to check whether these disparities might be due in part to incorrect information provided by proxy respondents, the same analysis was repeated and confined to 25-59 year olds who had given personal

³ Job-related training over 13 week period: *ed13wk* = 1 if respondents are in employment or *futur13* = 1 if respondents are not in employment but are undertaking training connected to jobs that they might be able to do in the future (data available since Summer 1994)

⁴ *leiscl* = 1 (data available since Spring 1999)

⁵ The relevant LFS variables are *nfe11-14* which cover activities to improve knowledge or skills in the 12 months prior to interviews (data available since January-March 2007).

responses on their own behalf. The results differed little from the initial analysis which included proxy respondents (Table 2.2, Part B).

To some extent the lack of overlap between the two sets of survey responses may reflect problems of timing. The skill-improvement question specifically refers to activities over a 12 month period whereas the education and training questions refer either to survey respondents' current status (formal education) or activities in the previous 13 weeks (job-related training) or four weeks (leisure education). However, it seems likely that, unrelated to the timing issue, a proportion of survey respondents give inconsistent answers to questions about education, training and skill-improvement activity. In the light of these points, we need to enter two important caveats about the present analysis. First, the measures of adult participation in education and training for which time series data are available probably underestimate the proportion of adults who are involved in learning of some kind. Second, survey data on adult learning are far from perfect due to different interpretations of questions by different respondents and the difficulties of recalling all relevant information during survey interviews.

Table 2.1: Participation in education, training and activities to improve knowledge or skills, all persons aged 25-59, UK, 2008 (population-weighted)

A: Education and training participation (a)

	Type of education and training participation (%)
Formal education only	4
Job-related training only	14
Leisure education only	4
Formal education plus job-related training	6
Formal education plus leisure education	0.4
Job-related training plus leisure education	1
All three forms of learning	1
No education or training	70
Total	100

B: Activities to improve knowledge or skills in last 12 months (b)

	Skill-improving activities (%)
One activity	21
Two activities	10
Three activities	4
Four activities	1
No skill-improving activities	65
Total	100
<i>Grossed-up population estimate</i>	<i>28748510</i>
<i>Unweighted n =</i>	<i>54496</i>

Source: Labour Force Survey, 2008, April-June quarter

Notes:

(a) Education and training participation comprises formal education, job-related training in the last 13 weeks and/or leisure or other education classes (not job-related)

(b) Activities to improve knowledge or skills comprise lessons or courses, open/distance education, seminars/workshops and/or on-the-job training.

Table 2.2: Cross-tabulation of survey responses on participation in education, training and activities to improve knowledge or skills, all persons aged 25-59, UK, 2008 (population-weighted)

A: Including proxy respondents

	Activities to improve knowledge or skills in last 12 months (%)		
	Yes	No	Total
Education and training participation (%)			
Yes	19	11	30
No	16	54	70
Total	35	65	100
<i>Grossed-up population estimate</i>			28748510
<i>Unweighted n =</i>			54496

B: Excluding proxy respondents

	Activities to improve knowledge or skills in last 12 months (%)		
	Yes	No	Total
Education and training participation (%)			
Yes	21	12	33
No	16	51	67
Total	37	63	100
<i>Grossed-up population estimate</i>			20132015
<i>Unweighted n =</i>			37874

Source: Labour Force Survey, 2008, April-June quarter

Notes:

(a) See notes to Table 2.1 for definitions of education and training participation and activities intended to improve knowledge or skills.

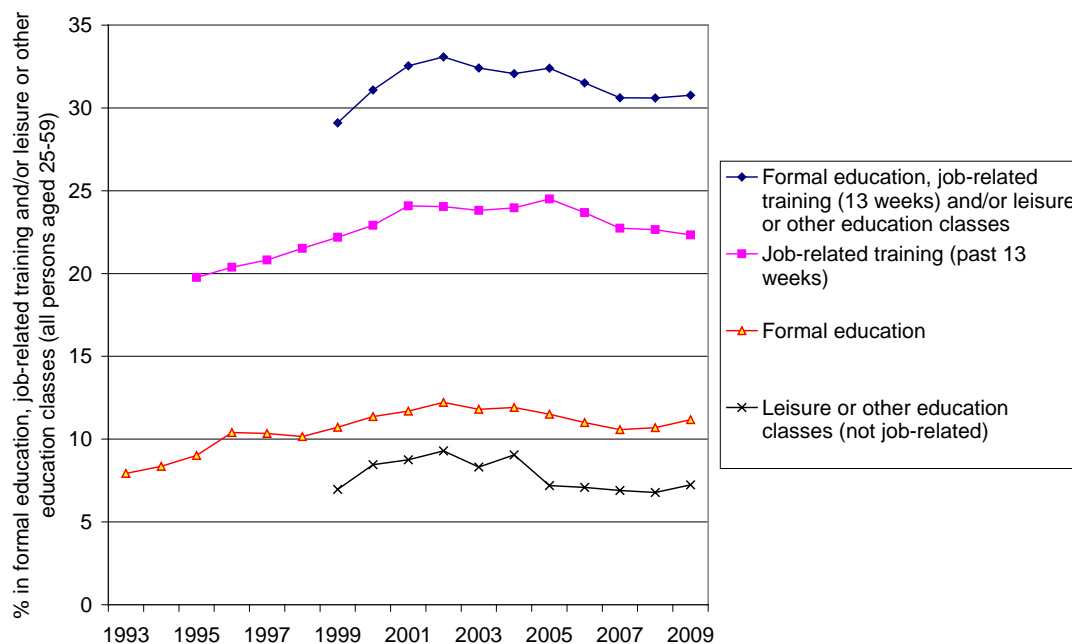
3. Trends in adult participation in education and training

In 2002 some 33.1% of all people aged 25-59 were engaged in formal education, job-related training or leisure education, up from 29.1% in 1999. By 2009 this proportion had declined to 30.8%. Figure 3.1 shows that all three components of this combined measure contributed to these trends but with the steepest fall occurring in the proportion engaged in leisure or similar education. Involvement in formal education and job-related training grew steadily during the 1990s so that the proportions engaged in both these activities in 2009 were still well above their 1993 levels.

Women's participation in one or more form of adult education and training is substantially higher than it is for men. Male involvement peaked at 30.1% in 2002 and by 2009 had fallen to 27.2%, much the same as in 1999 (Figure 3.2A). By contrast, female involvement peaked at 36.0% in 2002 and although it fell to 34.3% in 2009, this was still three percentage points (pp) higher than in 1999 (Figure 3.2B). For both formal education and leisure-related education, the timing of the recent decline in adult female participation was similar to that of males. However, in the case of job-related training, the decline in adult women's involvement set in later (after 2005) than it did for men (after 2002).

The main factors underlying these patterns of 1990s growth followed by decline since the early 2000s are explored here, first, through descriptive statistics and, second, through multivariate analysis. In terms of age, it is clear that the recent decline in different forms of adult learning has primarily involved those aged between 25 and 49. The 50-59 age group has seen a steady rise in participation from 20.8% in 1999 to 25.1% in 2009 (Figure 3.3). This growth in adult learning for 50-59 year olds has occurred mainly in job-related training. In the case of formal education and leisure-related education, the decline in participation in recent years has involved all age groups between 25-59 (Appendix Figure A1). By way of comparison with younger age groups, it is notable that participation in education and training for 20-24 year olds peaked in 2001 and has been on a declining trend since that year. This contrasts with steady growth in 16-19 year old participation between 1999-2009 (Figure 3.4).

Figure 3.1: Overview of education and training participation, all persons aged 25-59, UK, 1993-2009 (population-weighted)



Source: Labour Force Survey (Spring Quarters: March-May 1993-2004; April-June 2005-2009).

Notes:

(a) Definitions of education and training participation:

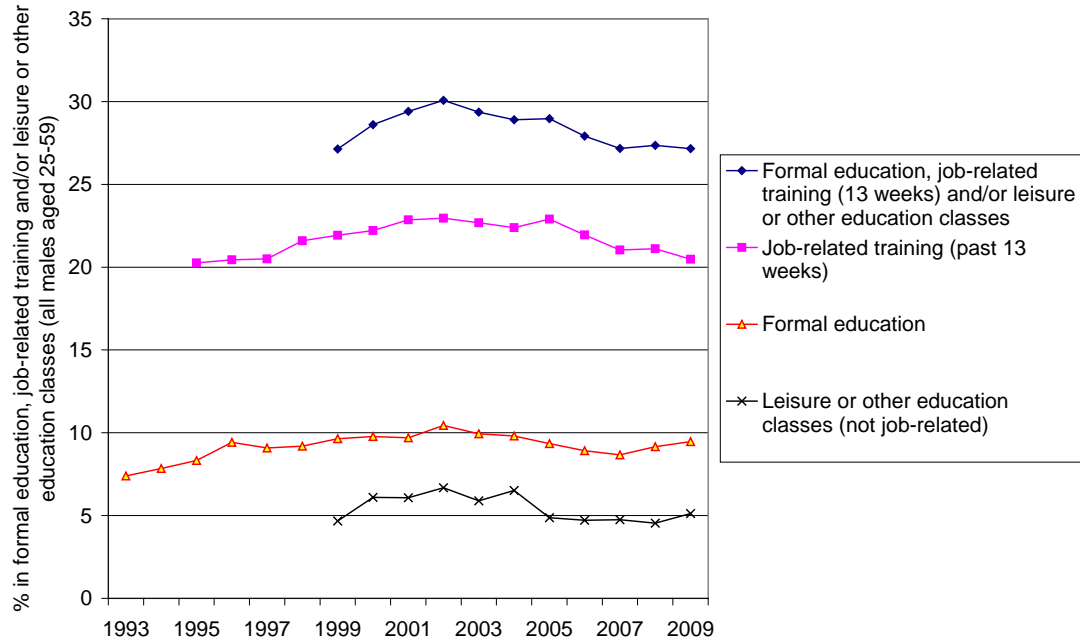
Formal education: Working or studying towards qualification, or enrolled on education course, or both

Job-related training: Have taken part in some job-related education or training in last 13 weeks

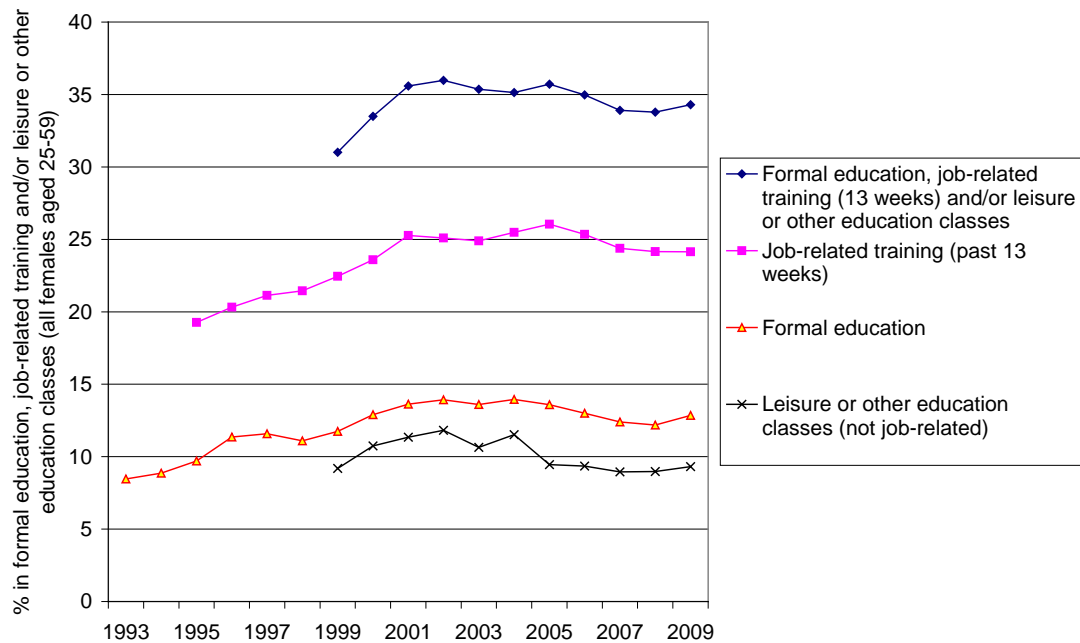
Leisure or other education classes: Have taken part in other leisure or education classes (not job-related) in last 4 weeks

Figure 3.2: Overview of education and training participation, males and females aged 25-59, UK, 1993-2009 (population-weighted)

(A) Males aged 25-59

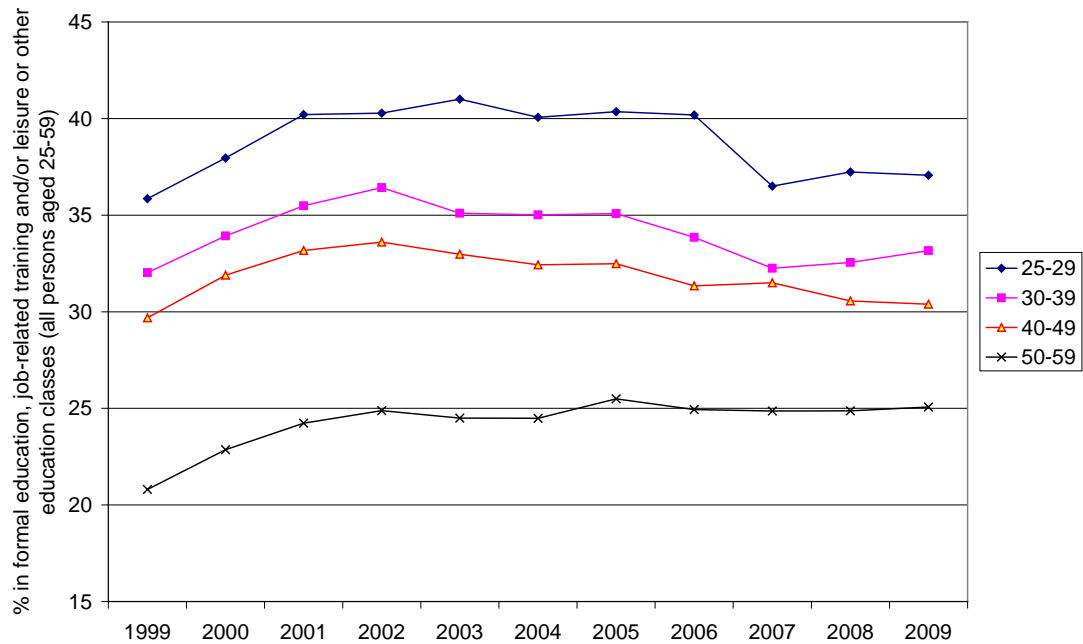


(B) Females aged 25-59



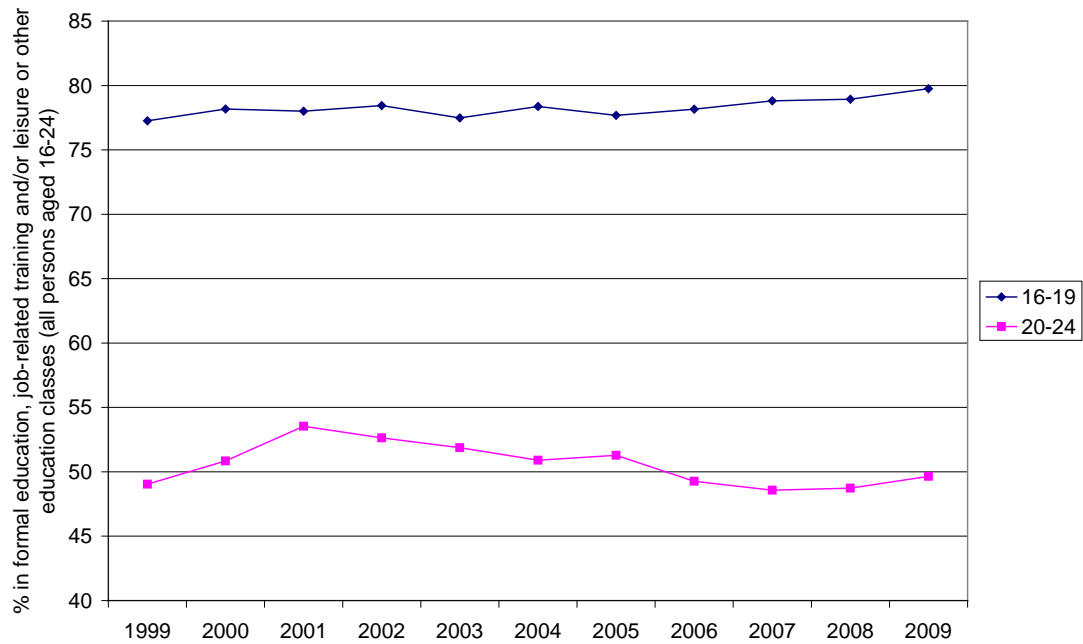
Source and notes: See Figure 3.1

Figure 3.3: Participation in formal education, job-related training (13 weeks) and/or leisure and other education classes: all persons aged 25-59, analysed by age group



Source and notes: See Figure 1

Figure 3.4: Participation in formal education, job-related training (13 weeks) and/or leisure and other education classes: all persons aged 16-24, analysed by age group



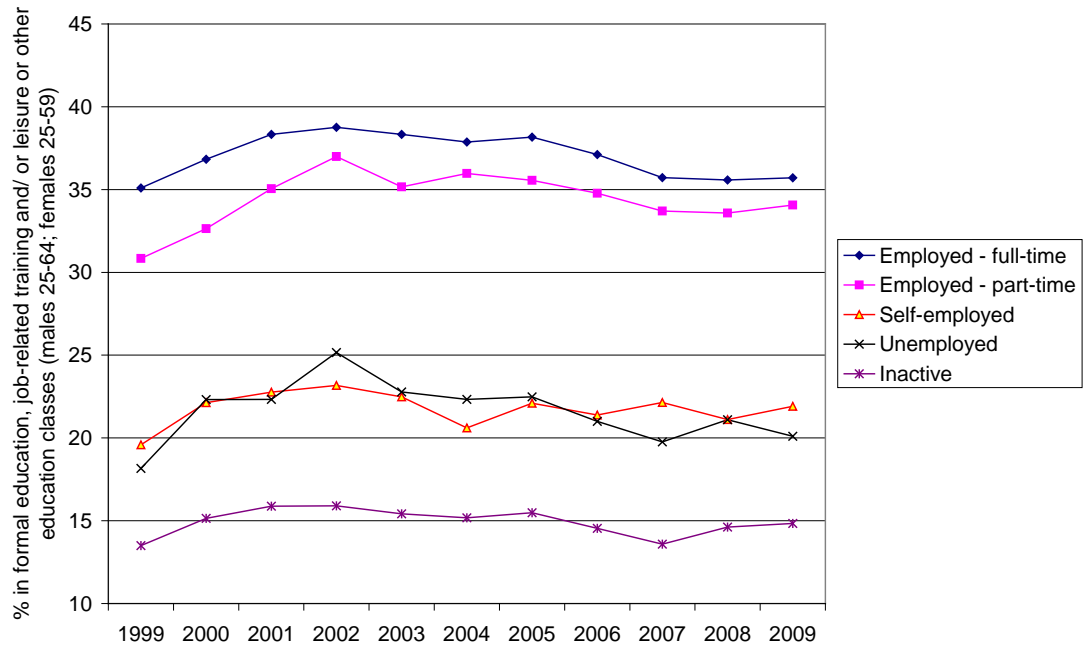
Source and notes: See Figure 1

With regard to economic activity status, the recent declines in participation have occurred among all categories (employed, self-employed, unemployed and economically inactive), with the sharpest falls for all categories occurring in leisure or similar education (Figures 3.5 and A2.3). Declines in participation in formal education have affected all categories except for inactive persons while declines in job-related training have mainly concerned those in full-time or part-time employment (Figures A2.1-2.2).⁶

In respect of educational qualifications, the overall decline in participation in education and training in recent years has applied to all qualification groups but has been stronger for adults with NVQ4 or graduate-level qualifications than for people with NVQ3 or lower qualifications (Figure 3.6). In the case of formal education, the period of growth in education and training participation during the 1990s ended much earlier (1996) for the highly-qualified groups than it did for those with NVQ3 or NVQ2 qualifications whose participation peaked in 2002 (Figure A3.1). For adults with low or no qualifications, participation in formal education was actually on a rising trend over the whole period from 1993 to 2009, albeit from a low base (up from 2.6% to 6.2% during this time). By contrast, both job-related training and leisure-related education have showed declining trends for all qualification groups since the early 2000s (Figures A3.2-3.3).

⁶ Note that job-related training here is defined to cover, not just training received by persons in employment over a 13 week period prior to LFS interviews (*ed13wk* = 1) but also work- or job-related training received by persons who are not in employment (*futur13* = 1).

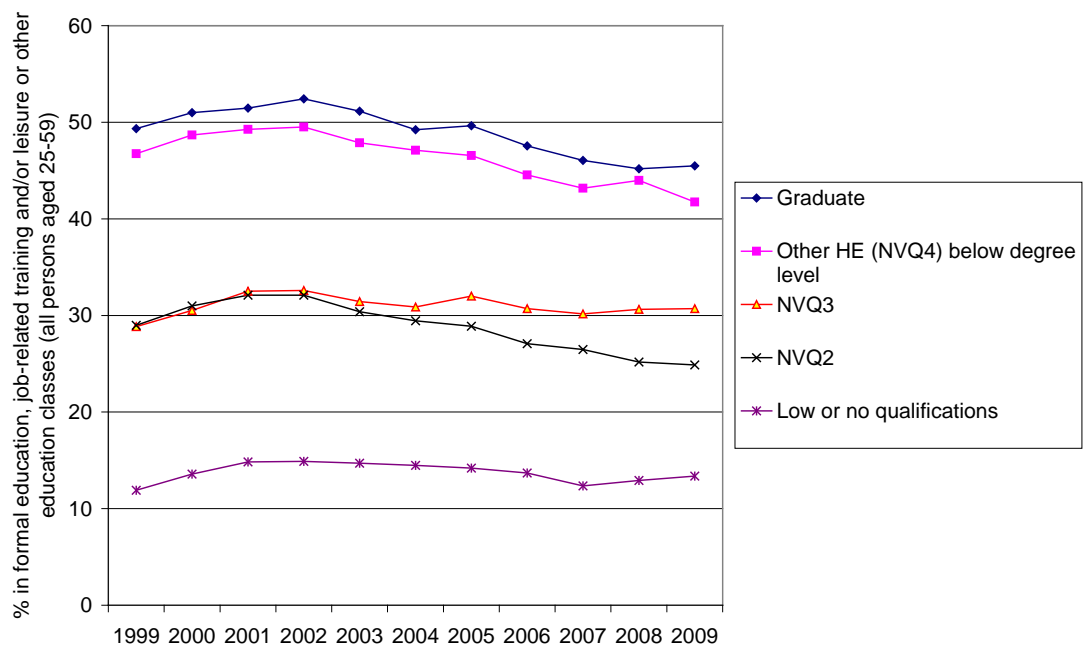
Figure 3.5: Participation in formal education, job-related training (13 weeks) and/or leisure and other education classes: all persons aged 25-59, analysed by economic activity



Source and notes: See Figure 1.

Note: Part-time defined as usually working less than 30 hours per week in main job.

Figure 3.6: Participation in formal education, job-related training (13 weeks) and/or leisure and other education classes: all persons aged 25-59, analysed by highest qualification held



Source and notes: See Figure 1.

In order to carry out a multivariate analysis of the main factors contributing to this recent decline in adult learning, we model the probabilities that individuals engage in different forms of education and training as follows:

$$(1) \Pr(EdTrg_i) = F(X_i\beta_1)$$

where

$$EdTrg_i \begin{cases} = 1 & \text{if the individual has participated in education or training} \\ = 0 & \text{if no such participation has occurred} \end{cases}$$

$F(\cdot)$ is the cumulative distribution function of the standard normal distribution; and X_i is a vector of individual characteristics that might be expected to influence the probability of participating in education or training (for example, gender, age, ethnicity, marital status, highest qualification held and economic activity status).

We then carry out a probit regression analysis of the probability of individual adults participating in:

- (i) formal education, and/or job-related training and/or leisure or other education classes
- (ii): formal education alone
- (iii): job-related training alone
- (iv): leisure or other education classes alone

The analysis is carried out for all persons aged 25-59 over the period 1999-2009 for which we have data on all three components of adult learning. (Descriptive statistics for these data are shown in Appendix Table A1).

In order to investigate the main factors contributing to the recent downturn in adult learning, each model is estimated for two different time periods -- 1999-2002 and 2003-09 -- which correspond to the recent periods of growth and decline in adult education and training participation described above. Following the probit analysis, we carry out cross-equation tests of parameter differences relating to each variable in the respective time periods.

Table 3.1 reports estimates of the probability of participating in any one or combination of the three main forms of adult learning in these two time periods. It shows the marginal effects of each independent variable taking a value of one as compared to a value of zero, evaluated at the means of independent variables in each equation. Thus, in Column 1.1, the estimated probability of 30-39 year olds participating in education and/or training between 1999-2002 was 7.3 percentage points (pp) higher than it was for the reference group – 50-59 year olds -- after controlling for age, economic activity, qualifications and other individual characteristics. Between 2003-09 the estimated probability of 30-39 year olds receiving training fell to being 5.7 pp above that for 50-59 year olds (Column 1.2) and the test score reported in Column 1.3 shows that this decline between the two time periods in the marginal effect attached to being aged 30-39 was statistically significant at the 1% level.

As Figure 3.3 shows that 50-59 year olds' participation in education and training remained steady from 2002 onwards, we infer that reduced participation by 30-39 year olds contributed strongly to the overall decline in participation. The same applies to the reduction in participation by 40-49 year olds. Table 3.1 also shows significant declines between the two time periods in the marginal effects attached to all qualifications from NVQ2 upwards relative to those with low or no qualifications. Although the possession of formal qualifications remains strongly positively linked to participation in adult learning, Mason and Bishop (2010) suggest that the expanded supply of qualification holders in recent years (especially university graduates) may have contributed to a weakening of the relationship between prior education and adult learning. At the same time education and training rates for low-qualified people have tended to remain steady (albeit at relatively low levels), or even increase slightly during the 2000s, in part because of government policies designed to enhance social inclusion (for example, the Train to Gain programme which has been aimed primarily at people who do not yet hold NVQ2 qualifications).

Overall, in the case of age and qualifications, the broad patterns of difference shown by descriptive statistics (Figures 3.3 and 3.6) are found to apply in the multivariate context as well. However, the same is not true of economic activity status. Although descriptive statistics suggest that the decline in education and training participation

since 2002 has been spread fairly evenly between employed, unemployed and inactive persons (Figure 3.5), the multivariate analysis suggests that the brunt of the decline has been borne by people classified as inactive (the reference category) and, especially, by unemployed people (Table 3.1).

When we turn to analysis of each component of the adult learning measure in turn, the main factors associated with declining participation in formal education since 2002 are found to be age 30-39, inactivity, unemployment and possession of qualifications from NVQ2 upwards (Table 3.2, Columns 2.1-2.3). All age groups between 25-49 are associated with the fall in job-related training (Columns 3.1-3.3) but there is no significant relationship between age and the decline in leisure education (Columns 4.1-4.3). Inactivity is significantly associated with falling participation in all three types of adult learning, while unemployed people have contributed disproportionately to the decline in formal education and job-related training (but not to the decline in leisure education, in which participation by unemployed people was comparatively low in both time periods).

It is notable that holding qualifications at any level from NVQ2 upwards is just as strongly associated with reduced involvement in job-related training as it is with the decline in formal education participation. For example, the probability of graduates undertaking job-related training between 1999-2002 was 33 pp higher than it was for those with low or no qualifications. Between 2003-09 this disparity remained very large but fell to 29 pp. In the case of leisure education, the later time period also saw a reduction in the marginal effect of holding graduate-level qualifications but the decline was proportionately greater for those holding NVQ2 qualifications than for graduates or holders of other higher education or NVQ3 qualifications (Table 3.2).

One feature of these estimates is that female participation in all three forms of adult learning remained significantly higher than male participation in both time periods, even after controlling for age, qualifications and economic activity. Ethnic minority status was positively associated with participation in both formal education and job-related training in both time periods (as compared with white people), with this differential tending to increase between 2003-09. By contrast, in the case of leisure

education, there was a small but statistically significant increase in the negative marginal effect of ethnic minority status in the later time period.⁷

⁷ Further research is needed to explore the differences *between* ethnic minorities in their involvement in adult learning.

Table 3.1: Probit regression estimates of the probability of participating in formal education, job-related training (13 weeks) and/or leisure or other education classes: all persons aged 25-59, 1999-2002 and 2003-09 – Marginal effects (evaluated at sample means)

	(1.1)	(1.2)	(1.3)	
	Formal education, job-related training and/or leisure education	Formal education, job-related training and/or leisure education		
	1999-2002	2003-2009	Chi2 test (p-value)	
Female	0.1008*** [0.007]	0.0996*** [0.005]	0.663	
Ethnic minority	0.0280*** [0.009]	0.0485*** [0.009]	0.001	***
Single	0.0119*** [0.004]	0.0155*** [0.004]	0.104	
Age25_29	0.0906*** [0.008]	0.0886*** [0.006]	0.696	
Age30_39	0.0730*** [0.005]	0.0569*** [0.004]	0.001	***
Age40_49	0.0547*** [0.003]	0.0456*** [0.003]	0.055	*
Employed full-time	0.1867*** [0.014]	0.1957*** [0.013]	0.041	**
Employed part-time	0.1626*** [0.009]	0.1824*** [0.008]	<0.001	***
Self-employed	0.0511*** [0.015]	0.0703*** [0.011]	0.001	***
Unemployed	0.0865*** [0.009]	0.0730*** [0.007]	0.046	**
Graduate	0.3820*** [0.013]	0.3371*** [0.010]	<0.001	***
Other HE (NVQ4)	0.3639*** [0.007]	0.3242*** [0.004]	<0.001	***
NVQ3	0.2117*** [0.004]	0.1995*** [0.003]	<0.001	***
NVQ2	0.1731*** [0.003]	0.1361*** [0.004]	<0.001	***
Observations	257715	388600		
Log likelihood	-145104	-221607		
Pseudo R sqd	0.096	0.085		

Source: Labour Force Survey (Spring Quarters)

Notes: * significant at 10%; ** significant at 5%; *** significant at 1%

Probit estimates, population-weighted. Robust standard errors in parentheses are corrected for clustering of observations at regional level. All equations include region and year dummies. The dependent variable = 1 if the individual has participated in the stipulated form of education and training and = 0 if he/she has not done so. Marginal effects are evaluated at the mean values of other independent variables. The reference category for age groups is age 50-59. For qualification groups the reference category is low or no qualifications. For economic activity status the reference category is inactive. Chi squared tests of the equality of marginal effects in each time period are derived from seemingly unrelated regression estimates of each pair of equations.

Table 3.2: Probit regression estimates of the probability of participating in formal education, job-related training (13 weeks) and leisure or other education classes: all persons aged 25-59, 1999-2002 and 2003-09 – Marginal effects (evaluated at sample means)

	(2.1)	(2.2)	(2.3)		(3.1)	(3.2)	(3.3)		(4.1)	(4.2)	(4.3)	
	Formal education	Formal education			Job-related training	Job-related training			Leisure education	Leisure education		
	1999-2002	2003-2009	Chi2 test (p-value)		1999-2002	2003-2009	Chi2 test (p-value)		1999-2002	2003-2009	Chi2 test (p-value)	
Female	0.0331*** [0.005]	0.0341*** [0.004]	0.716		0.0591*** [0.004]	0.0614*** [0.003]	0.473		0.0545*** [0.003]	0.0478*** [0.002]	0.616	
Ethnic minority	0.0525*** [0.005]	0.0631*** [0.005]	0.097	*	0.0154*** [0.006]	0.0308*** [0.005]	<0.001	***	-0.008 [0.005]	-0.0128*** [0.002]	0.045	*
Single	0.0179*** [0.002]	0.0206*** [0.002]	0.190		0.0061** [0.003]	0.0108*** [0.002]	0.059	*	0.0029** [0.001]	0.001 [0.002]	0.304	
Age25_29	0.1187*** [0.007]	0.1236*** [0.006]	0.331		0.0763*** [0.004]	0.0571*** [0.004]	<0.001	***	-0.0024 [0.003]	0.0021 [0.002]	0.215	
Age30_39	0.0843*** [0.004]	0.0731*** [0.002]	0.001	***	0.0632*** [0.003]	0.0405*** [0.002]	<0.001	***	-0.0045 [0.003]	-0.0014 [0.002]	0.261	
Age40_49	0.0556*** [0.003]	0.0501*** [0.003]	0.160		0.0551*** [0.003]	0.0387*** [0.002]	<0.001	***	-0.0034* [0.002]	-0.0013 [0.001]	0.403	
Employed full-time	-0.0041 [0.010]	-0.005 [0.009]	0.655		0.2208*** [0.013]	0.2285*** [0.012]	0.067	*	0.0071*** [0.002]	0.0126*** [0.002]	0.046	**
Employed part-time	0.0082* [0.005]	0.0081*** [0.003]	0.959		0.2094*** [0.015]	0.2297*** [0.014]	0.001	***	0.0096*** [0.003]	0.0161*** [0.002]	0.001	***
Self-employed	-0.0364*** [0.007]	-0.0360*** [0.005]	0.823		0.0868*** [0.017]	0.1119*** [0.017]	<0.001	***	0.0144*** [0.003]	0.0202*** [0.003]	0.085	*
Unemployed	0.0218*** [0.008]	0.0108* [0.006]	0.017	**	0.1195*** [0.012]	0.1012*** [0.007]	0.049	**	0 [0.003]	0.0004 [0.002]	0.942	

Table 3.2: continued

	(2.1)	(2.2)	(2.3)		(3.1)	(3.2)	(3.3)		(4.1)	(4.2)	(4.3)	
	Formal education	Formal education			Job-related training	Job-related training			Leisure education	Leisure education		
	1999-2002	2003-2009	Chi2 test (p-value)		1999-2002	2003-2009	Chi2 test (p-value)		1999-2002	2003-2009	Chi2 test (p-value)	
Graduate	0.1785*** [0.010]	0.1270*** [0.007]	<0.001	***	0.3339*** [0.013]	0.2864*** [0.010]	<0.001	***	0.1184*** [0.005]	0.1158*** [0.003]	0.007	***
Other HE (NVQ4)	0.2110*** [0.007]	0.1590*** [0.004]	<0.001	***	0.3262*** [0.006]	0.2884*** [0.006]	<0.001	***	0.0999*** [0.005]	0.0928*** [0.004]	0.672	
NVQ3	0.1188*** [0.003]	0.0901*** [0.003]	<0.001	***	0.1713*** [0.005]	0.1665*** [0.004]	0.060	*	0.0628*** [0.002]	0.0576*** [0.002]	0.732	
NVQ2	0.0863*** [0.003]	0.0592*** [0.003]	<0.001	***	0.1415*** [0.005]	0.1154*** [0.004]	<0.001	***	0.0517*** [0.003]	0.0401*** [0.003]	0.020	**
Observations	257715	388600			257715	388600			254173	377611		
Log likelihood	-85682	-128637			-124868	-191796			-70295	-95392		
Pseudo R sqd	0.066	0.057			0.107	0.093			0.042	0.051		

Source and notes: See Table 3.1

4. Adult skills and training at city-region level

4.1 Regional inequalities

As might be expected, there are substantial differences between different British regions in participation in adult learning. In 2008 the proportion of 25-59 year olds engaged in formal education, job-related training and/or leisure education ranged from 27% in the North West to 34% in the South West (Table 4.1). Most of this variation between regions occurred in job-related training and leisure education rather than in formal education.

Table 4.1: Participation in formal education, job-related training (13 weeks) and leisure or other education classes: all persons aged 25-59, Government Office regions in Great Britain, 2008

	Formal education, job-related training (13 weeks) and/or leisure or other education classes	Formal education	Job-related training (past 13 weeks)	Leisure or other education classes (not job-related)
	<i>% of persons aged 25-59</i>			
North East	30	11	22	7
North West	27	10	20	6
Yorks & Humberside	29	10	22	5
East Midlands	30	10	22	7
West Midlands	30	12	22	6
Eastern	31	11	23	7
London	32	12	21	9
South East	32	10	24	7
South West	34	12	26	7
Wales	31	11	24	5
Scotland	33	10	26	7
Total	31	11	23	7
Maximum	34	12	26	9
Minimum	27	10	20	5

Source: Labour Force Survey, 2008 (Spring quarter)

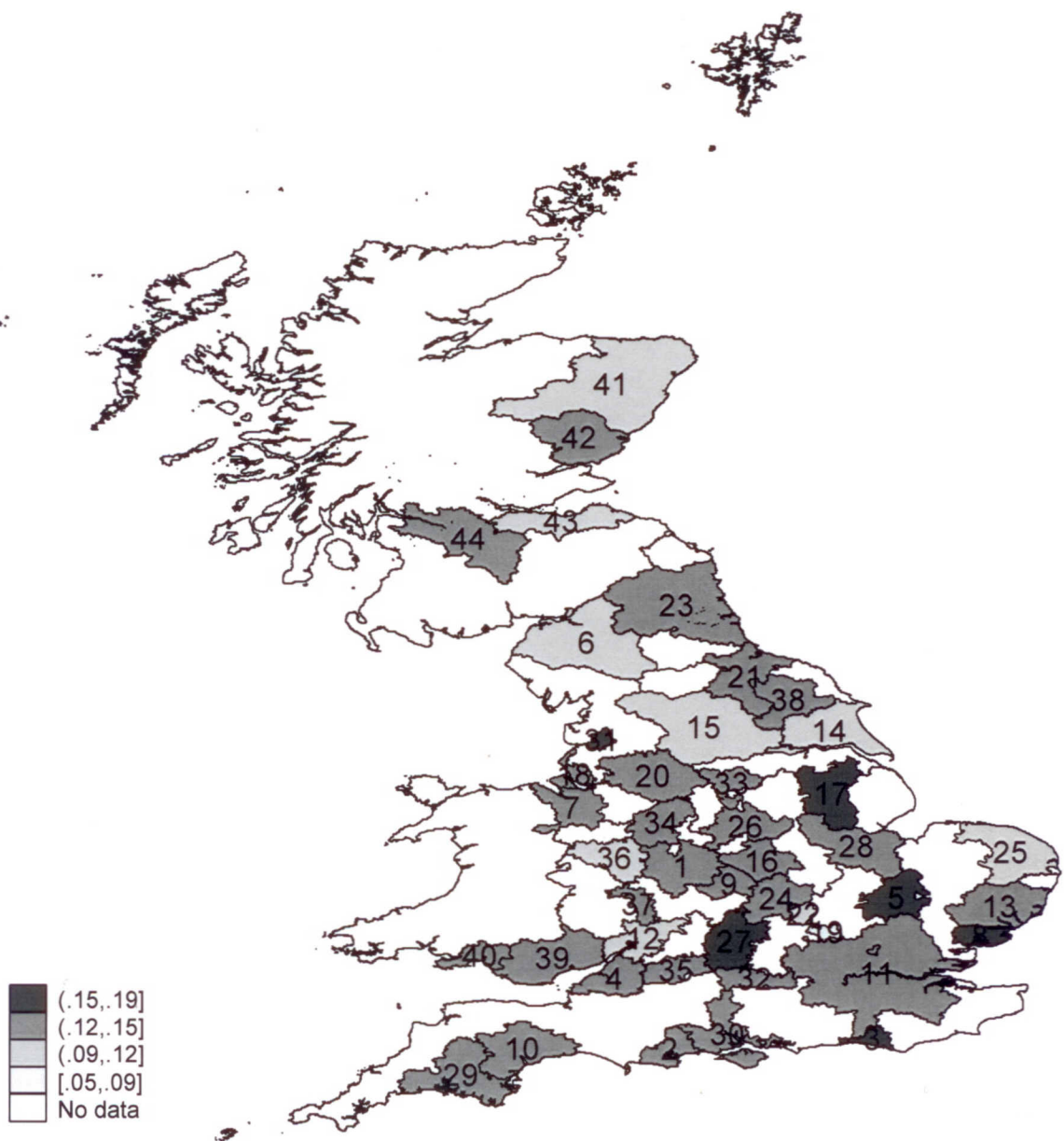
However, these data refer to Government Office Regions which cover large and diverse territories and do not correspond to labour markets. Therefore, for the present analysis, we make use of data for 44 British city-regions which account for just under

80% of total UK employment. City-regions typically comprise large metropolitan areas – or contiguous metropolitan areas -- together with their surrounding hinterlands (Scott, 2005). Our own definition of city-regions derives from Robson et al (2006) who made use of employment, commuting, housing and retail data to identify 39 relatively self-contained city-regions in England and their constituent local authority districts (LADs). For reasons described in the notes to Table 4.2, we reduced this list to 38 English city-regions and added data for 6 more city-regions in Scotland and Wales. As Robson et al (2006) demonstrate, the city-regions identified according to their criteria tend to overlap with the commuting patterns of managers and professionals. Thus they potentially delineate labour markets for high-level skills while also encompassing localised travel-to-work areas which are more relevant to lower-skilled workers.⁸

This city-regions dataset has been built up from LAD-level data for 1994-2008 derived from a number of sources such as the Labour Force Survey (via NOMIS) and the Annual Survey of Hours and Earnings. It covers several indicators of social and economic outcomes such as employment, inactivity and dependency rates as well as measures of demography, average wages, workforce qualifications, job-related training and industrial structure. The training measure here refers to job-related training received in the four weeks prior to LFS interviews. By this measure, adult training rates at city-region level in 2008 ranged from as low as 6% in Luton to 18% in Colchester and Lincoln (Table 4.2, Column 1). Other city-regions with above-average adult training rates include Oxford, Cambridge, Preston and Brighton. City-regions with below-average adult training rates include Carlisle, Milton Keynes, Telford and Wrekin and Norwich as well as several city-regions in Scotland and Northern England (Figure 4.1). These disparities in adult training rates are mirrored by equally large gaps between city-regions in employment rates and skill levels. For example, employment rates in 2008 ranged from 66% in Liverpool to 82% in Exeter (Table 4.2, Column 4). The proportion of working-age people with qualifications at NVQ4 or higher ranged from 19% in Peterborough to 47% in Cambridge (Table 4.2, Column 3).

⁸ There are currently 243 Travel-To-Work Areas in the UK which are defined such that at least 75 per cent of the resident economically active population actually work in the area while at the same time at least 75 per cent of everyone working in the area actually live in the area (<http://www.statistics.gov.uk/geography/ttwa.asp>)

Figure 4.1: Proportion of people aged 25-retirement age (males 64, females 59) who received job-related training in previous four weeks, 2008, analysed by city-region



Job-related training_employees aged 25-ret., 2008

Source: Derived from Labour Force Survey (NOMIS)

Key to city-regions:

1. Birmingham/Sandwell/Wolverhampton
2. Bournemouth/Poole
3. Brighton & Hove
4. Bristol/S.Gloucester
5. Cambridge
6. Carlisle
7. Chester
8. Colchester
9. Coventry
10. Exeter
11. Greater London
12. Gloucester/Cheltenham
13. Ipswich
14. Kingston upon Hull
15. Leeds/Bradford
16. Leicester
17. Lincoln
18. Liverpool
19. Luton
20. Manchester/Salford/Trafford
21. Middlesbrough/Stockton
22. Milton Keynes
23. Newcastle/Gateshead/Sunderland
24. Northampton
25. Norwich
26. Nottingham/Derby
27. Oxford
28. Peterborough
29. Plymouth
30. Portsmouth/Southampton
31. Preston
32. Reading
33. Sheffield
34. Stoke-on-Trent
35. Swindon
36. Telford and Wrekin
37. Worcester
38. York
39. Cardiff
40. Swansea
41. Aberdeen
42. Dundee
43. Edinburgh
44. Glasgow

Table 4.2: Employment, qualification and job-related training rates, Great Britain, 2008

	People aged 25-retirement (a) receiving job-related training in last 4 weeks as % of all people aged 25-retirement in employment, 2008	Working-age people receiving job-related training in last 4 weeks as % of all working age people in employment, 2008	Holders of NVQ4-plus qualifications as % of working-age population, 2008	Persons in employment as % of working-age population, 2008
Great Britain - Mean	13.5	13.7	29.0	74.2
Highest GOR	14.3	15.0	38.6	78.5
Lowest GOR	12.6	12.7	23.9	70.4
City-region level - Mean	13.2	14.2	28.4	75.3
Highest	18.2	19.0	46.5	81.7
Lowest	5.7	6.6	18.7	65.9
GOR - Highest	North East	North East	London	South East
GOR - Lowest	Eastern	Eastern	North East	London
City-region - Highest	Lincoln	Lincoln	Cambridge	Exeter
City-region - Lowest	Luton	Luton	Peterborough	Liverpool

Source: Derived from Labour Force Survey/NOMIS

Notes:

(a) Age 25-retirement refers to males aged 25-64 and females aged 25-59.

(b) Definitions of English city-regions are derived from Robson et al, 2006, Chapter 2 (especially Figures 2.8 and 2.9). We are grateful to Brian Robson and colleagues for the use of their LAD (local authority district) mapping to city-regions. Their Table 2.2 identifies 39 'destination nodes' which constitute the nuclei of city-regions in England. We have reduced this total to 38 English city-regions by combining Nottingham and Derby because of the overlap in commuting patterns between these two cities and their surrounding areas. City-regions in Wales and Scotland were identified with the aid of information in Derek Halden Consultancy (2002), Morgan (2006) and Statistics for Wales (2008).

How have these regional inequalities in adult training rates evolved over time? Figure 4.2 shows that, while average rates of job-related training at city-region level tended to rise for most of the 1990s and then decline since the early 2000s, the coefficient of variation on training rates fluctuated sharply during this period, without displaying any clear trend.¹ Although this measure of dispersion was about 30% higher in 2008 than it was in 1994, it experienced several downward shifts as well as upward movements during this period.

Similar uncertainty applies to the evolution of regional inequality in our measure of skills, ie, the proportion of working-age people with qualifications at NVQ4 level or

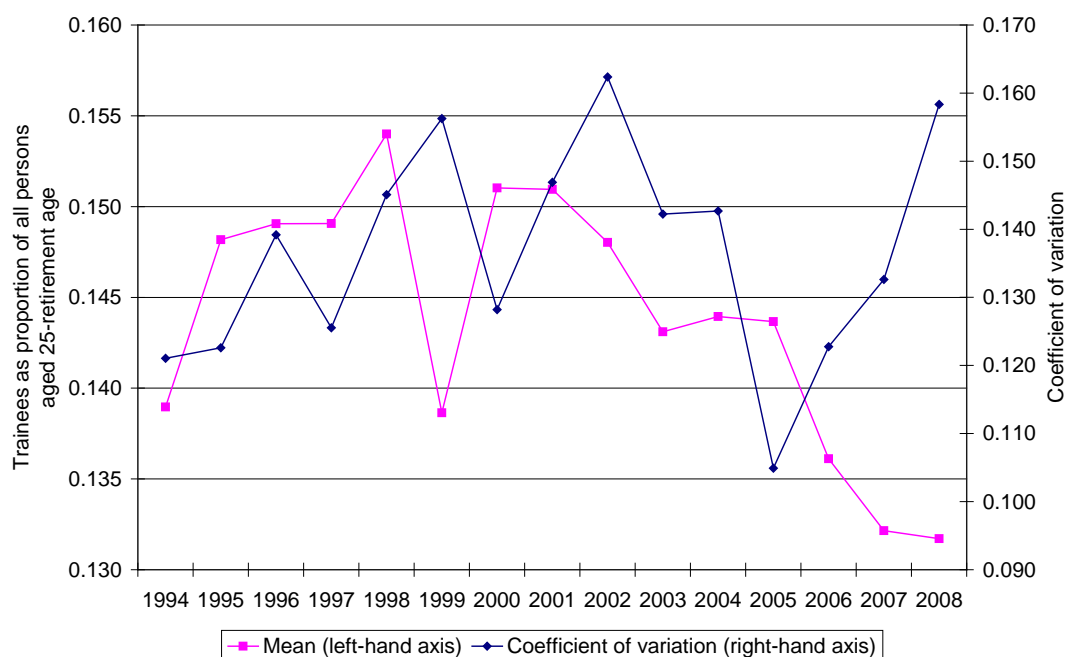
¹ The coefficient of variation is defined as the ratio of the standard deviation to the mean of training rates at city-region level. The timing of growth and decline in average training rates at city-region level (derived from LFS data on training received in the previous four weeks) is broadly in line with recent trends in the 13 week training measure discussed in Section 3.

above. In 2008 the coefficient of variation on this skills measure was about 12% higher than in 1994 but this conceals several periods of decline in regional inequality on skills during the period (Figure 4.3). This may reflect the general growth in certified skills in the UK since the early 1990s, as the mean value of the NVQ4-qualified share of the working-age population rose steadily over the whole period from 0.19 in 1994 to 0.28 in 2008.

By contrast, there is a much clearer trend in the dispersion of employment rates at city-region level over this period. Mean employment rates rose from 72% to 76% between 1994-2000 and then tended to level off or decline slightly during the 2000s. At the same time the coefficient of variation on this measure fell steadily between 1999 and 2004 and in 2008 it was about 24% lower than in 1994.

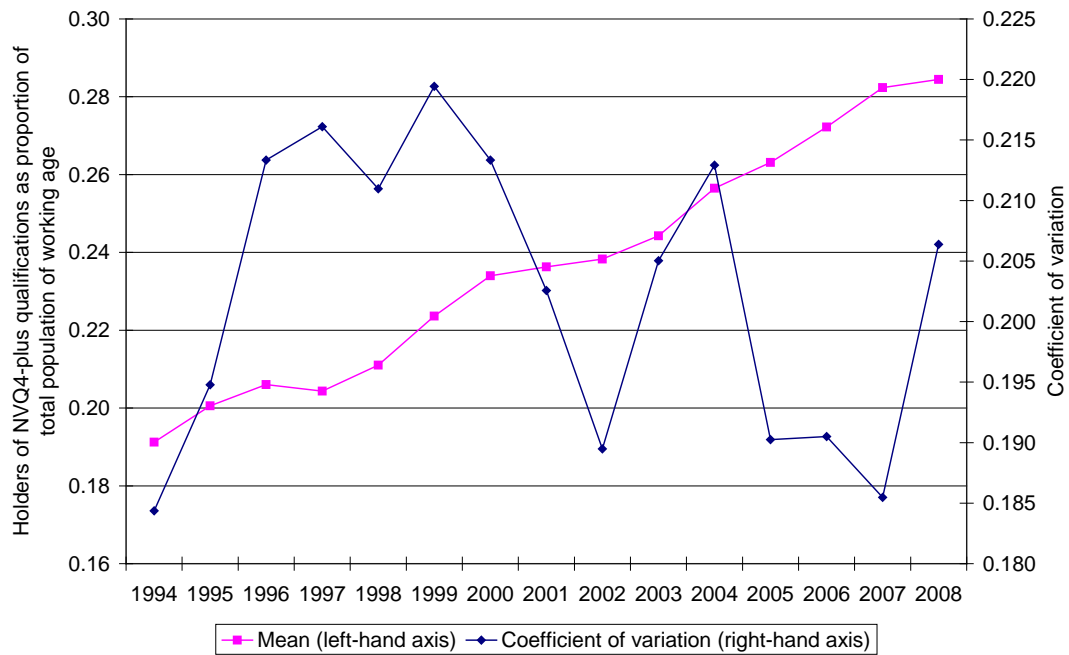
In summary, there are large disparities in adult training rates between city-regions and these gaps do not appear to have diminished in recent years even when gaps in qualification and employment rates between city-regions have been narrowing to some extent. We now go on to explore the main factors underlying adult training rates at city-region level in detail.

Figure 4.2: People aged 25-retirement receiving job-related training in last 4 weeks as proportion of all people aged 25-retirement in employment in city-regions, Great Britain, 1994-2008



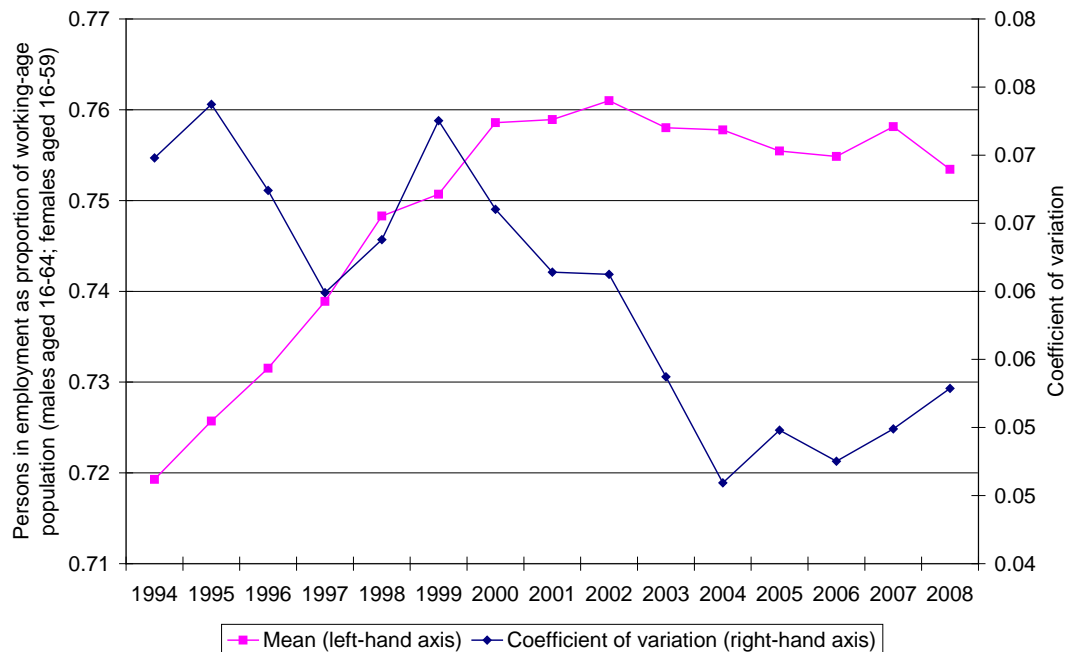
Source and notes: See Table 4.2

Figure 4.3: Holder of NVQ4 or higher qualifications as proportion of working-age population (males aged 16-64; females aged 16-59) in city-regions, Great Britain, 1994-2008



Source and notes: See Table 4.2

Figure 4.4: Employment rates in city-regions, Great Britain, 1994-2008



Source and notes: See Table 4.2

4.2 Sources of variation in adult training rates at city-region level

One of the great regularities of research on employer-provided training – spanning different sectors and countries -- is that highly-educated employees typically receive more training than do employees with few or no qualifications. An important reason for this is that high levels of ability (as signified by educational qualifications) are likely to be complementary to training and thus contribute to higher returns to training provision (Booth, 1991; Green, 1993; Lynch and Black, 1998; Acemoglu and Pischke, 1998). In addition, highly-qualified workers are more able to co-invest in their own education and training as they tend to be less credit-constrained than low-skilled workers.

Bilateral correlations show that, at city-region level, training rates for all persons of working age (ie, aged 16-retirement) are indeed positively correlated with two qualification-based measures of skills, namely, the proportions holding qualifications at either NVQ Level 4 and above or NVQ Level 3 and above (Table 4.3). However, the adult training rate (for people aged 25 to retirement age) is not significantly related to either skill measure. Another difference between the training rate for persons aged 25-retirement and that for all persons aged 16-retirement concerns their relationship to employment rates. The adult training rate is significantly negatively associated with adult employment rates whereas the training rate for the whole working-age population is significantly positively related to employment rates for that population.

Since training rates are expected to be affected by diverse other factors such as demographic and industrial structure within each city-region, we explore the relationship between adult training, skills and employment rates in more detail through multivariate analysis. Specifically, we estimate the following model of adult training rates:

$$(1) \text{AdultTrg}_t = \beta_0 + \beta_1 \text{Skills}_{it} + \beta_2 \mathbf{X}_{it} + \varepsilon_{it}$$

where AdultTrg_{it} refers to the proportion of people aged 25-retirement age receiving job-related training in city-region i in year t ; Skills_t is the proportion of the working-age population which holds NVQ Level 4 or higher qualifications; and \mathbf{X} is a vector of city-region characteristics including employment rates and other variables which

prior research has suggested may affect economic outcomes at regional level, for example, workforce skills, industrial structure and pay rates (Overman and Puga, 2002; Badinger and Url, 2002; Mason, Bishop and Robinson, 2009).

The variables available at city-region level are defined as follows:

- Skills: the proportions of the working-age population with (1) NVQ4 or higher qualifications and (2) NVQ3 qualifications
- Employment rates: persons in employment as a proportion of the working-age population
- Age structure: the proportions of people in employment aged 16-24 and 50-retirement (ie, males aged 50-64 and females aged 50-59)
- Gender: the share of women in total employment
- Part-time: part-time employees as a proportion of total employment
- Industrial structure: employment in manufacturing, financial and business services and the public sector as proportions of total employment
- Size structure of workplaces: employment in workplaces with less than 50 employees as a proportion of total employment
- Growth in employment: average annual rates of growth in total employment
- Pay: average gross hourly pay (constant prices)
- Entrepreneurship: New firm start-up rates per 1000 population, where new firm start-ups are measured as annual VAT registrations less annual VAT deregistrations
- Annual rate of growth in the working-age population: a variable which captures the net effects of age-related movements into and out of working-age populations as well as net migration in and out of city-regions by working-age people.

Descriptive statistics for these variables are shown in Table 4.4. Since data for the majority of control variables are only available since 1997, we estimate Equation (1) for the 1997-2008 period. Table 4.5 shows the results of Fixed Effects (FE) panel data estimates which make use of time series variation within city-regions but not of cross-sectional variation between city-regions. This ensures the consistency of our estimators by removing city-region specific effects which are correlated with

independent variables in our models. At the same time we seek to reduce possible bias due to unobserved time-invariant heterogeneity between city-regions.

In view of concerns about the potential endogeneity (two-way interdependence or reverse causality) of our skills measures, Column 1 in Table 4.5 shows the results of instrumental variable (IV) estimates in which the NVQ4-plus skill measure is instrumented by one-period and two-period lagged versions of itself. The results, which pass standard tests for instrument validity, suggest that we cannot reject a null hypothesis that more efficient Ordinary Least Squares (OLS) estimates should be preferred to IV estimates.² Accordingly, Columns 2-4 present Fixed Effects OLS estimates of Equation 1.

In our preferred model (Column 2), the adult training rate at city-region level is found to be positively related to skills (proxied by the NVQ Level 4 or above measure), with an increase of 10 percentage points (pp) in the skills measure associated with a 1.8 pp increase in the adult training rate. Adult training is also significantly positively related to the share of financial and business services in employment and the annual growth rate in the population of working age (which, as described above, captures the net effects of changes in age structure and migration into city-regions). At the same time adult training is found to be inversely related to the share of older people (aged 50-retirement) in the total workforce.³ The coefficient on the skills measure changes very little if we also control for those with NVQ Level 3 skills (Column 3) or for the adult employment rate (Column 4).

When we carry out similar Fixed Effects estimates of the determinants of training rates for all persons aged 16-retirement (Table 4.6), the relationship with skills at NVQ Level 4 or above is found to be much the same as for adult training rates, and the overall training rate is also positively related to growth in the population of working age. However, in contrast to the adult training rate, the overall training rate is

² In the presence of heteroscedasticity, the C statistic is an appropriate test of a null hypothesis that the potentially endogenous regressor (skills) is in fact exogenous (Baum, Shaffer and Stillman, 2003).

³ Adult training rates are also significantly negatively related to our measure of entrepreneurship, ie, new start firms per 1000 population. One could speculate about the possible reasons for this effect but the main point to note is that the relevant coefficient is very small.

not significantly affected by the age structure of the workforce or by the sectoral composition of employment.

Given the strength of the relationship between skills and adult training, it is important to assess the main factors contributing to the substantial disparities in skill levels between city-regions. High level skills, as proxied by the NVQ4-plus employment share, are found to be significantly related to employment rates, with an increase of 10 pp in employment rates associated with a 1.9 pp increase in the NVQ4-plus share of employment. Tests for the potential endogeneity of employment rates in this model, shown in Table 4.7, Column 1, suggest that OLS estimates should be preferred.

These estimates show that disparities in skill levels are strongly related to differences in age structure and industrial structure between city-regions (Table 4.7, Column 2). All else being equal, skills are significantly negatively related to the proportions of both younger persons (aged 16-24) and older persons (aged 50-retirement) in employment. By contrast, skill levels are positively related to the share of financial and business services in total employment, the share of small firms in total employment, the part-time employment share and (in a small way) to the prevalence of new firm start-ups.⁴

Since high-level skills have been found to be strongly positively linked to adult training rates at city-region level, we infer that inter-regional differences in employment rates and other factors associated with high-level skills may be contributing indirectly to regional disparities in adult participation in training.

⁴ The positive association between skill (NVQ4-plus) levels and the part-time employment share warrants further investigation. It may be attributable in part to well-qualified women taking up part-time work in order to accommodate domestic responsibilities (Lyonette et al, 2010).

Table 4.4: Descriptive statistics for variables in regression analysis, city-regions in Great Britain, 1997-2008

Variable	Obs	Mean	Std. Dev.	Min	Max
Training rate (all aged 25-retirement)	528	0.14	0.02	0.06	0.21
Training rate (all aged 16-retirement)	528	0.16	0.02	0.07	0.23
Employment rate (all aged 25-retirement)	528	0.75	0.04	0.61	0.85
Employment rate (all aged 16-retirement)	528	0.78	0.05	0.60	0.90
Holders of NVQ4 or higher qualifications as proportion of working-age population	528	0.25	0.06	0.14	0.47
Holders of NVQ3 qualifications as proportion of working-age population	528	0.19	0.02	0.12	0.25
Employment share of 16-24 year olds	528	0.16	0.02	0.04	0.23
Employment share of persons aged 50-retirement	528	0.23	0.03	0.13	0.32
Female share of employment	528	0.46	0.02	0.40	0.51
Part-time share of employment	528	0.32	0.03	0.25	0.40
Manufacturing share of employment	528	0.14	0.04	0.05	0.31
Financial and business services share of employment	528	0.17	0.06	0.08	0.35
Public sector share of employment	528	0.26	0.05	0.13	0.42
Workplace size under 50 employees share of employment	528	0.45	0.04	0.36	0.58
Average gross hourly pay (£, 2005 prices)	528	11.10	1.72	8.02	18.33
Average annual growth rate in employment	528	0.01	0.02	-0.09	0.08
New firms per 1000 population	528	1.01	0.67	-0.66	7.56
Average annual growth rate in working-age population	528	0.01	0.01	-0.01	0.02

Source: City-regions dataset derived from Labour Force Survey/NOMIS and Annual Survey of Hours and Earnings

Table 4.5: Determinants of job-related training rate for persons in employment aged 25-retirement at city-region level, Great Britain, 1997-2008

	(1)	(2)	(3)	(4)
	Fixed effects, Instrumental variables	Fixed effects	Fixed effects	Fixed effects
NVQ4 or higher share of working-age population	0.3966**	0.1769**	0.1798**	0.1888**
	[0.163]	[0.071]	[0.078]	[0.072]
NVQ3 share of working-age population			0.012	
			[0.063]	
Employment rate (all aged 25-retirement)				-0.0725
				[0.059]
Age 50-retirement employment share	-0.0758	-0.0962*	-0.095	-0.0712
	[0.061]	[0.056]	[0.059]	[0.063]
Female employment share	0.1350*	0.103	0.1023	0.0698
	[0.074]	[0.068]	[0.069]	[0.081]
Part-time employment share	-0.0434	-0.0049	-0.0064	0.0005
	[0.066]	[0.071]	[0.077]	[0.075]
Manufacturing employment share	0.0177	0.0142	0.0149	0.0142
	[0.055]	[0.058]	[0.061]	[0.061]
Financial and business services employment share	0.0824	0.1219*	0.1214*	0.1106*
	[0.070]	[0.063]	[0.066]	[0.062]
Public sector employment share	0.0578	0.0313	0.0315	0.0043
	[0.065]	[0.058]	[0.060]	[0.064]
Workplace<50 employment share	-0.0634	-0.0223	-0.0221	-0.0374
	[0.087]	[0.075]	[0.077]	[0.076]
Average annual growth rate in employment	-0.0596*	-0.0405	-0.04	-0.018
	[0.034]	[0.036]	[0.037]	[0.041]
Average gross hourly pay (2005 prices)	0.0001	0.0002	0.0002	-0.0001
	[0.002]	[0.002]	[0.002]	[0.002]
New firms per 1000 population	-0.0043**	-0.0035*	-0.0035*	-0.0036*
	[0.002]	[0.002]	[0.002]	[0.002]
Average annual growth rate in working-age population	0.5175**	0.5417**	0.5396**	0.5071**
	[0.254]	[0.234]	[0.248]	[0.243]

Continued on next page

Table 4.5 (continued): Determinants of job-related training rate for persons in employment aged 25-retirement at city-region level, Great Britain, 1997-2008

	(1)	(2)	(3)	(4)
	Fixed effects, Instrumental variables	Fixed effects	Fixed effects	Fixed effects
Observations	528	528	528	528
Adjusted R2	0.090	0.131	0.205	0.210
Hansen J test	2.354			
Hansen P value	0.125			
C statistic	1.952			
C statistic P value	0.162			
Kleibergen-Paap LM statistic	20.93			
Kleibergen-Paap P value	<0.001			
F statistic		6.597	6.801	9.391
Root MSE	0.0161	0.0158	0.0155	0.0154

Source: City-regions dataset derived from Labour Force Survey (NOMIS) and Annual Survey of Hours and Earnings

Notes: * significant at 10%; ** significant at 5%; *** significant at 1%

Fixed effects panel data estimates. Robust standard errors in parentheses are corrected for clustering of observations at city-region level. The dependent variable is the proportion of persons in employment aged 25-retirement age (males 64, females 59) who have received job-related training in the previous four weeks. All equations include year dummies. In Column 1 the NVQ4 skills measure is instrumented with its own values at time t-1 and t-2. In the presence of heteroscedasticity, clearly indicated by Breusch-Pagan tests, the Hansen J statistic is an appropriate test of the null hypothesis of instrument validity. The Kleibergen-Paap LM statistic tests the null hypothesis that the matrix of reduced-form coefficients in the first-stage regression is under-identified. The C statistic tests the null hypothesis that the potentially endogenous (instrumented) regressor is in fact exogenous.

Table 4.6: Determinants of job-related training rate for all persons in employment of working-age (aged 16-retirement) at city-region level, Great Britain, 1997-2008

	(1)	(2)	(3)	(4)
	Fixed effects, Instrumental variables	Fixed effects	Fixed effects	Fixed effects
NVQ4 or higher share of working-age population	0.2896 [0.205]	0.1344* [0.069]	0.1474* [0.077]	0.1285* [0.071]
NVQ3 share of working-age population			0.0532 [0.071]	
Employment rate (all aged 16-retirement)				0.0541 [0.096]
Age 16-24 employment share	0.074 [0.063]	0.0549 [0.064]	0.054 [0.067]	0.0516 [0.067]
Age 50-retirement employment share	0.0195 [0.072]	-0.0017 [0.063]	0.0033 [0.067]	-0.0064 [0.065]
Female employment share	0.0043 [0.075]	-0.0077 [0.069]	-0.0101 [0.069]	-0.009 [0.070]
Part-time employment share	0.0186 [0.077]	0.0454 [0.081]	0.0387 [0.088]	0.0399 [0.086]
Manufacturing employment share	-0.0032 [0.065]	-0.0059 [0.066]	-0.0027 [0.068]	-0.007 [0.068]
Financial and business services employment share	0.0485 [0.070]	0.0759 [0.063]	0.0734 [0.066]	0.0816 [0.062]
Public sector employment share	0.0285 [0.069]	0.0078 [0.065]	0.0086 [0.067]	0.0297 [0.077]
Workplace<50 employment share	0.0823 [0.105]	0.1053 [0.089]	0.1059 [0.091]	0.1273 [0.092]
Average annual growth rate in employment	-0.0216 [0.035]	-0.0083 [0.036]	-0.0062 [0.037]	-0.025 [0.051]
Average gross hourly pay (2005 prices)	0.0002 [0.002]	0.0003 [0.002]	0.0005 [0.002]	0.0005 [0.002]
New firms per 1000 population	-0.0032 [0.002]	-0.0027 [0.002]	-0.0026 [0.002]	-0.0027 [0.002]
Average annual growth rate in working-age population	0.3939 [0.259]	0.4227* [0.256]	0.414 [0.269]	0.4405* [0.253]

Continued on next page

Table 4.6 (continued): Determinants of job-related training rate for persons in employment aged 16-retirement at city-region level, Great Britain, 1997-2008

	(1)	(2)	(3)	(4)
	Fixed effects, Instrumental variables	Fixed effects	Fixed effects	Fixed effects
Observations	528	528	528	528
R-squared	0.372	0.385	0.386	0.385
Hansen J test	0.339			
Hansen P value	0.561			
C statistic	0.848			
C statistic P value	0.3571			
Kleibergen-Paap LM statistic	21.99			
Kleibergen-Paap P value	1.68E-05			
Adjusted R2		0.294	0.356	0.355
F statistic		21.53	28.11	22.6
Root MSE	0.0171	0.017	0.0166	0.0166

Source: City-regions dataset derived from Labour Force Survey (NOMIS) and Annual Survey of Hours and Earnings

Notes: * significant at 10%; ** significant at 5%; *** significant at 1%

Fixed effects panel data estimates. Robust standard errors in parentheses are corrected for clustering of observations at city-region level. The dependent variable is the proportion of persons in employment aged 16-retirement age (males 64, females 59) who have received job-related training in the previous four weeks. All equations include year dummies. In Column 1 the NVQ4 skills measure is instrumented with its own values at time t-1 and t-2. See notes to Table 4.5 for details of test statistics.

Table 4.7: Determinants of skill levels at city-region level, Great Britain, 1997-2008

	(2) Fixed effects, Instrumental variables	(1) Fixed effects
Employment rate	0.1930** [0.080]	0.1947** [0.083]
Age 16-24 employment share	-0.1323** [0.052]	-0.1324** [0.054]
Age 50-retirement employment share	-0.1507** [0.059]	-0.1508** [0.062]
Female employment share	-0.0803 [0.060]	-0.0803 [0.062]
Part-time employment share	0.1495** [0.063]	0.1493** [0.065]
Manufacturing employment share	-0.0206 [0.055]	-0.0207 [0.057]
Financial and business services employment share	0.1934*** [0.064]	0.1935*** [0.066]
Public sector employment share	-0.052 [0.072]	-0.0513 [0.074]
Workplace<50 employment share	0.2238*** [0.067]	0.2244*** [0.069]
Average annual growth rate in employment	0.0244 [0.042]	0.0239 [0.043]
Average gross hourly pay (2005 prices)	0.0012 [0.002]	0.0012 [0.002]
New firms per 1000 population	0.0034** [0.002]	0.0034** [0.002]
Average annual growth rate in working-age population	0.2448 [0.227]	0.2453 [0.235]
Observations	528	528
Adjusted R2		0.746
F statistic		79.7
Root MSE		0.015
Hansen J test	0.156	
Hansen P value	0.693	
C statistic	0.136	
C statistic P value	0.713	
Kleibergen-Paap LM statistic	31.0	
Kleibergen-Paap P value	<0.001	

Source for Table 4.7: City-regions dataset derived from Labour Force Survey (NOMIS) and Annual Survey of Hours and Earnings

Notes for Table 4.7: * significant at 10%; ** significant at 5%; *** significant at 1%

Fixed effects panel data estimates. Robust standard errors in parentheses are corrected for clustering of observations at city-region level. The dependent variable is the proportion of working-age people with NVQ4 qualifications or higher. Both equations include year dummies. In Column 2 the employment rate is instrumented with its own value at time t-1 and a ranked version of itself. See notes to Table 4.5 for details of test statistics.

5. Summary and assessment

In recent years there have been signs of a downturn in adult learning in the UK. In 2002 some 33% of all people aged 25-59 participated in formal education, job-related training or leisure education, or some combination of these activities. This represented an increase from 29% in 1999. However, by 2009 this proportion had declined to 31%. All three components of the combined measure of adult learning contributed to these trends but the steepest fall occurred in the proportion engaged in leisure or similar education.

The recent decline in different forms of adult learning has primarily involved people aged between 30 and 49 and those classified as unemployed or economically inactive. Although better-qualified people are still more likely than low-qualified people to engage in adult learning, the probability of engaging in such learning has also declined for all qualification groups at NVQ2 and above in recent years. After controlling for age, qualifications and economic activity, the probability of females participating in adult learning has remained significantly higher than for males throughout the 1999-2009 period.

Analysis at city-region level reveals sharp regional inequalities in adult participation in training. In some city-regions job-related training rates for 25-59 year olds are three times higher than in other areas. These disparities in adult training rates are mirrored by equally large gaps between city-regions in employment rates and skill levels.

Adult training rates at city-region level are strongly positively related to the proportion of the workforce with high-level skills (NVQ Level 4 or above). Adult training is also positively influenced by the share of financial and business services in employment and the annual growth rate in the population of working age (which captures the net effects of changes in age structure and migration into city-regions). By contrast, adult training rates at city-region level tend to be lower, the larger is the share of older people (aged 50-retirement) in the total workforce.

Since adult training rates are so closely linked to high-level skills at city-region level, we infer that inter-regional differences in employment rates, age structure and

industrial structure associated with high-level skills may be contributing indirectly to regional disparities in adult participation in training. Nonetheless, it is notable that the large differences in adult training rates between city-regions have not diminished in recent years even though gaps in employment rates and skill levels have narrowed to some extent.

The recent fall in adult learning participation, together with the continuation of marked regional inequalities in adult training rates, represent a setback for government policy aimed at promoting lifelong learning. This decline comes at a time when there is continued evidence of adult employees needing extensive skills upgrading and improvement in order to improve the competitiveness of private sector firms and the efficiency of public sector organisations (Mason and Bishop, 2010). Government policy-makers in the future will face considerable challenges in reversing the fall in adult learning participation and reducing regional disparities in adult learning.

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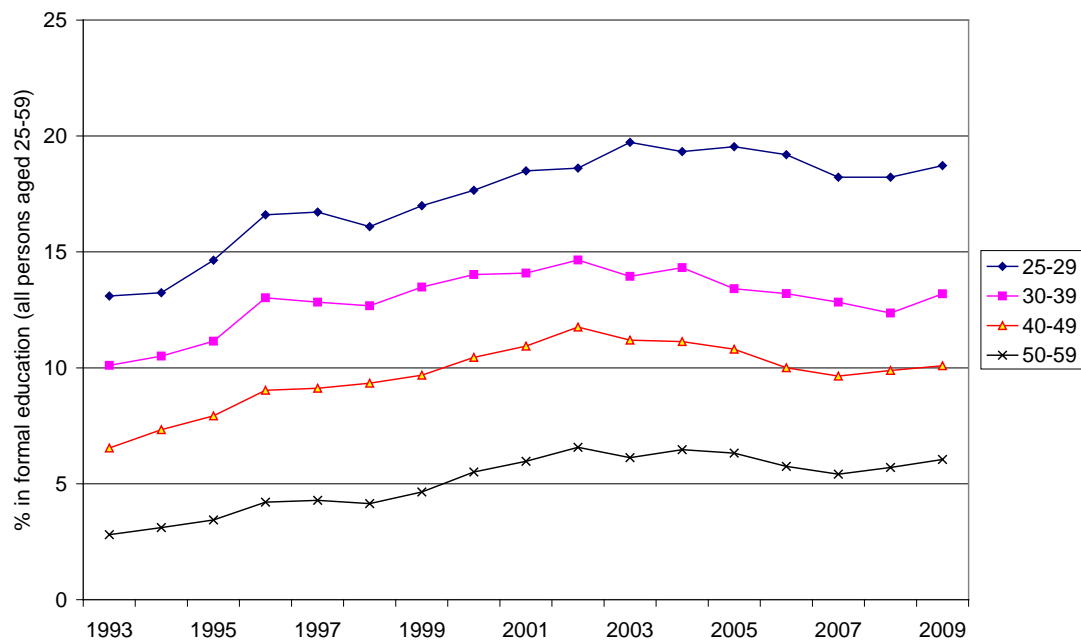
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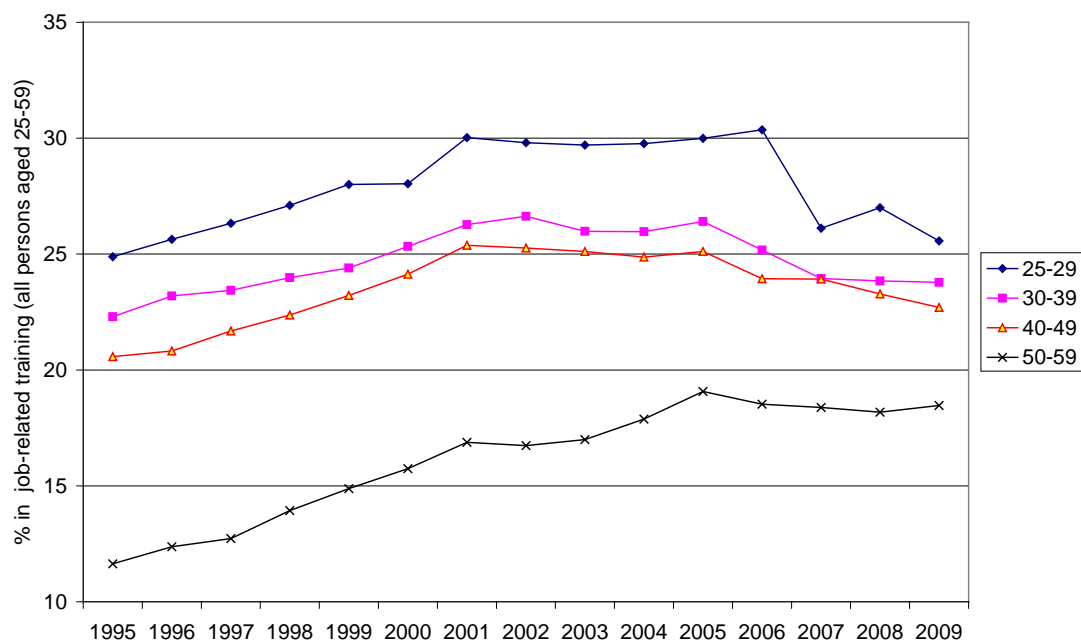
STATISTICAL APPENDIX

Figure A1: Participation in formal education, job-related training (13 weeks) and/or leisure and other education classes: all persons aged 25-59, analysed by age group

(1) Formal education



(2): Job-related training (13 weeks)



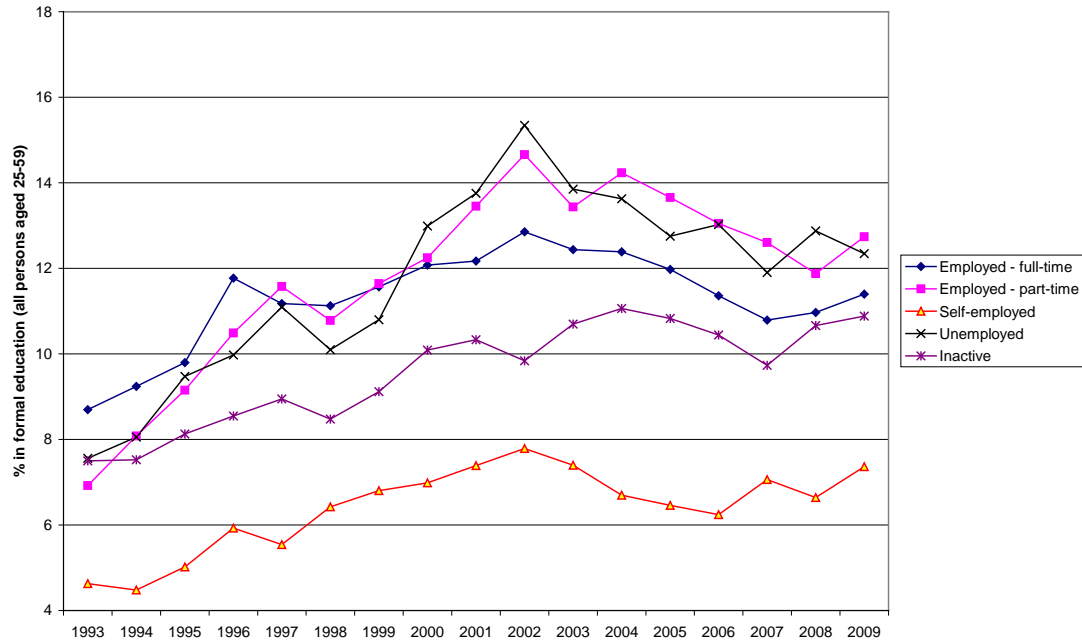
(3) Leisure and/or other education classes



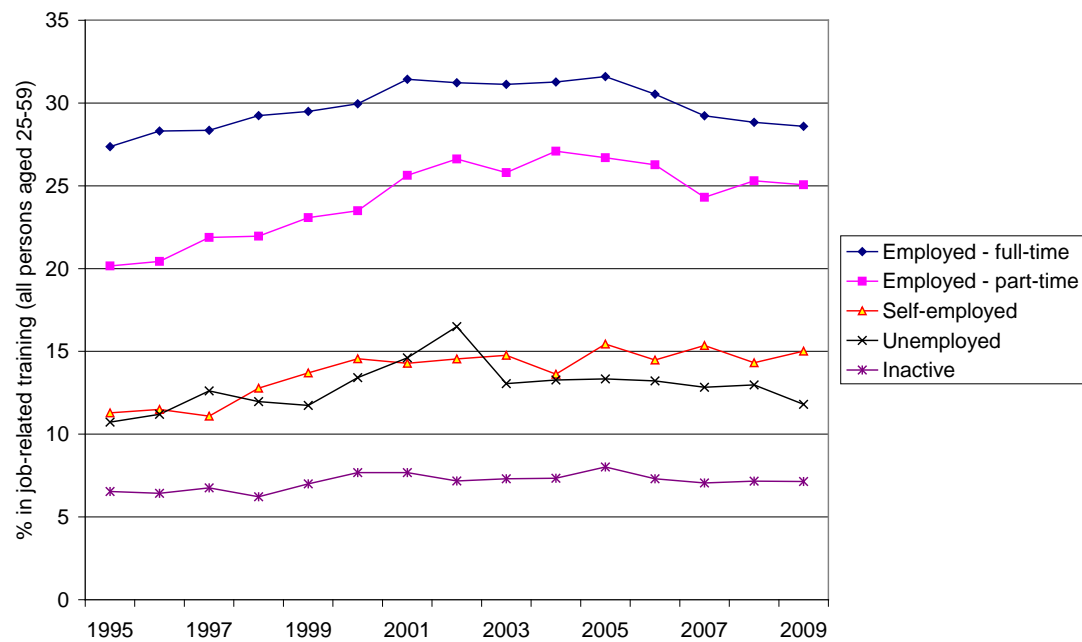
Source and notes: See Figure 1.

Figure A2: Participation in formal education, job-related training (13 weeks) and/or leisure and other education classes: all persons aged 25-59, analysed by economic activity

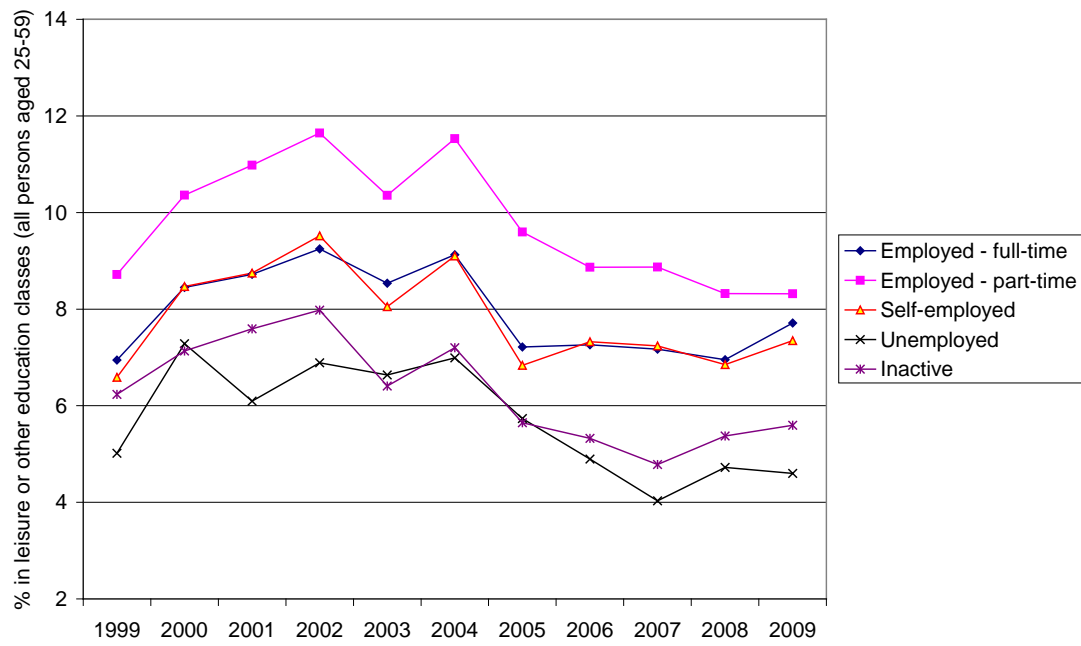
(1) Formal education



(2): Job-related training (13 weeks)



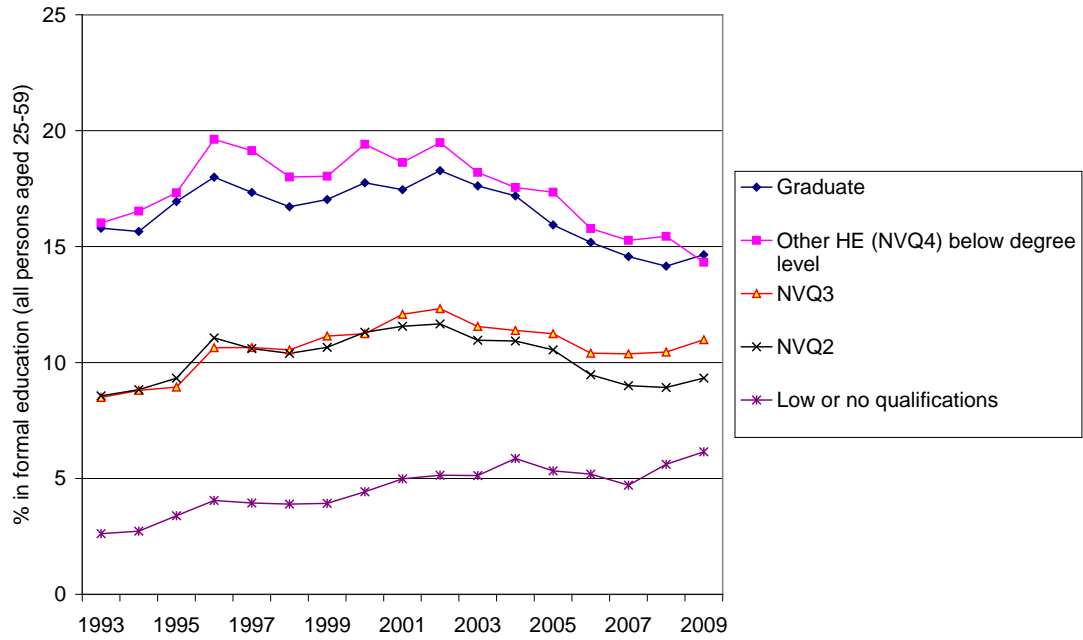
(3) Leisure and/or other education classes



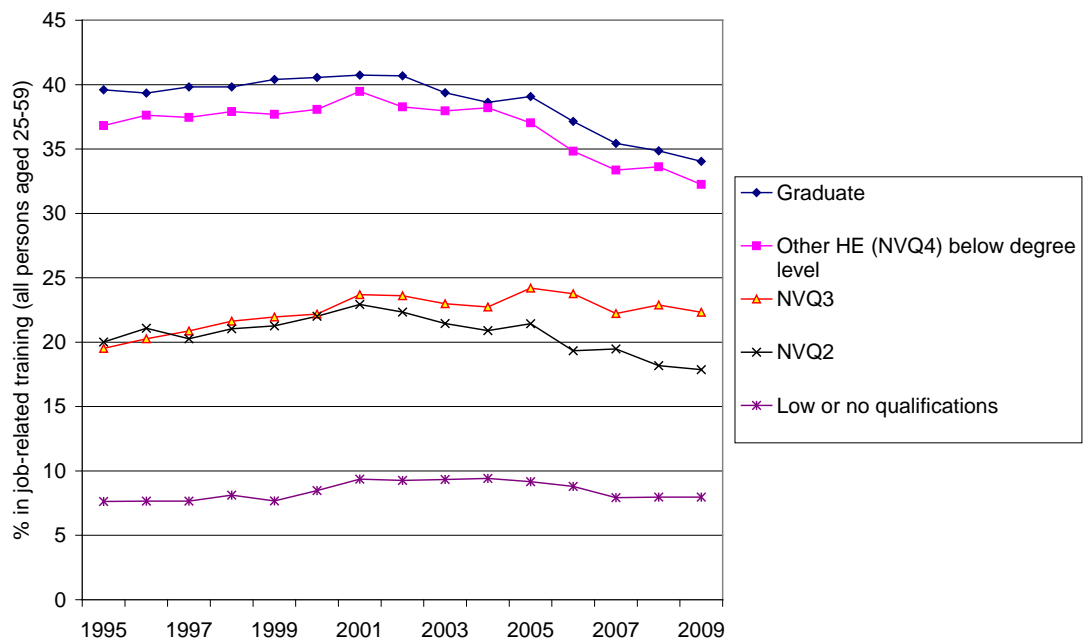
Source and notes: See Figure 4.

Figure A3: Participation in formal education, job-related training (13 weeks) and/or leisure and other education classes: all persons aged 25-59, analysed by highest qualification held

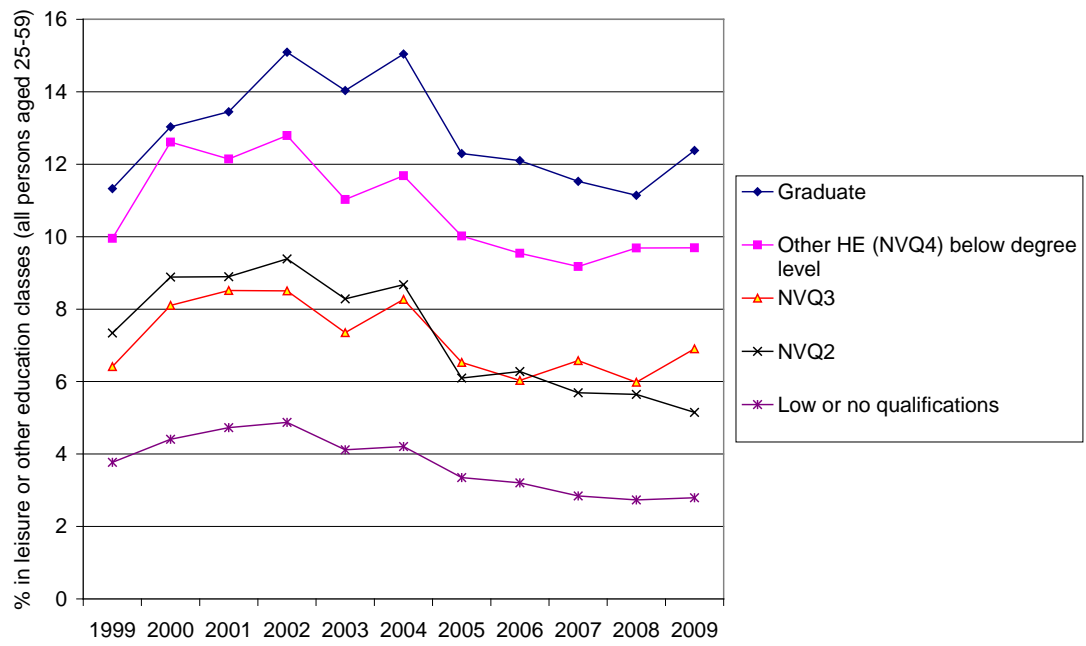
(1) Formal education



(2): Job-related training (13 weeks)



(3) Leisure and/or other education classes



Source and notes: See Figure 1.

Table A1: Descriptive statistics for Labour Force Survey analysis: all persons aged 25-59, 1999-2002 and 2003-09 (unweighted)

Variable	1999-2002			2003-09		
	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.
Education, job-related training and/or leisure education	264395	0.31	0.46	399756	0.310	0.46
Formal education	264395	0.11	0.32	399756	0.109	0.31
Job-related training (13 weeks)	264395	0.23	0.42	399756	0.231	0.42
Leisure education	258808	0.08	0.28	384231	0.074	0.26
Female	264395	0.52	0.50	399756	0.524	0.50
Ethnic	262450	0.06	0.23	395428	0.09	0.28
Single	264395	0.36	0.48	399756	0.40	0.49
Age25_29	264395	0.13	0.33	399756	0.12	0.32
Age30_39	264395	0.32	0.47	399756	0.30	0.46
Age40_49	264395	0.28	0.45	399756	0.31	0.46
Age50_59	264395	0.26	0.44	399756	0.27	0.45
Employed full-time	259799	0.53	0.50	391325	0.54	0.50
Employed part-time	259799	0.15	0.35	391325	0.15	0.35
Self-employed	259799	0.10	0.30	391325	0.10	0.31
Unemployed	259799	0.03	0.18	391325	0.03	0.18
Inactive	259799	0.19	0.39	391325	0.18	0.38
Graduate	260349	0.16	0.37	392790	0.21	0.41
Other NVQ4	260349	0.10	0.29	392790	0.10	0.30
NVQ3	260349	0.22	0.42	392790	0.21	0.41
NVQ2	260349	0.20	0.40	392790	0.21	0.41
Other qualifications	260349	0.09	0.28	392790	0.08	0.27
Low or no qualifications	260349	0.23	0.42	392790	0.19	0.39
North East	264395	0.04	0.21	399756	0.05	0.21
North West	264395	0.11	0.31	399756	0.11	0.31
Yorks & Humberside	264395	0.09	0.28	399756	0.09	0.29
East Midlands	264395	0.07	0.26	399756	0.07	0.26
West Midlands	264395	0.09	0.28	399756	0.08	0.28
Eastern	264395	0.09	0.29	399756	0.09	0.29
London	264395	0.11	0.31	399756	0.11	0.31
South East	264395	0.14	0.34	399756	0.14	0.35
South West	264395	0.08	0.28	399756	0.08	0.28
Wales	264395	0.05	0.21	399756	0.05	0.21
Scotland	264395	0.09	0.29	399756	0.09	0.28
Northern Ireland	264395	0.04	0.19	399756	0.04	0.20
1999	264395	0.26	0.44			
2000	264395	0.25	0.43			
2001	264395	0.24	0.43			
2002	264395	0.24	0.43			
2003				399756	0.15	0.36
2004				399756	0.15	0.35
2005				399756	0.14	0.35
2006				399756	0.14	0.35
2007				399756	0.14	0.35
2008				399756	0.14	0.35
2009				399756	0.13	0.34

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