Part-Time Work, School Success and School Leaving.*

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March 2006

Abstract

In this paper, we analyse part-time employment of teenagers still in full-time education, their academic performance, and their school leaving decisions. Our estimation strategy takes account of the possible interdependencies of these events and distinguishes between two alternative states to full time education: entering the labour force full time and going on to further training. We model this decision in a flexible way, considering the three choices as ordered, but allowing the threshold parameters to depend on observed characteristics. Our analysis is based on data from the UK National Child Development Study, which has an unusually rich set of variables on school and parental characteristics. Our main finding is that working part time while in full time education has only small adverse effects on exam performance for females, and no effects for males. The effect of part time work on the decision to stay on at school is also negative, but small, and marginally significant for males, but not for females. Other important determinants of exam success as well as the continuation decision are parental ambitions about the child's future academic career. We also find evidence for the birth order being associated with academic performance, but not with the school continuation decision, conditional on exam outcomes.

Keywords: Teenage labour supply, educational attainment, training.
JEL-Classification: C35, I20, J24

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*We are grateful to Steve Machin and two anonymous referees for useful comments and suggestions.

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1 Introduction

In Britain, the age of 16 marks an important milestone in the lives of young people who face a series of significant educational and labour market choices. One decision facing 16 year olds still in full-time education is whether they should work part-time or not. The age of 16 also represents the time that pupils sit their first set of public examinations, the results of which can be crucial in determining eligibility for further education and career success. Yet another choice facing the teenager is what they should do after completion of their compulsory full-time education. Should they remain in school, go into training, or join the full-time labour market?

Given the importance of the choices made at 16, it is not surprising that part-time work, academic success and school-leaving decisions have been the focus of previous literature. According to the 1992 UK Labour Force Survey, one third of 16 and 17 year olds in full-time education had a part time job (see Sly 1993). Considering only 16 year olds, 23.8 percent of those in full time education work part time in 1992; in 2004, this percentage has slightly increased, with 28.2 percent of all 16 year olds in full time education having a part time job.[1] Micklewright, Rajah and Smith (1994), using data from the Family Expenditure Survey (FES), found a similar pattern of teenage working habits. Studies based on US data indicate that part-time work amongst those in full-time education is not only a UK phenomenon. For instance, Griliches (1980) analysed different data sets for the years 1966 and 1974 and found that at least fifty percent of all high school graduates worked and studied simultaneously.

The factors affecting levels of educational attainment have also been the subject of empirical analysis. Studies have typically tended to address the question whether levels of educational attainment can be explained by differences in school quality or are due to differences in individual characteristics and parental inputs (see, for instance, Steedman (1983) and Robertson and Symons (1990)).

[1] Own calculations, based on British Labour Force Survey.

Finally, concerns relating to the proportion of British teenagers remaining in education beyond the minimum school leaving age have prompted a range of studies examining the staying-on decision. Rice (1987), Micklewright, Pearson and Smith (1990) and Micklewright (1989) all examine the factors which influence the school leaving decision. Dustmann, Rajah and vanSoest (2003) show that class size may be an important determinant. Similarly, policy concerns have arisen because of the low number of teenagers enrolling in further training courses. Booth and Satchell (1994) analyse this in a study which examines the factors affecting the take up of apprenticeships.

Although teenage labour supply, school performance and school-leaving decisions have all individually been the subject of extensive empirical examination, the possible links amongst the three activities have attracted less attention. There are a number of studies that have considered, for example, the effects of part-time work by those still in school on educational and occupational expectations (Griliches, 1980), as well as its impact on subsequent wage rates (Ehrenberg and Sherman, 1983). Ehrenberg and Sherman, investigating the effect of part-time work during full-time education on academic performance and school enrollment in the next year, find no effect on grade point averages, but a negative effect on next years' enrollment probabilities. Eckstein and Wolpin (1999) find that working while in school reduces school performance. On the other hand, working part time during full time education may provide teenagers with a taste of what the labour market is like, and may allow them to make more informed career choices. Investigating effects of working while in school on future economic outcomes, Ruhm (1997) and Light (2001) find a positive correlation, while Hotz et al. (2002) argue that positive effects diminish when controlling for selection.

Decisions to work part-time, school performance and educational and occupational choices may be simultaneously determined. A priori, the relationship between working part-time while still in full-time education and the school leaving decision is unclear. On the one hand, working and studying at the same time may be an indication that the teenager wishes to join the labour market as soon as possible. On the other hand, it

may provide the young person with first-hand information about the negative aspects of jobs which are available for low skilled labour, and this may discourage the teenager from entering the full-time labour market.

Similarly, school performance is likely to be affected by hours worked, and one would expect a negative correlation between hours worked at 16 and examination success. The possible negative effect of working part-time while being in full-time education is particularly relevant in the current debate (although on post-secondary level) about introduction of tuition fees, being discussed or already implemented in many European countries. In turn, success in public examinations at 16 will have some bearing on the decision to continue with schooling beyond the minimum leaving age, particularly if schools require pupils to have achieved a certain educational standard before allowing them to proceed any further. Thus, hours worked at 16 may have a direct effect on school leaving decisions, as well as an indirect effect through examination results.

In this paper we incorporate the possible links between working part-time, school performance and school leaving decisions into a three equation model based on data taken from the third and fourth waves of the National Child Development Study (NCDS). We allow the number of hours worked to affect both examination results and the school leaving decision, and we allow examination performance to influence school leaving. We model these three events simultaneously. In contrast to earlier studies we differentiate between those 16 year olds who leave school to enter the labour force and those who leave to go on to further training. This is an important distinction since a large percentage of school leavers do not enter the labour market immediately.

The paper is structured as follows. In the next section, we discuss the data used for the estimation. In section 3, we present the econometric model. Section 4 discusses the results, and section 5 concludes.

2 Data and Variables

We base our analysis of participation, school success and school leaving on data taken from the NCDS, which followed a cohort of individuals born during 3rd - 9th March 1958 (see Micklewright (1988) for a detailed description of the data). The same data source is used for several other studies in the UK on similar topics, such as Dolton and Vignoles (2000), Harmon and Walker (2000), Feinstein and Symons (1999), Currie and Thomas (1998), Robertson and Symons (1996), Dearden, Ferri and Meghir (2000), and Dustmann, Rajah and van Soest (2003). Of particular interest is the data recorded in the third and fourth sweeps of the survey (NCDS3 and NCDS4) and information collected in the Public Examinations Survey (PES), a follow-up survey to NCDS3. NCDS3 records extensive information about the respondents, such as educational and physical development, aspirations for the future, spare time activities etc., as well as much of the usual information gathered in household surveys. A similar range of information was also gathered for NCDS4, conducted in 1981 when cohort members were aged 23, as well as further details covering education and employment experience. We thus have a very detailed picture of each teenager and his or her family prior to and after the individual has made his or her choices at the age of 16. The NCDS teenager were the first school cohort who were legally required to stay in full time education until the age of 16.

Although providing a remarkably rich source of information, the NCDS is not without drawbacks. It is recognized that there have been a series of changes in the structure and organisation of schooling and further education in England and Wales over the last decades, and these may have had some impact on teenagers' attitudes to schooling, training and work. Also, the NCDS cohort reached a minimum school leaving age at a time when the youth labour market was very different in comparison with now. Despite these factors, an examination of the NCDS should still yields some insights which are of relevance for education and training policies today. Despite the numerous changes in the secondary and tertiary education sectors, teenagers today still face the same

threefold choice as those in 1974.

As part of NCDS3 individuals were asked whether they had a regular part-time job during term time and how many hours they worked per week, with the responses being recorded in a banded form. We use this information to construct a measure of weekly hours worked while still being in full time education.

The data set used for estimation is based on a sub-sample of 3,427 cases out of possible 11,602 who were traced at NCDS3, PES and NCDS4. Differences in the educational system in Scotland restricted our analysis to teenagers living in England and Wales. Information collected at the third sweep was retrieved from four separate sources (from the cohort member, from his or her parents, from the school that the 16 year olds attended and from the teenager's doctor) and for a number of respondents one or more of the questionnaires was not completed.

The timing of NCDS3 in Spring 1974 means that we observe the cohort members when they are still in full-time compulsory secondary education and just a few months before they sat their first set of public examinations, O' levels and Certificates of Secondary Education (CSE's), in June. On the basis of the information recorded in NCDS3 alone we are unable to determine how the cohort members performed in their examinations, nor whether they decided to leave school at the first available opportunity (June 1974). Fortunately, the PES conducted in 1978 has detailed information on the examination results of some 95% of respondents to NCDS3, obtained from the schools that the NCDS children attended. We take as our measure of academic success the number of Ordinary level (O'level) passes achieved by the NCDS cohort members by 1974. At the time of the survey, two sets of public examinations were in existence - Ordinary level examinations and Certificates of Secondary Education (CSEs). For O' levels candidates were graded on a scale of A - E where C and above was considered a pass. For CSEs, results were graded from 1 to 5 and a Grade One was considered to be an O'level equivalent. We therefore use the term O level to include CSE Grade One passes.

For information on school leaving decisions, we draw on NCDS4. As part of NCDS4, respondents completed a month-by-month diary which recorded their economic activity. We use the information recorded in February 1975 to see whether the cohort members had, at the end of their sixteenth year, decided to continue with full-time school, or whether they had gone on to do some form of training.[2]

An important issue was missing or incorrectly recorded information. Our final sample of 3,427 observations is considerably smaller than the total number of 11,602 individuals that are interviewed in NCDS3, PES and NCDS4. In table A1 in the appendix, we report means and standard deviations for some variables for our balanced estimation sample, and for the sample of individuals reported in NCDS3, PES and NCDS4, and when considering every variable in isolation. Means are re-assuringly similar, suggesting that combined attrition due to missing information in variables used for our analysis is not changing the sample composition, at least based on observables.

Variables

Table 1 shows the means for all the dependent variables used in our analysis, for both the male and the female sample, together with brief variable definitions. At the end of the 16th year, about 32 percent of both males and females have decided to stay on at school. 38 percent of males, but only 22 percent of females have enrolled into training schemes, with the remaining 46 percent of females and 30 percent of males having joined the labour market full-time. Thus, although staying on rates seem to be equally distributed across males and females, a larger fraction of those who do not stay on in full time education obtain further training among males than among females.

[2]We classify all those who have any element of training associated with their job as being in the "training" category, in addition to those enrolled on full-time training schemes. Thus, for example, an individual in part-time employment and on an apprentice scheme would be classed as being in training, as would someone who was simultaneously on a government training scheme and in part-time education.

Table 1: Descriptive Statistics, Activity Choice, Hours Worked and Exam Success

Variable	Description	Female (n=1713) Mean	Male (n=1714) Mean
Dep. Var.:			
AT16	Choice of activity at end of 16th year		
0	Stay at school	31.560	31.800
1	Enroll on training scheme	22.090	38.020
2	Enter the labour Force	46.340	30.180
HOURS	Index of hours worked part-time at 16		
None		49.550	47.960
0-3		2.580	6.380
3-6		16.890	13.810
6-9		21.620	13.600
9-12		5.000	6.430
12-15		1.840	5.020
15+		2.520	6.800
EXAM	Number of O'levels/CSE Grade One passes	2.207	2.433

While at school, and before sitting the final examinations, nearly 1 in 2 individuals works. Of those who work, hours worked are concentrated in the 3-9 weekly hours range, with more male than female teenagers in the range above 15 hours. For exam results, we report the average number of O'levels achieved, which is slightly higher for males.

Table 2 reports means and variable descriptions for the explanatory variables in our analysis. These include a large range of family and parental background variables, child's school background variables, and the interest parents express in their children's school work and educational career. We further include a measure of the child's ability.

Parental and family background variables comprise the number of older and younger siblings, labour market status and occupational level of the parents, the parents' educational level, the income of the household,[3] and a measure of the 16 year-old's ethnicity.

For the child's school background, we use variables which specify the type of school that the 16 year old attended in 1974. During the early 1970s, a tripartite selection-based system of grammar schools, secondary modern schools and technical schools was

[3]The income information in NCDS3 is recorded in a banded form. We constructed a continuous measure of income, taking into account all sources of household income, following Micklewright (1986).

Table 2: Descriptive Statistics, Explanatory Variables

Variable	Description	Female (n=1713) Mean	Female (n=1713) Std Dev	Male (n=1714) Mean	Male (n=1714) Std Dev
Explanat. Var.:					
oldsib	Number of older siblings	0.4294	0.64	0.426	0.63
yngsib	Number of younger siblings	1.2118	1.23	1.195	1.25
paageft ^{L*}	Age father left full-time education	4.0187	1.75	4.005	1.71
maageft ^{L*}	Age mother left full-time education	4.0099	1.39	4.028	1.42
unrate ^{E}	Regional unemployment rate for school leavers	0.0388	0.04	0.040	0.04
ctratio	Child-teacher ratio at the school level	17.392	14.08	17.203	1.91
able7	% score on sum of age 7 maths and reading test	72.298	21.26	75.437	19.68
loginc^{E}	Logarithm of household income	3.864	0.37	3.858	0.42
pawork	Father working	0.912		0.896	
nopa	No father	0.037		0.047	
mawork	Mother working	0.701		0.681	
paprof^{L}	Father's occupational class 'professional	0.055		0.059	
paskill^{L}	Father's occupational class 'skilled'	0.515		0.481	
pass^{L}	Father's occupational class 'semi-skilled	0.339		0.349	
paserv^{L}	Father's socioeconomic group 'service industry'	0.006		0.003	
pafarm^{L}	Father's socioeconomic group 'Agricultural worker'	0.023		0.028	
maprof^{L}	Mother occupational class 'Professional'	0.003		0.002	
maserv^{L}	Mother's socioeconomic group 'Service industry'	0.128		0.113	
kidnoeur	Teenager not European	0.014		0.009	
comp	Teenager attends a comprehensive school (non-selective state run)	0.539		0.521	
grammar	Teenager attends a grammar school (higher ability state run)	0.133		0.165	
special	Teenager attends a special school (handicapped and special need children)	0.023		0.017	
indep	Teenager attends a private school	0.048		0.040	
singsex	Teenager attends a single sex school	0.249		0.284	
modern	Teenager attends a secondary modern school	0.243		0.248	
tech	Teenager attends a technical school	0.011		0.005	
intpar	Teacher considers parents to be interested in teenager's school work	0.736		0.755	
parleave	Parents want teenager to leave at 16	0.344		0.308	
paralev	Parents want teenager to sit A levels	0.224		0.280	
paruniv	Parents want teenager to go to university	0.367		0.345	

*: These variables are measured on a scale from 1 to 10; 1 denotes that the parent left school aged 12 or less, 2 aged 13-14 etc.

^{E}: Variable excluded from examination equation. ^{L}: Variable excluded from school leaving equation.

still being used in many local authorities. Performance in the 'eleven plus' examination taken at age 11 or 12 was used to select pupils into one of these school types. This system, however, was criticised because of the selection purely on the basis of performance at the age of 11 or 12. As a result, from the mid-1960s onwards, a number of local education authorities had moved away towards a system with comprehensive schools taking all children in a given local authority, regardless of their ability. We include dummy variables to reflect all these school types. As a further indicator of the quality of education that 16 year-olds received we also include the pupil-teacher ratio in the school that the cohort member attends.[4]

To measure the parents' interest about their offspring's educational career, we use a variable on the opinion of the teacher on whether the parent is concerned about the teenager's school performance, and variables which indicate whether the parents want the teenager to complete Advanced levels (A'levels) or to follow a University education.

We also include a measure for the general economic situation the teenager faces out of the school system. We use the regional unemployment rate amongst school leavers in summer 1974, which reflects the level of demand for school leavers.

The NCDS includes the results obtained from the attainment tests in mathematics and reading comprehension that respondents sat at the ages of 7, 11 and 16. These have been used extensively in a number of studies. Such previous achievements may capture variation in unobserved ability or past inputs across children, which is likely to be correlated with current school quality measures. Hanushek, Rivkin and Taylor (1996) among others use standardised test scores to control for these differences. We include combined tests scores at the age of 7 in all three equations, on the grounds that measures of attainment at 7 are likely to be the closest proxy for the underlying ability of teenagers, and parental input early at the early stages of the life cycle. They are less 'contaminated' by later parental attention, quality of schooling and other factors

[4]This variable is derived using information on the total school roll divided by the number of full-time equivalent teachers.

which will determine how well a child will perform in school tests. Furthermore, the results of test scores at 7 clearly avoid any potential endogeneity problems that could arise with the test results at 16.

3 The Econometric Model

Our model consists of three equations. The first equation explains variations in hours of work supplied on a part-time basis by 16 year olds who have yet to complete their compulsory full-time schooling. The second equation explains our measure of examination success at 16. The third equation explains the school leaving decision. We assume that these events are sequential,[5] with the decision to work on a part time basis while being in full time education taken before examinations and decisions whether or not to continue schooling, and we take account of this structure in the specification of our estimation equations.[6]

Hours worked are reported only as categorical information. There are seven categories, and the bounds of the categories are known (see Table 1). We therefore model this variable as a grouped regression (see Steward (1983)):[7]

$$H^* = X_H \beta_H + u_H \; ; \tag{1}$$

$$H = 3j \text{ if } m_{j-1} < H^* \leq m_j \, ,$$

$$m_{-1} = -\infty, \; m_j = 0.5 + 3j \;\; (j = 0, ..., 5) \, , \;\; m_6 = \infty.$$

[5]Information on hours worked was gathered at least three or four months before respondents took their O'levels and were able to leave school.

[6]We consider the sequentiality as a natural model choice. However, other formulations are possible. Notice that, in the way we formulate our model, we do allow for observables as well as unobservables to affect all choices simultaneously. **Arthur? This responds to referee 2 who doubts our sequential formulation; perhaps you have something to add?**

[7]For notational convenience, the index indicating the individual is omitted throughout.

Here H denotes the hours category, multiplied by 3 to make the scale comparable to that of actual hours worked per week. H^* is a latent variable, and X_H is a vector of explanatory variables. The vector X_H contains all variables in the model. The distribution of the error term u_H is discussed below.

The dependent variable in the exam equation is the number of O'level passes obtained at age 16 (see section 2). This number is zero for about 50 percent of all individuals, and we model it as a censored regression equation:

$$E^* = X_E\,\beta_E + \gamma_E\,H + u_E\,;\quad E = \max(E^*, 0)\,. \tag{2}$$

Here E denotes the number of O'levels, E^* is a latent variable, X_E is a vector of explanatory variables, and u_E is an error term. We explicitly allow exam success to depend on hours worked when attending school.

The choice between continuing full-time education ($C = 0$), going into a training programme ($C = 1$), and entering the labour force ($C = 2$) may be viewed as inversely ordered by the amount of education involved. An appropriate specification is therefore an ordered response model:

$$C^* = X_C\,\beta_C + \gamma_C\,H + \delta_C\,E + u_C, \tag{3}$$
$$C = 0 \text{ if } C^* < 0,\ C = 1 \text{ if } 0 < C^* < m_C,\ C = 2 \text{ if } C^* > m_C\,.$$

Here C^* is a latent variable, X_C is a vector of explanatory variables, and u_C is an error term (with variance normalized to one). The index C^* depends on hours worked when 16, and on the exam success, with coefficients γ_C and δ_C. In the standard ordered probit model, the category bound $m_C > 0$ is estimated as an additional parameter. We extend the standard specification by allowing m_C to depend on all explanatory variables in the equation:

$$m_C = exp(X_C\,\beta_m + \gamma_m\,H + \delta_m\,E)\,. \tag{4}$$

This leads to a model with the same degree of flexibility as the multinomial logit model, in which the alternatives are not ordered (see Pradhan and Van Soest (1995) for a comparison of the two in a similar framework).

Although our estimation equation is more flexible than the standard ordered probit model, it still imposes an order on the three choices. As we say above, we believe that this is a plausible assumption for our particular application. **Arthur: Could you add a sentence - perhaps saying that the threshold estimates are in accordance with this assumption or the like.**

The vector of error terms $u = (u_H, u_E, u_C)'$ is assumed to be independent of all explanatory variables in X_H, X_E and X_C and multi-variate normal with mean zero and covariance matrix Σ. By means of normalisation, $\Sigma(3,3) = Var(u_C)$ is set equal to one. If $\Sigma(1,2) = 0$, hours are exogenous in the exam equation. Similarly, if $\Sigma(1,3) = \Sigma(2,3) = 0$, hours and exam results are exogenous for the school leaving decision. If Σ is diagonal, the three equations can be estimated separately by maximum likelihood. If Σ is not diagonal separate estimation results in inconsistent estimates of exam- and school leaving equation due to endogeneity. Therefore, the three equations are estimated jointly by maximum likelihood. Simpler two stage estimators for the exam equation and the school leaving equation are not available in this case. The likelihood contribution of each individual is either a trivariate normal probability (if $E = 0$), or a univariate density multiplied by a bivariate normal (conditional) probability if $E > 0$. See the appendix for the likelihood contributions.

To allow for the general case without restrictions on Σ, we have to make some identifying restrictions on the variables in X_E and X_C. In Table 1, those variables which are excluded from the exam equation are marked with superscript "^{E}"; those variables which are excluded from the school leaving equation are marked with superscript "^{L}". To identify the hours worked in the examination equation, we exclude the local unemployment rates and our measure for parental income from X_E. The effect of parental income on the child's examination success should be reflected by the school type vari-

ables (richer parents tend to send their children to better schools), the occupational level of the parent, and the interest the parent expresses in the child's school work. We retain all these variables in the examination equation. Our exclusion of income is based on the assumption that income has no further effect on exam success than that already captured by these variables.[8]

To identify hours worked and exam success in the school leaving equation, we exclude the occupational and educational status of the parents from X_C. We retain, however, variables which reflect the wish of the parents that the child proceeds into higher education (variables PARALEV, PARUNIV, and PARINT). Our exclusions therefore imply that parents' education and occupational status have no direct effects on the continuation decision, over and above those captured by the parents' expressed interest in the offspring's educational career.[9]

4 Results

We have estimated and compared a variety of different specifications. Based on likelihood ratio tests, we come to the following conclusions: First, pooled estimation of males and females with different intercepts between both groups is rejected in favour

[8]Even conditional on school type variables and variables that reflect parental interest, parental income may affect exam success, as richer parents may be able to provide more educational resources. To check that, we ran some preliminary regressions, where we identify hours worked only by the local unemployment rate, and include parental income in the exam equation. Parental income is not significant, with p-values of 0.27 and 0.17 for females and males respectively. Also, parental income is not a strong predictor for hours worked (see Table 6); identification works mainly through local unemployment rates. **Arthur: Please check.**

[9]Again, excluding parental education from the staying on equation may be debatable. To check this, we ran some preliminary regressions, where we identify exam success only through parental occupational and labour market status, and retain parental education in the staying on equation. The p-values for joint significance are 0.11 for males and 0.87 for females. **Arthur... This is based on simple linear IV regressions.**

of separate estimation. Second, the ordered probit specification of the school leaving equation is rejected in favour of the specification which allows for flexible thresholds. Thirdly, specifications which do not allow for correlation in the error terms cannot be rejected against the general specification. This suggests that the rich set of conditioning variables, including our measures for ability, eliminates correlation in unobservables across the three equations. And finally, models in which hours worked enter linearly can not be rejected against models where hours worked enter nonlinearly in exam- and school leaving equations, using dummies for the hours categories.

We report results for two specifications. Model I imposes diagonality on Σ, thus restricting the correlation between the error terms to be equal to zero. This corresponds to separate estimation of the three equations. Model II allows for any correlation between the error terms.

The Interdependence between Hours Worked, Exam Success, and Staying On Decision.

We first discuss the parameter estimates for the variables hours worked in the exam equation, and hours worked and exam success in the school leaving equation. Table 3 presents the estimates for the exam equation. Table 4 summarizes the marginal effects of hours worked and exam success on the school leaving decision (see appendix for the marginal effects and their standard errors).

Consider first the exam equation (Table 3). Comparing the models I and II leads to the following conclusions. For males, the effect of hours worked on exam success is negative and significant in specifications which do not allow for correlation between the errors (model I). Estimates indicate that a ten hour increase in part-time work reduces the number of O'levels by 0.49 for males and 0.22 for females; the effect for females, however, is not significantly different from zero. If we allow for correlation in the error terms (models II), the effects turn insignificant for both males and females. The estimated correlation coefficients $\rho(1,2)$ are not significantly different from zero

Table 3: Exam Equation, Males and Females

Specification	Model I		Model II		Model I		Model II	
	Coeff	t-ratio	Coeff	t-ratio	Coeff	t-ratio	Coeff	t-ratio
Variable	Males				Females			
Con(ex)	-7.263	-6.07	-7.326	-5.74	-10.881	-10.25	-10.877	-9.95
oldsib/10	-0.878	-5.33	-0.920	-5.52	-0.275	-1.94	-0.261	-1.82
yngsib/10	-0.208	-2.61	-0.215	-2.53	-0.159	-2.13	-0.161	-2.03
pawork	0.152	0.32	0.103	0.22	0.022	0.06	0.076	0.22
paprof	1.686	2.71	1.713	2.72	1.238	2.69	1.096	2.23
paskil	0.347	0.76	0.303	0.66	0.962	2.94	0.976	2.87
pass	0.317	0.68	0.281	0.60	0.724	2.15	0.719	2.08
mawork	-0.265	-1.25	-0.311	-1.42	-0.019	-0.10	-0.027	-0.14
maprof	0.935	0.53	1.005	0.56	-0.389	-0.05	-0.272	-0.02
kidnoteu	-0.933	-0.74	-0.854	-0.66	-0.969	-0.83	-1.175	-1.00
comp	0.544	2.30	0.593	2.37	0.816	3.78	0.828	3.83
grammar	2.807	7.90	2.855	7.69	2.492	7.97	2.478	7.81
indep	2.272	4.25	2.451	4.11	2.315	5.12	2.297	4.94
special	1.138	1.50	1.194	1.50	1.433	1.31	1.483	1.33
singsex	-0.293	-1.17	-0.280	-1.11	0.534	2.58	0.524	2.54
ctratio/10	-0.403	-0.78	-0.458	-0.86	-0.197	-0.45	-0.150	-0.34
intpar	0.768	3.35	0.767	3.33	1.310	6.24	1.354	6.02
paruniv	2.945	12.21	3.043	10.90	2.903	12.46	2.930	12.47
paralev	1.207	4.73	1.257	4.83	1.127	5.13	1.129	5.12
paageft/10	1.939	2.85	1.885	2.76	1.713	2.93	1.776	2.94
maageft/10	1.738	2.13	1.777	2.17	1.544	2.21	1.444	2.05
able7/10	0.684	12.89	0.670	11.94	0.943	17.31	0.945	16.56
hours	-0.049	-2.88	0.013	0.20	-0.022	-1.20	-0.061	-0.71
sigma(ex)	3.150	33.40	3.171	30.88	2.884	38.14	2.895	35.85
Rho(1,2)			-0.204	-0.94			0.118	0.47

Table 4: Marginal Effects, Hours and Exam, Various Specifications

Decision:	Stay in School		Training		Labour Market	
Variable	Coeff	t-ratio	Coeff	t-ratio	Coeff	t-ratio
			Males			
Model I						
hours	-0.004	1.73	0.003	1.79	0.0005	0.28
exam	0.063	9.90	-0.006	0.77	-0.0574	7.27
Model II						
hours	-0.003	0.68	0.003	1.56	-0.000	0.05
exam	0.066	5.08	-0.006	0.68	-0.059	3.77
Rho(1,3)	0.019	0.15				
Rho(2,3)	0.016	0.12				
			Females			
Model I						
hours	-0.003	1.46	0.007	3.00	-0.003	1.15
exam	0.063	9.33	0.003	0.44	-0.066	8.09
Model II						
hours	-0.009	1.47	0.004	1.35	0.005	0.63
exam	0.046	3.18	-0.001	0.11	-0.045	2.29
Rho(1,3)	-0.106	-0.64				
Rho(2,3)	-0.258	-1.45				

either. The null of Model I is therefore not rejected against the more general alternative Model II.

For the school leaving equation, we only discuss the marginal effects on the probabilities of each of the three states, presented in Table 4. When restricting the correlation between the error terms to zero (models I), we find that the number of hours worked affects the decision to stay on at school negatively for both males and females, but only for males is the effect significant at the 10 percent level. Hours worked have a positive effect on entering a training scheme for both males and females. If we allow for nonzero correlation coefficients (models II), the hours variables retain their signs, but turn insignificant. The estimates of the correlation coefficients $\rho(1,3)$ are insignificant as well - again, Model I is therefore not rejected against the more general alternative Model II. In conclusion, we can not reject a negative effect of hours worked on exam success and the decision not to continue in full time education for males; however, the effects on both outcomes are moderate and, in the case of the school leaving decision, at the margin of statistical significance.

The effect of exam results on the staying on decision is clear-cut, and endogenization changes the estimates only slightly. According to model II, an increase by one in the number of O'levels passed decreases the probability of leaving school and joining the labour market by 5.9 and 4.5 percentage points for males and females, respectively. It increases the probability of staying on at school by 6.6 percentage points for males and 4.6 percent for females. The effect on joining a training scheme is insignificant for both.

We conclude from these results that working part time while attending school is unlikely to have a notable effect on exam success. Furthermore, the effect of part time work on the school leaving decision is likewise moderate, and the effect is not significant in the more general model. Labour force participation while attending school seems therefore to play a minor role for both these events. In contrast, exam success does affect the school leaving decision strongly, reducing the probability that the individual joins the labor market, and increasing the probability that the individual stays on at school.

Parental Background

Exam Success

Looking specifically at each equation in turn, we now examine the impact of the other variables. We first discuss the coefficients of the examination success equation, presented in Table 3. The coefficients on the school type variables give rise to results which have potentially important policy implications, given the highly controversial debate in the UK surrounding the merits of selective versus non-selective schools. We find that the type of school that the teenager attends has a significant impact on academic performance, even when differences in family background and ability have been controlled for. The base category includes teenagers attending secondary modern or technical schools (lower ability state run schools). Teenagers attending independent (selective non-state run schools) or grammar schools (higher ability state run schools)

(variables GRAMMAR, INDEP) perform significantly better than their counterparts in non-selective state run schools. Furthermore, attendance of a single sex school seems to matter only for females: it influences their exam performance significantly positive, while the effect on male performance is negative, but insignificant. These findings are consistent with the idea that whilst teenage girls tend to perform more strongly in a single sex environment, teenage boys do not.[10]

The dummy variables reflecting parental interest in the teenager's education and future prospects (INTPAR, PARUNIV and PARALEV) are all strongly significant, with the expected signs. The estimates indicate that these parental attitudes are strongly associated with the child's performance. According to estimates in columns 1 and 3, the fact that the parents want the teenager to take A'levels is associated with an increase in the number of O'levels by about one. Children of parents who want the 16 year old to attend university have about 3 more O'levels, both males and females.[11]

The effect of the father's and mother's educational background (PAAGEFT, MAAGEFT, which measure the age at which the parents left full time education) on the child's success is likewise quite strong and significant for both samples, with similar magnitudes for mothers and fathers. Since we condition on indicators which express the parents' interest in the child's academic performance as well as on the child's ability, these variables may reflect to some extent the quality of parental input. The ability measure (ABLE7) has the expected positive sign and is strongly significant. Based on columns 1 and 3, an increase in test scores by 10 (on a scale between 1 and 100) raises the number of O'levels by 0.67 for males and 0.96 for females.

For both males and females the number of older and younger siblings affects exam success negatively, with older siblings being more important. This result is in line with Becker's (1991) hypothesis about a trade-off between the quantity and quality of

[10]See Dearden, Ferri and Meghir 2002 and Dustmann, Rajah and vanSoest 2003 for more analysis of school type on school success.

[11]See also Feinstein and Simons (1999) for analysis of parental interest variables.

children, and suggests that parental attention is reduced as family size increases. Furthermore, our results suggest birth order effects, particularly for males. Here parental attention seems to be unevenly distributed, with most being given to older children. Similar results are reported by Hanushek (1992) who shows that birth order plays an important role for childrens' academic performance. Large negative birth order effects on child's education are also reported in a recent study by Black, Devereux and Salvanes (2005). In their work, effects remain when conditioning on fixed family effects.

School Leaving

We now turn to the school leaving equation. Estimation results are presented in Table A1, and marginal effects for model II on the probabilities of the three outcomes for the average male and female in Tables 5a,b.[12] Here both the direct effect on C^* and the indirect effect through the threshold m_C are taken into consideration (see equation (4), and appendix for details). The first column presents the effect on the probability of remaining in school, the second and third on the probabilities of choosing some training programme and entering the labour market respectively.

Conditional on exam success, some school type variables retain an effect on the school leaving decision. We find that teenagers attending grammar or independent schools are more likely to remain in school beyond the age of 16, even when performance in O'levels is controlled for. Here, the school type dummies may be capturing a number of effects such as the quality of careers' guidance that may be available in schools of varying types. For example, peer pressure in grammar or independent schools may discourage teenagers from leaving school at the first possible opportunity. Furthermore, specialist staff employed to give informed advice about education and career choices may have an effect on school–leaving decisions.

The variables reflecting the interest of the parent in the teenager and the desire of the parent that the child continues education are strongly significant, with the

[12]Estimated coefficients for model I are very similar, except for the variables HOURS and EXAM, which are discussed above.

Table 5a: Marginal Effects, Model II, Males

Decision:	Stay in School		Training		Labour Market	
Variable	Coeff	t-ratio	Coeff	t-ratio	Coeff	t-ratio
Con(le)	-0.596	3.22	0.141	0.92	0.454	2.73
oldsib/10	-0.019	0.82	-0.009	0.49	0.029	1.53
yngsib/10	-0.007	0.64	-0.003	0.31	0.010	1.19
mawork	-0.022	0.70	0.070	2.24	-0.047	1.70
pawork	0.018	0.32	-0.010	0.22	-0.007	0.17
kidnoteu	0.071	0.56	0.009	0.09	-0.081	0.83
comp	0.048	1.46	-0.063	2.42	0.015	0.56
grammar	0.086	1.77	-0.272	3.81	0.186	2.49
indep	0.206	2.78	-0.180	1.34	-0.026	0.18
special	0.092	0.84	-0.464	2.34	0.371	2.48
singsex	0.057	1.86	0.008	0.26	-0.066	2.24
loginc	0.009	0.22	0.019	0.48	-0.028	0.77
unrate	-0.340	1.10	0.381	1.40	-0.040	0.15
ctratio/10	-0.138	2.53	-0.001	0.05	0.140	2.34
intpar	0.050	1.59	0.014	0.54	-0.065	2.54
paruniv	0.343	9.86	-0.151	4.16	-0.192	5.14
paralev	0.225	6.29	-0.085	2.41	-0.140	4.26
able7/10	0.026	2.77	-0.000	0.14	-0.025	3.02
hours	-0.003	0.68	0.003	1.56	-0.000	0.05
exam	0.066	5.08	-0.006	0.68	-0.059	3.77

Table 5b: Marginal Effects, Model II, Females

Decision:	Stay in School		Training		Labour Market	
Variable	Coeff	t-ratio	Coeff	t-ratio	Coeff	t-ratio
Con(le)	-0.635	2.99	-0.429	2.10	1.064	4.71
oldsib/10	-0.033	1.69	-0.028	1.39	0.061	2.74
yngsib/10	0.012	0.95	-0.027	2.42	0.014	1.21
mawork	0.027	0.95	0.000	0.01	-0.027	0.82
pawork	0.024	0.50	0.027	0.56	-0.052	0.96
kidnoteu	-0.002	0.01	0.223	2.02	-0.221	1.26
comp	0.062	1.88	-0.022	0.80	-0.040	1.18
grammar	0.127	2.73	-0.071	1.24	-0.055	0.82
indep	0.139	1.78	0.129	1.37	-0.268	2.47
special	-0.078	0.47	0.122	1.12	-0.044	0.35
singsex	0.010	0.34	-0.030	0.90	0.019	0.53
loginc	0.041	1.05	-0.011	0.31	-0.029	0.67
unrate	-0.588	1.93	-0.041	0.15	0.629	2.04
ctratio/10	-0.129	1.85	0.104	1.36	0.025	0.30
intpar	0.055	1.73	0.044	1.50	-0.099	2.77
paruniv	0.431	11.57	0.026	0.66	-0.457	9.96
paralev	0.197	5.57	0.071	2.34	-0.268	8.12
able7/10	0.010	0.94	0.016	2.12	-0.026	2.37
hours	-0.009	1.47	0.004	1.35	0.005	0.63
exam	0.046	3.18	-0.001	0.11	-0.045	2.29

expected sign. Parental aspirations that the child attends university or achieves A levels increases the probability of remaining at school for males by 35 and 25 percentage points respectively. For females, the wish of the parent that the child aims for a university education increases the probability of remaining at school by 41 percentage points. These large effects suggest that even at age 16, parents can have a strong influence on the child's educational career.[13]

The pupil-teacher ratio is negatively and significantly associated with the probability of staying on at school for males, conditional on the school type variables, but not for females. Dustmann, Rajah and van Soest (2003) discuss class size effects on staying on decisions, and subsequent labour market outcomes in detail.

While the effect of the number of O'levels passes obtained seems to be the same for males and females (see discussion above), the effect of the ability variables is not. For males it increases the probability of remaining in full time education, and decreases the probability of joining the labour force full time. The effect on training scheme participation is not significant. For females, the ability variable positively influences the decision to participate in training, but negatively influences the decision to join the labor force. Its effect on the decision to remain in full-time education is insignificant. This may reflect the fact that traditionally teenage girls have been pushed towards certain careers requiring vocational or other types of training (e.g. nursing or secretarial jobs), irrespective, to a certain extent, of their ability levels or their academic performance. Notice that these results, though holding for the NCDS cohort, may not hold any more for females entering the labour market today.

Hours worked

We now turn to the hours worked equation. Results for model II are reported in table 5. Since the model is a grouped regression model, we can interpret the coefficients as marginal effects on hours worked.

[13]See Dustmann (2004) for a discussion of the importance of child's age when important school track choices have to be made.

Table 6: Hours Worked Equation

Specification	Model II Males		Model II Females	
Variable	Coeff	t-ratio	Coeff	t-ratio
Con(ho)	0.359	0.09	-1.337	-0.42
oldsib/10	0.006	0.01	0.235	0.78
yngsib/10	0.725	3.46	0.552	3.34
loginc	0.647	0.76	-0.245	-0.42
pawork	0.791	0.72	1.772	2.04
paprof	-0.970	-0.59	-4.207	-3.62
paskil	-0.393	-0.38	-1.706	-2.24
pass	-1.162	-1.08	-1.623	-2.07
pafarm	8.287	5.41	-0.535	-0.47
mawork	1.177	1.86	0.962	1.98
maprof	-3.881	-0.68	-4.804	-0.31
maserv	-0.364	-0.44	0.987	1.45
paserv	-2.127	-0.66	0.204	0.06
kidnoteu	-3.441	-1.51	-6.777	-2.36
comp	-1.762	-2.79	-0.470	-0.93
grammar	-1.810	-1.74	-1.270	-1.64
indep	-7.409	-4.47	-2.817	-2.32
special	-5.602	-2.64	-4.299	-2.28
singsex	-1.047	-1.49	-0.119	-0.23
ctratio/10	-1.479	-1.12	0.572	0.46
intpar	0.577	1.02	1.426	2.94
paruniv	-3.627	-5.37	-0.263	-0.47
paralev	-0.889	-1.29	0.376	0.72
paageft/10	-0.553	-0.28	-1.538	-0.98
maageft/10	-1.551	-0.68	-1.826	-1.01
unrate	-19.245	-3.29	-24.355	-5.36
able7/10	0.465	3.38	0.353	3.03
sigma	9.048	32.65	7.211	31.15

For both males and females, the number of younger siblings has a strong positive effect on the number of hours the teenager works, while the number of older siblings is insignificant. An obvious explanation is that individuals have to compete with younger siblings for the financial resources parents are able to allocate between them, while older siblings are financially more independent.

Most indicators for parents' occupational status and skill level are insignificant, with one exception - the variable which indicates that the father owns or works on a farm, which affects the labour supply of males positively. The mother's participation in the labour market is positively associated with hours worked for both males and

females, and the effect is significant at the 5% level for female teenagers and at the 10% level for males. One reason may be that women often work in positions where there are part-time work opportunities for their off-spring. It may also be that children who see their mother work may be more likely to engage in part-time work themselves.

The school types have the expected sign. Teenagers attending independent or grammar schools are likely to work fewer hours than those in the base category (secondary modern or technical schools). This may be because 16 year olds who go to independent or grammar schools have less free time to work part-time; they might be given more homework, be more involved in extra-curricular activities or may have to travel further to attend school. Surprisingly, male teenagers in comprehensive schools seem also to work less hours, compared to those on modern or technical schools. Also, sons of parents who wish that their child attends university work less hours. This variables is significant for females. Finally, ability has a significant and positive effect on hours worked for both sexes, perhaps because higher ability teenagers need to spend less time studying (controlling for differences in school type).

5 Conclusion

In this paper, we investigate the decision to work part time while still in full time education, subsequent exam success, and career choices of 16 year old school children in a model which takes account of the possible interdependencies of these events. In particular, we allow the number of hours worked to affect both examination results and the school leaving decision, and we allow examination performance to influence school leaving. These three outcomes are sequential, with hours worked during school time observed before taking final examinations, and exam success determined before the school continuation decision is taken. We model these three events jointly, taking account of the sequential nature. We also further differentiate the school leaving decision, distinguishing between the 16 year olds who leave school to enter the labour force

and those who leave to go on to further training. This distinction seems important, as, despite leaving full time education, a large fraction of school leavers enrolls on various training schemes and rather than entering the labour market immediately. We model this decision in a flexible way, considering the three choices as ordered, but allowing the threshold parameters to depend on observed characteristics.

Our analysis is based on data from the third and fourth waves of the National Child Development Study (NCDS). This cohort survey is unique in the detail it provides on school outcomes, parental and family background, and teenagers' other activities. In addition, the longitudinal nature of the survey allows measurement of events over time, which is important to link the three events we investigate.

Initial specification tests suggest separate estimation for males and females, and support the specification with flexible thresholds. The specification that imposes diagonality on the error structure of the three equations can not be rejected against the most general specification, suggesting that the rich set of conditioning variables absorbs correlation in unobservables across equations that is correlated with the respective outcomes.

Regarding the relationship between labour supply when in full time education and school performance, we conclude that working part-time has only small adverse effects on exam performance for males, but not for females. The effect of hours worked on the decision to remain in full time education is negative, but likewise small, and marginally significant for males. We conclude from these results that working while in full time education does not have adverse impacts on school performance nor does it particularly encourage early school-leaving for females; there is some evidence of small adverse effects for males. These results are potentially important, as they suggest that the impact of part time work during school education does not lead to any larger disadvantages in scholastic achievements. However, one should remember that our findings relate to the 1974 cohort, and may not necessarily carry over to children leaving school today.

On the other hand, we find that strong examination performance at O'level considerably influences the school leaving decision for both males and females. These results remain virtually unchanged, whether or not we estimate the three outcome equations separately, or estimate a fully structural model.

Other findings relate to the rich set of family and parental background characteristics on which we condition. We find that teenagers in larger classes tend to drop out of school earlier than those in smaller classes. This last effect prevails even when controlling for school types. Children in independent and grammar schools tend to out-perform their counter-parts in non-selective schools, even when differences in family background and individual characteristics are taken into account. Important for exam success as well as the continuation decision are parental ambitions about the child's future academic career, both in significance level as well as in magnitude, and conditional on other parental characteristics. We also find that exam performance is negatively related to number of siblings, where differences in the effect between older and younger siblings clearly suggest birth order effects, supporting results in the recent literature. Birth order does however not affect the school continuation decision, conditional on examination outcomes.

6 References

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Appendix: Likelihood Contributions and Marginal Effects

We only present the likelihood contributions of individuals with $C = 1$ (training scheme). Likelihood contributions of those with $C = 0$ or $C = 2$ are derived in a similar manner. We have to distinguish two cases:

1): $H = 3j;\ E = 0;\ C = 1.$

The likelihood contribution is given by

$$\begin{aligned} L &= P\{m_{j-1} < H^* < m_j,\ E^* < 0,\ 0 < C^* < m_C\} \\ &= P\{m_{j-1} - X_H\,\beta_H < u_H < m_j - X_H\,\beta_H,\ u_E < -X_E\,\beta_E - \gamma_E\,H, \\ &\qquad -X_C\,\beta_C - \gamma_C\,H\ < u_C\ < m_C - X_C\,\beta_C\ - \gamma_C\,H\}\,. \end{aligned} \tag{5}$$

This can be written as a linear combination of four trivariate normal probabilities. For m_C, the expression on the right-hand side of (4) can be substituted.

2): $H = 3j;\ E = E^* > 0;\ C = 1.$

Denote the residual in the exam equation by $e_E = E - X_E\,\beta_E - \gamma_E\,H$. Then the likelihood contribution is given by

$$\begin{aligned} L &= f_{E^*}(E)\ P\{m_{j-1} < H^* < m_j < 0, 0 < C^* < m_C | E\} = \\ &= f_{u_E}(e_E)\ P\{m_{j-1} - X_H\,\beta_H < u_H < m_j - X_H\,\beta_H, \\ &\qquad -X_C\,\beta_C - \gamma_C\,H\ - \delta_C\,E < u_C\ < \\ &\qquad m_C - X_C\,\beta_C\ - \gamma_C\,H\ - \delta_C\,E |\ u_E = e_E\} \end{aligned} \tag{6}$$

Here f_{E^*} and f_{u_E} are the univariate normal densities of E^* (conditional on exogenous variables) and u_E. The conditional probability in (6) is a bivariate normal one. We use the BFGS algorithm in GAUSS to maximize the likelihood, and computed the standard errors from the outer products of the scores.

Marginal Effects in School Leaving Equation

The computation of the marginal effects presented in Tables 4 is based on (3) and (4). For notational convenience, we write $Z_C = (X_C, H, E)$, $\theta_C = (\beta_C', \gamma_C, \delta_C)'$, and $\theta_m = (\beta_m', \gamma_m, \delta_m)'$. We then have

$$\frac{\partial P[C=0|Z_C]}{\partial Z_C} = -f_{u_C}(-Z_C\theta_C)Z_C, \tag{7}$$

$$\frac{\partial P[C=1|Z_C]}{\partial Z_C} = f_{u_C}(-Z_C\theta_C)Z_C + f_{u_C}(m_C - Z_C\theta_C)(m_C-1)Z_C, \tag{8}$$

$$\frac{\partial P[C=2|Z_C]}{\partial Z_C} = f_{u_C}(m_C - Z_C\theta_C)(1-m_C)Z_C. \tag{9}$$

The effects in Tables 4 are evaluated at sample averages. Since the marginal effects are functions of the parameters, the standard errors of their estimates can be computed from the standard errors of the parameter estimates (taking the distribution of Z_C as given). This can in principle be done by the delta method. A computationally easier alternative is to use simulations. The standard errors in Tables 4 are computed as the standard deviations in samples of 500 marginal effects, computed from 500 draws of the vector of parameters from the estimated asymptotic distribution of the vector of parameter estimates.

Table A1: Attrition

	All Obs. NCDS3, NCDS4, PES			Sample		
Variable	N. Obs.	Mean	StD	N. Obs.	Mean	StD
oldsib	8223	1.16	1.41	3380	1.04	1.28
yngsib	8213	1.21	1.27	3373	1.20	1.23
paageft	8106	4.03	1.82	3427	4.01	1.73
maageft	8217	3.97	1.43	3427	4.01	1.41
able7	10109	65.20	21.16	3427	67.11	20.42
loginc	6538	3.80	0.42	3427	3.83	0.39
pwork	8340	0.87	0.32	3427	0.90	0.29
mawork	8222	0.66	0.47	3427	0.69	0.46
stayon	8832	0.31	0.45	3427	0.32	0.46

Table A2: Continuation Equation

	Parameters		Threshold m_C		Parameters		Threshold m_C	
	Males				Females			
Variable	Coeff	t-ratio	Coeff	t-ratio	Coeff	t-ratio	Coeff	t-ratio
Con(le)	2.071	3.33	0.526	1.46	2.168	3.05	-0.654	-0.91
oldsib/10	0.069	0.88	-0.013	-0.28	0.113	1.77	-0.052	-0.74
yngsib/10	0.026	0.63	-0.003	-0.15	-0.042	-0.98	-0.094	-2.19
mawork	0.082	0.73	0.165	2.23	-0.085	-0.90	-0.016	-0.17
pawork	-0.058	-0.29	-0.032	-0.27	-0.082	-0.50	0.049	0.28
kidnoteu	-0.276	-0.67	-0.024	-0.10	-0.032	-0.05	0.650	1.54
comp	-0.165	-1.44	-0.154	-2.34	-0.207	-1.88	-0.128	-1.26
grammar	-0.293	-1.70	-0.625	-3.87	-0.419	-2.64	-0.353	-1.82
indep	-0.700	-2.78	-0.471	-1.60	-0.455	-1.72	0.250	0.80
special	-0.317	-0.82	-1.037	-2.31	0.279	0.49	0.460	0.99
singsex	-0.202	-1.85	-0.005	-0.07	-0.040	-0.38	-0.107	-0.92
loginc	-0.034	-0.24	0.041	0.43	-0.142	-1.10	-0.072	-0.55
unrate	1.180	1.09	0.955	1.47	1.949	1.97	0.474	0.50
ctratio/10	0.488	2.39	0.047	0.68	0.433	1.75	0.436	1.68
intpar	-0.178	-1.58	0.013	0.19	-0.184	-1.66	0.085	0.79
paruniv	-1.192	-8.67	-0.457	-5.22	-1.453	-11.16	-0.365	-2.75
paralev	-0.780	-5.91	-0.275	-3.45	-0.665	-5.39	0.006	0.05
able7/10	-0.095	-2.79	-0.013	-0.77	-0.037	-1.05	0.038	1.32
hours	0.011	0.76	0.009	1.74	0.033	1.54	0.023	2.60
exam	-0.224	-5.99	-0.036	-1.82	-0.154	-3.35	-0.050	-2.05
Rho(1,3)	0.019	0.15			-0.106	-0.64		
Rho(2,3)	0.016	0.12			-0.258	-1.45		