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Student Work Placements in Small Firms: Do They Pay-off or Shift Tastes?

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ABSTRACT. We present a model of training investments and employment outcomes. In this model training may enhance trainees' tastes for particular types of career (taste shift) and/or shift their wage offer distributions (pay-off). An empirical analysis is conducted with a unique data-set of UK graduates. These data contain information on students' career tastes before small-firm placements as well as their employment outcomes after graduation. Analysis of these data indicates that the placements provide a pay-off among highly employable graduates who face certain disadvantages in the labour market. Conversely individuals, who expressed a taste for small-firm careers before placements, are more likely to take-up small-firm employment after placements suggesting these individuals experience enhanced opportunities for their preferred career. However individuals with pre-placement large-firm preferences have no greater likelihood of entering small-firms' employment after placements indicating there is no fundamental effect on career tastes.

KEY WORDS: career preferences, employment outcomes, government-subsidised training programmes, selection bias, small firms

JEL CLASSIFICATIONS: J24, I28, C35

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1. Introduction

It is often argued that training is a form of human capital investment that yields a rate of return in the form of a higher marginal product of trained labour (see Becker, 1964, for the seminal exposition of this argument). This may lead to a greater likelihood of high wage employment amongst skilled workers. What has received much less attention in the literature is that training may also change the career tastes of the trainees. In particular, for those without work experience, it may engender a more positive view of careers in the types of firms where formal work experience is first provided. This paper develops this issue by taking the case of work-experience training to University students provided in small firms. We assess, for which types of trainees, small firms' training cause a large firm/high wage pay-off and which types shift into small-firm careers.

If the human capital enhancing effect of the training (pay-off effect) is dominant, we would expect trainees to move up the large firm/high wage employment pecking order relative to a comparable group of non-trainees. Conversely, training may enhance tastes and/or opportunities for small-firm employment leading to an increased incidence of small-firm (lower wage) careers.

Our prior is that the pay-off effect will dominate – at least amongst participants facing certain disadvantages in the labour market. The reasoning here is twofold. Firstly, where individuals take up training on the basis of their potential employability, instead of being randomly assigned, then participants may tend to be types who are able to command the high wages typically offered by large firms. Secondly, highly

employable, but disadvantaged, participants may have the greatest likelihood of pay-off since they may also have low reservation wages, due to these disadvantages, thereby raising their employment propensity further. However, if the training engenders a fundamental change in attitudes favouring small-firm careers, then individuals with large-firm preferences prior to the training may be subsequently more likely to enter a small-firm career. Conversely the training may 'merely' enhance small-firm career opportunities among individuals who are pre-disposed to these careers – by helping the creation of successful job matches for example. In that case entry into small-firm careers may be most likely among those who already have a taste for a career in a small business.

The empirical sections of this paper use data from a sample of participants in the 1994 Shell Technology Enterprise Programme (STEP) and a comparable sample of non-participants. STEP is a major state-subsidised small-firm placement scheme for undergraduates at UK universities. The original aims of the programme were not only to increase the workplace skills of participants, and hence their value to all types of employers, but also to foster a more positive view of small-firm careers among graduates and to enhance students' reputations among small business owners.

The remainder of this paper is organized as follows. Section 2 sets out the basis for state involvement in the provision of small firms' work placements and provides a brief description of the objectives and organisation of STEP in 1994. In Section 3, we present a model for trainee-firm joint training investment decisions and employment outcomes. The model incidentally highlights possible causes of skills under-investment in small firms. The model also yields predictions about the characteristics of individuals who may be susceptible to a large firm pay-off and the features of those who may be likely to take-up small-firm careers after placements. In Section 4, we set out our econometric methodology which accounts for placement selection bias. The following section provides a brief discussion of our data, which consists of a sample from the 1994 cohort of STEP participants and a comparable sample of non-participants. Section 6 contains formal econometric analysis of the impact of STEP on graduates' full-time employment outcomes measured shortly after graduation. In particular we examine, for different types of graduate, whether these placements provide a large-firm full-time employment pay-off or a shift towards small-firm careers. Finally, in Section 7, some policy implications and overall conclusions are presented.

2. State-subsidised work placements in small firms

2.1. *Background*

Traditionally there have been few links between small firms and university students in terms of either training or employment. A general explanation for under-investment in training in small firms, which may have particular relevance to student trainees, is the problem of poaching of trained workers by large firms. That is, the small firm, having equipped the student with skills that are of value both to itself and large firms, is likely to lose its trainees to high wage offers made by large firms. Other reasons for the shunning of graduates by small firms are the traditionally held views that graduates are theoretical, inexperienced and too expensive making offers of training and employment unlikely. The typically short planning horizon of small businesses makes the prospect of a long-term investment in a graduate, with an uncertain pay-off, even more unlikely.

From the students' perspective, the lack of ties with small businesses may be explained by awareness that large firms provide better-paid jobs (Belfield, 1999) and are more likely to provide training than smaller firms (Brown et al. 1991; Morrisette, 1993). Hence large firms are more attractive to graduates and, amongst private sector employers, large firms have traditionally been the dominant employers of graduates. This is reinforced by the views of undergraduates that large firms are more 'prestigious' employers. For example, Westhead (1998) shows that 90% of students view multinationals as high prestige employers, whereas only 20% thought small firms had high prestige. Finally, large enterprises generally have specialist graduate recruitment

personnel whose function is to liase with universities to recruit the most able graduate talent. No such formal graduate recruitment occurs in the vast majority of small firms.

For much of the 1980's the comparative lack of contact between small firms and universities was of little importance but, at the end of that decade, the UK graduate labour market began to change for two reasons. First, there was a major increase in the number of graduates produced by educational institutions. Between 1989 and 1993 the number of graduates grew by 63%, having already doubled over the previous decade (Court et al., 1995). The second is the longer-term reduction in average enterprise size. In 1979 the share of UK private sector employment, accounted for by enterprises with 500 or more employees, was 43%; by 1991 this share had fallen to 33% (Storey, 1994).

The UK government became concerned that, if (under-) graduates continued to view small firms as inappropriate (low prestige) employers, this could lead to an increase in graduate unemployment at a time when small firms were seeking workers. It therefore provided public funds for STEP on the grounds that the programme would increase the awareness of students about employment in small firms and would help to shift career preferences in favour of small firms.[1]

2.2. *Step*

STEP is a unique national scheme covering the whole of the UK. It places undergraduates (and some postgraduates) in small and medium-sized enterprises (SMEs) for 8 weeks during the summer vacation following the penultimate year of their course (i.e., the second year in England and Wales and the third year in Scotland). The programme is presumed to benefit students in several ways (Kirby and Mullen, 1990). It provides an opportunity for students to gain practical experience of project management, in a task-orientated environment, in an SME. It enables them to apply classroom-based learning to the solution of problems in the world of work. Finally, it develops enterprise and interpersonal competencies.

The aims of the programme are not only to increase the workplace skills of participants, and hence their value to all types of employers, but also to increase the chances that students would consider small-firm careers. The programme is, in addition, designed to provide value to the placement firm and to help address the problem of skills under-investment in small firms.

In particular, STEP students undertake a clearly specified project with the purpose of benefiting the host SME. Illustrations of the projects undertaken for SMEs include the development of marketing plans, the installation of computerised databases, creation of web-sites, or the scientific testing of potential new products (see Westhead, 1997, 1998; Westhead and Storey, 1998, for analysis of the benefits to placement firms).

In 1994, the programme was co-ordinated throughout the UK by a project team contracted to the Shell Enterprise Unit at Shell UK Limited. It was delivered at a local level by a national network of 72 agencies such as training and enterprise councils (TECs), local enterprise councils (LECs) and local enterprise agencies, which had strong links with SMEs in their local area. Students who participated in the programme were paid £100 per week. Most placements received subsidies, amounting to 50% of the direct costs in some instances, from Government funding agencies or private sector sponsors to encourage new and small businesses to participate in the scheme. Agencies also received a payment to cover their direct costs associated with running the programme. The balance was paid by the SME.

3. A model of investments in placements and employment outcomes

The principal aims of the model presented in this section are: (i) to highlight possible causes of under-investment in training in small firms; (ii) to formalize the argument that small firms' placements may influence employment outcomes athrough both pecuniary (pay-off) and non-pecuniary (taste-shift) channels; and (iii) to inform the specification of the econometric model which appears later in this paper.

3.1. *Placement decisions*

The decision for a firm to offer, and a student to accept, a placement involves both parties making

an assessment of their respective returns and costs from the venture. In particular, we assume a placement is taken up if the net private return to the host firm and the student is greater than zero:

$$\xi_s E(R_s) + \xi_f E(R_f) - C_{sf} > 0 \quad (1)$$

where $E(R_s)$ and $E(R_f)$ are the expected returns to the student and firm, respectively; ξ_s and ξ_f are, respectively, the student's and firm's discount factors (which are decreasing functions of their discount rates) and C_{sf} consists of the (joint per trainee) direct costs and the opportunity cost of the placement.[2] An immediate result here is that these costs may be higher among small firms if there are economies of scale in training. This may lower the incidence and extent of training in small firms relative to large firms capable of exploiting any scale economies.[3] Short planning horizons among students and/or firms, implying high discount rates (and small discount factors), will also result in lower investment levels. This may be a socially sub-optimal outcome where social planners are more forward looking than private agents.

The expected returns for students include the expected wage after the placement. Regarding returns to the firm, if the student is retained after the placement then the firm will reap the excess of the value of the student's output over the wage – assuming firms have labour market monopsony power (see Stevens, 1994, 1996). Formally, if labour markets are imperfectly competitive and there is uncertainty regarding labour turnover (arising, for example, due to productivity shocks occurring between training and employment) then we may expect a (representative) student to work in the firm in which he or she has the highest productivity (π^1 say) and to receive a wage equal to his or her second highest productivity (π^2 say) (Stevens, 1994, Proposition 1). In that case the (gross) joint private returns may be written

$$\xi_s E(\pi^2) + \xi_f E(\pi^1 - \pi^2 | \pi = \pi^1) \Pr ob(\pi = \pi^1) \quad (2)$$

where π is the student's productivity in the training firm and $\Pr ob(\pi = \pi^1)$ is the likelihood of the training firm retaining the student. This likelihood may be especially low for small training firms in the face of competition from large firms able to derive a higher productivity from the student and hence able to pay a higher wage. The social returns to training are $\xi_s E(\pi^2) + \xi_f E(\pi^1 - \pi^2)$ (assuming no differences between the discount rates of social planners and private agents) which, combined with a low retention probability in Equation (2), implies that the extent of under-investment in small firms' training may be particularly high.

In the case of STEP part of the solution to the under-investment problem is to design a project tailored specifically to the needs of the firm. The point is that the training firm reaps the return from the project, regardless of whether or not the trainee is poached, since the project remains with the firm in either instance.[4] Formally, the direct marginal benefit of specific training accrues entirely to the training firm (Stevens, 1994, Proposition 6).

3.2. *Employment outcomes*

Training may affect employment outcomes by shifting the location of trainees' wage offer distributions. In particular the 'pay-off' from training consists of an increase in the level of wage offers, which results in a greater likelihood of well-paid/large-firm employment. However work placements in small firms may also affect small-firm outcomes. Specifically, the placement may shift career tastes in favour of small firms.

The impact of placements on employment outcomes may be shown using a simple model of individuals' job satisfaction. Assume individuals derive a utility from employment ('job satisfaction'), $U^1(w, \mathbf{x})$, where is the wage offer and $\mathbf{x}$ is a vector of career tastes/preferences. Individuals choose work if $U^1 \geq U^0$ where U^0 is the reservation level of utility; $U^1(w, \mathbf{x}) - U^0$ is the employment propensity.[5] The change in job satisfaction, following the small-firm placement, may be written

$$dU^1(w, \mathbf{x}) = U^1_w dw + U^1_{x_s} dx_s \quad (3)$$

where $x_s \in \mathbf{x}$ represents tastes for small-firm careers and $U^1_z = (\partial/\partial z)U^1$. The first term on the

right-hand-side of (3) is the pay-off following an increase in wage offers (dw) after the placement. This effect increases the likelihood of a large-firm career, given utility functions are increasing in wage offers $U^1_w > 0$. The second term on the right hand side of (3) represents the taste shift following placements. This effect increases the likelihood of lower paid small firms' employment assuming that $U^1_{x_s} > 0$. This assumption signifies that individuals who derive satisfaction from working in a small firm ($U^1_{x_s} > 0$) require a lower wage offer to achieve the same level of utility as an individual whose utility is unaffected by working in a small firm ($U^1_{x_s} = 0$).[6] In the remainder of the paper, we will use the phrase 'radical/fundamental taste shift' to denote a change in the parameter $U^1_{x_s}$ from zero before the placement to positive after the placement. If the placement engenders a radical taste shift then individuals, with no small-firm inclinations before the placement, will derive job satisfaction from small-firm employment after the placement thereby increasing their likelihood of a small firm career.

The paths, leading from work placements to employment, are summarised in Figure 1.

Figure 1 identifies key influences on the paths individuals are likely to follow after work placements.[7] These influences are programme aims, individual characteristics/human capital and labour demand. Firstly a programme with the aim of enhancing small business career take-up will be more likely to achieve this objective than one aimed at increasing participants' skill levels.[8] Regarding individual characteristics/human capital, the most productive individuals[9] (high w and $U^1(w, \mathbf{x})$) with low reservation utility/wages (low U^0) and without small-firm inclinations ($U^1_{x_s} = 0$) will be most likely to experience a large-firm pay-off. The large-firm employment propensity is maximized for these individuals (assuming the programme does not engender a fundamental shift in career tastes). However, if the programme causes a fundamental shift in career tastes, then individuals may choose small firms' employment despite having no inclination to do so before training. Conversely, the programme may merely enhance small-firm career opportunities for individuals with pre-existing tastes for this type of career. For example, STEP may help create good long-term job matches between small businesses and students with a pre-disposition for small-firm careers. Finally, shifts in patterns of labour demand, from large businesses towards small businesses, will result in lower wage offers and an increased likelihood of small-firm employment provided reservation wages adjust downwards.

4. Econometric modelling issues

This section specifies an econometric model for placement take-up and employment outcomes. In particular, we are interested in analyzing, for different types of individuals, whether placements in small firms provide a large-firm pay-off or, alternatively, result in a shift towards small-firm careers. For those that take-up small-firm employment, we are interested in whether this outcome corresponds to a fundamental change in career tastes or merely reflects increased opportunities for those already inclined towards small businesses.

The equation for latent training investment decisions is, in light of Equation (1), and ignoring discounting issues, given by

$$p_i^* = Z_i'\alpha + u_i \tag{4}$$

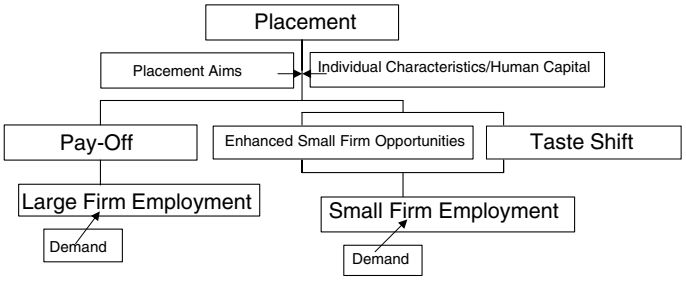

Figure 1. Paths from placements to employment.

TABLE I
Variable names, descriptive statistics (sample means with standard errors in parenthesis[a]) and definitions

	Whole Sample n = 348 Mean (s.e.)	STEP n = 252 Mean (s.e.)	Non- STEP n = 96 Mean (s.e.)	Employed n = 155 Mean (s.e.)	Not Employed n = 193 Mean (s.e.)	Definitions
Endogenous variables						
Employment	0.45 (0.03)	0.46 (0.03)	0.40 (0.05)	–	–	Received offer of job shortly after graduation (1 = Yes; 0 = No)
Small-firm employment	0.15 (0.02)	0.15 (0.02)	0.18 (0.04)	0.35 (0.04)	–	Received offer of job shortly after graduation from firm with less than 100 employees (1 = Yes; 0 = No)
Large-firm employment	0.30 (0.03)	0.31 (0.03)	0.22 (0.04)	0.65 (0.04)	–	Received offer of job shortly after graduation from firm with 100 or more employees (1 = Yes; 0 = No)
STEP	0.72 (0.02)	–	–	0.75 (0.03)	0.70 (0.03)	STEP participant (1 = Yes; 0 = No)
Personal characteristics						
Male	0.53 (0.03)	0.54 (0.03)	0.50 (0.05)	0.54 (0.04)	0.52 (0.04)	Individual's sex (Male = 1; female = 0)
Age	20.50 (1.22)	20.37 (1.15)	20.86 (1.32)	20.60 (1.39)	20.42 (1.05)	Individual's age in years
White	0.93 (0.01)	0.95 (0.01)	0.88 (0.03)	0.94 (0.02)	0.92 (0.02)	Individual's ethnic origin (White = 1; Other = 0)
Professional parent	0.76 (0.02)	0.81 (0.02)	0.64 (0.05)	0.75 (0.03)	0.77 (0.03)	Parental occupation (Business owner, Self employed, Professional, or Manager = 1; else = 0)
Degree						
Engineering	0.23 (0.02)	0.22 (0.03)	0.26 (0.04)	0.28 (0.04)	0.19 (0.03)	Engineering or Technology degree subject = 1; else = 0
Business	0.24 (0.02)	0.28 (0.03)	0.15 (0.04)	0.26 (0.04)	0.23 (0.03)	Business/Administration degree subject = 1; else = 0
Science	0.26 (0.02)	0.25 (0.02)	0.32 (0.05)	0.19 (0.03)	0.31 (0.03)	Science degree subject = 1; else = 0
II(i) or I Class	0.62 (0.03)	0.62 (0.03)	0.64 (0.05)	0.66 (0.04)	0.60 (0.04)	1st class or 2.1 degree = 1; else = 0
Home labour market						
Unemployment	8.98 (2.07)	9.23 (2.02)	8.32 (2.07)	8.96 (1.98)	9.00 (2.15)	Percentage of Unemployment in student's home residence county/country
Disposable income	98.35 (7.48)	97.74 (7.02)	99.94 (8.38)	99.22 (7.65)	97.65 (7.28)	Average household disposable income in student's home residence county/country
Non-STEP human capital investments						
Industrial society	0.08 (0.01)	0.06 (0.01)	0.14 (0.04)	0.12 (0.03)	0.05 (0.02)	Member of student Industrial Society (1 = Yes; 0 = No)

TABLE I
Continued

Duke of Edinburgh	0.19 (0.02)	0.19 (0.02)	0.18 (0.04)	0.20 (0.03)	0.18 (0.03)	Duke of Edinburgh Award participant (1 = Yes; 0 = No)
AIESEC	0.04 (0.01)	0.03 (0.01)	0.07 (0.03)	0.03 (0.01)	0.05 (0.02)	Member of AIESEC (1 = Yes; 0 = No)
Other enterprise society	0.09 (0.02)	0.12 (0.02)	0.04 (0.02)	0.17 (0.03)	0.04 (0.01)	Participant in any other 'Enterprise' activity whilst at university/college (1 = Yes; 0 = No)
Other work experience	0.19 (0.02)	0.15 (0.02)	0.28 (0.05)	0.20 (0.03)	0.19 (0.03)	Other formal work experience activity (1 = Yes; 0 = No)
Summer job offer	0.65 (0.03)	0.58 (0.03)	0.82 (0.04)	0.71 (0.04)	0.61 (0.04)	Offer of paid employment during the summer of 1994 (1 = Yes; 0 = No)
Career Tastes						
Small firms prestigious	0.19 (0.02)	0.23 (0.03)	0.08 (0.03)	0.19 (0.03)	0.20 (0.03)	Perception of small-firm employment as high prestige (1 = high prestige; 0 = medium or low prestige)
Medium-sized firms prestigious	0.34 (0.03)	0.38 (0.03)	0.23 (0.04)	0.35 (0.04)	0.33 (0.03)	Perception of medium sized firm employment as high prestige (1 = high prestige; 0 = medium or low prestige)
Large firms prestigious	0.75 (0.02)	0.77 (0.03)	0.69 (0.05)	0.73 (0.04)	0.76 0.03)	Perception of large-firm employment as high prestige (1 = high prestige; 0 = medium or low prestige)
Self-employment prestigious	0.21 (0.02)	0.22 (0.03)	0.19 (0.04)	0.21 (0.03)	0.21 (0.03)	Perception of self employment as high prestige (1 = high prestige; 0 = medium or low prestige)
Local government prestigious	0.12 (0.02)	0.12 (0.02)	0.10 (0.03)	0.10 (0.02)	0.13 (0.02)	Perception of local government employment as high prestige (1 = high prestige; 0 = medium or low prestige)
Civil service prestigious	0.14 (0.02)	0.13 (0.02)	0.18 (0.04)	0.17 (0.03)	0.12 (0.02)	Perception of civil servant as high prestige (1 = high prestige; 0 = medium or low prestige)
Expect career in small firm	0.24 (0.02)	0.25 (0.03)	0.22 (0.04)	0.24 (0.03)	0.25 (0.03)	Expect to have career in small firm (1 = very likely; 0 = possible or unlikely)
Expect career in large firm	0.35 (0.03)	0.36 (0.03)	0.33 (0.05)	0.39 (0.04)	0.33 (0.04)	Expect to have career in large firm (1 = very likely; 0 = possible or unlikely)
Expect career in self-employment	0.12 (0.02)	0.14 (0.02)	0.04 (0.02)	0.10 (0.02)	0.12 (0.02)	Expect to have career in self employment (1 = very likely; 0 = possible or unlikely)

Notes: [a]Standard errors for binary variables are calculated as $\sqrt{\left(\frac{\hat{\pi}(1-\hat{\pi})}{n}\right)}$ where $\hat{\pi}$is the estimated proportion of observations on the binary variable equal to unity and n is the number of observations in the (sub-) sample.

where Z is a column vector of human capital, cost and regional labour market variables used to measure the net expected returns from training. u measures unobservable differences between individuals. The employment propensity, $U^1(w, \mathbf{x}) - U^0 \equiv e^*$, may be represented as

$$e_i^* = X_i'\beta + \gamma p_i + \varepsilon_i, \tag{5}$$

where X is a vector of human capital, (pre-placement) career preferences and regional demand variables and: $p_i = 1$ if $p_i^* > 0$; $p_i = 0$ otherwise. γ is the programme participation effect and ε captures unobservable heterogeneity.

Since training investment choices are partly determined by expected wage outcomes, participation is an endogenous variable which makes single equation estimation of (5) inappropriate. In particular, the problem of selection bias arises where outcomes differ amongst individuals with the same observable characteristics and participation decisions are based on these differences. For example, more employable individuals may expect a higher return from the programme and the same individuals may be more likely to get employment regardless of participation. Accordingly, and allowing for heterogeneity in slopes and intercepts between treated and non-treated individuals, we specify the econometric model as follows

$$\begin{aligned} p_i^* &= Z_i'\alpha + u_i \\ e_{p,i}^* &= X_i'\beta_p + \varepsilon_{p,i} \quad \Leftrightarrow p_i^* > 0 \\ e_{0,i}^* &= X_i'\beta_0 + \varepsilon_{o,i} \quad \Leftrightarrow p_i^* \leq 0 \end{aligned} \tag{6}$$

where the p and 0 subscripts partition the sample into treated and non-treated individuals, respectively. If we assume $(u_i, \epsilon_{p,i}, \epsilon_{0,i})$ is a normal random vector with variance–covariance matrix

$$\Sigma_i = \begin{pmatrix} \sigma_{u_i}^2 & \rho_{u\varepsilon_p}\sigma_{u_i}\sigma_{\varepsilon_{p,i}} & \rho_{u\varepsilon_0}\sigma_{u_i}\sigma_{\varepsilon_{0,i}} \\ \rho_{u\varepsilon_p}\sigma_{u_i}\sigma_{\varepsilon_{p,i}} & \sigma_{\varepsilon_{p,i}}^2 & \rho_{\varepsilon_p\varepsilon_0}\sigma_{\varepsilon_{0,i}}\sigma_{\varepsilon_{p,i}} \\ \rho_{u\varepsilon_0}\sigma_{u_i}\sigma_{\varepsilon_{0,i}} & \rho_{\varepsilon_p\varepsilon_0}\sigma_{\varepsilon_{0,i}}\sigma_{\varepsilon_{p,i}} & \sigma_{\varepsilon_{0,i}}^2 \end{pmatrix} \tag{7}$$

we may estimate (6) as a (heteroscedastic) bivariate probit model with endogenous switching. Identification of the parameters in the employment equation requires the exclusion from X of at least one independent variable appearing in (see Model 6 in Maddala, 1983, p. 122). Our model indicates that cost variables enter the investment decision but not the equation for employment outcomes. The likelihood function for this model may be written

$$\begin{aligned} L = \prod_{i=1}^{n} & \Phi_2\left(\frac{Z_i'\alpha}{\sigma_{u_i}}, \frac{X_i'\beta_p}{\sigma_{\varepsilon_{p,i}}}, \rho_{u\varepsilon_p}\right)^{e_i p_i} \\ & \times \Phi_2\left(\frac{Z_i'\alpha}{\sigma_{u_i}}, \frac{-X_i'\beta_p}{\sigma_{\varepsilon_{p,i}}}, -\rho_{u\varepsilon_p}\right)^{(1-e_i)p_i} \\ & \times \Phi_2\left(\frac{-Z_i'\alpha}{\sigma_{u_i}}, \frac{-X_i'\beta_0}{\sigma_{\varepsilon_{0,i}}}, \rho_{u\varepsilon_0}\right)^{(1-e_i)(1-p_i)} \\ & \times \Phi_2\left(\frac{-Z_i'\alpha}{\sigma_{u_i}}, \frac{X_i'\beta_0}{\sigma_{\varepsilon_{0,i}}}, -\rho_{u\varepsilon_0}\right)^{e_i(1-p_i)} \end{aligned} \tag{8}$$

where $\Phi_2(\cdot)$ denotes the bivariate standard normal distribution function. This likelihood function highlights that the correlation between the employment disturbances, $\rho_{\epsilon_p\epsilon_0}$, is not identified since no individual is observed in both the STEP and non-STEP states simultaneously.

5. Data

The data used in this study consists of a sample of participants in the 1994 STEP programme and a comparable sample of non-participants. Information on the characteristics of these individuals was collected before the placement period in summer 1994. One year later, after graduation, information on their employment outcomes was gathered. A full discussion of the data collection process is given in Appendix A. In Table I, we define the principal variables used in the analysis and provide summary statistics. Summaries are given for the whole sample and for four sub-samples of direct relevance to our analysis. These are the sub-samples of STEP and non-STEP students, and the sub-samples for students with and without jobs.

The basic finding is that 46% of STEP students obtained full-time employment offers shortly after graduation compared with 40% of non-STEP students. Notably 31% of STEP

students received offers of large-firm employment (defined as firms with 100 or more employees) versus only 22% of non-STEP students.[10]

The explanatory variables in the training investment and employment equations can be split into the following categories.

5.1. *Personal characteristic*

This includes the student's ethnic background, age and the professional status of their parents. Students with professional parents may be more likely to participate in STEP reflecting increased family support/opportunity for career enhancing activities. The descriptive statistics indicate that 81% of the sample of STEP students has professional parents against only 64% of non-participants. Also being of white ethnic origin may both increase the likelihood of program participation (see e.g., O'Higgins, 1994) and increase the likelihood of employment (see e.g., Drew et al., 1992).

5.2. *Degree*

Under the heading of 'degree' we include the subject studied and the class of degree obtained by the student. We anticipate that obtaining an upper second or better will positively affect employment outcomes. This follows since class of degree signals to the employer the student's ability and future productivity (see McKnight, 1999 and Smith et al., 2000, for empirical evidence of the influence of subject and class of degree on early graduate career paths). We also anticipate substantial variations in employers' demand for graduates by degree subject. The summary statistics show that graduates in engineering are more likely than not to have a job offer whereas the converse is true for science graduates.

5.3. *Home labour market*

This group includes a set of regional dummies (not shown in Table I) together with disposable income and the unemployment rate. For example, students from areas with high unemployment may consider STEP investments as a means of gaining a competitive edge over other individuals and increase their chances of getting a job. Accordingly these students may be more likely to participate than students from areas with low unemployment who may be likely to get jobs regardless of STEP investments.[11]

5.4. *Non-STEP human capital investments*

This category covers non-academic student activities and alternatives to STEP participation. If the student has the alternative of a well-paid summer job offer this will raise the opportunity cost of STEP investment, reducing the likelihood of participation. The effect of participation in clubs and societies on STEP participation may be positive or negative depending on whether they are complements to or substitutes for STEP investments in employment prospects. The summary statistics tend to support the view that clubs and societies are substitutes for STEP. Also, if human capital investments are subject to diminishing returns we would expect non-STEP investments to have a greater positive impact on the employment of non-STEP students than STEP students.

5.5. *Career Tastes*

These variables reflect the student's views on the prestige of different careers and the type of career that they expect to have after graduation. They are coded to reflect strong career tastes (see the variable definitions in Table I). These variables are included in the employment equations since they may affect individuals' job satisfaction (see Section 3). For example students with large-firm tastes may require a higher wage offer to achieve a given level of job satisfaction. Accordingly these individuals may be less likely to be in employment soon after graduation. The converse may be true amongst individuals with small-firm career preferences. However we note that the summary statistics on large and small-firm tastes are inconclusive as to their association with employment.

Also, small-firm preferences are likely to positively influence STEP take-up by lowering the psychic cost of the investment. Indeed, as we might have predicted from this, STEP students are significantly more likely than non-STEP students to express a view that employment in small

or medium-sized firms is prestigious (with p-values of 0.001 and 0.008, respectively; p-values not reported in Table 1). Similarly the proportion of STEP students expecting a self-employed career is significantly higher than in the non-STEP sample ($p = 0.008$).

6. Estimation results

In order to derive initial impressions of the relationships between STEP participation and employment outcomes, we begin this section with estimates derived from single equation probits. However these estimates may be biased due to self-selection into STEP so we follow up with estimation of simultaneous equation models of training investments and employment outcomes (bivariate probits with endogenous switching). From these latter models, we are able to derive the effects of participation on employment outcomes. This allows us to address the central questions raised by this paper: that is, whether small-firm placements enhance small-firm or large-firm employment prospects among different types of individual.

Firstly, however we report probit estimates of the STEP impact on all firms and small firms' employment. In the following Table II, we report two specifications for small firms' employment: (i) less than 25 employees and (ii) less than 100 employees.[12]

Regarding all firms employment, STEP participation increases the likelihood of employment by around 18% points. Among the 'degree' variables, individuals with engineering degrees are more likely to have a job offer while the employment premium for a II(i) or first class degree is around 13% points. Students from high income regions and from the East-Midlands are more likely to have job offers while membership of the student Industrial Society is the only non-STEP human capital investment with a significantly positive effect. Among career tastes, only students who view local government and civil service careers as prestigious have any remotely significant (at the 10% level) variation in their employment likelihoods; these effects are negative (17% points) and positive (16% points), respectively.

The small-firm estimates are disappointing, in terms of overall and individual significance of effects, in comparison to the all firms estimates. This, most likely, reflects the low incidence of small-firm employment observed in the sample. In particular only around 8%, out of the sample of 348 individuals, received job offers in firms with less than 25 employees while the corresponding figure for offers from firms with less than 100 employees is 15%. Importantly, in neither of the small firms' specifications do we find a significant impact of STEP. Additionally, in the less than 25 employees model, only the variable 'North' is significant at the 5% level. Out of the remaining explanatory variables only 'Engineering', degree class and 'Large Firms Prestigious' are significant at the 10% level (though each effect has a plausible sign).

In the less than 100 employees model, there is an improvement in the specification: the effects of 'Engineering', student Industrial Society membership and 'Local Government Prestigious' are significant at the 5% level and 'Other Enterprise Society' at the 10% level (again with plausible signs). In the remainder of this section, we will confine the analysis of small firms' employment to the instance of less than 100 employees due to the poor performance of the less than 25 employees specification.

Although the estimates in Table II hint at a positive impact of STEP, taking employment likelihoods as a whole, this estimate, as previously mentioned, may be biased due to self-selection into the programme. Accordingly we now turn to estimates of a simultaneous equation model which allows for self-selection into STEP and heteroscedasticity in unobservables. We adopt parsimonious specifications for the employment outcomes since highly parameterized models failed to converge due to the likelihood functions being non-concave (this is a not uncommon problem encountered in estimating binary dependent variable models with selection and/or heteroscedasticity). Given this issue, it is important to check the adequacy of the final specifications. Accordingly, for the employment mean equations in Table III, we present Lagrange-Multiplier (LM) tests for the omitted variables from each variable grouping. In addition, these tests are supplemented with LM tests for omitted variables from the employment variance equations.

TABLE II
Single Equation Probit Estimates of STEP Impact – marginal effects (*p*-values in parenthesis)

	All firm employment	Small firm employment (< 25 employees)	Small firm employment (< 100 employees)
Variable			
STEP	0.181 (0.015)	0.010 (0.554)	−0.024 (0.590)
Personal characteristics			
Male	0.022 (0.718)	0.011 (0.694)	−0.005 (0.897)
Age	0.168 (0.489)	−0.034 (0.715)	0.060 (0.668)
Age-squared	−0.003 (0.219)	0.001 (0.446)	−0.001 (0.709)
White	0.144 (0.219)	0.005 (0.857)	−0.024 (0.716)
Professional parent	−0.049 (0.484)	−0.011 (0.494)	−0.023 (0.577)
Degree			
Engineering	0.177 (0.022)	0.030 (0.079)	0.097 (0.039)
Business	0.062 (0.458)	0.005 (0.826)	0.074 (0.147)
Science	−0.131 (0.074)	−0.001 (0.953)	−0.058 (0.213)
II(i) or I class	0.131 (0.031)	−0.026 (0.071)	−0.018 (0.633)
Home labour market			
(Log) Unemployment	0.123 (0.395)	−0.005 (0.884)	−0.091 (0.311)
(Log) Disposable Income	1.132 (0.019)	0.073 (0.530)	0.273 (0.359)
South-West	−0.035 (0.055)	−0.044 (0.975)	−0.012 (0.334)
East-Midlands	0.126 (0.024)	0.017 (0.165)	0.028 (0.406)
West-Midlands	−0.008 (0.522)	0.004 (0.126)	0.003 (0.674)
North	−0.022 (0.592)	0.020 (0.022)	0.036 (0.167)
Non-STEP human capital investments			
Industrial Society	0.239 (0.034)	−0.037 (0.303)	−0.219 (0.043)
Duke of Edinburgh Award	−0.028 (0.707)	−0.009 (0.619)	−0.070 (0.168)
AIESEC	−0.051 (0.729)	−0.014 (0.725)	−0.122 (0.309)
Other Enterprise Society	0.079 (0.143)	0.011 (0.169)	0.044 (0.081)
Other work experience	0.003 (0.974)	−0.027 (0.200)	−0.069 (0.177)
Career tastes			
Small firms prestigious	−0.047 (0.564)	0.007 (0.704)	0.026 (0.613)
Medium-sized firms prestigious	0.064 (0.372)	0.014 (0.454)	0.017 (0.706)
Large firms prestigious	−0.064 (0.373)	−0.031 (0.066)	−0.008 (0.860)
Local government. prestigious	−0.174 (0.068)	−0.038 (0.205)	−0.197 (0.023)
Civil service prestigious	0.156 (0.075)	0.008 (0.732)	0.036 (0.506)
Expect Career in self- employment	−0.086 (0.371)	−0.009 (0.699)	−0.064 (0.297)
Expect Career in small firm	−0.086 (0.237)	0.001 (0.945)	−0.027 (0.548)
Expect Career in large firm	−0.000 (0.998)	−0.014 (0.366)	−0.042 (0.287)
Constant	−8.121 (0.028)	0.035 (0.965)	−1.549 (0.485)
Log-likelihood	−214.78	−80.16	−131.69
χ^2(*p*-value)	0.010	0.222	0.146

The estimates of the STEP participation equation are in the final column of Table III. Having a professional parent could increase the likelihood of participation reflecting increased family support for the student's career development (see Willis and Rosen, 1979 and O'Higgins, 1994, for evidence on the importance of family background for education and training choices) – although this effect is on the borderline of statistical significance ($p = 0.053$). Also a 1%

TABLE III
Parsimonious bivariate probit models with endogenous switching – marginal effects (p-values in parenthesis)

Variable	All firm employment		Small firm employment (< 100 employees)		Step selection
	STEP	Non-STEP	STEP	Non-STEP	
Personal characteristics					
Male	–	–	–	–	0.079 (0.160)
Age	–	–	–	–	−0.145 (0.000)
Age-squared	–	–	–	–	0.013 (0.146)
White	−0.009 (0.963)	0.183 (0.125)	−0.053 (0.622)	−0.070 (0.888)	0.200 (0.217)
Professional Parent	–	–	–	–	0.152 (0.053)
LM	0.195		0.472		
Degree					
Engineering	0.246 (0.005)	0.257 (0.120)	0.237 (0.016)	0.028 (0.837)	–
Business	0.063 (0.434)	0.064 (0.765)	0.082 (0.300)	−0.009 (0.946)	0.197 (0.000)
Science	–	–	−0.031 (0.638)	−0.147 (0.178)	–
II(i) or I class	0.101 (0.132)	−0.063 (0.657)	−0.014 (0.783)	−0.053 (0.657)	–
LM	0.058		–		
Home labour market					
(Log) Unemployment	–	–	–	–	0.617 (0.000)
(Log) Disposable income	0.500 (0.332)	0.980 (0.200)	–	–	–
South-West	−0.021 (0.192)	−0.014 (0.815)	–	–	–
East-Midlands	0.165 (0.024)	0.174 (0.069)	0.103 (0.091)	−0.015 (0.935)	−0.138 (0.006)
West-Midlands	–	–	0.027 (0.085)	0.028 (0.203)	
North	–	–	–		−0.099 (0.030)
LM	0.238		0.871		
Non-STEP human capital investments					
Industrial Society	0.114 (0.384)	0.202 (0.013)	–	–	−0.143 (0.000)
Duke of Edinburgh Award	0.030 (0.723)	−0.413 (0.009)	−0.027 (0.753)	−0.460 (0.353)	–
AIESEC	–	–	–	–	−0.095 (0.208)
Other enterprise society	–	–	0.038 (0.215)	–	–
Other work experience	–	–	–	−0.142 (0.229)	–
Summer job offer	–	–	–	–	−0.174 (0.000)
LM	0.682		0.000		
Career tastes					
Small firms prestigious	–	–	0.046 (0.567)	−0.173 (0.074)	0.142 (0.009)
Medium-sized firms prestigious	0.053 (0.489)	0.311 (0.166)	−0.043 (0.488)	0.046 (0.758)	–
Large firms prestigious	−0.178 (0.015)	−0.044 (0.755)	–	–	–
Local Government. prestigious	−0.181 (0.081)	−0.282 (0.063)	–	–	–
Civil service prestigious	–	0.538 (0.002)	–	–	–
Expect career in self–employment	−0.138 (0.130)	–	−0.100 (0.044)	0.702 (0.017)	–
Expect career in small firm	−0.079 (0.348)	−0.087 (0.619)	–	–	–
Expect career in large firm	–	–	−0.108 (0.028)	−0.053 (0.632)	–
LM	0.633		0.014		
Constant	−0.517 (0.000)	−0.706 (0.000)	−0.406 (0.146)	0.085 (0.657)	0.797 (0.000)
ρ_{iu}	0.633 (0.013)	−0.044 (0.922)	0.242 (0.590)	0.384 (0.445)	
Variance					
Self-employment prestigious	−0.881 (0.036)	0.548 (0.443)	–	–	
Medium-sized firms prestigious	–	–	–	–	−0.557 (0.063)
Scotland	–	–	–	–	−0.071 (0.100)
LM	0.629		0.000		

Notes:

1. The selection equation estimates were obtained from the all firm employment model. The selection equation estimates for the small firms' model were found to be very similar and are accordingly not reported.
2. Following Harvey (1976) we employ the functional form $\sigma_i^2 = \exp(W_i'\theta)^2$, where W is a (row) vector of explanatory variables with no intercept. The marginal effects of control variables on the job offer probabilities are calculated using the conditional mean functions, which are given by $\text{Prob}(e_0 = 1|p = 0, x)$ and $\text{Prob}(e_0 = 1|p = 1, x)$. For the STEP participation equation, marginal effects are calculated using the unconditional mean function for STEP participation, which is given by, $\text{Prob}(p = 1|Z)$.
3. The marginal effects of continuous control variables are then obtained from the derivatives of these functions. For binary control variables, the marginal effects are calculated as the discrete change in the conditional/unconditional mean function resulting from the inclusion of the relevant variable. In both cases the marginal effects are evaluated at each observation and the estimates presented are obtained by averaging over the sample. The delta method is employed to calculate the asymptotic variance of the marginal effects which is required for calculating the reported t–statistics.
4. LM tests (p-values) are tests for omitted variables from the mean and variance equations. In the mean equations the tests are for the omitted variables from each variable grouping. In the variance equations the omitted variables consist of all the omitted variables from the corresponding mean equations.

increase in unemployment is associated with a 0.6% point increase in investment likelihood. This suggests that students, from regions with high unemployment, expect a higher net return from STEP than students from areas where employment prospects are good anyway. Unsurprisingly, for such a business orientated programme, business degree students are more likely to participate, by some 20% points, than students reading other types of degree. The negative relationship between membership of clubs and societies and STEP suggests that non-STEP career investments and STEP investments are substitutes in employment outcomes (although AIESEC is insignificant). It is no surprise that a taste for small-firm careers (small firms prestigious) results in an increased incidence of STEP participation. Finally an increase in the opportunity cost of participation, as measured by the offer of a summer job, reduces the participation likelihood by around 17% points.

The employment equations are in columns 2–5 of Table III. They present some interesting initial results. The following discussion relates to both all-firm and small-firm employment unless indicated otherwise. For STEP graduates (columns 2 and 4) we see that the main determinants of employment outcomes fall under the degree, home labour market and career taste headings. For example, in both all firm and small-firm employment, STEP graduates with engineering degrees are about 25% points more likely to get a job soon after graduation compared to the respective reference degree categories (which are science and arts degrees for all firm employment and arts degrees for small-firm employment). Also STEP graduates with large-firm career tastes ('large firms prestigious') display a diminished likelihood of employment. These relationships suggest that graduates with large firm career preferences are induced into employment by higher wage offers and will therefore wait longer to find an acceptable wage offer. A similar negative relationship is found, in small firms' employment, for STEP graduates with self-employment preferences ('expect career in self-employment'). This indicates that a relatively high paid employment offer is required to induce these individuals to give up, at least temporarily, their self-employment aspirations. Notice that involvement with student clubs plays no role in determining STEP graduates' chances of employment. This suggests that human capital investments are subject to diminishing returns.

In contrast, amongst non-STEP students, it is variations in their human capital investments and career tastes that explain all-firms employment whereas career tastes alone explain small-firm outcomes. Notably non-STEP graduates involved with the student industrial society have (all-firm) employment prospects enhanced by 20% points. Regarding career tastes, in contrast to the effects for STEP graduates, it is tastes for careers in the civil service that have a positive impact on quick entry into (all-firms) employment. This may reflect greater non-pecuniary motivation[13] on the part of these individuals. Self-employment career expectations increase the likelihood of small-firm employment by more than 70% points (which is much larger in magnitude and opposite in sign to the corresponding effect for STEP graduates).

The LM tests for misspecification of the employment mean equations suggest that the model is mainly well-specified across the variable groupings (as indicated in 7 out of 9 of these tests). However, some concern is raised as to the possibility of misspecification of 'non-STEP human capital investments' ($p = 0.000$) and 'career tastes' ($p = 0.014$) for small firms' employment. The miss-specification tests involving the variance equations also indicate all firm employment is well-specified ($p = 0.629$) but again suggest there are problems with small-firm employment ($p = 0.000$). Accordingly, some caution should be attached to interpreting the small-firm estimates.

We now turn to look at the treatment effects of participation on employment outcomes. Full definitions and explanations of these effects are given in Appendix B. The treatment effects on all firms' employment are set out in Table IV. These effects are evaluated at sample means and for individuals with particular characteristics that may affect their reservation wage/utility levels and, hence, their employment propensity. Note the treatment effects for the different types are estimated using predicted probabilities based in the whole sample. In some cases, there may be few actual cases in sample with the specified characteristics. However, we note that one of the

TABLE IV

Effects of STEP Participation on all firm employment: effects at sample means and effects for individuals with given characteristics[a] (*p*-values in curved parenthesis; base probabilities in bold and in square parenthesis). Treatment on the treated (TTE), treatment on the non-treated (TNTE) and average treatment (ATE) effects

	TTE	TNTE	ATE
At sample means	0.214 (0.291) **[0.257]**	−0.209 (0.207) **[0.283]**	0.128 (0.416) **[0.261]**
+ Specified Characteristic(s)			
Male	0.199 (0.310) **[0.258]**	−0.224 (0.192) **[0.284]**	0.128 (0.416) **[0.261]**
Female	0.233 (0.272) **[0.256]**	−0.192 (0.234) **[0.281]**	0.128 (0.416) **[0.261]**
White	0.199 (0.349) **[0.273]**	−0.228 (0.177) **[0.300]**	0.118 (0.484) **[0.277]**
Non-white	0.378 (0.090) **[0.104]**	−0.015 (0.938) **[0.118]**	0.224 (0.212) **[0.109]**
Engineering degree	0.213 (0.472) **[0.443]**	−0.269 (0.261) **[0.472]**	0.085 (0.717) **[0.450]**
Business degree	0.224 (0.383) **[0.245]**	−0.238 (0.330) **[0.276]**	0.192 (0.426) **[0.247]**
Member of Industrial Society	0.225 (0.247) **[0.235]**	−0.194 (0.232) **[0.260]**	0.147 (0.339) **[0.239]**
Not a member of Industrial Society	0.299 (0.084) **[0.050]**	−0.054 (0.649) **[0.062]**	0.285 (0.091) **[0.051]**
Non-white female with at least a II(i) class degree	0.457 (0.047) **[0.092]**	0.040 (0.852) **[0.104]**	0.269 (0.151) **[0.097]**
White female with at least a II(i) class degree	0.278 (0.204) **[0.249]**	−0.167 (0.354) **[0.274]**	0.174 (0.303) **[0.255]**
White male with at least a II(i) class degree	0.244 (0.230) **[0.251]**	−0.203 (0.283) **[0.278]**	0.174 (0.303) **[0.255]**
At least a II(i) degree and not a member of the industrial society	0.340 (0.050) **[0.044]**	−0.042 (0.721) **[0.054]**	0.324 (0.054) **[0.044]**
At least a II(i) degree and a member of the industrial society	0.283 (0.139) **[0.214]**	−0.156 (0.381) **[0.238]**	0.202 (0.193) **[0.218]**
Non-white, female, without a professional parent and comes from the North	0.512 (0.043) **[0.090]**	0.076 (0.693) **[0.102]**	0.230 (0.189) **[0.098]**
Non-white, female, without a professional parent, comes from the North, has at least a II(I) degree and does not view small firms as highly prestigious	0.584 (0.020) **[0.078]**	0.131 (0.526) **[0.090]**	0.274 (0.135) **[0.086]**
White, male, with a professional parent and comes from the East-Midlands	0.157 (0.526) **[0.431]**	−0.317 (0.152) **[0.461]**	0.049 (0.798) **[0.437]**
Non-white, female, without a professional parent, comes from the North, has at least a II(i) degree, views small firms as highly prestigious and does not expect a career in self-employment	0.491 (0.037) **[0.081]**	0.068 (0.753) **[0.092]**	0.288 (0.118) **[0.086]**

Notes: [a] The effects for individuals with particular characteristics are computed with the relevant characteristics fixed at the appropriate values and the remaining characteristics held at sample means.

main reasons for estimating structurally identified models is to enable projecting the impacts for types who may have *no* corresponding observations within the sample (see Heckman, 2001).

The effects evaluated at the sample means of the explanatory variables indicate STEP has no impact on employment outcomes (in contrast to the inferences from the single equation estimates in Table II). However, positive impacts are sometimes found for individuals with given characteristics. In particular there is some evidence of effects for non-white participants (TTE = 0.378, $p = 0.090$) and individuals who are not members of the student industrial society (TTE = 0.299, $p = 0.084$ and ATE = 0.285, $p = 0.091$). We also find that non-white females with a minimum of a II(i) class degree derive significant benefits from STEP (TTE = 0.457, $p = 0.047$ and ATE = 0.269, $p = 0.097$). In contrast, white males and females with at least a II(i) derive no benefits.

The effects for a non-white female participant, without a professional parent and who comes from a high unemployment region (the North) is about 51% points but only significant at the 10% level ($p = 0.090$). The effect for this type of participant who, in addition, has a II(i) class degree and *does not* have small-firm career tastes is higher and statistically significant at the 5% level (TTE = 0.584, $p = 0.020$) – we will discuss this specific instance shortly. Females and non-whites may expect lower wage offers while individuals from high unemployment regions may receive fewer offers of work. These characteristics

accordingly typify someone with a low reservation wage/utility. In contrast, a white male with a professional parent and who comes from a low unemployment region (the East Midlands) shows no enhancement in employment outcomes. An individual with these characteristics is likely to have a high reservation wage/utility. Notice that the low reservation wage/utility types, who derive benefits, are otherwise disadvantaged individuals with low base probabilities of employment. In contrast, the high reservation wage/utility types, who derive no benefits, are otherwise advantaged individuals (high base probabilities).

The pattern, TNTE < ATE < TTE, observed in Table IV, indicates that participants have a comparative advantage from STEP treatment whereas non-participants derive below average benefits (which are, in fact, statistically insignificant). This suggests participants are a select group with above average employability (whereas non-participants have below average employability).

In Table V the treatment effects for small-firm employment outcomes are presented.

As before, the effects, estimated at sample means, are statistically insignificant. However this

TABLE V

Effects of STEP participation on small firm employment (p-values in curved parenthesis; base probabilities in bold and in square parenthesis). Treatment on the treated (TTE), treatment on the non-treated (TNTE) and average treatment (ATE) effects

	TTE	TNTE	ATE
At sample means	−0.197 (0.487) **[0.316]**	−0.062 (0.696) **[0.111]**	−0.170 (0.453) **[0.280]**
+ Specified characteristics			
Views small firms as highly prestigious	0.092 (0.729) **[0.067]**	0.057 (0.700) **[0.008]**	0.089 (0.719) **[0.063]**
Expects a career in self-employment	−0.878 (0.000) **[0.922]**	−0.760 (0.005) **[0.768]**	−0.854 (0.000) **[0.895]**
Expects a career in a large firm and *does not* view small firms as highly prestigious	−0.287 (0.414) **[0.346]**	−0.113 (0.380) **[0.134]**	−0.246 (0.371) **[0.299]**
Views small firms as highly prestigious, *does not* expect a career in self-employment and has other work experience	0.172 (0.040) **[0.005]**	0.075 (0.623) **[0.000]**	0.163 (0.044) **[0.005]**
Non-white, female, without a professional parent and comes from the North	−0.255 (0.762) **[0.413]**	−0.112 (0.839) **[0.193]**	−0.163 (0.797) **[0.271]**
Non-white, female, without a professional parent, comes from the North, has at least a II(I) degree and *does not* view small firms as highly prestigious	−0.337 (0.693) **[0.486]**	−0.170 (0.780) **[0.244]**	−0.222 (0.737) **[0.318]**
White, male, with a professional parent and comes from the East-Midlands	−0.038 (0.914) **[0.208]**	0.021 (0.917) **[0.062]**	−0.024 (0.933) **[0.177]**
Non-white, female, without a professional parent, comes from the North, has at least a II(i) degree, views small firms as highly prestigious and *does not* expect a career in self-employment	0.156 (0.625) **[0.047]**	0.100 (0.570) **[0.010]**	0.130 (0.569) **[0.030]**

is not the case for individuals with particular career tastes (stated pre-placement). Notably there is a dramatic fall in the likelihood of small-firm employment, following placements, among individuals who expect self-employment careers (TTE = −0.878, $p = 0.000$; TNTE = −0.760, $p = 0.005$; ATE = −0.854, $p = 0.000$). In contrast individuals who regard small-firm careers as highly prestigious, who have some (non-STEP) work experience and who lack entrepreneurial ambitions are more likely to enter small firms on graduation (TTE = 0.172, $p = 0.040$; ATE = 0.163, $p = 0.044$). This provides evidence that STEP helps to enhance opportunities for small-firm employment among those pre-disposed toward such careers. However individuals with large-firm career expectations, and who did not view small-firms as prestigious prior to the placement, are no more likely to enter small firms after placements than without them. Accordingly there is no evidence of a fundamental change in tastes, in favour of small-firm careers, following placements. Notice that the treatment effects, in Table V, for the low reservation wage/utility types, as defined in Table IV, are statistically insignificant (see rows 7 and 8 of Table V). This result, combined with the positive effects reported for these types in Table IV (see rows 16 and 17 of Table IV), suggests that STEP enhances their large-firm, rather than small firm, employment outcomes.[14] Further the pay-off effect is maximized for the low reservation wage/utility participant with a II(i) degree and who does not have small-firm career tastes (TTE = 0.584, $p = 0.020$ in row 17 of Table IV). This corresponds to the type of individual, predicted by the theoretical analysis in Section 3, as being most likely to experience a large-firm pay-off (given the programme does not engender a fundamental shift in career tastes)[15].

Finally, in the last row of Tables IV and V, we examine the treatment effects for an individual who is both a highly employable low reservation wage/utility type, with a II(i) class degree, and who also has career inclinations towards small-firms. The aim of this is to examine whether the scheme's pay-off effect dominates its small-firm take-up effect or vice-versa. The impact, on all firms employment, for participants (last row of Table IV) is around 49% points (TTE = 0.491, $p = 0.037$). However there is no impact on the small-firm outcomes for the same type of individual (TTE = 0.156, $p = 0.625$). The conclusion is that employable individuals with low reservation wages and small-firm career tastes experience a large-firm pay-off with there being no effect on their small-firm take-up. That is, the pay-off effect is dominant among individuals for whom career choices could go either way.

In summary, we have found a large-firm pay-off amongst groups with above average employability and with characteristics associated with low reservation wage/utility levels. Similarly we have found a modest increase in the likelihood of small-firm employment take-up among certain individuals who were inclined towards small-firm careers before the placement. There is no such increase for those with large-firm inclinations pre-placement. Also the pay-off effect appears to dominate over the impact on small-firm careers among individuals who may potentially experience both types of programme impact. We conclude that there is no evidence that STEP has succeeded in creating a radical change in graduate career tastes resulting in a shift into small-firm employment.

7. Conclusions

Work placements in small firms may result in the traditional pay-off of high wage employment or, alternatively, may cause a shift towards small-firm careers. The placement may succeed in increasing small firm take up by shifting career tastes in favour of small firms or by enhancing opportunities for small-firm careers. The theoretical analysis in this paper highlights that individual characteristics and career tastes, in addition to the aims of the scheme and labour demand, are likely to be important in determining employment outcomes. In particular the large-firm pay-off is more likely among highly employable individuals with low reservation wage/utility levels. However, if the programme engenders a radical taste shift in favour of small-firm careers then individuals with no small-firm preferences prior to the placement may be more likely to enter a small firm after the placement. Conversely, if the programme merely enhances small-firm career opportunities, small firm outcomes may be more

likely among individuals who already have preferences for careers in this type of firm.

These issues have been examined empirically, by tracking students who have taken small-firm work placements, under the STEP programme, and a comparable group of non-STEP students. We find that STEP students have above average employability in that they derive above average benefits from placements (comparative advantage). Also there is no evidence that non-participants would have derived any benefits had they taken a placement. Amongst participants, we find that STEP enhances the likelihood of employment among individuals who may have low reservation wage/utility levels due to (labour market) disadvantages. In contrast the impact for advantaged participants is negligible.

We also find that STEP placements enhance small firms' employment outcomes among types with pre-existing preferences for these careers. However, there is no corresponding impact for individuals without small-firm preferences prior to the placement. The implication is that while STEP may be successful in enhancing small-firm career opportunities the scheme does not achieve a fundamental shift in career tastes towards small firms. In addition, for types with the potential for experiencing both the pay-off effect and enhanced small firms' outcomes, the pay-off effect is dominant. It would be informative to track the employment behaviour of the individuals in our sample at later stages in their careers. It may be the case that the real role of STEP is to sow the seeds for future careers owning or managing small businesses rather than to cause an immediate shift into small-firm employment. If this were the case we would expect to observe a more prevalent small-firm take-up further down the career path.

These results have some important implications for student small firms' work experience policy. Firstly, placements enhance entry into large-firm careers only amongst highly employable individuals who may experience disadvantages in the labour market. Accordingly targeting these types for placements may help to increase the programme's net return from large-firm employment. Similarly placements enhance small-firm take-up only amongst certain individuals who are already 'on message' about small-firm careers. Targeting these individuals for placements may, for example, help the creation of successful full-time job matches between the placement firm and student. However, since the programme does not result in a radical shift in career tastes, it would appear unwise to target otherwise average students, with no prior tastes for a small-firm career, even if they were willing to try out a small-firm over a summer vacation.

Policy makers, involved with student training, may view it as a sign of success that some types of graduates do well in the labour market after a work placement in a small-firm, albeit that these graduates still gravitate towards large-firm careers. However, with a continually rising supply of graduates and a persistently high employment share accounted for by small businesses, the same policy makers should be concerned at the apparent inability of these placements to shift entrenched graduate preferences for large-firm careers.

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Appendix A: Data

The population of 1025 STEP students (undergraduates and postgraduates) who participated in the 1994 programme (row (i) in Table AI) were contacted (column 1). Information on STEP students was collected by three questionnaires separated in real time.

The first questionnaire collected basic information on the student prior to the 1994 STEP placement. This covered

information about them, their student activities and their career preferences i.e., their views on the prestige associated with different careers and what type of career they expect to have after graduation. Column 2 in Table AI shows 691 STEP students responded to the structured questionnaire prior to the placement (67% response rate) (Holmes et al., 1994). A second questionnaire, presented to STEP students at the end of the 8-week placement, sought to determine whether their expectations of the programme had been realised. Column 3 shows 431 STEP students responded to this second questionnaire. The third questionnaire, administered 12 months later (after graduation in 1995), examined whether the programme had an identifiable influence upon participant students. In particular, regarding employment outcomes, students were asked whether they had received an offer of full-time employment and, if so, the size of their prospective employer (less than 10 employees; 10–24 employees; 25–99 employees or at least 100 employees). Column 4 shows 336 out of 431 STEP students (78% response rate) responded to this questionnaire, as well as to the two earlier questionnaires.

A control group of students who did not participate in the 1994 STEP were also identified. Row (ii) (column 2) in Table AI shows that 200 students who did not participate in STEP, were also interviewed in 1994. They were also asked about themselves, their activities, and their views on career prestige and career expectations. The non-STEP students were selected on the grounds that they did not differ significantly from the STEP students in terms of six observed variables. This matching procedure was successful with regard to age of the students, nationality, gender, occupation of parents and degree course. However, STEP students from the south of England (the standard regions of East Anglia, the South East and the South West) were over-represented (31% compared with 26%) (Holmes et al., 1994).

Twelve months later, after graduation in 1995, 118 of the 200 non-STEP students responded to a second questionnaire (59% response rate) (column 4). This examined whether the non-STEP students had been offered full-time jobs after graduation and, if so, the nature of these jobs.

Tests were conducted for sample attrition. The STEP and non-STEP respondents to the 1995 questionnaires (column 4) did not differ from the students surveyed in 1994 (column 2) on five of the original six matching observed variables: gender, degree course, nationality, home address in the 'south' and occupation of parents. Non-STEP students in 1995, however, were slightly but significantly older than STEP students (in 1994) (20.9 and 20.4 years of age, respectively).

Table AI shows 336 STEP students responded to the questionnaire administered in 1995. Seventy-eight of these, however, had not completed their undergraduate degree courses and six were already postgraduate students. Since the STEP claims to be an undergraduate programme, this paper focuses exclusively upon the 252 undergraduate STEP students who had completed their undergraduate degree courses in 1995 with the intention of assessing their full-time employment outcomes. These are compared with 96 non-STEP undergraduates who also completed their undergraduate degree courses in 1995. These numbers are shown in the final column of Table AI.

Appendix B: Effects of step participation on employment outcomes

Firstly consider the average treatment effect (without loss of generality, assuming homoscedasticity and variances normalized to unity)

$$\begin{aligned}\mathrm{ATE}(X) &= \mathrm{Pr}ob(e_p = 1|X) - \mathrm{Pr}ob(e_0 = 1|X)\\ &= \Phi(X'\beta_p) - \Phi(X'\beta_0)\end{aligned}$$

This effect compares the average outcome for individuals, randomly selected onto placements, against the average outcome for individuals randomly denied access to placements. Next we consider the 'treatment on the treated' effect

$$\begin{aligned}\mathrm{TTE}(X,Z) &= \mathrm{Pr}ob(e_p = 1|X,Z,p=1)\\ &\quad - \mathrm{Pr}ob(e_0 = 1|X,Z,p=1)\\ &= \frac{\Phi_2(Z'\alpha, X'\beta_p, \rho_{u\varepsilon_p})}{\Phi(Z'\alpha)}\\ &\quad - \frac{\Phi_2(Z'\alpha, X'\beta_0, \rho_{u\varepsilon_0})}{\Phi(Z'\alpha)}\end{aligned}$$

This effect measures the total employment gain to participants from treatment. Similarly we can derive the total gain for non-participants ('treatment on the non-treated') as

$$\begin{aligned}\mathrm{TNTE}(X,Z) &= \mathrm{Pr}ob(e_p = 1|X,Z,p=0)\\ &\quad - \mathrm{Pr}ob(e_0 = 1|X,Z,p=0)\\ &= \frac{\Phi(X'\beta_p) - \Phi_2(Z'\alpha, X'\beta_p, \rho_{u\varepsilon_p})}{1-\Phi(Z'\alpha)}\\ &\quad - \frac{\Phi(X'\beta_0) - \Phi_2(Z'\alpha, X'\beta_0, \rho_{u\varepsilon_0})}{1-\Phi(Z'\alpha)}\end{aligned}$$

If TTE(X,Z) > ATE (X) then the programme produces greater benefits under self-selection than under random assignment i.e., participants have a comparative advantage from placements. This may suggest participants have above average employability. In contrast, if TNTE(X,Z) < ATE(X) then this may indicate non-participants have below average employability.

In common with most of the treatment effects literature, we will assume constant the general equilibrium consequences of the programme in evaluating outcomes. These consequences include, for example, the (downward) effects of an increased supply of skilled workers on skilled wages.

Notes

[1] Shell (UK) provided its funding on the grounds that it could see large enterprises, such as itself, being net job shedders of jobs in the subsequent decades. As part of its social and corporate responsibility, Shell thought it was appropriate to provide funding for projects designed to encourage the start up and development of smaller enterprises which would provide the new jobs of the future.

[2] Their respective share in the returns will determine the sharing of costs between firms and trainees. If the skills are

perfectly general then the trainee will foot the bill. However if there is a non-transferable component we may expect firms to make a contribution. In this analysis, we assume the training consists of a mix of transferable and non-transferable skills so that costs are shared (the trainee works for a low placement wage). We assume the skills mix is (exogenously) determined by any or all of the following parties: the host firm; the trainee and the programme administrator.

[3] This need not imply under-investment in skills. However, if one or both parties to the investment face liquidity constraints in financing training costs then this may lead to a sub-optimal investment. Financial constraints may be especially relevant in the contexts of both small firm and student credit markets. We note that the solution to under-investment, in this case, is not for government to subsidize skills' investments but rather for it to provide finance for parties who would invest in skills were they able to obtain sufficient capital. Policies that may achieve this objective include training vouchers and loan guarantee schemes. However, it is outside the scope of this paper to examine the issue of liquidity constraints more closely.

[4] An example of this might be an IT system or network developed by the trainee that continues to provide value to the training firm even though the trainee takes up employment elsewhere.

[5] For the purposes of our analysis, we take U^0 as given (i.e., it remains unchanged after the placement). However, in the standard model of optimal job search U^0, representing the reservation wage, is a function of the level of unemployment benefits, the arrival rate of job offers and the probability that these offers fall above the asking wage (see e.g., Lancaster and Chesher, 1983).

[6] Conversely we may expect $U^1_{x_l} < 0$, where $x_l \in \mathbf{x}$ represents tastes for large firms' careers. That is, individuals who derive satisfaction from working in a large firm require a higher monetary compensation to achieve a given level of work satisfaction.

[7] We emphasize that Figure 1 characterizes paths from placements to employment only. Within the context of student placements other paths, leading to postgraduate study for instance, could be envisaged.

[8] In a sense STEP hedges its bets in that it combines the aim of creating a positive view of small firm careers with the aim of augmenting the skills of participants.

[9] STEP participants may fall into this category since they are selected onto the scheme on the basis of their ability to make a tangible contribution to the host firm.

[10] We recognize that receiving a full-time employment offer is a necessary but not a sufficient condition for employment. However it seems reasonable to maintain that individuals will not go to the effort of applying for jobs that have wages below their reservation wage (possible exceptions to this may be cases where individuals do 'practice' interviews with no intention of taking the job if offered it). If this is the case then all employment offers entail wage offers that exceed the individual's reservation wage and are therefore potentially acceptable. We can then infer, from the variations in job offers in our data, whether individuals have a greater disposition towards small firm or large firm employment.

[11] On the demand side, regions with high unemployment may receive greater public assistance with labour market interventions that could increase take up of STEP in these regions.

[12] Attempts at a third small firms' specification of less than 10 employees yielded un-interpretable estimates due to there being very few cases of employment in these instances (around 4% out of the sample of 348 students).

[13] Such motivation may include a desire for public service.

[14] It is not necessary to estimate a model for large firm employment model to show this. However estimation of such a model confirmed that STEP enhanced large firm employment outcomes. These results, which are not reported in order to conserve space, are available from the corresponding author on request.

[15] In addition to being likely to receive high wage offers and having a low reservation wage, these individuals' job satisfaction are unaffected by working in a small firm.

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