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Evaluating outcomes from the Youth Training Scheme using matched firm-trainee data†

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I. Introduction

Over the last 10 years a variety of studies have estimated the effect of participation in Youth Training Schemes (YTSs) on subsequent employment and earnings.[1] Typically, these studies compare average earnings or employment probabilities between ex-participants and non-participants at some point after training finishes. Previous studies have tended to estimate averages across all YTS participants, or at best very aggregated groups. Using matched data on both trainees and training providers, this study provides more detailed estimates of the YTS employment effect than has previously been possible.

Main & Shelly (1990), Main (1991) and Mealli, Pudney & Thomas (1996) show that those who complete a YTS have significantly higher employment rates than those who leave early.[2] In this study we provide an explanation for why 'completers' do better than those who leave schemes early. The vast majority of YTS places are provided by firms; only a small proportion of YTSs are provided by specialist training agencies. This is important because many successful YTS outcomes are accounted for by trainees who are kept on in permanent jobs after their training finishes. This explains why there is such

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[1]These include Main & Shelly (1990), Whitfield & Bourlakis (1991), Main (1991), O'Higgins (1994), Dolton, Makepeace & Treble (1994a, 1994b), Green, Hoskins & Montgomery (1996), Dolton, Gannon & Makepeace (1998) and Andrews, Bradley & Upward (1999).

[2]Mealli *et al.* (1996) use a subset of the same data used in this study. They do not, however, provide a comparison of participants and non-participants; nor do they test their hypothesis about why 'completers' do better.

a strong correlation between the duration of a YTS and the success of the outcome. Trainees who are kept on as permanent employees complete the full two-year YTS, and can be thought of as 'well-matched' with their training provider. Youths who fail to find a training place in a firm, and whose training is provided by specialist training providers tend to be further disadvantaged by the fact that they have no access to the internal labour market. This study therefore provides new evidence on why some schemes are more successful than others. By relating characteristics of trainees and firms to training outcomes we are able to show which factors determine whether trainees are kept on by their training provider.

The data used in this study cover the period 1988–1992. Since the early 1990s there have been various changes to the structure of government-funded training for 16–18 year-olds. In 1994 the YTS began to be replaced by Modern Apprenticeships (MA) and National Traineeships, which in turn were replaced by Advanced Modern Apprenticeships and Foundation Modern Apprenticeships.[3] An obvious issue is whether an evaluation of the YTS is still relevant. Despite numerous relaunches and relabelling, government-funded youth training continues to be provided by the same organisations and employers. Training and Enterprise Councils (TECs) have been responsible for distributing funding to training providers throughout the 1990s, and those employers which took school-leavers onto YTSs were also involved in providing Modern Apprenticeships.

A key aim of MA was to raise the quality of training provided by requiring that training led to national vocational qualifications (NVQ level 3 or 4). Trainees were sent on day-release schemes to Colleges of Further Education and Training Centres. Interestingly, in our data we are able to distinguish between standard YTSs and so-called ''Employee Status'' schemes. As will be explained, these were very close in structure to subsequent MA and in many ways provide a useful test-bed for assessing whether Modern Apprenticeships are likely to lead to better employment outcomes than standard YTSs. Employers who provided Employee-status YTSs were also the employers who went on to provide MA.

Evaluations of the YTS from the early late 1980s and early 1990s are therefore still very relevant for informing current policy. We should also note that despite the large falls in unemployment over the 1990s, over 260,000 (9%) of 16–18 year-olds are employed on Government-funded training. This is actually rather more than were employed on YTSs during the period of this study.[4]

The paper is organised as follows. Section II describes the methods used in the literature for comparing employment outcomes between participants and

[3]Detailed descriptions of the development of youth training in the UK can be found in Bradley (1995) and Deakin (1996). The introduction of MA is described by Howarth & Stone (1999).

[4]Source: HMSO (2001, Table 3.10).

non-participants. Section III describes the data used in this study. Three methods are then used for analysing these data. First, Section IV presents cross-section estimates of the difference in employment probabilities between participants and non-participants. Second, Section V analyses the duration of search. Third, Section VI presents new results on the relationship between the quality of the firm-trainee match and the precise outcome of each YTS. Section VII concludes.

II. Methods for evaluating YTS employment outcomes

Previous evaluations of employment effects of YTS participation are summarized in Table 1.[5] The most common method for comparing employment outcomes between participants and non-participants is to estimate a probability model such as a Probit:

$$\Pr(y_i = 1) = \Phi(\mathbf{x}_i'\beta + d_i\delta), \tag{1}$$

where y_i is a dummy variable denoting employment ($y_i = 1$) or unemployment ($y_i = 0$) at some point after training is completed, Φ is the normal cumulative distribution function, $\mathbf{x}_i$ is a vector of characteristics, and d_i is a dummy variable denoting previous participation on the YTS. An estimate of the change in employment probability is then given by

$$\hat{\Delta} = \Phi(\bar{\mathbf{x}}'\hat{\beta} + \hat{\delta}) - \Phi(\bar{\mathbf{x}}'\hat{\beta}),$$

where $\bar{\mathbf{x}}$ is some average set of characteristics. This is the method used by Main & Shelly (1990), Whitfield & Bourlakis (1991) and Main (1991).

Numerous modifications to Equation (1) can be made to allow for additional complexity in the data. First, one can allow the outcome y_i to include additional labour market states, in which case Equation (1) can be estimated as a multinomial model.

Second, one can allow the coefficients on $\mathbf{x}_i$ to vary between participants and non-participants, in which case Equation (1) is estimated as two separate Probits.

Third, one can restrict the control group (i.e. those with $d_i = 0$) to some subset of all school-leavers who do not participate. Non-participants at the top of the ability distribution (such as those who enter further education) are usually excluded on the grounds that they are an inappropriate comparison group.[6] Implicitly, this is an attempt to control for unobserved differences between

[5]Not shown in this table are three earlier studies by Main & Raffe (1983a, 1983b) and Main (1985).

[6]On practical grounds, this group are also excluded because they do not enter employment at all until after the sample is collected.

TABLE 1

Previous UK studies estimating the impact of the YTS on employment

Study and dataset	*Date of leaving school*	*Date of employment observation*	*YTS version*	*Sample size*	*Methodology*	*Summary of results*
Main & Shelly (1990); Scottish Young People's Survey (SYPS)	1983–84	Apr 86	YTS1	1,198	Eqn (1), with d_i replaced by $\mathbf{d}_i$ containing 'ever on a YTS' and 'completed a YTS'. Control group restricted to those unemployed in October 1984 and April 1985	'Advantaged' school-leaver $\Delta = +0.13(0.048)$ 'Disadvantaged' school-leaver $\Delta = +0.11(0.04)$
Whitfield & Bourlakis (1991); Youth Cohort Study (YCS)	1983–84	Feb 87	YTS1	2,513	Eqn (1)	$\Delta \approx +0.04$ (Significant at 10%)
Main (1991); SYPS	1984–85	Oct 87	YTS1	1,383	Eqn (1), with d_i replaced by $\mathbf{d}_i$ containing 'ever on a YTS' and 'completed a YTS'. Control group restricted to those unemployed on leaving school	'Advantaged' school-leaver +0.14 (Significant at 10%) 'Disadvantaged' school-leaver +0.19 (Significant at 10%)

continued overleaf

TABLE 1

(continued)

Study and dataset	*Date of leaving school*	*Date of employment observation*	*YTS version*	*Sample size*	*Methodology*	*Summary of results*
O'Higgins (1994); YCS	1983–84	Spring 1986	YTS1	2,855	Eqn (2)	Advantaged $\Delta = 0.00$ (na) Average $\Delta = +0.09$ (0.041) Disadvantaged $\Delta + 0.11$ (0.040)
Dolton *et al*. (1994b); YCS	1985–86	Sep 86–Feb 89	YTS2	2,003	Eqn (3). Dependent variable t_i defined with and without netting out time on a YTS. Control group restricted to those unemployed in September 1986	Including time on a YTS: Males: $\delta = -0.702(0.131)$ Females: $\delta = -0.244(0.129)$ Netting out time on a YTS: Males: $\delta = +0.206(0.127)$, Females: $\delta = +0.386(0.126)$
Dolton *et al.* (1998); YCS	1985–1986	Mar 94	YTS2	1,368	Eqn (2), where selection equation estimates selection into the sample rather than selection into training. Sample restricted to those who left school before age 17	Estimates on training dummies are generally insignificantly different from zero

participants and non-participants. The control group also sometimes excludes those who find employment soon after leaving school, on the same grounds.

Fourth, one can allow the participation measure to include several types of training, such as apprenticeships, NVQ qualifications, and so on. This can be achieved by replacing the dummy d_i with a vector of dummy variables $\mathbf{d}_i = [d_{1i}, d_{2i}, \ldots, d_{ki}]$ representing k types of training.

Fifth, it is common to relax the assumption that participation is exogenous. If unobserved characteristics which determine the decision to participate are correlated with unobserved characteristics which affect the probability of finding a job, estimates of δ will be biased. This can in principle be dealt with by estimating a bivariate Probit model for participation and employment. That is, by estimating

$$\Pr(y_i = 1, d_i = 1) = \Phi_2(\mathbf{x}_i'\beta + d_i\delta, \mathbf{z}_i'\gamma, \rho), \tag{2}$$

where Φ_2 is the bivariate normal distribution with correlation ρ, and $\mathbf{z}_i$ is a set of characteristics determining participation on a YTS.

Lastly, one can estimate Equation (1) at various points in time. There is no reason to suppose that the YTS effect is constant across time. It might be the case that participants only gain several years after leaving a YTS. Main & Shelly (1990) compare employment probabilities about one year after participants leave training; Dolton *et al.* (1998) estimate the effect some six years later.

The logical extension of estimating Equation (1) at various points in time is a model measuring the duration of search. In this case the dependent variable is y_{it}, a sequence of zeros (representing non-employment) followed by a one, representing employment. If y_{it} is measured continuously over time we have a standard duration model. The *hazard rate* is the rate of exit into employment at time t conditional on being in non-employment up to time t. A common model for estimating hazards is the proportional hazards model:

$$h(t) = h_0(t)\exp(\mathbf{x}_i'\beta + d_i\delta), \tag{3}$$

where $h_0(t)$ is the baseline hazard, and the effect of participation d_i on the conditional probability of leaving unemployment is given by

$$\frac{\partial \log h(t)}{\partial d_i} = \delta.$$

Thus although Equation (3) is a duration model, and Equation (1) is a cross-section Probit model, in both cases $\hat{\delta}$ is an estimate of the effect of participation on the probability of employment.

The general conclusion from the studies summarised in Table 1 is that participation on a YTS increases the probability of subsequent employment, but only by a small amount, and by far less than other factors, such as early employment experience and other measures of labour market 'advantage'. The more recent studies by Dolton *et al.* (1994b) and Dolton *et al.* (1998) predict smaller or even negative effects.

In this paper we estimate variants of Equations (1) and (3). In addition, the reasons for the success of certain types of YTS are examined using matched firm-trainee data.

III. Data

The data come from the computerised records of the Lancashire Careers Service (LCS) for the period March 1988 to June 1992.[7] These records are used to place young people (16–19 year-olds) in training places and employment. The data contain information on approximately 95% of all school-leavers in Lancashire during the sample period.

The data comprise 45 monthly cross-sections, which cover five cohorts of school-leavers. These cross-sections are appended to construct a complete sequence of spells for each individual over the sample period. A spell is defined as an uninterrupted period of time in a particular labour market state. Individuals can be in one of four states at any point in time: employed, unemployed, further education or a YTS. Although the data is recorded monthly, each cross-section contains the start date of the current spell to the nearest day. By linking the cross-sections together it is possible to construct a sequence of spells and transition dates between spells which are accurate to the nearest day, if we make the assumption that individuals do not enter and exit a state between any two cross-sections. If they do, information on that spell is lost.

Set against this measurement error, however, is the fact that the data provide a contemporaneous computerised account of spells and transitions between labour market states.[8]

The total sample consists of 79,213 school-leavers. Individuals are dropped from the sample if they have incomplete information, if they enter a spell where labour market status is unknown, or if they are still in a YTS or in further education at the end of the sample period.[9] The remaining sample

[7]The data are described in more detail in Upward (1998a, 1998b).

[8]Work by Elias (1997) suggests that recall bias may make retrospective information on employment transitions inaccurate, particularly for school-leavers, and so the use of contemporaneous records is to be preferred.

[9]15% of the sample have incomplete information, usually because their school was unknown; 12% have a spell of unknown status; 40% are still in a YTS or FE course at the end of the sample period.

consists of 26,082 individuals. Of these, however, only the first two cohorts contain a long enough sample period. These two cohorts comprise 7,651 females and 9,100 males.

Data on individuals include gender, age, ethnic minority status,[10] health, GCSE qualifications, occupational preferences and the year left school. Data on the local unemployment rate, the characteristics of the last compulsory school attended, and the socio-economic characteristics of the ward in which that school is located are also matched in.

Where the current state is a YTS, each spell includes an identifier which allows that spell to be matched to information on the firm or training agency which provided the training as well as detailed information about the characteristics of the YTS itself. These data consist of:

YTS type 77 percent of YTSs are standard training places in firms (i.e. not in specialist training organisations) which last a maximum of two years. 14 percent of YTSs are for *YTS employees* — permanent employees whose wage is subsidised by the YTS allowance. YTS employees were often taken on as part of a longer period of training leading to formal qualifications. In this sense they were closer to the current Modern Apprenticeships than the standard YTS. The remaining YTSs offer 'special funding': additional funds are made available to the training provider, usually because they are expected to take on school-leavers with additional training needs. These YTSs are often provided by voluntary training organisations rather than firms in the private sector.

YTS length The precise length, in days, of each YTS is recorded.

Number of YTSs entered Some school-leavers enter a YTS, leave before the YTS is completed, and subsequently enter another YTS. About 14 percent of participants enter more than one YTS.

Occupation The occupation of each YTS is recorded. Occupations are defined using a series of 74 'Occupational Training Family' (OTF) codes.[11] These occupations are used to determine whether the YTS offers training in an apprenticeship occupation. Apprenticeship occupations typically use the 2-year YTS as the beginning of a longer training programme.

Firm size The number of employees working in the firm providing the YTS.

Entry requirements Although access to the YTS was guaranteed for all school-leavers, most firms providing placements specified requirements in terms of minimum age, GCSE grades, subjects studied at school and the application method.

[10]The ethnic minority groups in these data are primarily of Pakistani and Bangladeshi origin.
[11]Definitions are listed in Upward (1998b, Table 16).

Most importantly, the data allow each trainee to be followed into the labour market after training finishes. It is therefore possible to distinguish whether a trainee is taken on by the firm which provided the training, or whether they find work in the external labour market. This makes it possible to examine more precisely the reasons why some YTSs are more successful than others.

IV. Cross-section employment probabilities

Table 2 summarises the proportion of the sample from cohorts 1 and 2 in each labour market state at five points in time during the sample period. These points are relative for each cohort; thus 'September year 1' refers to September 1988 for cohort 1 and September 1989 for cohort 2. Note that the final cross-section only contains data from cohort 1, because the sample ends before cohort 2 reaches this point in time. Participants are defined throughout as those who have completed 28 days in a YTS.[12] This explains why a small proportion of non-participants are recorded in a YTS.

The proportion of participants in employment is below that of non-participants for the first three cross-sections, but jumps to overtake from the fourth cross-section onwards. By the time of the final cross-section, the probability of a trainee being employed is 90.55 percent, compared to 86.52 percent for a non-trainee.

The raw YTS employment effect is therefore 4.03 percentage points.[13] To control for other characteristics, estimates of Equation (1) are reported, for the final cross-section only, in Table 3. The sample is split by gender, and the single dummy d_i is replaced by a vector of YTS types $\mathbf{d}_i$, consisting of (a) YTS type (Standard, YTS employee, Special); (b) YTS length; (c) number of YTSs; (d) apprenticeships.

Table 3 shows that there is a clear relationship between the time spent on the YTS and the subsequent probability of employment. The coefficients on 'Completed YTS' are positive and significant. Completing a YTS raises $\Pr(y_i = 1)$ by 5.1 percentage points for males and 7.4 points for females. This effect is large compared to the effect of most other covariates.

Males who enter more than one YTS do significantly worse than non-participants, although this effect is insignificant for females. As would be expected, YTS employees have higher employment probabilities (4.1–6.8 percentage points) presumably because they are even more likely to be kept on after training finishes.[14] Female school-leavers who participated on special schemes (those with additional funding) have a significantly lower probability of employment. There is a similar effect from the variable measuring whether

[12]28 days is the standard induction period for the YTS.
[13]Standard error 0.7 percentage points.
[14]This hypothesis is tested in Section 6.

TABLE 2

Five cross-sections from the LCS data

	Column %				
	Sep yr 1	*Sep yr 2*	*Sep yr 3*	*May yr 4*	*Sep yr 4*
Participants ($d_i = 1$)					
Employment ($y_i = 1$)	2.69	22.63	75.42	86.84	90.55
Unemployment ($y_i = 0$)	1.62	5.13	8.71	8.96	8.30
Further education	0.23	0.38	0.21	0.21	0.02
YTS	95.47	71.87	15.67	4.00	1.12
N	5325	7941	8225	8250	4552
Non-participants ($d_i = 0$)					
Employment ($y_i = 1$)	41.87	66.70	78.01	83.27	86.52
Unemployment ($y_i = 0$)	25.23	16.49	15.58	12.98	11.82
Further education	25.20	16.06	6.32	3.72	1.67
YTS	7.70	0.75	0.09	0.02	0.00
N	11426	8810	8526	8501	4316

the participant receives special funding. Both these variables are picking up the fact that special funding was made available to school-leavers with personal and social problems.

The other controls generally have the expected signs. The most important influences on employment probability are qualifications (positive) and previous unemployment experience (negative). This later variable is particularly important: a female school-leaver who is unemployed in the September after leaving school has a probability of employment three years later some 17 percentage points lower. For males, this effect is smaller, at around seven percentage points, but it is still very significant.

As noted in Section II, these estimates of the impact of the YTS might be biased if there are unobserved differences in the characteristics of participants and non-participants which are correlated with the training decision. A simple method for reducing the degree of unobserved heterogeneity is to compare participants and non-participants who have similar career histories.[15] We therefore estimated an additional model on this restricted sample. The key results were robust across both specifications, and the key result that it is completing a YTS which increases employment probability is confirmed.[16]

These results confirm that the variation *among* YTS participants is at least as important in determining subsequent employment outcomes as the variation

[15]Card & Sullivan (1988) argue that "... comparisons of trainees and controls with exactly the same pre-training history have a definite intuitive appeal."

[16]Full results are available on request from the Author.

TABLE 3

Probit estimates of the YTS employment effect, September year 4[a]

	Females			*Males*		
	Marg. effect[b]	*Coeff.*	*p-value*	*Marg. effect*	*Coeff.*	*p-value*
$<$ 6 months YTS	0.005	0.034	[0.724]	−0.003	−0.030	[0.780]
6–12 months YTS	−0.002	−0.014	[0.886]	0.025	0.282	[0.027]
12–18 months YTS	−0.027	−0.153	[0.192]	0.018	0.190	[0.200]
18–23 months YTS	−0.003	−0.019	[0.893]	0.010	0.096	[0.508]
Completed YTS	0.074	0.562	[0.000]	0.051	0.557	[0.000]
Multiple schemes	−0.017	−0.098	[0.411]	−0.050	−0.365	[0.001]
YTS employee	0.068	0.627	[0.017]	0.041	0.559	[0.005]
Special schemes	−0.096	−0.451	[0.004]	−0.001	−0.005	[0.971]
YTS apprentice	−0.097	−0.453	[0.033]	−0.007	−0.061	[0.528]
Left school at 15	−0.020	−0.116	[0.075]	0.002	0.015	[0.827]
Poor health	0.002	0.011	[0.890]	0.002	0.015	[0.846]
Ethnic minority	−0.017	−0.100	[0.506]	−0.019	−0.159	[0.283]
Additional funding for participant	−0.077	−0.381	[0.004]	−0.052	−0.378	[0.002]
GCSE grades D/E	0.044	0.287	[0.000]	0.041	0.431	[0.000]
1–3 GCSE grades C+	0.056	0.394	[0.000]	0.047	0.557	[0.000]
$\geq$ 4 GCSE grades C+	0.083	0.608	[0.000]	0.047	0.575	[0.000]
District unemp. rate	−0.002	−0.010	[0.678]	−0.002	−0.016	[0.472]
Unemployed in September year 1	−0.174	−0.747	[0.000]	−0.074	−0.510	[0.000]
FE in September year 1	−0.035	−0.201	[0.009]	−0.030	−0.247	[0.005]
Constant	—	−0.115	[0.841]	—	0.605	[0.303]
Other controls[c]						
Local employment conditions		5 variables			5 variables	
Willingness to travel		2 dummies			2 dummies	
School characteristics		6 variables			6 variables	
Occupational choices		12 dummies			12 dummies	
Number of occupational choices		3 dummies			3 dummies	
Socio-economic characteristics		8 variables			8 variables	
N[d]		4005			4724	
Observed Pr$(y_i = 1)$		0.876			0.920	
Log L		−1244.359			−1119.055	
$\chi^2(54)$		511.16			391.21	

[a]Estimates of Equation (1) with d_i replaced by a vector of YTS types.

[b]Marginal effects for a variable x_k are computed as $\phi(\bar{\mathbf{x}}'\beta)\beta_k$ if x_k is continuous, and as the difference in $\Phi(\bar{\mathbf{x}}'\beta)$ between $x_k = 1$ and $x_k = 0$ if x_k is a dummy. $\bar{\mathbf{x}}$ is evaluated at the mean of the whole sample.

[c]See descriptions in Upward (1998a, Ch. 4).

[d]Total sample $N = 8729$ is slightly less than the sample in Table 2 because those individuals still in training or FE at this point are excluded.

between participants and non-participants. In particular, the subsequent employment success of the YTS depends on the length of the scheme: YTS completers do significantly better than those who leave early.

V. Duration estimates

In this section the rate at which participants and non-participants find jobs is compared. There are two key issues to resolve when doing this. First, should spells of non-employment which are not unemployment (i.e. YTSs and FE spells) be counted as time spent searching for employment? To illustrate this, Figure 1 plots Kaplan-Meier estimates of the survivor function including and excluding time spent in non-employment states which are not unemployment. The survivor function shows the proportion of the sample which have yet to enter employment at each point in time, and is estimated by

$$\hat{S}(t) = \prod_{j|j \leq t} \frac{n_j - d_j}{n_j}, \tag{4}$$

where n_j is the number of observations 'at risk' at time j (i.e. the number of individuals who are still unemployed) and d_j is the number of individuals who enter employment at time j.

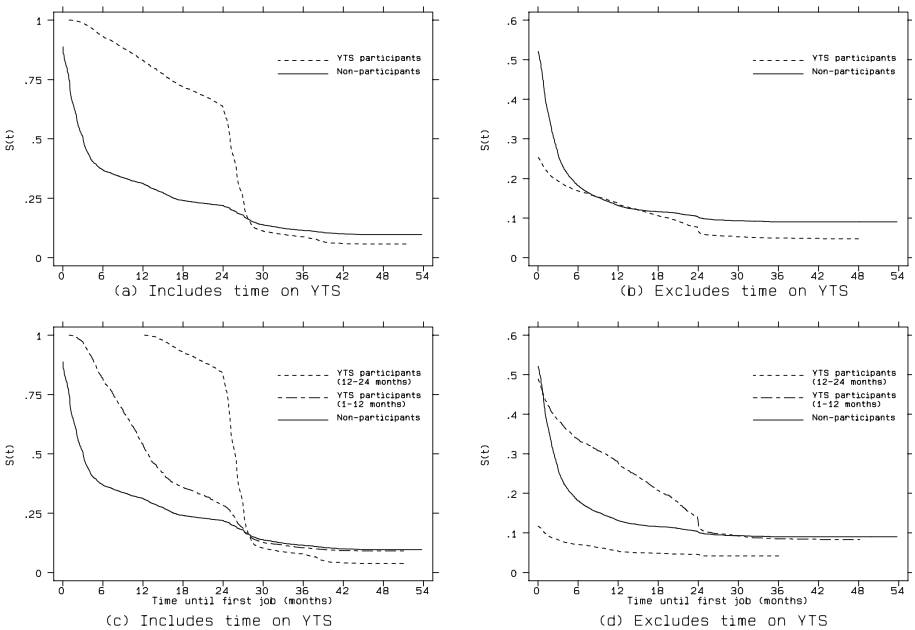

Figure 1. Kaplan-Meier survivor functions: time until first job

Panel (a) shows that if time spent in training is included as time spent searching, YTS participants have much slower entry rates to employment for the first two years. After excluding time spent training, panel (b) shows that participants have faster entry rates to employment. Indeed, about 70% of participants enter employment immediately after finishing their YTS, compared to about 50% of non-participants. This problem is exacerbated if the survivor function is estimated separately for different lengths of YTSs, shown in panels (c) and (d) of Figure 1. Participants who spend more than 12 months on a YTS have extremely high employment rates once training finishes — nearly 90 percent, shown in panel (d) — but by definition must have zero entry rates to employment for the first 12 months, as shown in panel (c).

There is some evidence to suggest that the YTS is not used primarily as a job search channel: those who leave schemes early have lower employment probabilities than those who remain for the full two years. Of course, this might merely indicate that the YTS is a poor search mechanism. However, it is important to stress again that the majority of YTSs involved employment in a "real" firm, and can therefore be thought of as low wage temporary employment. The evidence from Table 3 suggests that an early spell of unemployment is the single most damaging event which can occur in a school-leaver's early career. A comparison of the costs and benefits of entering a YTS rather than unemployment should not therefore equate a year spent on each. Therefore we take the decision to not to treat spells in a YTS as search in the sense that these individuals are not unemployed.[17]

The second issue is that it is not clear how to deal with spells of unemployment which occur *before* spells in a YTS start. In fact, a large proportion of YTS spells are preceded by a spell of unemployment. For this reason estimates of search duration are conditioned on having entered unemployment after leaving school.

The graphical methods shown in Figure 1 do not control for either observable or unobservable differences between participants and non-participants. It is well-known that failure to allow for possible unobserved heterogeneity can bias the estimates of the included parameters (Lancaster 1979). Heterogeneity can arise either as a result of there being unobserved characteristics which vary between individuals, or as a result of model misspecification. However, it has also been argued (Narendranathan & Stewart 1993) that the available techniques for controlling for omitted heterogeneity may also result in bias, and "there is no reason to expect these distortions to be less serious than those resulting from omitted heterogeneity in the first place"(p. 71).

[17]We should stress that this decision inevitably produces results which are more favourable to the YTS.

In order to verify the robustness of the results, the hazard models in this section are estimated using four different methods. First, Equation (3) is estimated as a Cox proportional hazards model where durations are recorded to the nearest day. This model does not impose any restrictions on the shape of the baseline hazard. Ridder (1987) argues that the bias in the estimated parameters of a proportional hazards model may not be too severe, provided that the baseline hazard has a sufficiently flexible functional form.

Second, in order to examine whether the results are robust to the assumption that transitions are recorded accurately to the nearest day, durations are grouped to the nearest month and a Cox regression estimated again.

As explained by Jenkins (1995) and Stewart (1996), if duration data are recorded in discrete intervals, the correct likelihood can be estimated by standard limited dependent variable techniques.[18] The third method therefore estimates the model on the monthly data using a sequential binary response model with the hazard linked to the regressors via the complementary log-log link (Equation (12) in Jenkins (1995)).

Finally, the fourth method re-estimates the third model with the inclusion of an additional parameter to allow for Gamma distributed unobserved heterogeneity, as suggested by Meyer (1990) and described in Jenkins (1997).

In addition to the inclusion of an additional parameter, we also restrict the sample to those who experience unemployment on leaving school, for the same reasons given in Section IV. Table 4 summarises the duration of search for this subsample. Of the total sample of 16,751 school-leavers, 6,528 are unemployed in their first spell after leaving school. About half of these (3,345) subsequently enter a YTS. As would be expected, unemployed school-leavers are more likely to enter a YTS than the average school-leaver. The initial spell of unemployment is much shorter for those who enter a YTS, but this is more than compensated for by the length of the training spell, which is often 2 years in length. The subsequent search period for YTS participants averages just 71 days.[19]

Tables 5 and 6 report the four sets of estimates of Equation (3), with the single dummy d_i replaced with the same vector of YTS covariates used in Probit analysis. The results in this section measure the duration of search taken from the end of the *first* period of training. Thus the period of training is not included in any search time. However, additional spells of training or FE which take place after the first spell in a YTS has finished are counted. For non-participants, the duration of search is measured from the end of the first spell of further education, if there is one.

[18]Jenkins notes that the grouping of duration intervals does not usually seem to impart aggregation bias.

[19]This mean search period is misleading because of the large proportion of individuals who leave a YTS and start a job immediately.

TABLE 4

Search durations by three groups of school-leavers

	Length in days[a]				
	Initial spell of unemployment	*Intervention*	*Post intervention search*	*Total search time*	*Sample size*
Non-participants ($d_i = 0$)	250	—	—	250	2897
Participants ($d_i = 1$)	49	527	71	647	3345

[a]Censored spells are truncated by the end of the sample period.

For all four specifications, and for both men and women, the duration dummies for YTS participants are greater than unity and significant, confirming that after netting out training time, all participants have higher entry rates to employment. Those who complete a YTS have much the highest hazard ratios. This result is unaffected by the introduction of an additional parameter for unobserved heterogeneity. Interestingly, the relationship between duration of scheme and the exit rate is not monotonic. Completers always have the highest exit rate, followed by those who leave a YTS between six and 12 months into the programme. For women, the lowest exit rate is those who nearly finish, while for men it those who complete less than six months.

Those who subsequently enter other YTSs ('Multiple schemes) have significantly lower exit rates in all four specifications. This is unsurprising because of the way the data are constructed: spells in a YTS after the first are counted as periods of search rather than being netted out.

YTS employees have higher exit rates, but this effect is small and insignificant in three out of the four specifications for women. This may be because YTS employees who find work quickly are also those who complete the full two years. Female participants in special schemes have significantly lower exit rates to employment, while there is no significant effect for men.

Although the magnitude of the coefficients varies across the four different specifications, the results are qualitatively the same. Aggregating the data to the nearest month appears to have little effect on the results. The additional parameter estimating the variance of the Gamma-distributed unobserved heterogeneity is highly significant (model 4), but this does not affect the general conclusion that YTS participants have higher exit rates than non-participants. Indeed, the effect of including the additional parameter is to *increase* the positive effect of YTS participation, suggesting that any bias arising from unobserved heterogeneity serves to underestimate the impact of the YTS on search duration.

TABLE 5

Estimates of time until first job, females[a]

	Cox PH[b] *(Nearest day)*		*Cox PH (Nearest month)*		*PG*[c] $\sigma^2 = 0$		*PGM*[d] $\sigma^2 > 0$	
	Coeff.	*p-value*	*Coeff.*	*p-value*	*Coeff.*	*p-value*	*Coeff.*	*p-value*
< 6 months YTS	0.849	[0.000]	0.588	[0.000]	0.945	[0.000]	4.201	[0.000]
6–12 months YTS	1.003	[0.000]	0.696	[0.000]	1.107	[0.000]	4.858	[0.000]
12–18 months YTS	0.822	[0.000]	0.558	[0.000]	0.873	[0.000]	4.057	[0.000]
18–23 months YTS	0.554	[0.000]	0.354	[0.006]	0.547	[0.000]	3.425	[0.000]
Completed YTS	1.246	[0.000]	0.844	[0.000]	1.505	[0.000]	7.634	[0.000]
Multiple schemes	−0.562	[0.000]	−0.407	[0.000]	−0.649	[0.000]	−2.770	[0.000]
YTS employee	0.176	[0.137]	0.102	[0.386]	0.350	[0.017]	1.018	[0.321]
Special schemes	−0.863	[0.000]	−0.660	[0.000]	−0.989	[0.000]	−2.622	[0.000]
YTS apprentice	−0.091	[0.644]	−0.077	[0.695]	−0.125	[0.543]	−0.838	[0.287]
Left school at 15	0.000	[1.000]	0.003	[0.955]	−0.004	[0.933]	−0.128	[0.433]
Poor health	−0.006	[0.929]	0.009	[0.894]	−0.024	[0.727]	0.042	[0.831]
Ethnic minority	−0.162	[0.128]	−0.123	[0.245]	−0.218	[0.050]	−0.583	[0.071]
Additional funding for participant	−0.500	[0.001]	−0.506	[0.001]	−0.504	[0.001]	−1.529	[0.000]
GCSE grades D/E	0.425	[0.000]	0.365	[0.000]	0.463	[0.000]	0.989	[0.000]
1–3 GCSE grades C+	0.520	[0.000]	0.435	[0.000]	0.583	[0.000]	1.325	[0.000]
≥ 4 GCSE grades C+	0.553	[0.000]	0.462	[0.000]	0.620	[0.000]	1.370	[0.000]
1989 school-leaver	−0.111	[0.028]	−0.079	[0.117]	−0.153	[0.004]	−0.100	[0.554]
$\ln(\sigma^2)$	—		—		—		1.031	[0.000]
Number of individuals	2653		2653		2653		2653	
Number of observations	2653		2653		20961		20961	
Log L	−16006.699		−16443.798		−3876.487		−3548.623	

[a]Net of time spent in training or further education. Sample restricted to those entering unemployment on leaving school, Other controls (not shown) include all those used in the Probit estimates shown in Table 3.

[b]Cox proportional hazards model.

[c]Prentice-Gloeckler (1978) model; see Jenkins (1997).

[d]Meyer (1990) model incorporating Gamma-distributed unobserved heterogeneity; see Jenkins (1997).

These results confirm the cross-section estimates. Once training has finished (say, two years after leaving school) those school-leavers who enter a single YTS and complete the full two years of training are more likely to be in employment than either non-participants or participants who leave a YTS early.

VI. The match between trainees and firms

The time spent on a YTS is clearly an important determinant of the success of the scheme, at least in terms of employment outcomes. There are two main

TABLE 6

Estimates of time until first job, males[a]

	Cox PH[b] *(Nearest day)*		*Cox PH (Nearest month)*		*PG*[c] $\sigma^2 = 0$		*PGM*[d] $\sigma^2 > 0$	
	Coeff.	*p-value*	*Coeff.*	*p-value*	*Coeff.*	*p-value*	*Coeff.*	*p-value*
$<$ 6 months YTS	0.540	[0.000]	0.388	[0.000]	0.542	[0.000]	6.531	[0.000]
6–12 months YTS	0.836	[0.000]	0.600	[0.000]	0.890	[0.000]	8.132	[0.000]
12–18 months YTS	0.658	[0.000]	0.456	[0.000]	0.682	[0.000]	8.297	[0.000]
18–23 months YTS	0.729	[0.000]	0.532	[0.000]	0.783	[0.000]	8.521	[0.001]
Completed YTS	1.273	[0.000]	0.837	[0.000]	1.577	[0.000]	19.312	[0.000]
Multiple schemes	−0.420	[0.000]	−0.330	[0.000]	−0.440	[0.000]	−3.474	[0.002]
YTS employee	0.137	[0.031]	0.080	[0.206]	0.360	[0.000]	2.793	[0.084]
Special scheme	0.014	[0.906]	0.021	[0.858]	−0.004	[0.976]	0.143	[0.884]
YTS apprentice	−0.057	[0.309]	−0.049	[0.387]	−0.065	[0.301]	−0.390	[0.538]
Left school at 15	−0.005	[0.909]	0.002	[0.962]	−0.018	[0.690]	−0.157	[0.514]
Poor health	0.019	[0.709]	0.023	[0.643]	0.017	[0.754]	−0.101	[0.733]
Ethnic minority	−0.179	[0.146]	−0.149	[0.227]	−0.238	[0.066]	−2.055	[0.007]
Additional funding for participant	−0.125	[0.270]	−0.166	[0.143]	−0.100	[0.382]	0.095	[0.875]
GCSE grades D/E	0.346	[0.000]	0.314	[0.000]	0.379	[0.000]	1.787	[0.000]
1–3 GCSE grades C+	0.415	[0.000]	0.348	[0.000]	0.492	[0.000]	1.779	[0.000]
$\geq$ 4 GCSE grades C+	0.339	[0.000]	0.300	[0.000]	0.361	[0.000]	0.842	[0.017]
1989 school-leaver	−0.017	[0.678]	−0.004	[0.914]	−0.044	[0.334]	0.030	[0.909]
$\ln(\sigma^2)$	—		—		—		1.807	[0.000]
Number of individuals	3589		3589		3589		3589	
Number of observations	3589		3589		17997		17997	
Log L	−24370.335		−25041.121		−5000.031		−4514.914	

[a]Net of time spent in training or further education. Sample restricted to those entering unemployment on leaving school, Other controls (not shown) include all those used in the Probit estimates shown in Table 3.

[b]Cox proportional hazards model.

[c]Prentice-Gloeckler (1978) model; see Jenkins (1997).

[d]Meyer (1990) model incorporating Gamma-distributed unobserved heterogeneity; see Jenkins (1997).

explanations for this result. First, that completing a YTS provides additional human capital for the trainee. Second, that completing a scheme is an indicator of the quality of the match between the trainee and the firm, and that the YTS is used as a screening mechanism by employers and trainees. One piece of evidence which supports the screening explanation is given in Table 3: the returns to doing between 12 and 23 months of a YTS are insignificantly different from zero. This suggests that completion of a YTS acts as a signal of quality, rather like a qualification. In addition, if the YTS were providing human capital rather than operating as a screening mechanism then we might

expect that trainees who complete the full 24 months and join another employer are as successful as those who complete but remain with their training provider. We find that this is not the case.

In this section we provide more evidence for the screening hypothesis. We show that a large proportion of YTS 'completers' are those who are kept on by their training provider, and that this is a good predictor of employment status up to two years later. Since the completion of schemes and being kept on are such important determinants of the success of a scheme, we then analyse which characteristics of trainees and firms are more likely to result in being kept on. This is of particular importance with regard to the evaluation of schemes (including those currently in operation), since it provides new evidence on the type of schemes which result in successful matches.

Each spell in a YTS ends in one of seven measured outcomes. These are shown in Table 7, together with the average length of each spell. There is a strong relationship between the outcome of a YTS and its length.

To illustrate this further, Figure 2 plots the estimated Kaplan-Meier survivor function for YTS length, split by the outcome of the YTS.[20]

Because of the small number returning to education, these are grouped together with those entering another YTS. The survivor function for being kept on is above that for moving to a new employer, and the survivor function for staying in the same occupation is above that for moving to a new occupation. In other words, trainees who leave YTSs early are more likely to switch employers and occupations. The survivor functions for unemployment, switching employers and occupations, and entering another YTS show that these exits are associated with the shortest durations of all.

The first destination after finishing training is a good predictor of employment outcomes up to two years later. Table 8 compares the immediate employment outcome with employment 24 months later. Even after two years, trainees who are kept on by their training provider are four or five percentage points more likely to be in employment than those who are not kept on.

A six-way multinomial Logit model is estimated to determine which types of trainee and which types of YTS are more likely to result in "positive" outcomes.[21] By positive outcomes we mean those outcomes which are associated with a higher probability of employment.[22]

[20]Survivor functions are estimated using Equation (4), where n_j is the number of individuals still on a YTS at time j and d_j is the number who leave a YTS at time j.

[21]To try and simplify the analysis, various constrained versions of the multinomial Logit were tested against the full six-way model (Cramer & Ridder 1991). It seems possible that adjacent outcomes $y = (0, 1)$ (being kept on) $y = (2, 3)$ (employed elsewhere) and $j = (4, 5)$ (not employed) might be collapsed together. However, even imposed individually these constraints are rejected. The full six-way model is therefore estimated.

[22]However, we do not make any assumption about the ordering of these outcomes, and so do not estimate an ordered model. *A priori* it is not obvious how one might rank these six outcomes.

TABLE 7

YTS outcomes

Outcome of YTS	*Number of spells*	*Proportion*	*Average Length of YTS (days)*
Same employer, same occupation (OTF) ($y_i = 0$)	4378	0.446	651
Same employer, different OTF ($y_i = 1$)	523	0.053	527
New employer, same OTF ($y_i = 2$)	708	0.072	383
New employer, different OTF ($y_i = 3$)	1419	0.145	289
Unemployed ($y_i = 4$)	1778	0.181	294
Entered another YTS ($y_i = 5$)	933	0.095	163
Returned to education ($y_i = 5$)	78	0.008	194
Total	9817	1.000	458

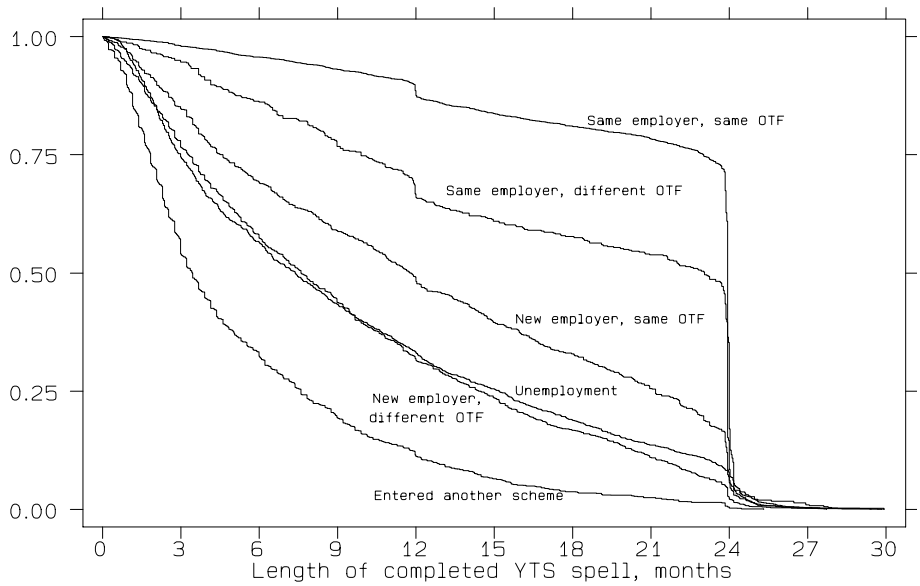

Figure 2. Kaplan-Meier survivor functions of YTS spells split by outcome

The model estimated is

$$\Pr(y_i = j) = f(\mathbf{x}_c, \mathbf{x}_s, \mathbf{x}_m), \quad j = 0, \ldots, 5, \tag{5}$$

where f is given by

$$\Pr(y_i = j) = \frac{\exp(\mathbf{x}_i'\beta_j)}{\sum_{k=0}^{J} \exp(\mathbf{x}_i'\beta_k)}.$$

TABLE 8

Transitions from initial YTS outcome

	Employment status 24 months later (% of total)				
	Emp.	*Unemp.*	*YTS*	*FE*	*N*
Same employer, same OTF	98.31	0.47	0.47	0.47	886
Same employer, different OTF	98.58	1.69	0.00	0.00	211
New employer, same OTF	94.12	4.28	1.60	0.00	374
New employer, different OTF	93.44	5.78	0.67	0.11	899
Unemployed	60.92	34.14	4.39	0.55	911
Entered another scheme	79.86	11.49	8.51	0.14	705

The outcome is a function of three sets of covariates. First, $\mathbf{x}_c$ is a vector of the usual individual characteristics. In general, school-leavers with 'better' characteristics will be more likely to be kept on by their training provider, and less likely to end up unemployed. An additional control included here is the individual's previous state before entering the YTS.

Second, $\mathbf{x}_s$ is a vector of YTS characteristics. These include the size and location of the firm providing the training, the occupation of the YTS, and the usual measures of YTS type (YTS employee, additional funding). $\mathbf{x}_s$ also includes measures of the training provider's requirements for potential participants. When firms advertise YTS vacancies with the Careers Service they list certain requirements. These include (a) whether a written application is required; (b) the qualification level required, and (c) whether certain subjects are required.

Finally, $\mathbf{x}_m$ is a set of controls which measure how 'close' the characteristics of the YTS applicant and the YTS are: (a) the participant's qualifications may be higher or lower than the required qualifications; (b) the preferred occupation of the participant may match the occupation of the YTS at the two- or three-digit level; (c) the preferred location of the participant may match the location of the firm; and (d) the subjects that the participant studied at school may match the subjects required by the firm.

Tables 9 and 10 report estimates of Equation (5) separately for females and males. The results are presented as a series of marginal effects, which are easier to interpret than the coefficients (Greene 1993, p.666). The marginal effects sum to zero across the columns. Notice that the effect of a covariate on the 'best' outcome (being kept on in the same OTF) is often the opposite to its effect on the 'worst' outcome (unemployment). For females, for example, this is the case for 26 out of 38 covariates. It is less easy to predict the relationship between the signs on the other outcomes. Below, the results are discussed in detail for each set of covariates.

TABLE 9

Multinomial Logit estimates of post-YTS outcome, females[a]

	$y = 0$	$y = 1$	$y = 2$	$y = 3$	$y = 4$	$y = 5$
	Same firm		*New firm*			
	Same OTF	*New OTF*	*Same OTF*	*New OTF*	*YTS*	*Unemp.*
Participant characteristics x_c						
Age 16	0.024	0.005	−0.016	−0.012	−0.023	0.021
Age 17	−0.011	0.003	0.004	−0.033	−0.058**	0.094**
Ethnic minority	−0.007	0.034*	−0.050	−0.002	−0.040	0.065*
GCSE grades D/E	0.043	0.023	−0.042**	−0.010	0.025	−0.039
1–3 GCSE grades C+	0.052	0.039*	−0.040	−0.012	0.035	−0.074
$\geq$ 4 GCSE grades C+	0.116**	0.041*	−0.033	0.004	0.054	−0.182**
No subjects	−0.020	−0.011	−0.038	0.041	0.001	0.027
Poor health	−0.033	−0.002	0.012	0.001	0.007	0.015
District unemp. rate	−0.025**	0.001	0.002	0.006*	0.012**	0.005*
Job choice: skilled non-manual	0.049	0.037	−0.021	−0.026	−0.029	−0.010
Job choice: other manual	−0.016	0.040	0.003	−0.027	0.002	−0.003
Job choice: other non-manual	0.030	0.033	−0.012	−0.078**	−0.023	0.051
Job choice: FE	0.084	0.036	0.014	−0.060	−0.033	−0.041
Unwilling to enter YTS	−0.123*	−0.027	−0.010	0.038	0.015	0.106**
1989 school-leaver	0.004	−0.030**	−0.002	−0.020	0.000	0.047**
Unemployed before YTS	−0.047**	−0.013	0.007	0.015	0.004	0.035**
Another YTS before YTS	0.000	−0.034**	0.020	0.024	−0.002	−0.009
Employed before YTS	−0.036	−0.007	0.007	0.007	0.001	0.027
Additional funding for participant	0.005	0.050**	−0.093**	0.002	0.003	0.033
YTS characteristics x_s						
Firm size 10–50	0.034	0.041**	−0.016	−0.051**	−0.015	0.007
Firm size 50–100	0.026	0.016	−0.022	0.004	−0.027*	0.004
Firm size > 100	0.091**	0.008	−0.019	−0.030	−0.011	−0.039*
Hourly wage	0.043	−0.055	−0.006	0.057	−0.048	0.009
Skilled non-manual occ.	−0.015	0.028	0.085*	−0.020	−0.004	−0.074*
Other manual occ.	0.007	0.042	0.035	0.015	−0.047	−0.052
Other non-manual occ.	−0.093	0.030	0.088*	0.065	−0.025	−0.065
YTS employee	0.153**	0.020	−0.015	−0.049	−0.009	−0.099**
Special schemes	−0.370**	−0.004	0.075**	0.060	0.141**	0.098**
Written application required	0.037*	0.012	−0.002	0.000	0.003	−0.050**
GCSE grades D/E	0.027	−0.042**	0.024	−0.001	−0.001	−0.006
GCSE grades C+	0.066	−0.074**	0.091**	−0.003	−0.013	−0.067
No subjects required	0.050**	−0.046**	−0.002	−0.030*	0.008	0.020

TABLE 9

(continued)

	$y = 0$	$y = 1$	$y = 2$	$y = 3$	$y = 4$	$y = 5$
	Same firm		*New firm*			
	Same OTF	*New OTF*	*Same OTF*	*New OTF*	*YTS*	*Unemp.*
Match between participant and YTS characteristics x_m						
Grade lower	−0.020	0.016	−0.040*	0.008	0.008	0.028
Grade higher	−0.034	−0.018	0.030*	0.027	0.002	−0.007
OTF match at 2-digits	0.014	0.012	0.034**	−0.021	−0.013	−0.025
OTF match at 3-digits	0.091**	−0.027**	0.045**	−0.042*	−0.038**	−0.030
Location match	0.006	−0.005	−0.002	0.003	0.002	−0.003
Subject match	−0.018	−0.006	0.028	−0.020	−0.008	0.024
Constant	0.264**	−0.064	−0.160**	0.005	−0.073	0.029
Sample size	1339	238	303	633	362	722
Log-likelihood			−5366.640			
$\chi^2(190)$			885.80			

[a]Estimates of Equation (5). Coefficients reported are marginal effects. Asterisks refer to significance of marginal effects: two asterisks indicates significance at the 5% level, one indicates significance at the 10% level.

Participant characteristics

Age The age variable used here refers to the age of the participant at the start of a YTS spell. The great majority of participants start their YTS when they are 16. Older participants are more likely to exit into unemployment ($y = 5$). School-leavers who start YTSs later are more likely to have used up some of their entitlement to training, and this group will therefore be less likely to be kept on for the full two years.

Ethnicity Females from ethnic minority groups are more likely to exit into unemployment, although the marginal effect is only significant at the 5.6% level. The effect for males is insignificant.

Qualifications In general, the marginal effects have the expected signs. The missing category is the bottom group (few or no qualifications), and for females all the marginal effects for the first two outcomes are positive, and become larger for higher qualification groups. The baseline probability of being kept on in the same OTF is 0.431, and so the impact of higher qualification levels is around 25% for females and 50% for males. As one would expect, higher qualification groups also have significantly lower probabilities of exiting into unemployment.

Subjects The dummy variable used here refers to the small proportion of school-leavers without qualifications in English, maths or science. None of the

TABLE 10

Multinomial Logit estimates of post-YTS outcome, males[a]

	$y = 0$	$y = 1$	$y = 2$	$y = 3$	$y = 4$	$y = 5$
	Same firm		*New firm*			
	Same OTF	*New OTF*	*Same OTF*	*New OTF*	*YTS*	*Unemp.*
Participant characteristics x_c						
Age 16	0.017	0.004	−0.001	−0.014	−0.007	0.000
Age 17	−0.083**	−0.002	0.010	0.011	−0.027	0.090**
Ethnic minority	−0.071	−0.025	0.020	−0.011	0.048*	0.040
GCSE grades D/E	0.089**	0.021	−0.012	−0.034	−0.005	−0.059**
1–3 GCSE grades C+	0.134**	0.029*	0.006	−0.016	−0.015	−0.138**
$\geq$ 4 GCSE grades C+	0.238**	0.043**	−0.012	−0.034	−0.028	−0.207**
No subjects	0.019	0.002	0.013	−0.070**	−0.005	0.041*
Poor health	−0.028	0.007	−0.013	0.009	0.008	0.017
District unemp. rate	−0.027**	−0.001	−0.001	−0.001	0.022**	0.008**
Job choice: skilled non-manual	−0.124**	0.005	−0.002	0.072**	0.016	0.033
Job choice: other manual	−0.014	0.004	0.007	0.005	−0.023*	0.021
Job choice: other non-manual	−0.085**	0.009	−0.018	0.046**	0.023	0.025
Job choice: FE	0.006	−0.019	0.028	0.001	0.023	−0.038
Unwilling to enter YTS	−0.215**	0.009	0.017	0.033	0.044	0.111**
1989 school-leaver	−0.014	−0.013**	0.000	−0.006	0.003	0.030**
Unemployed before YTS	−0.069**	−0.013**	0.016*	0.005	0.005	0.056**
Another YTS before YTS	−0.029	−0.019*	−0.001	−0.021	0.018	0.051**
Employed before YTS	−0.057	−0.011	0.006	0.024	−0.015	0.053**
Additional funding for participant	−0.037	0.004	−0.027*	0.017	0.024	0.020
YTS characteristics x_s						
Firm size 10–50	−0.011	0.003	0.007	0.025*	−0.013	−0.012
Firm size 50–100	−0.012	−0.001	0.008	0.043**	−0.029**	−0.010
Firm size > 100	−0.007	0.006	−0.020*	0.007	0.018	−0.004
Hourly wage	0.070	0.021	−0.038	−0.034	−0.013	−0.007
Skilled non-manual occ.	−0.039	0.002	0.020	0.017	0.002	−0.001
Other manual occ.	−0.029	0.024**	0.005	0.011	0.009	−0.019
Other non-manual occ.	−0.143**	0.034**	0.029**	0.040**	0.010	0.029
YTS employee	0.218**	0.013	−0.039**	−0.076**	−0.057**	−0.058**
Special schemes	−0.261**	0.029**	0.002	0.092**	0.089**	0.049**
Written application required	0.039**	0.009	−0.008	0.013	−0.029**	−0.024*
GCSE grades D/E	0.111**	−0.031**	0.003	−0.043**	−0.023	−0.019
GCSE grades C+	0.186**	−0.022	−0.003	−0.094**	−0.029	−0.038
No subjects required	0.004	0.000	0.015	0.002	−0.030**	0.009

TABLE 10
(continued)

	$y = 0$	$y = 1$	$y = 2$	$y = 3$	$y = 4$	$y = 5$
	Same firm		*New firm*			
	Same OTF	*New OTF*	*Same OTF*	*New OTF*	*YTS*	*Unemp.*
Match between participant and YTS characteristics x_m						
Grade lower	−0.051	0.003	0.001	−0.012	0.034	0.025
Grade higher	0.041	−0.003	−0.020	−0.031	0.022	−0.009
OTF match at 2-digits	0.015	0.011	0.008	0.009	0.008	−0.051**
OTF match at 3-digits	0.106**	−0.033**	0.029**	−0.024*	−0.017	−0.061**
Location match	0.026	−0.015**	−0.009	−0.011	0.012	−0.003
Subject match	−0.053	−0.026*	0.018	0.032	0.014	0.015
Constant	0.377**	−0.079**	−0.053	0.003	−0.210**	−0.038
Sample size	2263	227	300	610	529	839
Log-likelihood			−6248.600			
$\chi^2(190)$			1667.87			

[a]Estimates of Equation (5). Coefficients reported are marginal effects. Asterisks refer to significance of marginal effects: two asterisks indicates significance at the 5% level, one indicates significance at the 10% level.

marginal effects for females is significant at the 5% level, and only two are significant for males. Male participants with no subjects are more likely to exit into unemployment (0.041).

Health Poor health is associated almost by definition with worse labour market outcomes, because careers officers record this variable based on the extent to which poor health might effect job choices. However, the relationship between health and YTS outcome appears weak. Marginal effects are all small ($\leq |0.033|$) and none is significant at the 5% level.

Unemployment rate This is the local unemployment rate (in percent) at the start of the spell *after* a YTS finishes. Higher unemployment rates would be expected to be associated with a higher probability of exiting into unemployment. This is significantly the case for both genders: a 1% increase in the unemployment rate increases the probability of exiting a YTS and entering unemployment by between 0.005 and 0.008. In addition, higher unemployment rates are associated with significantly lower re-employment rates within the same occupation.

Job preferences The base group here is those who expressed a preference for skilled manual employment. Few of the marginal effects are significant for females. This may reflect the fact that occupational choices are correlated with occupational outcomes, which are discussed below. For males, note that relative

to the base group other occupational choices are less likely to lead to staying on with a training provider.

Willingness to participate Participants who express unwillingness to participate in the YTS are also less likely to be kept on by their training provider. One would presume that they are less likely to complete the YTS. This effect is large (-0.123 for females and -0.215 for males) in relation to the overall average probability. It is not clear *a priori* whether unwilling participants leave YTSs early because they enter other employment. It would appear not from these results. For both males and females the marginal effect on $y = 5$ (unemployment) is significant and positive.

Previous state The base group consists of participants who entered a YTS straight from school. Participants who were unemployed before entering the YTS are more likely to return to unemployment and less likely to be kept on by their training provider. The effects on the other states appear generally insignificant.

Additional participant funding Additional funding reflects special training needs and general disadvantage in the labour market. This variable is not associated with significantly worse post-YTS outcomes. Instead the effect appears to come through the 'Special scheme' variable described below.

YTS characteristics

Firm size The base group is the smallest firm size (less than 10 employees). For females, larger firms seem more likely to retain their participants, either in the same or in a new occupation. These results are either insignificant or reversed for males. Large firms appear slightly *less* likely to retain participants in the same occupation, and male participants are slightly more likely to find employment with a new firm in a different occupation. The marginal effects are much smaller and generally insignificant, however, and it may be that there are correlations between other factors (such as occupation type and YTS type) which swamp the firm size effect for males.

Hourly wage Although the majority of YTSs pay a flat allowance, there is still some variation in hourly wages.[23] Much of the variation will be picked up by the YTS type variables (YTS employees almost always receive over and above the allowance), and none of the marginal effects is significant at the 5 percent level. It is not clear which way one would expect the effect to go. Higher paying YTSs will be more attractive to participants, but might also lead employers to be less willing to keep participants on at a higher rate of pay. It may be that these two effects cancel each other out.

[23]See Upward (1998a, Ch.5) for more detail.

Occupation These variables refer to the actual occupation of the YTS, rather than the occupational preference of the participant, although the two will tend to be correlated. The base group is skilled manual occupations. None of the marginal effects is significant at 5 percent for females, although as expected individuals in occupations which are not skilled manual are less likely to be kept on. This effect is stronger and significant for males. YTSs in other non-manual occupations are significantly less likely to end with the provider keeping the trainee on in the same occupation, but *more* likely to end with a new occupation in the same firm. Again, this may reflect the fact that the base group (skilled manual occupations) are traditionally apprenticeship occupations where trainees are kept on for further training after the two-year YTS has finished.

YTS type YTS employees are significantly more likely to be kept on by their training provider. This effect is large for both females and males (0.153 and 0.218 respectively). This is unsurprising since these participants are by definition in more permanent employment positions than standard YTS trainees.

YTSs receiving additional funding, on the other hand, are far less likely to lead to continuing employment with the same firm. This is one of the largest negative effects on outcome $y = 0$: -0.370 for females and -0.261 for males. Special YTSs are unlikely to lead to employment with the training provider. However, this is compensated for somewhat by slightly higher probabilities of employment with a different employer. Nevertheless, both females and males on special YTSs have an increased probability of exiting into unemployment.

Application requirements YTS places with higher application requirements tend to be associated with better outcomes. For example, YTSs which require a written application are more likely to result in continuing employment and less likely to result in unemployment. This may reflect the fact that training providers who require written applications gain more information about potential participants before the YTS starts, and are therefore more likely to take on those who are suitable.

The top two required grade categories have been collapsed together because there are no females with the top grade who exit into state $y = 1$.[24] The base group is the bottom qualification category. The effects for females are generally insignificant, although the top qualification group is more likely to exit into a job with a new firm. For males, the results are more clear cut and intuitive: participants with higher qualifications are significantly more likely to be kept on by their training provider in the same OTF.

The match between participant and YTS characteristics

Qualifications The participant's qualifications are compared with those required by the training provider. Over 50 percent of participants have higher

[24]Although the model will converge with zero cell sizes, standard errors cannot be computed.

grades than those specified by the firm. The base group here is those whose qualifications match the requirements. There is little evidence that 'mismatch' between participants' qualifications and firms' requirements makes certain outcomes more or less likely. All marginal effects for males are insignificant, and all but one for females.

Occupational choice Participants' occupational preferences are recorded to three digits. About 46 percent of participants are in a YTS which matches their first occupational choice at this level, and a further 34 percent are in a YTS which match to two digits. This reflects the fact that the Careers Service matching routine uses occupational preferences to determine which school-leavers are submitted to which vacancies.

OTF matches at three digits are more likely to result in continued employment in the same OTF, or employment at a new firm in the same OTF ($y = 0$, $y = 2$). The marginal effects on the other four outcomes are all negative and generally significant: participants participating in YTSs which match their preferences are less likely to exit into a different occupation or to become unemployed.

This is perhaps an encouraging result insofar as it suggests that the Careers Service matching process is helping to improve YTS outcomes. Of course, this result does not necessarily imply that a policy of only submitting participants to YTSs which match their most preferred occupation would increase the aggregate number of outcomes $y = 0$ and $y = 2$. Firstly, there may be a restricted supply of post-training jobs. Secondly, this result might reflect some sample selection problem: more able participants are able to find YTSs which match their preferences, and these same participants are more likely to be kept on by their training provider.

VII. Conclusions

This study has provided new evidence on both the effects of the YTS on subsequent employment outcomes, and on the process by which successful outcomes are achieved. The data used is larger and more accurate than the Youth Cohort Study, the only previous source for YTS evaluations in England. Although there have been various changes in policy towards youth training since 1991, many of the agents remain the same, and these results shed light on current policy outcomes.

YTS outcomes vary considerably depending on the characteristics of the scheme. YTS participants who were taken on as YTS employees (see p. 9) have higher employment probabilities and were more likely to be taken on by the training provider. Interestingly, these were the schemes closest in spirit to the current Modern Apprenticeships, in that they were often part of a longer apprenticeship training program.

In contrast, so-called 'special' schemes are less successful because they do not offer the opportunity for being kept on as permanent employees with the training provider. Females on special schemes are significantly less likely to be employed than those who do no training (Table 3), and find jobs at a slower rate (Table 5). Both males and females on special schemes are significantly less likely to be taken on by their training provider at the end of the scheme (Tables 9 and 10). These YTSs do not usually offer work experience with employers. This may also be a reflection of the fact that participants on these YTSs are disadvantaged, and employers were not prepared to pay the additional cost in taking them on. Nevertheless, because these trainees do not have access to the opportunities of work experience, they find it hard to subsequently gain employment.

YTS employment effects are estimated to be larger than the consensus estimates from the YCS, but only for those who complete the full two years of training. This is particularly true if one compares school-leavers who experience a spell of unemployment after leaving school. The employment effects of scheme length show a distinct jump at 24 months. The employment returns to 18–23 months are zero, which suggests that the YTS operates at least partly as a screening device.

We also provide new evidence of an association between the length of the scheme and being ''kept on'' by the training provider, and in this sense the role of the internal labour market is crucial. Of course, it seems likely that the positive association between scheme length, being kept on and having positive employment outcomes is endogenously determined by the quality of the trainee, the provider and the match. This has implications for the attempts that have been made to answer the question: 'what is the impact of the YTS on a randomly chosen individual?' Rather, one should be asking: 'what is the impact of a randomly chosen YTS on a randomly chosen individual?'

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