THE IMPACT OF EDUCATION AND TRAINING ON THE LABOUR MARKET EXPERIENCES OF YOUNG ADULTS

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Abstract

This paper uses pooled cross-section data on recent school leavers in Ireland to model the determinants of labour market status and wages for young adults. Firstly we use a multinomial logit model to analyze whether individuals exit school to employment, unemployment or higher education. Family background is an important predictor for participation in higher education reflecting the degree of rationing in the system. The level of educational attainment influences the probability of entering higher education or employment. The estimates for earnings functions show large differences across gender with males being rewarded significantly higher. The returns to training are positive though biased upwards by sample selection particularly for females.

Introduction

The determinants of earnings are of perennial interest to economists and others. While there is a vast body of research on these determinants there is relatively little work focused on the labour market experience of young adults (e.g., Micklewright (1989), Andrews and Bradley(1997)). However there are good reasons to think that this age group is both especially interesting and worth analysing independently of conventional analyses of returns to education. The choices that individuals make when leaving school, in particular whether to pursue higher education or not, are likely to have a long lasting effect on their earnings (amongst other things). Secondly conventional returns to education models rely on a simple human capital approach where years of schooling is the measure of human capital. Empirically this seems to be a robust assumption (see Lindahl & Krueger (1999), Denny & Harmon (1999)). However there are strong *a priori* reasons to suspect that this assumption is less relevant for adults who are just leaving school. Firstly the information set available to potential employers is less rich than for older workers since potential employees do not have labour market experience so it is difficult to signal their productivity. This may put a premium on educational attainment since it is easily observed. Second individuals are unlikely to be as well informed as older adults and are more likely to rely on their family both for information and, possibly, for financial support.

This paper adds to the small but growing body of micro-econometric evidence on the impact of education and training on the labour market outcomes of young adults. We use a series of pooled cross section surveys of school leavers to measure the impact of second level educational attainment and participation in state-sponsored training on earnings of young people in Ireland.

Section 2 describes the data and context briefly. Section 3 analyses how the labour market status is affected; that is whether the probability of being employed or being in further

education (compared to being unemployed) is influenced by participation in education and training. Finally section 4 measures the effect of education and early training on hourly earnings.

1. Data and Context

The data set used in this paper is the annual survey of Irish school leavers collected by the Economic and Social Research Institute for the Departments of Education & Science and Enterprise, Trade & Employment. The respondents are sampled ten months after leaving secondary school. We pool the data for six years (1990-1995) yielding a total sample of 10,165; 5185 females and 4980 males. For further description of the dataset see, for example, McCoy & Whelan (1996).

The primary focus of this paper is the impact of educational attainment and training on employment and earnings, so it is worth briefly explaining the context in which this data is collected[1]. The system is split into primary, secondary and third levels. Primary school typically starts at five years of age and ends at age twelve. At this point all students enter secondary school which is where the decision to leave first presents itself[2]. The first of the state exams is the Intermediate (now named the Junior Certificate), labelled hereafter "JC". It is

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[1] The Irish educational system has changed substantially since the 1960s. Comprehensive descriptions can be found elsewhere (Tussing, 1978; Hannan, McCabe and McCoy, 1997).

[2] At the end of primary school there was an examination known as the Primary Certificate. This was abandoned in the late 1960's as secondary education was developed and state funding at second level meant the removal of fees. This fee-paying aspect to secondary education was a major hurdle for families, so typically among the older generation those that received secondary/third level education came from a wealthier socio-economic background. See Denny and Harmon (2000) for a more detailed analysis of this policy change.

usually examined after three years of secondary school are completed. So this is normally at age fifteen which is the minimum school leaving age. The examination is taken in usually nine subjects including as compulsory, Mathematics, English and the Irish language. Students may leave school at this point or, as the majority do, proceed to the senior cycle which ends in a second set of state exams, the Leaving Certificate (hereafter LC) examination. This senior cycle takes two years of study so it is usually taken at age seventeen[3]. This is a *baccalaureate* type examination in around seven subjects. For all students this includes Mathematics, English and the Irish language and most will take a mix of science, humanities and business oriented subjects for their remaining choices. Examinations can be sat at Ordinary level or Higher level. This distinction is important for entry to formal third level education, which is based on a "points system" with results on the more advanced papers getting higher points.

Training at school age can take two forms, both associated with an exit from the school system. Students can participate in a myriad of vocational-oriented courses under the auspices of a scheme known as Vocational Preparation and Training Programme (VPTP). The VPTP can be taken following the Junior Certificate where the entrants to the programme are drawn mainly from the lowest portion of the ability distribution. These training courses generally last for one year and are in areas such as childcare, catering and basic mechanical skills. Rarely do students return after this period to full time education. VPTP can also be taken after the LC where the number of schemes have increased dramatically during the 1990's. Typically these are one-year

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[3] A summary indication of the changes in the system can be gleaned from the fact that the proportion of the age-cohort taking the Junior cycle examinations rose from about 40% in 1967 to close to 100% in 1994; and the proportion taking Senior cycle examinations rose from about 21% to about 82% (see FitzGerald 1996). In more recent years, the senior cycle has been extend to three years with a "transition year" immediately after the Junior Certificate exam emphasising non academic work.

programme in commercial/secretarial/legal skills, community nursing, other social studies programmes and catering.   Many of the students taking this option would be from the lower end of the distribution of LC scores but many VPTP programme serve as foundation year programme for further sub-degree level study in Ireland, allowing VPTP to act a 'catch-up' mechanism for some. Third level education is fee based although the fees are less than the full cost. There is a means tested grant available, covering fees and a variable contribution to living expenses.

3.   Modelling the Determinants of Labour Market Status

We have three alternatives for labour market outcomes after leaving school – higher education, employment and unemployment – rather than the binary choice more common in the literature. In table 1 and 2 we present the results of a multinomial logit estimation.   Here the dependent variable takes one of three values corresponding to the three outcomes with the reference category being unemployment.

Table 1: Multinomial Logit Estimates - Females

	Employment		Higher Education	
	Co-Eff.	*s.e.*	**Co-Eff.**	*s.e.*
Junior Cert	.9014	*.1954*	1.2357	*.4376*
Leaving Certificate	1.0298	*.1703*	2.8957	*.3839*
No. of Higher Papers – JC	.0116	*.0682*	.4843	*.0682*
No. of Higher Papers – LC	.1893	*.0321*	.6956	*.0330*
Post JC VPTP	-.2693	*.2115*	-.0804	*.3794*
Post LC VPTP	.5072	*.1097*	-1.7626	*.1416*
Dublin Resident	.1702	*.1067*	-.4134	*.1203*
Father Farmer	-.0110	*.1483*	.1602	*.1533*
Father Employed	.7792	*.0941*	.8872	*.1105*
Father Professional – Non Management	-.1658	*.2361*	-.9133	*.2305*
Father Intermediate Non-Manual	-.0422	*.2347*	-1.0873	*.2324*
Father Skilled Manual	-.2126	*.2162*	-1.3368	*.2144*
Father Semi-Skilled Manual	-.2271	*.2349*	-1.6039	*.2418*
Father Unskilled Manual	-.3892	*.2281*	-1.9028	*.2402*
Constant	-.6732	*.2844*	-2.4200	*.4512*

N	*5185*
Log Likelihood	*-3666.47*

Year dummies included

Table 2: Multinomial Logit Estimates - Males

	Employment		Higher Education	
	Co-Eff.	*s.e.*	**Co-Eff.**	*s.e.*
Junior Cert	.7700	*.1463*	.6442	*.3999*
Leaving Certificate	1.0323	*.1458*	2.9907	*.3576*
No. of Higher Papers – JC	.0233	*.0596*	.5221	*.0692*
No. of Higher Papers – LC	.0816	*.0359*	.6889	*.0353*
Post JC VPTP	.1530	*.1658*	-.5434	*.5033*
Post LC VPTP	.3059	*.1759*	-1.1920	*.2274*
Dublin Resident	-.1141	*.1089*	-.3292	*.1265*
Father Farmer	-.2748	*.1410*	.5165	*.1497*
Father Employed	.7397	*.0905*	.7352	*.1141*
Father Professional – Non Management	.3172	*.2210*	-.1465	*.2134*
Father Intermediate Non-Manual	.1590	*.2177*	-.4423	*.2122*
Father Skilled Manual	-.0905	*.1974*	-1.2249	*.1923*
Father Semi-Skilled Manual	-.3244	*.2150*	-1.3264	*.2223*
Father Unskilled Manual	-.4325	*.2126*	-1.4177	*.2268*
Constant	-.6719	*.2561*	-2.8644	*.4257*

N	*4980*
Log Likelihood	*-3580.07*

The estimates of the multinomial logits for females and males are presented in Tables 1 and 2 respectively. For females the results with regard to educational qualifications are of the expected sign, the higher one's qualifications are the higher the probability of either being employed or of entering higher education. The impact of the Leaving Certificate on higher education is particularly big reflecting the fact that entry is almost entirely based on a points system determined by scores in these examinations. Variations in how well a student does at the state exams, proxied by the number of higher level papers taken, is also associated with employment and higher education. Turning to the effect of training, there are interesting differences. Firstly, timing matters: completion of a training program if the student has left after the junior cycle of school ("Post JC VPTP") does not measurably improve a female's chances of avoiding unemployment. If it follows the completion of the senior cycle it increases the probability of employment as one might expect but is associated with lower probability of higher education. These results suggest that training programs will not compensate a young female who leaves school early. One interpretation of these results is that VPTP does increase earnings (as we show in the next section) but switches individuals away from the route to traditional higher education. If we believe that there is a large premium to university education (as shown in Callan and Harmon (1999)) then the net effect of VPTP on lifetime earnings could be negative. However one should note that the average attainment of higher-level papers by those in third level education is significantly higher than those in post-LC VPTP. It is doubtful therefore that many of the VPTP school leavers would have made the entry to higher education.

The impact of family background is striking for a number of reasons. Father's socio-economic status has a big effect on the probability of reaching higher education, the omitted category is the highest level ("Professional- managerial") so the negative coefficients show the penalty for a having a father who is from a "lower" socio-economic background. This is

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consistent with a significant body of research, mostly by sociologists, on the impact of parental background of education[4]. The precise mechanisms through which this disadvantage are unclear. It is likely to be partly an income effect: the system of state grants is modest and unlikely to compensate for the costs, direct and indirect, of higher education. There are also more "sociological" effects to do with young working class individuals growing up in families and communities where there is little or no tradition of participation in higher education. Interestingly socio-economic background has no significant impact on the probability of employment. By contrast, having a father who is employed has qualitatively the same positive effect on the probability of being either employed or of entering higher education. Since this is likely to be highly correlated with father's income it suggests that the father's occupation is not only picking up an income effect[5].

While the results for males in Table 2 are broadly similar for the impact of education and training there are noteworthy differences when it comes to effects of parental background. As with females there is little effect of father's occupation (conditional on him being employed) on the probability of employment but there is a notable difference in how it influences participation in higher education. The effects are smaller in size in general and there is a distinct difference between the coefficients corresponding to the two types of non-manual (i.e. white collar) occupations which are small and those for the three manual categories of occupation. So young males are less penalised by a less favourable background than females especially if they are not

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[4] See Clancy (1995) or the anecdotal evidence in Lynch & O'Riordan (1996). Whelan and Hannan(1999) is a good overview.

[5] Further evidence of income effects in the demand for education can be found in Denny & Harmon (2000) which shows the abolition of fees for most secondary schools had a differential impact on schooling depending on parental background.

from the less *unfavourable* (i.e. middle-class) categories. Why this distinction exists between males and females is difficult to tell. It is however consistent with the earlier argument that these socio-economic background variables are not simply picking up income effects. If they were, why would the effect vary with gender? It could be the case that young females have a lower claim on parental resources than their male siblings so that any financial disadvantage is magnified. It may simply be that expectations or preferences depend on gender but this is hardly an explanation.

One final result is worth mentioning, the effect of the individual being from Dublin. Dublin is the capital city and home to about one third of the population and the location of a large number of the state's universities and other third level institutions including most of the larger ones. On simple supply grounds one would expect location in Dublin to increase the participation in higher education (see Card (1995) who shows evidence for the US on the effect of proximity to college). It is therefore puzzling that the effect should be the direct opposite and statistically significant for both males and females. For the significant numbers of students who leave home to attend college the extra cost of accommodation is non-trivial. It could, perhaps, be picking up some other characteristic of individuals not fully measured by the educational attainment variables.

4. Estimating the determinants of youth earnings

In this section we analyse the determinants of earnings focussing on the role of educational and training qualifications. A simple "Mincer" earnings function of the standard form

(1) $\qquad y_i = \mathbf{S}_i \boldsymbol{d} + \mathbf{X}_i \boldsymbol{b} + \boldsymbol{h}_i$

can be estimated, where, for i individuals, y is the measure of wages (in this instance the logarithm of gross hourly earnings), $\mathbf{S}$ is a matrix of schooling characteristics or human capital measures, $\mathbf{X}$ is a matrix of other individual characteristics such as region of residence and h is the error term. The parameter vectors d and b are measures of the returns to the different characteristics. Since we use the (natural) logarithm of wages these coefficients can be interpreted approximately as the proportionate effect of a unit change in the relevant characteristic on wages[6]. We exclude terms in age and age squared since there is no significant variation given that these are school leavers.

The specification in (1) makes the implicit assumption that the data used in the earnings equation is a random sample. There are however good reasons for suspecting that this is not the case. We allow for these sample-selection effects using Lee's (1983) generalization of Heckman's (1978) well known sample selection correction procedure. This involves using a multinomial logit to calculate a Mill's ratio type term which is included as an auxiliary regressor. The statistical significance of the estimated coefficient corresponding to the correction term (denoted in our estimates as λ following the convention in the literature) is a test of whether there is, in fact, sample selection bias. Identification of the selection correction can be achieved through non-linearities in the correction term. However it makes more sense to impose some exclusion restrictions; that is omit variables from the earnings equation and include them in the logit. In this paper we use family background variables such a paternal

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[6] The wages we use are not adjusted for inflation. This is very unlikely to make any difference since almost all the variation in the data comes from variation *across individuals*. We include separate dummy variables for each year that control for aggregate shocks to the economy including changes in the price level.

occupation and employment status. We use the logit estimates shown in Tables 1 and 2 to generate the correction term.

In order to estimate this equation we select the sample of those in employment giving us a working sample of 1550 females and 1436 males. Our schooling measures include a dummy variable for whether the last examination sat was the JC or the LC (leaving a default category of "no qualification" to allow us to interpret the parameter estimates as the increase or decrease in earnings from these qualifications), a count of the number of higher level papers taken by the school-leavers by type of last exam, and a dummy variable indicating whether some VPTP training was received, either post-JC or post-LC. We also control for the sample year and whether the school-leaver was resident in Dublin. The results are presented in Table 3 separately for males and females. For each gender column (a) refers to the estimation of equation (1) without controlling for selectivity bias, while column (b) presents estimates where we control for the selection effects on the basis of the mechanism outlined above.[7]

The dominant result from these earnings equations is that female youths obtain rewards for their human capital investments which are significantly lower than for the male youths. If we focus first on the uncorrected results it can be seen that the education variables have quite different effects. The JC has a large effect on earnings for males of 10% but the same is not true for females where no premium is evident for this qualification. Similarly the premium for the LC over the alternative of no qualification is 25% for the boys and only 14% for the girls (although the marginal return to the qualification over having left with JC is the same for both

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[7]   Occupational and industry choice are not controlled for in the regression, as these choices are likely to be endogenous.

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males and females at 14%). Thus the key difference between the male and female youths in terms of returns to schooling is that females who finish school with a Leaving Certificate end up about 10% worse off than males *other things being equal*, the source of this gap being the zero returns from the JC.

Table 3: **Wage Equation Estimates – Ordinary Least Squares**
Dependent variable: log gross hourly wages

	(a) Females		*(b) Females*		*(a) Males*		*(b) Males*	
	No Selection		*With Selection*		*No Selection*		*With Selection*	
	Co-Eff.	*s.e.*	**Co-Eff.**	*s.e.*	**Co-Eff.**	*s.e.*	**Co-Eff.**	*s.e.*
Junior Cert	-.0036	*.0555*	-.0459	*.0590*	.1016*	*.0452*	.0822	*.04896*
Leaving Certificate	.1406*	*.0469*	.1176*	*.0478*	.2455*	*.0432*	.2318*	*.04553*
No. of Higher Papers – JC	.0254	*.0166*	.0335*	*.0174*	-.0007	*.0140*	.0018	*.01400*
No. of Higher Papers – LC	.0009	*.0052*	.0132*	*.0077*	.0332*	*.0081*	.0425*	*.01303*
Post - JC VPTP	-.0280	*.0656*	-.0163	*.0661*	-.0473	*.0379*	-.0486	*.03813*
Post - LC VPTP	.1461*	*.0200*	.0825*	*.0358*	.1709*	*.0428*	.1483*	*.05063*
Dublin resident	.1179*	*.0210*	.1020*	*.0225*	.1182*	*.0255*	.1179*	*.02556*
λ	--	--	-.1097*	*.0504*	--	--	-.0554	*.05781*
Constant	.7150*	*.0475*	.8323*	*.0724*	.6083*	*.0453*	.6648*	*.07426*
N	1550		1550		1436		1436	
Adjusted R^2	0.1202				0.1391			

Starred (*) variables are statistically significant at the 95% level. Year dummies included

To allow for an examination of the impact of post school training (the VPTP programme) we form an interaction of the dummy variable that indicates the last school exam taken and the dummy indicating participation in VPTP. This allows us to interpret the coefficients as measuring the marginal impact of VPTP over the state exam of either IC/JC or LC only. There is an unambiguous premium for those who attain post-LC VPTP. Moreover the differences between gender in the returns to post-LC VPTP is negligible - for males this amounts to a marginal effect of 17% while for females the effect is 15%. We cannot reject the

hypothesis that participation in VPTP if preceded only by the junior cycle of secondary school (JC) has a zero return.

The discussion of the issue of selection corrections for labour market participation coupled with the finding of significant differences in the returns to the quantity of education between males and females might raise the question as to whether these differences can be explained by the non-random nature of the employed sample. If we consider therefore the results for the 'selectivity corrected' estimation procedure, in column (b) of the table for males and females we find the additional correction terms λ term is statistically insignificant for the male sample which implies that one cannot reject the hypothesis of no sample selection bias[8]. This is borne out by the parameter estimates themselves: they are broadly the same for the uncorrected estimates: large statistically significant effects for the JC and LC (although less precise for JC) and returns to higher level papers, followed by large returns for post-LC VPTP. By contrast for females the results do differ, and the test on λ suggests the presence of selection bias in the simple regression results presented in column (a). However, if anything the gender difference becomes more stark - the JC remains insignificant in earnings determination but the returns to the LC are lower, less than 12%, compared to the earlier 14% from the uncorrected results. In this respect *not* controlling for the fact the girls who are employed are different on average from those who are not, causes a small but statistically significant *upward* bias in the estimated return to the Leaving Certificate. More importantly for this female sample is the striking result that the estimated returns to post-LC VPTP almost halves, from 14.6% to 8.25%.

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[8] As is well known this inference may be sensitive to the parametric assumptions underlying the selectivity correction.

The finding that it is important to control for sample selection for females and not males is very common for studies of "prime age" individuals (i.e. age 17-60). The results here have the important implication that the return of 14.6% in the uncorrected estimation was partly picking up the fact that those who select into employment (which is presumably a combination of self- and employer based selection) are of "higher quality" *ceteris paribus*.

While the estimated return to the level of education (as measured by the parameter estimates on the JC/LC dummy variables) is positive as expected it is interesting to look at the effect of the variables that measure the premium from taking higher level exams in the LC and JC. These might be considered a measure of the quality of the education (in that higher level student often undergo more intensive tuition for example). Alternatively one might consider these a measure of the ability of the individuals as revealed to the employer. The number of higher level papers taken in the last exam sat has a big effect for the LC males of around 3% per subject taken, whereas, interestingly, there is no premium for higher papers amongst the LC females. JC higher-level papers have no real impact for either group. In the selection corrected results, the premium from higher-level papers for females is now statistically significant for both exams, adding in the case of the LC around 1.3% per subject to hourly earnings. However this still lags behind the results for males confirming the general finding that in earnings terms the female youth market does not confer the same level of return to investment in human capital as the male youth market.

5. Conclusions

This paper uses pooled cross section data to analyse the determinants of earnings and labour market status for school leavers in Ireland for the period 1990-1995. We use a conventional econometric specification of earnings controlling for educational attainments as well as parental

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background. In addition we control for sample selection bias, which turns out to be important for the females in the sample only. The results show, *inter alia*, that returns are higher for males in the sample and that there are sizeable returns to participation in vocational training programs. Controlling for selection (into employment) is important for the females in the sample and has the effect of reducing the marginal return to the Leaving Certificate and the impact of training and hence widening the gap between the returns to males and females. Measuring the impact of father's socio-economic status confirms the widely held view that those from better off backgrounds are more likely to go on to higher education and more likely to avoid unemployment.

By pooling the data one imposes constant coefficients over time, a restriction that is easily relaxed. One might conjecture that participation in labour market programs (or indeed in higher education) could act as a "safe haven", i.e. as a relatively attractive option when the current returns to employment are low. This suggests that the determinants of labour market status could vary with macroeconomic conditions. In future work we plan to test this by using data collected over a longer time-span. The dramatic upturn in the economy in recent years should allow a test of this hypothesis.

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