



Are Scottish Degrees Better?

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ISER Working Papers
Number 2005-6

Institute for Social and Economic Research

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The support of both the Economic and Social Research Council (ESRC) and the University of Essex is gratefully acknowledged. The work reported in this paper is part of the scientific programme of the Institute for Social and Economic Research.

Readers wishing to cite this document are asked to use the following form of words:

Taylor, Mark P. and Robert E. Wright (May 2005) 'Are Scottish Degrees Better?', *Working Papers of the Institute for Social and Economic Research*, paper 2005-6. Colchester: University of Essex.

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ABSTRACT

In wave twelve of the British Household Panel Survey, information was collected about the higher education institution attended by respondents with a degree. Therefore, it is possible to determine whether a respondent studied at a Scottish or English institution. In this paper, wage equations are estimated with panel data methods in an attempt to measure differences in the rates of return to Scottish and English degrees. The analysis suggests that the graduate earnings premium is larger in Scotland than in England. However, the return to English degrees appears to be higher than for Scottish degrees in the Scottish labour market.

NON-TECHNICAL SUMMARY

A main difference in the education system between Scotland and England, which goes beyond the fact that education policy is a devolved matter in Scotland, relates to higher education. At an English institute a normal honours degree requires three years of study (for students who completed their secondary schooling in England) while at a Scottish institute a normal honours degree requires four years of study (for students who completed their secondary schooling in Scotland). Although the total length of time graduates of both systems spend in education is usually the same, typical graduates from English institutes study one year more at secondary school and one year less at university relative to typical graduates from Scottish institutes. There is also a considerable amount of cross-border traffic in higher education. Many students from England study in Scotland and a smaller number from Scotland study in England. Although English students with A-level qualifications may be allowed to enter the second year of a Scottish degree programme, most do not, so in effect when they graduate they have an extra year of schooling. On the other hand, Scottish students who study in England are usually required to complete a further year of secondary schooling (such as Advanced Highers) before they enter the first year of an English degree programme. Therefore, most Scottish students upon graduation will have the same number of years of primary, secondary and higher education as their English counterparts.

The above suggest that there may be differences in both the quantity and quality of higher education in Scotland and England. Human capital theory suggests that one year of secondary education is unlikely to be a perfect substitute in the labour market for one year of higher education. Likewise, the same theory suggests that the additional year of schooling that English-schooled graduates of Scottish institutes typically have on graduation would not go unrewarded in the labour market. In addition, those students who receive their secondary education in Scotland, but receive their higher education in England (and vice versus), are unlikely to be a random subset of students. They are likely to be a self-selected group who are different on a variety of characteristics that impact on labour market outcomes. More generally, such differences suggest that the earnings returns to higher education may vary depending on whether the individual attended a Scottish or English institute. With this in mind, the purpose of this paper is to estimate the earnings returns to higher education in Scotland and England and to examine if this return varies depending on whether the higher education was received at a Scottish or an English institute.

Our analysis suggests that the additional year of higher education that degree graduates of Scottish institutions of higher education usually receive (relative to graduates of English institutions) is not rewarded in the labour market. One possible explanation is that Scottish degrees may simply be perceived as inferior products in the labour market. For whatever reasons, it may be that employers remunerate Scottish degrees less than English degrees. However, we believe such a conclusion is premature, since our estimates are based on very restrictive assumptions that need to be relaxed before we draw any firm conclusions about the relative merits of Scottish and English higher education.

Education policy in Scotland is a devolved responsibility. However, both the Scottish Executive and the UK Government are committed to achieving the target on having 50 per cent of young people in higher education. Based on the age participation index, this target was reached in Scotland in 2000 (Scottish Executive, 2004). However, the analogous index for England is about 35 per cent (National Statistics, 2004). Such a large difference in the participation rate suggests that Scottish institutes of higher education may be admitting on average students of lower ability than English institutes. If this is the case, then it should not be surprising that Scottish graduates on average have lower earnings than English graduates since ability is a key determinant of earnings. The models estimated in this paper attempt to control for differences in ability through a panel data approach. However, this approach has well known weaknesses and future research will have to model more explicitly the impact of qualifications obtained prior to entry into higher education.

Are Scottish Degrees Better?

1. Introduction

There are considerable differences in the education systems across the constituent countries of the United Kingdom. A main difference between Scotland and England, which goes beyond the fact that education policy is a devolved matter in Scotland, relates to higher education. At an English institute a “normal” honours degree requires three years of study (for students who completed their secondary schooling in England) while at a Scottish institute a “normal” honours degree requires four years of study (for students who completed their secondary schooling in Scotland). Although the total length of time graduates of both systems spend in primary, secondary and higher education is usually the same, typical graduates from English institutes study one year more at secondary school and one year less at university relative to typical graduates from Scottish institutes.

There is also a considerable amount of cross-border traffic in higher education. Many students from England study in Scotland and a smaller number from Scotland study in England. Although English students with A-level qualifications may be allowed to enter the second year of a Scottish degree programme, most do not, so in effect when they graduate they have an “extra” year of schooling. On the other hand, Scottish students who study in England are usually required to complete a further year of secondary schooling (such as “Advanced Highers”) before they enter the first year of an English degree programme. Therefore, most Scottish students upon graduation will have the same number of years of primary, secondary and higher education as their English counterparts.

The above suggest that there may very well be differences in both the quantity and quality of higher education in Scotland and England. Human capital theory suggests that one year of secondary education is unlikely to be a perfect substitute in the labour market for one year of higher education. Likewise, the same theory suggests that the additional year of schooling that English-schooled graduates of Scottish institutes typically have on graduation would not go unrewarded in the labour market. In addition, those students who receive their secondary education in Scotland, but receive their higher education in England (and vice versus), are unlikely to be a random subset of students. They are likely to be a “self-selected” group who are different on a variety of characteristics that impact on labour market outcomes. More generally, such differences suggest that the earnings returns to higher

education may vary depending on whether the individual attended a Scottish or English institute.

Despite the potential importance of this question for guiding higher education policy, particularly in Scotland, it has not received much direct attention in empirical research. Although numerous studies have estimated the earnings returns to education for Great Britain (or the United Kingdom) as a whole, few have attempted to explore differences of the type discussed above. Most simply estimate some form of human capital earnings equation where regional differences are captured by a set of dummy variables. Such studies usually find that after holding education, work experience and a variety of other factors constant, earnings and wages on average are lower in Scotland compared to England but these studies constrain the rate of return to education to be the same across regions.

Recent research has suggested that the rate of return to education may vary between Scotland and England. For example, recent empirical work by Gasteen, Houston and Davidson (2004a,b,c,d) (also see Houston, Gasteen and Davidson, 2002) present some evidence that the rate of return to education (including higher education) may be higher in Scotland compared to England. However, Bell and Sarajev (2004) conclude: “Our key finding is that, conditional on individual and labour market factors, and on years of schooling, the different characteristics of the Scottish and English education systems do not significantly affect the weekly wage rate received by full-time employees. Further, our comparison of Scottish and English qualifications do not suggest significant differences in returns to qualifications that are broadly equivalent.” As far as we are aware, this is the only study that has attempted to estimate the returns to Scottish and English qualifications separately.

With this brief background in mind the purpose of this paper is: (1) to estimate the earnings returns to higher education in Scotland and England and (2) to examine if this return varies depending on whether the higher education was received at a Scottish or an English institute. The data used in the analysis is from the *British Household Panel Survey* (Brice, Buck and Prentice-Lane, 2001). The next section describes the data used and describes the specifications of the earnings equations estimated. Results are presented in Section 3. Concluding comments follow in Section 4.

2. Data and Model

In wave 12 of the *British Household Panel Survey* (conducted in the Autumn of 2002) a module was included to update the educational profile of respondents. One of the questions asked of individuals who had earned a university degree was the name of the institute attended. Therefore for individuals present in this wave it is possible to distinguish if the individual graduated from a Scottish or English institute. It is also worth noting that from wave 9 (1999) onwards Scotland was considerably over-sampled which makes the number of observations much larger than that usually available in nationally-representative surveys (see Laurie and Wright, 2000).

From wave 12 original BHPS sample members living in England and Scotland were extracted (i.e. residents of Wales were dropped). The analysis was restricted to employees between the ages of 25 to 59. Individuals below the age of 25 were excluded in order to reduce the problem associated with the potential endogeneity of schooling within this age group. Likewise, individuals over the age of 59 were excluded to reduce the problem associated with the endogeneity of retirement within this age group. In this paper, only males are considered since it is not possible at this point in time to construct measures of actual cumulative work experience. Because of the problems associated with measurement error in earnings and hours worked amongst the self-employed, the analysis is restricted to those employed for wages and salaries. Finally to focus the analysis on Scottish-English differences, only graduates of Scottish and English institutes are included in the sample, with graduates from Welsh, Northern Irish and foreign institutes being dropped.

An hourly wage rate was constructed by dividing “usual gross” earnings by “normal” hours worked weighting for overtime. For those individuals who are present in wave 12 and also present in wave 9 or wave 10 or wave 11 (i.e. waves that also contain the enhanced Scottish sub-samples) the hourly wage rate (deflated to January 2003 prices with the RPI) from these waves was added to the working sample. Therefore our sample is a four-wave unbalanced panel spanning the period 1999-2003. Accounting for missing information on the other included variables (as described below) the sample consists of 2,836 individuals (2,039 in England and 802 in Scotland) who generated 8,354 observations, or an average of almost three observations per individual.

The earnings equation estimated is of the form:

$$\ln W_{it} = \ln W_0 + \alpha_1 \text{ScotDegree}_i + \alpha_2 \text{EngDegree}_i + \beta_1 E_{it} + \beta_2 E_{it}^2 + \gamma' X_{it} + \Theta_i + \mu_{it}$$

where: “ W_{it} ” is the hourly wage rate of individual “ i ” in wave “ t ”; “ $ScotDegree$ ” is a dummy variable coded “1” if the individual has a university degree from a Scottish institute and coded “0” if not; “ $EngDegree$ ” is a dummy variable coded “1” if the individual has a university degree from an English institute and coded “0” if not; and “ E ” is years of potential work experience (age-years of schooling-5). “ X ” is vector of other variables that may affect the hourly wage rate and includes a dummy for marital status coded “1” if the individual is married and coded “0” if not; a dummy variable for poor health coded “1” if the individual reports poor health and “0” if they do not; a set of dummy variables for place of birth (England, Wales, Scotland, or “elsewhere”, with England being the excluded category); and in some cases a set of dummy variables representing region of residence with “Greater London” being the excluded category (as shown in the Appendix Table). “ Θ_i ” is an individual-specific and time-invariant effect and “ μ_{it} ” is a random error term with the usual properties. “ $\ln W_0$ ” is a constant which represents the average on-entry-to-employment (log) wage rate of individuals without a degree. With this specification, the rate of return (ror) to Scottish and English degrees may be calculated as: $rorScot = [exp(\alpha_1)-1] \cdot 100$ and $rorEng = [exp(\alpha_2)-1] \cdot 100$, respectively. These rates of return may be interpreted as the percentage difference in earnings associated with having a university degree relative to not having a university degree.

3. Estimates

The estimated earnings equations are given in the Appendix Table. The models were estimated with OLS and with the standard random effects panel estimator. A fixed effects type of estimator was not used since the degree dummies in our data do not vary over the sample period. The estimated rates of return are given in Table 1, with the columns in this table corresponding with the columns in the Appendix Table. Likelihood ratio and F tests were used to test for differences in the estimates with the critical value being set at the five per cent level. In order to simplify the presentation of the results, only estimates based on the random effects estimator (RE) are discussed. This model should be superior since it attempts to control for persistent differences across individuals. As a general remark, the two estimators give similar results, but both are included in the tables for completeness.

In order to provide some estimates that are more directly comparable with the studies mentioned above, models were also estimated that do not distinguish whether the individual has a Scottish or English degree. The rate of returns based on this specification are given in

the upper panel of Table 1. Column 2 indicates that when individuals employed in Scotland or England are combined, the rate of return to a degree is 66.2 per cent. Therefore graduates in England and Scotland are estimated to earn about 66 per cent more than otherwise similar non-graduates. It is worth noting that this specification also includes dummies for region of residence. Two additional points about this specification are also worth noting. The first is that in keeping with most other studies the dummy variable for “Scotland” is negative and statistically significant. The coefficient indicates that after controlling for other factors, average wages are considerably lower than in Scotland—about 25 per cent lower when compared to London. The second is that the estimated rate of return to a degree is very similar to the OECD estimate of about 70 per cent (see OECD, 2003).

Column 4 shows that when these region dummies are dropped from the specification, the rate of return increases slightly to 69.8 per cent, suggesting that the estimates are not heavily dependent on the inclusion of these variables. Columns 6 and 8 shows the rate of return when the earnings equation is estimated separately for individuals employed in Scotland and England, but does not distinguish whether the individual has a Scottish or English degree. The estimates suggest that the return to a degree is higher in Scotland (75.9 per cent) compared to England (66.8 per cent). This difference is statistically significant at the five per cent level ($\chi^2 = 3.7, p = 0.05$). It is also worth noting that the estimates are also similar in magnitude to those of Gasteen, Houston and Davidson mentioned above.

The picture changes somewhat when the earnings equation include separate variables for “Scottish and English degrees”. Column (10) gives the rate of return when residents in Scotland or England are combined. The RE estimates indicate that the return to “Scottish degrees” is 65.5 per cent, which is lower than the return to “English degrees” of 71.3 per cent. However an F-test suggests that this difference is not statistically significant at the five per cent level ($F = 0.4, p = 0.52$).

Columns (12) and (14) present some evidence of a gap between the returns to Scottish and English degrees. These columns give the rates of return when the model is estimated separately for individuals living in Scotland and England. In Scotland, the return to “Scottish” degrees is much lower than for English degrees. The RE estimates indicate that the return to “English degrees” is 114.5 per cent compared to only 68.2 per cent for “Scottish degrees”. This difference is statistically significant at the 5 per cent level ($F = 4.7, p = 0.03$). In England, there is also a gap in the same direction but it is much smaller. The RE estimates indicate that the return to “English degrees” is 67.1 per cent compared to 58.7 per cent for

“Scottish degrees”. However, this difference is not statistically significant at the 5 per cent level ($F = 0.1, p = 0.70$).

4. Concluding Comments

The analysis suggests that the additional year of higher education that degree graduates of Scottish institutions of higher education usually receive (relative to graduates of English institutions) appears not to be rewarded in the labour market. One possible explanation is that Scottish degrees may simply be perceived as inferior products in the labour market. For whatever reasons, it may be the case that employers remunerate Scottish degrees less than English degrees. However, we believe such a conclusion is premature, since the estimates presented in this paper are based on a set of very restrictive assumptions that need to be relaxed before we draw any firm conclusions about the relative merits of Scottish and English higher education.

A partial catalog of “next steps” to follow includes extending the analysis to women. We have no reason to believe that our findings for men automatically apply to women, especially given their different labour market experiences. It is also likely to be important to control for subject studied since it is well known that earnings vary considerably across this dimension. In our analysis we have ignored this completely, which is a considerable limitation. Likewise, we need better controls for the quality of institution attended. Both of these factors could be better allowed for with a fixed effects estimation strategy but given the lack of variation in an individual’s educational qualifications through time this is not a straightforward task. Ignoring Wales and Northern Ireland (and the education flows between Scotland, England, Wales and Northern Ireland) means that the estimates presented in this paper are only a partial picture of the UK labour and education markets. For similar reasons, ignoring individuals with foreign educational qualifications is lamentable.

The analysis presented in this paper is based on the standard human capital interpretation of the determinants of earnings. The model estimated assumes that schooling is exogenous. Such an assumption is no longer accepted as realistic by most labour economists. The decision to go on to higher education, and the decision on what institution to attend, is not random. The estimates above do not take into consideration what can be termed “movers and stayers”. For example, those individuals who complete their primary, secondary and higher education in England may be very different to those individuals who complete their primary and secondary education in England but complete their higher education in Scotland.

In a similar manner, those individuals that complete their higher education in Scotland, but live in England, may be very different to individuals who complete their higher education in Scotland and live in Scotland. That is, there is a likely interaction between “place of schooling”, “place of higher education” and “place of employment” that our modelling strategy has completely ignored.

In order to explore this issue further, additional models were estimated that included variables that indicated whether the individual had completed “A-levels” or “Highers”. Although not a perfect match, these variables do provide some information relating to whether the individual likely completed their secondary schooling in England or Scotland (i.e. A-levels in England and Highers in Scotland). Because of the relatively small sample sizes the results are not presented here. However, the main finding confirms that the returns to English degrees is higher than Scottish degrees in Scotland, with the highest return being for those with “Highers” and an “English degree”. The lowest return is for those with “A-levels” and a “Scottish degree”.

Education policy in Scotland is a devolved responsibility. However, both the Scottish Executive and the UK Government are committed to achieving the target on having “50 per cent of young people in higher education”. Based on the age participation index, this target was reached in Scotland in 2000 (Scottish Executive, 2004). However, the analogous index for England is about 35 per cent (National Statistics, 2004). Such a large difference in the participation rate suggests that it is likely that Scottish institutes of higher education may be admitting “on average” students of lower ability than is the case in English institutes. If this is the case, then it should not be surprising that Scottish graduates “on average” have lower earnings than English graduates since ability is a key determinant of earnings. The models estimated in this paper attempt to control for differences in ability through a panel data approach. However, this approach has well known weaknesses and future research will have to model more explicitly the impact of qualifications obtained prior to entry into higher education.

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Table 1
Rate of Return to University Degrees
Scotland and England

Specification:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sample:	Both (*)		Both		Scotland		England	
Estimator:	OLS	RE	OLS	RE	OLS	RE	OLS	RE
<i>Degree</i>	67.6%	66.2%	71.3%	69.8%	82.2%	75.9%	66.8%	66.8%
Difference significant? (**)					<i>Yes</i>	<i>Yes</i>		
χ^2 value					10.8	3.7		
p-value					0.001	0.05		
Specification:			(9)	(10)	(11)	(12)	(13)	(14)
Sample:			Both		Scotland		England	
Estimator:			OLS	RE	OLS	RE	OLS	RE
<i>Scottish degree</i>			69.5%	65.5%	74.6%	68.2%	54.4%	58.7%
<i>English degree</i>			71.9%	71.3%	116.6%	114.5%	67.3%	67.1%
Difference significant? (**)			<i>No</i>	<i>No</i>	<i>Yes</i>	<i>Yes</i>	<i>No</i>	<i>No</i>
F-value			0.1	0.4	3.2	4.7	0.6	0.1
p-value			0.08	0.52	0.08	0.03	0.45	0.70

(*) Specification includes dummies for region of residence

(**) At the 5 per cent level.

**Appendix Table
Wage Equations**

Specification:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Sample:	Both		Both		Scotland		England		Both		Scotland		England	
Estimator:	OLS	RE	OLS	RE	OLS	RE	OLS	RE	OLS	RE	OLS	RE	OLS	RE
Degree	0.516 [21.9]	0.508 [21.3]	0.538 [23.2]	0.530 [21.9]	0.600 [12.8]	0.565 [11.8]	0.512 [19.1]	0.512 [18.4]	--	--	--	--	--	--
Scottish degree	--	--	--	--	--	--	--	--	0.528 [12.2]	0.504 [10.9]	0.557 [11.5]	0.520 [9.9]	0.434 [4.1]	0.482 [3.5]
English degree	--	--	--	--	--	--	--	--	0.542 [20.3]	0.538 [19.5]	0.773 [6.8]	0.763 [7.4]	0.515 [18.9]	0.513 [18.2]
Experience	0.027 [10.2]	0.029 [12.1]	0.027 [9.9]	0.029 [11.9]	0.026 [5.0]	0.025 [5.2]	0.027 [8.7]	0.031 [11.0]	0.027 [9.9]	0.029 [11.9]	0.025 [4.9]	0.025 [5.1]	0.027 [8.7]	0.031 [11.0]
Experience-sq (x 100)	-0.072 [9.7]	-0.072 [10.7]	-0.071 [9.3]	-0.071 [10.4]	-0.067 [4.7]	-0.061 [4.6]	-0.073 [8.2]	-0.075 [9.5]	-0.071 [9.3]	-0.071 [10.4]	-0.065 [4.6]	-0.060 [4.6]	-0.073 [8.2]	-0.075 [9.6]
Married	0.144 [7.1]	0.069 [4.6]	0.134 [6.4]	0.063 [4.2]	0.101 [2.4]	0.017 [0.6]	0.148 [6.1]	0.081 [4.7]	0.134 [6.4]	0.063 [4.2]	0.101 [2.4]	0.018 [0.6]	0.149 [6.1]	0.081 [4.7]
Poor health	-0.034 [4.0]	-0.001 [0.1]	-0.034 [4.0]	0.001 [0.1]	-0.020 [1.2]	0.006 [0.7]	-0.036 [3.7]	-0.002 [0.3]	-0.034 [4.0]	0.001 [0.01]	-0.019 [1.2]	-0.007 [0.7]	-0.036 [3.7]	-0.002 [0.3]
Place of birth:														
Wales	0.264 [3.1]	0.230 [3.0]	0.269 [3.2]	0.228 [3.0]	0.339 [2.0]	0.249 [1.3]	0.278 [2.9]	0.246 [3.0]	0.270 [3.2]	0.228 [3.0]	0.333 [1.9]	0.234 [1.2]	0.281 [2.9]	0.248 [3.0]
Scotland	0.055 [1.3]	0.053 [1.5]	-0.052 [2.5]	-0.063 [3.1]	0.032 [0.60]	0.022 [0.4]	0.277 [3.6]	0.272 [3.9]	-0.050 [2.3]	-0.059 [2.7]	0.047 [0.9]	0.038 [0.8]	0.292 [3.5]	0.281 [3.8]
Elsewhere	-0.012 [0.3]	-0.002 [0.1]	0.009 [0.2]	0.011 [0.3]	0.131 [1.5]	0.116 [1.3]	-0.002 [0.1]	0.004 [0.1]	0.009 [0.2]	0.012 [0.3]	0.124 [1.4]	0.114 [1.3]	-0.002 [0.1]	0.004 [0.1]

Place of residence:														
South East	-0.048 [1.2]	-0.025 [0.8]	--	--	--	--	--	--	--	--	--	--	--	--
South West	-0.159 [3.4]	-0.157 [4.0]	--	--	--	--	--	--	--	--	--	--	--	--
East Anglia	-0.201 [3.6]	-0.201 [4.2]	--	--	--	--	--	--	--	--	--	--	--	--
East Midlands	-0.278 [6.4]	-0.280 [7.1]	--	--	--	--	--	--	--	--	--	--	--	--
West Midland	-0.178 [3.8]	-0.153 [3.8]	--	--	--	--	--	--	--	--	--	--	--	--
North West	-0.194 [4.5]	-0.190 [5.0]	--	--	--	--	--	--	--	--	--	--	--	--
North East	-0.251 [6.2]	-0.243 [6.6]	--	--	--	--	--	--	--	--	--	--	--	--
Scotland	-0.281 [5.7]	-0.281 [6.9]	--	--	--	--	--	--	--	--	--	--	--	--
Constant	2.064 [52.7]	2.047 [60.8]	1.902 [76.8]	1.892 [82.9]	1.807 [26.3]	1.842 [29.6]	1.898 [67.3]	1.874 [73.8]	1.902 [76.7]	1.891 [82.7]	1.798 [25.6]	1.833 [29.4]	1.898 [67.2]	1.874 [73.8]
R²(%)	21.0	20.1	18.4	17.5	19.2	18.6	18.8	17.8	18.4	17.5	19.6	19.0	18.8	17.8
N individuals	2,836	2,836	2,836	2,836	802	802	2,039	2,039	2,836	2,836	802	802	2,039	2,039
N observations	8,335	8,335	8,335	8,335	2,259	2,259	6,076	6,076	8,335	8,335	2,259	2,259	6,076	6,076