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Parental Education and the Demand
for Higher Education :
some evidence for Belgium

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ABSTRACT

In this note, some empirical evidence on the role of parental
education and income in educational attainment is presented
for Belgium (1992). Direct and indirect effects of parental
education level on the demand for higher education are
analyzed.

Section I gives a brief overview of theories on the demand for
education. In section II the datasample of Belgian households
(1992) and descriptive statistics are presented. Ordinary
least-squares and logit regressions are shown in section III.
Section IV offers conclusions.

In this note, some empirical evidence on the role of parental education and income in educational attainment is presented based of a sample of Belgian households. Several empirical studies (Feldman and Hoenack 1969, Christensen and Melder 1975, Alvin & Thornton 1984, Hauser & Daymont 1977, Behrman, Pollak & Taubman 1982, Behrman & Taubman 1985, Behrman & Taubman 1986, Hill & Duncan 1987, and Taubman 1989 for a brief survey) have analyzed such effects using data for the United States. Direct and indirect effects of parental education level on the demand for higher education was analyzed by Kodde & Ritzen (1988) using data for the Netherlands. As far as we know, no analysis using Belgian data is available. Section I of the paper gives a brief overview of theories on the demand for education. In section II the data and descriptive statistics are presented. Ordinary least-squares and logit regressions are presented in section III. Section IV offers conclusions.

I. Theories on the demand for education.

At least three economic theories rival to explain the demand for education. These theories provide a possible list of determinants and a framework by which to organize an analysis of the demand for higher education.

I.1. Higher education as a consumption good.

Education may be seen as a consumption good which people buy when they perceive its current value to be higher than its current cost. Hence, the demand for education is explained by the economic textbook factors determining quantity demanded of a service i.e. its price (tuition and other induced money outlays), the price of complements (the cost of time), the price of substitutes (e.g. costs or benefits of military service, on-the-job training, etc.), purchasing power (current

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income, parental contributions, scholarships, loans, etc.) and "preferences" (e.g. ability, type of secondary education, education level or social class of parents, etc.).

The consumption view of education performs rather well in explaining observed long-run trends in participation to higher education (e.g. Campbell & Siegel 1967, Feldman & Hoenack 1969) or in explaining individual choices (e.g. Christensen, Melder & Weisbrod 1975, McPherson & Schapiro 1991, Hauser 1993, Cameron & Heckman 1993).

I.2. Higher education as an investment

The decision to participate in higher education is often framed as an investment decision. By getting additional education an individual adds to his "human capital" (Becker 1992, Schultz 1981, 1993). Education is an investment in human capital with costs now and returns later. Returns are monetary such as higher future earnings, less unemployment or enhanced labor market opportunities or non-monetary. In the human capital approach, the expected return on an investment in extra years at school becomes a prime determinant of demand. Expected labor market developments (relative earnings and wages, relative probabilities of unemployment, scope of labor job market opportunities, etc.) are especially important in explaining demand.

This view on education is most widely used in empirical economic literature explaining long run trends in the demand for education (e.g. Psacharopoulos 1973), forecasting future demand (e.g. Dresch 1975) and explaining individual choices (e.g. Cohn & Hughes 1994). Rates on return for education are available for a large number of countries and different levels of education (Psacharopoulos 1985, 1989), also for Belgium (Nonneman 1992, Cortens & Nonneman 1995).

I.3. Education as a screening device

Another hypothesis is that higher education primarily serves
to screen individuals rather than to enhance their ex-post
productivity (Spence 1974, Arrow 1973). Employers, having
difficulties in observing individual worker productivity, use
educational qualifications to hire workers and to fix their
wage levels. Potential employees use education to signal their
productivity. Crucial to this theory is that individuals of
higher ability use more education than lower ability
individuals because they learn more rapidly and consequently
face lower opportunity costs of education. The screening
theory implies e.g. that the demand for higher education (or
signaling potential productivity) increases as production
processes become more complex. More complex production makes
individual productivity less observable and stimulates the
need for screening devices. It should be said that the
empirical evidence for this theory is mixed as it is difficult
to discriminate empirically between phenomena due to screening
or to human capital investment (e.g. Cortens & Nonneman 1995).

II. DATA DESCRIPTION

II. 1. Data and definitions

Individual cross-section data for Belgium are available from
the Socio Economic Panel Study of the Centre for Social
Policy[1]. This data set on a wide range of socioeconomic
variables consists of a stratified sample of 3821 households.
We used these household data for 1992.

As secondary education in Belgium is compulsory, individuals
have the choice on continuing education after completion of
secondary education. Consequently, we selected those
individuals who completed secondary education and whose
parental family characteristics are known, from the household
data. The resulting sample consists of 121 individuals.

For these individuals variables on the level of education,
gender, the level of parental education, family income, family
size and occupation (head of household) can be constructed.
More precise definitions of the variables used are in table 1.

<<< insert table 1 >>>

II.2. Descriptive statistics

Table 2 contains average values for the total sample and for
the subsamples of those individuals who did not continue
education after compulsory secondary education (ED=0) and of
those individuals who went into higher education (= tertiary
education or university and non university education) after
completing secondary school (ED=1).

In this sample 51.2 percent of individuals continued into
higher education, which corresponds to the current average
rate of participation of about 50 percent. Average family

income in this sample is rather high. Closer inspection of the data reveals that in almost all families (98 percent) both parents participate in the labor market. As female labor force participation in Belgium is close to 39 percent, the sample is not typical in this respect.

About 30 percent of all parents have a higher education degree, with a slightly higher educational attainment for mothers (31.4 percent with higher education) than fathers (28.1 percent). Family size, gender composition and professional composition are not significantly different from average values for Belgium.

<<< insert table 2 >>>

Comparing average values between subsamples of those not continuing school (ED=0) and those continuing into higher education reveals some significant differences. First, significantly more females continue their education than males (z=3.24, p<.0007 [2]). This effect of gender is rather unexpected. Second, in the group continuing education average family income is significantly higher viz. on average about 12 percent (z=3.31, p<.0005). Third, parental educational attainment in the group continuing into higher education is more than double the level in the non-continuing group. The most outspoken difference is in the level of education of the mother. The difference in educational levels of father and mother between both groups is statistically significant (father: z=3.47, p<.0003; mother: z=4.52, p<.0000). Fourth, there are some outspoken differences in the professional composition of both groups. In this sample, all children of parents with a professional occupation continue into higher education. Of those continuing education, parents are less likely to be blue collar workers (z=1.68, p=.0465) and self-employed (z=0.93, p=.1762) but more likely to be middle and higher management (z=2.69, p=.0036) and professional (z=1.98, p=.0233).

III. PARENTAL EDUCATION AND EDUCATIONAL ATTAINMENT

Parental education has direct as well as indirect effects on the level of educational attainment of their children.

First, higher parental education indirectly contributes to the demand for education through income. A higher level of parental education leads to higher family earnings, a correlation explained by human capital theory (e.g. Mincer 1974, Becker 1975) or by screening theory (Arrow 1973, Spence 1974). As higher family earnings might overcome capital market imperfections such as credit rationing or increasing capital cost, family income contributes to more education (Kodde & Ritzen 1985).

Second, if higher ability leads to more education, parental education is a proxy variable for parental ability. If ability is (partially) genetically determined, the level of parental education might reflect scholastic ability of children.

A third possible explanation for the relationship between parental education and the demand for education is that educated parents have stronger preferences for education, which they impose on their children.

To appreciate the impact of parental schooling on the demand for education a three step recursive approach is followed. First, educational attainment (ED) is explained by gender (GEN), family income (the logarithm of INC), parental education (EF, educational level father and EM, educatinal level mother) and family size (FS). Second, (logarithm of) family income is explained by parental education (EF and EM) and professional group. The total effect of parental education is estimated by adding direct and indirect effects through family income.

With educational attainment (ED=1 if higher education, ED=0 if

secondary education) as the explanatory variable, the expected
signs on family income and parental education are positive,
whereas the expected sign for family size is negative if the
quantity quality trade-off (Schultz 1974) in expenditures for
children holds.
Although a dummy dependent variable leads to heteroscedastic
residuals so that ordinary least squares estimates not
entirely appropriate, both the linear probability model and
logistic regressions are reported in Table 3.

<<< insert table 3 >>>

The coefficients of income, parental education and family size
have the expected sign. Gender has a statistically significant
effect meaning that males have a significantly lower
probability of continuing into higher education[3] viz. 19% in
the linear probability model and 23% in the logistic
probability model[4].

Parents who both had a higher education substantially raises
chances of children to continue into higher education by 41%
according in the linear model and up to 50% in the logistic
model. Having a father who had higher education raises the
probability of a higher education for children with 13% to
17%., but the marginal effect of education of the mother is
more than double that of the father viz. +28% to +33%. Only
the effect of the educational level of the mother is
statistically significant (5% or better)[5].

Although the standard error of the estimated coefficient for
income is about as large as the estimate[6], the implied income
elasticity for the demand for higher education is +0.24 for
the linear model and +0.32 for the logistic model.

Human capital theory (or screening theory for that matter)
predicts that schooling affects income. So parental education
might increase family income, which has a positive effect on

the demand for education. Least square regression results on (the logarithm of) family income are presented in table 4.

<<< insert table 4 >>>

In the equation (1) two dummy variables were used for professional class i.e. PR=1 if professional occupation and MGT=1 if middle of higher management. As both coefficients are approximately equal and the number of professionals is small, PR and MGT are grouped in one dummy, leading to a slight improvement in adjusted R^2.

Coefficients have the expected sign, although the coefficient of male education is statistically not significant. According to these estimates, a higher education of the male would increase average family income by 7%, whereas higher education of the female would raise family income with 24%[7].

This would bring the indirect (income) effect of parental education on the probability of continuing into higher education at 4% according to the linear probability model and 5% according to the logistic model. At least 3/4 of this additional effect is due to the effect of maternal educational attainment.

Total effect of parental education are obtained by summing direct effects from equations in table 3 and indirect (income) effects derived from equations in table 4.

Similar values of the total effects of parental education are obtained from "reduced form" estimates of educational attainment, as presented in Table 5.

<<< insert table 5 >>>

If the father had higher education, the probability of continuing into higher education is raised with 14% (linear)

up to 18% (logit), and with an additional 32% (linear) up to
38% (logit) if the mother had higher education. If both
parents had higher education, chances for higher education are
46% (linear) up to 56% (logit) better than if none of the
parents had higher education.

IV. CONCLUSIONS AND CAVEATS

From the estimates presented here it is clear that the level
of parental education is an important stimulus for the demand
for higher education in Belgium. The indirect effect of
parental education through higher family income on the demand
for higher education is rather limited. If both parents had
higher education, the family is likely to enjoy a higher
income (+1/3), but the effect of this additional income on the
probability of higher education for children is rather limited
(4 to 5 percent). This indirect (income) effect is small
compared with the direct effect. If both parents had higher
education, children are 40 to 50 percent more likely to
continue into higher education. Another finding is that the
effects of maternal education are at least twice the effects
of the education of the father.

It should be clear that this relatively small sample (n=121)
is not representative for the country. This clearly limits the
general validity of these results. Further research with
larger data sets could verify the robustness of the present
findings.

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VI. APPENDICES

Table 1. Definitions of the variables

Variable	Definition
ED	educational attainment: higher education ED=1, no higher education ED=0
INC	parental income: total net monthly income in (100,000 BF)
GEN	gender: male GEN=1; female GEN=0
EF	education level of father: higher education EF=1; no higher education EF=0
EM	education level of mother: higher education EM=1; no higher education EM=0
FS	family size: number of siblings
BLC	BLC=1 if blue collar, BLC=0 else
MGT	MGT=1 if top and middle management, MGT=0 else
SE	SE=1 if self-employed, SE=0 else
PR	PR=1 if professional occupation (physicians, lawyers), PR=0 else

Table 2. Average values of variables[2]

Variable	total sample	ED=0	ED=1
ED	.512	0	1
INC (100000 BF)	1.322 (.466)	1.179 (.380)	1.459 (.501)
GEN	.562	.712	.419
EF	.281	.136	.419
EM	.314	.119	.500
FS (in numbers)	1.08	.932	1.226
BLC	.223	.288	.161
MGT	.223	.119	.323
SE	.124	.153	.097
PR	.033	.000	.065

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[2] value between brackets is the standard deviation

Table 3. Educational attainment (ED): direct effects

variable	OLS	logit
GEN	-0.186 (0.087)**	-0.907 (0.423)**
lnINC	+0.125 (0.117)	+0.649 (0.620)
EF	+0.134 (0.115)	+0.676 (0.575)
EM	+0.280 (0.120)**	+1.313 (0.603)**
FS	-0.023 (0.048)	-0.106 (0.246)
constant	+0.490 (0.085)**	+0.006 (0.403)
adj. R^2	0.185	
log likelihood	-72.809	-69.283

**significant at 5% level

Table 4. Family income (ln INC)

variable	OLS (1)	OLS (2)
EF	+0.074 (0.084)	+0.070 (0.084)
EM	+0.215 (0.090)**	+0.212 (0.089)**
MGT	+0.274 (0.087)**	–
PR	+0.388 (0.177)**	–
PR+MGT	–	+0.292 (0.082)**
C	+0.048 (0.040)	+0.049 (0.039)
adj. R^2	0.265	0.269

Table 5. Educational attainment (ED): total effects

variable	OLS	logit
EF	+0.142 (0.115)	+0.729 (0.570)
EM	+0.322 (0.114)***	+1.513 (0.572)***
GEN	-0.186 (0.087)**	-0.891 (0.420)**
FS	-0.020 (0.048)	-0.094 (0.244)
constant	+0.498 (0.084)***	+0.047 (0.397)
adj. R²	0.184	-
log likelihood	-73.411	-69.867

** significant at 5% level; *** at 1% level

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2. z = z statistic testing for the difference between the two means; p = probability of a value occurring which is less than z standard deviations from the mean

3. The higher chances for girls in attaining tertiary education can be a result of higher secundary school achievements and more significant effects of the family background. Arleen Leibowitz (Schultz, 1974, p. 444) concluded that the educationlevel of the mother has a more significant effect on girls' participation into higher education.

4. The marginal effect is estimated at sample average viz. $b_j.P(1-P)$ with P the average value of the dependent variable.

5. Note that there is a significant correlation between the educational level of the mother and the educational attainment of the father (r= .5674, t= 9.4102).

6. Parental income is not recorded at the time of educational choice, but at the time the inquiry took place. This bias can be an explanation for the low significance of parental income.

7. Effects are estimated as exp(b)-1

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