Chapter 5

Parents and their resources:

The relative influence of the education and occupation of both parents on the educational attainment of their offspring in the Netherlands between 1939 and 1991

5.1 Introduction

The study of the influence of social background on educational attainment involves a paradox: On the one hand, it is a good thing that parents care about their children and want to help them to attain the best possible educational outcome. On the other hand, this has an undesirable consequence, as it leads to differences in educational outcomes between children from different families that do not correspond with differences in ability, talent, or motivation of the children, because families differ in the amount of social, cultural, and economic resources they have available to help their offspring. One of the tasks of the education system is to alleviate this paradox by being a separate source of resources that can, at least partially, counteract the disadvantage faced by children from parents with fewer resources. The extent to which the education system fails in reaching this goal — that is, the inequality of access in education — has been an important research topic in social stratification and mobility research (Breen and Jonsson, 2005; Hout and DiPrete, 2006), and will also be the subject of this chapter.

In this chapter I will focus on the fact that families have multiple resources available, which are contributed by both parents. In particular, this chapter will study the relative influence of the following resources: occupational status and education of the father and the mother. This will be done by answering the following two questions: First, how important were each of these resources in the Netherlands between 1939 and 1991? Second, did the relative contributions of the education and occupational status of the father and the mother to educational attainment of the offspring change in the Netherlands between 1939 and 1991?

5.2 Parental resources and their effect on the education of the offspring

When describing these parental resources, it is useful to make a distinction between who is contributing and what is being contributed.

The most obvious comparison when describing who is contributing resources is the comparison between the father and the mother, but this may not be the most relevant comparison; other alternatives are: the parent of the same sex as the offspring versus the parent of the other sex, and the parent with the highest education or occupation versus the parent with the lowest education or occupation. Moreover, these possibilities are not mutually exclusive; for instance, the fact that the father has an effect does not preclude the highest educated parent from having an effect as well. So the background variables will be entered in such a way as to allow all these combinations, in a way similar to that used by Korupp et al. (2002).

These different ways in which parents can influence the educational attainment of their offspring correspond to different hypotheses about which parent matters. The first hypothesis is based on what Goldthorpe (1983) called the 'conventional view', which states that the family's class position is determined by the father alone, because of the conventional role model in which the father is in gainful employment and the mother takes care of the children. However, this reasoning can also be used to predict the opposite: the mother's characteristics are more important for the children's educational attainment, because in this view the children are likely to interact more with the mother. Finally, one may argue that it is the resources that one brings into the household that counts, and not whether the person who brings it into the household is male or female, in which case one would expect the effect of the father's and the mother's characteristics to be equal. The second hypothesis is based on what is sometimes called the 'dominance model' (Erikson, 1984), which postulates that it is the parent with the highest status that determines the family's class position. The justification of this model can be based on the 'power model' by McDonald (1977), which assumes that these differences in status represent differences in power within the family, and that children would be influenced by the most powerful parent. However, this type of reasoning can also be turned around to come to the opposite prediction. In this view, power is at least in part derived from the occupational status, and time spent attaining occupational status competes with time spent raising children. So, it is likely that the least powerful parent spends the most time with the children, and thus would have the strongest influence. The third set of hypotheses is based on the sex-role model, which assumes that daughters are primarily oriented towards their mother and sons towards their father because the same-sex parent is perceived by the children to have more rele-

vant information for their situation (Acock and Yang, 1984; Boyd, 1989). In principle this hypothesis could also be reversed — with the father influencing the daughter and the mother influencing the son — but it is less clear why such an arrangement would work.

As well as who is contributing resources, this chapter will also study what is being contributed. In particular, two types of resources that each parent can contribute will be considered: the highest achieved level education of the parent, and the parent's occupational status. Special attention will be paid to families in which the mother has never been in paid employment. Not only will this study try to measure the effect of the mother being a homemaker, but also two possible compensating strategies will be investigated: the father's occupation could become more important when he is the only person in the household who brings in occupational status, while the mother's education could become more important if that is her only source of status.

Finally, this chapter will also test whether the relative contributions of these resources have changed over time. Given the rapid change of the role of women in many aspects of society, it appears likely that the the mother's resources have increased in importance relative to the father's resources. However, a stability in the relative importance of the father's and mother's resources would correspond with the remarkable resilience of differences between men and women in some other areas like the division of household tasks (for example Greenstein, 2000; Gershuny et al., 1994). As a consequence, it is unclear whether to expect changing or constant relative contributions of the father versus the mother. In the case of the comparison between the parental occupational status and the parental education, there is a clear expectation about the change in their relative contributions. Occupational status is more closely related to the economic resources available in a family than parental education, and the influence of the economic resources is expected to decline over time due to two processes (De Graaf and Ganzeboom, 1993; De Graaf et al., 2000). First, economic resources influence educational attainment of the offspring by constraining the possibilities of families with insufficient economic resources. Given the economic growth in the Netherlands during the period being studied, it is expected that fewer and fewer families are constrained in their ability to send their children to school. Second, a deficiency in economic resources can easily be redressed by public policy, through subsidising education or direct subsidies to these families, and these measures have been implemented during the period under study. A similar decline in the influence of the parental education is not expected. As a consequence, the relative contribution of parental education is expected to increase.

5.3   Data and method

5.3.1   Data

The data consists of 11 surveys[1], which collected information from respondents from the Netherlands on the highest achieved level of education of the respondents, the highest achieved level of education and occupational status of their father, and highest achieved level of education and occupational status of their mother. All these surveys have been post-harmonized by Ganzeboom and Treiman (2009) as part of the International Stratification and Mobility File, ISMF. Together, these surveys contain information on approximately 11,500 respondents. This data covers the period between 1939 till 1991, as measured by the year in which the respondent was 12 (at around this age, students in the Netherlands make the most important choice in their educational career).

The highest achieved level of education of the respondents and their fathers and mothers are measured in pseudo-years, using the scale estimated in Chapter 3. The highest achieved level of education of the father and the mother has been rescaled such that it ranges between zero and one. The occupational status of the parents was measured in terms of the International Socio-Economic Index of occupational status [ISEI] (Ganzeboom and Treiman, 2003) and have also been rescaled to range between zero and one. This way, the size of the effect of the parent's education becomes comparable with the size of the effect of the parent's occupation: both measure what happens when the parent moves from the lowest position to the highest position.

In this chapter a mother is considered to have always been a homemaker if there is no information on her occupation. The homemakers are included in the analysis by setting their occupational status to zero, and adding an indicator variable to the model indicating whether or not the mother is a homemaker. The dummy for homemaker measures how much education respondents would have gained or lost if their mother had always been a homemaker rather than having the lowest status job. An interaction between the father's occupation and the homemaker dummy is added to allow the effect of father's occupational status to change when the father is the only person in the household to bring in occupational status. An interaction between the mother's education and the homemaker dummy is also added, to allow the effect of the mother's education to change when the mother's education is her only source of status.

To capture the different ways in which both parents could influence the respondent's education, the following sets of variables are added to the model:

---

[1]These surveys are: net92f, net94h, net95h, net95y, net96, net96y, net98, net98f, net99, net04i, and net06i, where the codes refer to the data references.

- the education and occupation of the father and the mother

- the education and occupation of the parent with the highest education or occupational status, and the education and occupation of the parent with the lowest education or occupation. This means the reference category is the parents when both have the same level of education or occupational status. Occupational statuses are considered to be equal when they differ by less then 10 ISEI points, while education is considered equal if the parents had attained the same educational category.

- the education and occupation of the parent with the same sex as the respondent, which means that the reference category is the parent of the opposite sex as the respondent. In case of female respondents, the occupation of the same-sex parent could be homemaker, so an interaction between the sex of the respondent and the homemaker indicator variable is also part of this set of variables.

So the main effects of the education of the father and the mother represent the effects when the father and the mother have the same education, and when the respondent has the opposite sex to the parent. Similarly the main effects of the occupational status of the father and the mother are the effects when the difference in occupational status between the father and the mother is less than 10 ISEI points and when the respondent has the opposite sex to the parent. All the other education and occupation variables measure the difference in effects with these reference categories.

Time is measured by the year in which the respondent was 12. This is seen as the best approximation of when any effect occurs because it is at approximately that age that students are streamed in the different tracks, which will have major consequences for their subsequent educational career. The unit of the time variable is decades since 1940. To allow for a non-linear trend, this variable is entered in the model as restricted cubic spline (Harrell, 2001) with knots at 1950, 1970, and 1980 using the `mkspline` command in Stata (StataCorp, 2007).

5.3.2 Method

The second research question requires a special model to test whether the relative impact of the different parental resources on the offspring's education changed over time. This is done by estimating a regression with parametricaly weighted explanatory variables (Yamaguchi, 2002). This model represents the null hypothesis that the effects of the parental resources may have changed over time, but that the relative impact of each of these resources has remained constant. The method will be discussed using the following simplified example: The respondent's education (`ed`) is influenced by

parental education (ped) and parental occupational status (pocc), and these effects are allowed to change over time (t), as in equation (5.1).

$$\text{ed} = \beta_0 + \beta_2 \text{t} + (1 + \beta_3 \text{t}) \left(\gamma_1 \text{ped} + \gamma_2 \text{pocc} \right) + \varepsilon \tag{5.1}$$

According to this equation, the effect of ped is $(1 + \beta_3 \text{t})\gamma_1$ and the effect of pocc is $(1 + \beta_3 \text{t})\gamma_2$. So, the effects of these variables are allowed to change over time, but the relative size of these effects, $\frac{(1+\beta_3 \text{t})\gamma_1}{(1+\beta_3 \text{t})\gamma_2} = \frac{\gamma_1}{\gamma_2}$, is constrained to remain constant over time. This is a so-called proportionality constraint.

The model in equation (5.1) can be estimated with maximum likelihood if we make the standard assumption that error term (ε) is normally distributed with mean 0 and a constant variance. If these assumptions are made, the alternative hypothesis, which relaxes the proportionality constraint, would then be represented by a normal linear regression with interactions between t and pedd and t and pocc. The test of the null hypothesis that the relative impact of these resources has remained constant over time is then the likelihood ratio test comparing these two models. This is implemented in Stata (StataCorp, 2007) as the `propcnsreg` package (Buis, 2007a), which is documented in Technical Materials I.

5.4   Results

The analysis started with a test of whether the relative sizes of the influence of different parental resources have remained constant. This is done by testing the model with constant relative effects of all parental resources against a model where the effects of all resources are allowed to change separately over time and between men and women, using the likelihood ratio test[2]. This results in an χ^2 value of 51.56, with 65 degrees of freedom, leading to a p-value of 0.886, which means that the null hypothesis of a constant relative effects cannot be rejected. The resulting model is shown as model 1 in Table 5.1. Table 5.1 consists of three main panels, labeled 'constrained', 'trend', and 'main'. The parameter estimates in the panel labeled 'constrained' refer to the effect of the parental resources on the respondent's highest attained level of education for men (model 1) or men and women (model 2) from the cohort that was 12 in 1940. The panel labeled 'trend' displays the change in effect of the parental resource variables over time and between men and women (model 1) or only over time (model 2). The panel labeled 'main' captures the effects of other variables that influence educational background. This panel contains the main effects of the variables specified in the panel 'trend', but could also have contained other control variables.

---

[2]The model with the proportionality constraint is presented as model 1 in Table 5.1, while the parameter estimates of the unconstrained model are not shown due to the large number of parameters in this model.

Table 5.1: Parameter estimates of models explaining highest achieved level of education

			Model 1		Model 2	
			b	se	b	se
constrained	occupation	father	2.571	(0.52)	3.437[a]	(0.26)
		mother	3.442	(0.53)	3.437[a]	(0.26)
		highest	-0.013	(0.46)		
		lowest	0.124	(0.64)		
		same sex	0.477	(0.45)		
		homemaker	-0.746	(0.24)	-0.625	(0.21)
		homeXfemale	0.465	(0.23)		
		homeXfather	1.367	(0.54)	1.955	(0.44)
	education	father	2.421	(0.36)	2.470[b]	(0.20)
		mother	2.133	(0.38)	2.470[b]	(0.20)
		highest	1.042	(0.26)	1.246	(0.23)
		lowest	-0.983	(0.41)	-1.135	(0.41)
		same sex	0.081	(0.35)		
		homeXmother	1.006	(0.45)	0.945	(0.46)
trend	$year_1$		-0.144	(0.03)	-0.158	(0.02)
	$year_2$		0.075	(0.03)	0.078	(0.02)
	female		0.125	(0.11)		
	femaleX$year_1$		-0.050	(0.06)		
	femaleX$year_2$		0.017	(0.05)		
	constant		1.000	.	1.000	.
main	$year_1$		0.617	(0.14)	0.681	(0.12)
	$year_2$		-0.429	(0.15)	-0.437	(0.12)
	female		-2.148	(0.40)	-1.684	(0.23)
	femaleX$year_1$		0.576	(0.21)	0.415	(0.12)
	femaleX$year_2$		-0.099	(0.22)	-0.074	(0.12)
	constant		7.945	(0.29)	7.790	(0.25)
log likelihood			-29951.4		-29959.2	

[a,b] entries with the same superscript are constrained to be equal.

Table 5.2: Constraints on the effects of the parental resources (Wald tests)

Null hypothesis	occupation			education		
	χ^2	df	p	χ^2	df	p
female = 0	24.88	1	0.000	31.97	1	0.000
father = mother	1.64	1	0.201	0.43	1	0.511
highest = same = lowest	0.11	2	0.947	16.22	2	0.000
same sex = different sex	4.24	2	0.120	0.05	1	0.830

The analysis continued with a description of the effects of the parental resources. These effects are shown in the panel labeled 'constrained' in Table 5.1. This description can be split into two parts. The first part has to do with which parent contributes the resource: only the father, the father and the mother, the parent with the highest and the lowest occupational status or education, and/or the parent with the same and the opposite sex. Model 1 simultaneously allows all these effects. These effects were tested and these tests are reported in Table 5.2. The first row in this table reports the test that only the father contributes, this is the conventional hypothesis. This hypothesis is rejected for both the parental education and the parental occupational status. The second row tests whether there is a difference in effect between the occupational status and the education of the father and the occupational status and education of the mother. The hypothesis that the effects are the same for both fathers and mothers cannot be rejected for parents' occupation nor for parents' education. The third row tests the dominance hypothesis: whether the effect of the parent with the highest education or occupational status differs from the effects when both parents have the same occupational status or education, and whether the effects of the parents when both parents have the same education or occupational status differs from the effect of the parent with the lowest education or occupational status. The hypothesis that these effects are the same must be rejected for the education of the parents, but this is not the case for the parents' occupational status, indicating support for the dominance hypothesis for parental education but not for parental occupational status. Finally, the last row tests the sex role hypothesis: whether the effect of the mother on the daughter and the father on the son is different from the effect of the mother on the son and the father on the daughter[3]. The hypothesis of no difference in effect of the parent with the same sex as the respondent and the parent with the opposite sex as the respondent could not be rejected, neither for the effect of parental education nor for the effect of parental occupational status. This provides evidence against the sex-role hypothesis.

---

[3]Notice that the effect of the occupation of the parent with the same sex as the respondent is captured by two variables, the occupational status of the same sex parent and the interaction between homemaker and female. So this is a 2 degree of freedom test for occupation and a 1 degree of freedom test for education.
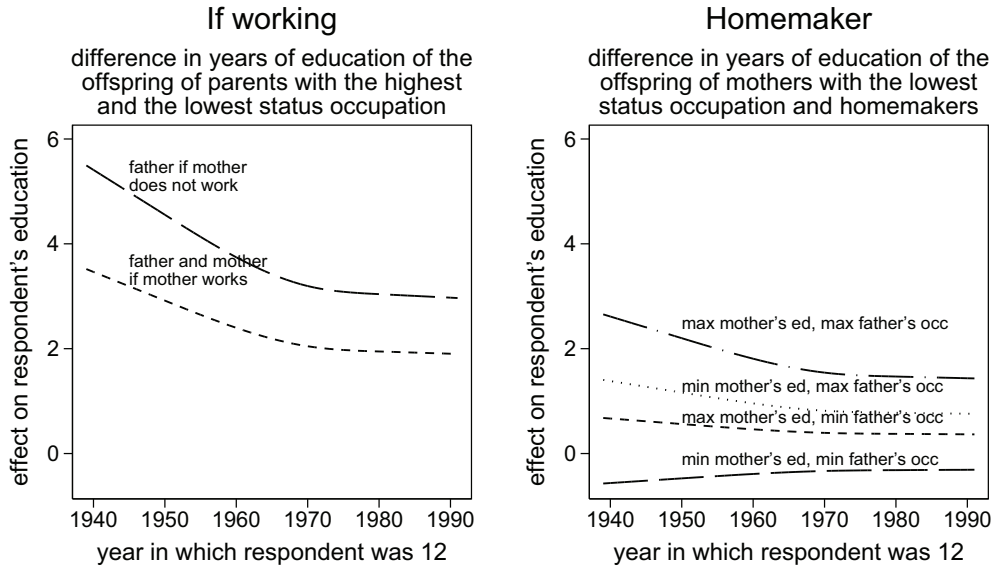
The second part of the description of the effect of parental resources has to do with which resource contributes most. Two types of resources have been distinguished: the occupational status of the parent, and the education of the parents. Of particular interest in this case are the parameters of father and mother in the first panel, which represents the effects of the father's and the mother's occupation or education in 1940 when they have the same occupational status or education as their partner, are not of the same sex as the sex of their offspring, and the mother has worked. It indicates that the effect of parental occupational status is stronger than the effect of parental education. Within model 1 this difference is not significant ($\chi^2(2) = 3.08$, p = .214), but within model 2 parental occupational status has a significantly stronger effect than parental education ($\chi^2(1) = 8.54$, p = .004).

Model 1 can be further simplified by forcing the effects of the resources to be the same for male and female respondents, that is constraining the effects of female, femaleXyear$_1$, and femaleXyear$_2$ in the second panel of Table 5.1 to be zero. All these constraints together result in the simplified model 2 in Table 5.1. The parameters can be interpreted in the following way: Within the sub-panel labeled 'occupation', the parameters for father and mother are the effects of the father's and mother's occupational status on the respondent's education in 1940 if the mother has not always been a homemaker. It shows that if a parent moves from the lowest to highest status occupation, the education of the offspring is expected to increase by 3.5 pseudo-years. The effect of the variable homemaker indicates the difference in pseudo-years of education between respondents whose mother has always been a homemaker and whose mother had a job with the lowest status. So the offspring is likely to attain more education when the mother has had the lowest status job as apposed to being a homemaker. The effect of homeXfather shows that when the mother has always been a homemaker, the father's occupational status increases by about 2.0 pseudo-years. This means that the negative effect of the mother being a homemaker can be decreased or even reversed by an increase in the father's occupational status. The sub-panel labeled 'education' shows that increasing a parent's education from the lowest to the highest level would result in an increase in the offspring's education of 2.5 pseudo-years if the father and the mother have the same education, and that this effect increases by 1.2 pseudo-years if the parent is the highest educated parent, and decreases by 1.1 pseudo-years if the parent is the lowest educated parent. The effect of the interaction term homeXmother shows that if the mother has always been a homemaker, the effect of her education increases by about a pseudo-year. As a consequence, the effect of the mother being a homemaker can become less negative or even positive when the mother has a higher level of education.
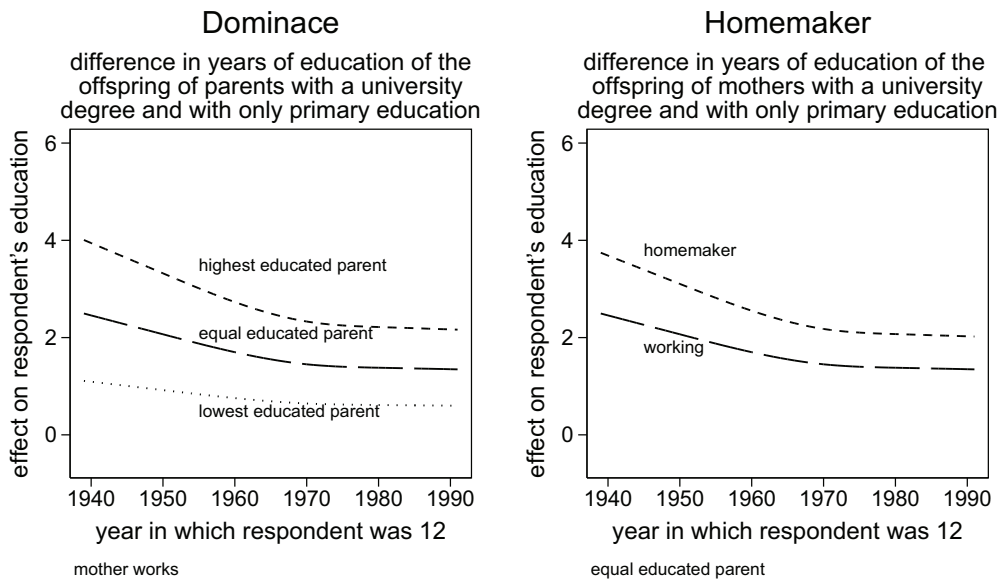
These effects are also represented in Figure 5.1, together with how they changed over time. Due to the proportionality constraint, the shape of the trend is the same for

Figure 5.1: Effects of parental resources on respondent's education

Effect of occupational status

If working

difference in years of education of the
offspring of parents with the highest
and the lowest status occupation

Homemaker

difference in years of education of the
offspring of mothers with the lowest
status occupation and homemakers

Effect of education

Dominace

difference in years of education of the
offspring of parents with a university
degree and with only primary education

Homemaker

difference in years of education of the
offspring of mothers with a university
degree and with only primary education

all family background variables. It shows that the effects decrease over time, but that this decrease slows down. The time trend is in Table 5.1 represented by the restricted cubic spline terms $year_1$ and $year_2$, which were parameterized in such a way that if $year_2$ is not significant, the trend is not significantly different from a linear trend, so Table 5.1 shows that this slowing down of the trend is statistically significant.

5.5 Conclusion

This chapter started with the notion that parents have multiple resources available with which they can help their offspring. This chapter focussed on two of these: parental education and parental occupational status. Two questions were asked about this: First, how important are each of these resources in the Netherlands between 1939 and 1991? Second, did the relative contributions of the education and occupational status of the father and the mother to educational attainment of the offspring change in the Netherlands between 1939 and 1991?

The first question was split up into two parts:

1. which parent contributes most to the educational attainment of the offspring:

   - the father or the mother, or

   - the parent with highest or lowest education or occupation, or

   - the parent with the same sex as the respondent or the opposite sex, or

   - any combination of these three?

2. what parental resource contributes most to the educational attainment of the offspring: their education or occupational status?

The analysis showed that as long as the mother works, it does not matter who brings in the resources. The only exception is that the education of the highest educated parent has a larger effect than the effect of education if both parents have the same level of education, which in turn is larger than the effect of the lowest educated parent. Otherwise, the effects of the father's characteristics are the same as the effects of the mother's characteristics, there is no difference in the effects of the education and occupational status of the parent with the same sex as the respondent and the parent with the opposite sex to the respondent, and there is no difference in the effects of the parent with the highest, same, and lowest occupational status. Having a mother who has always been a homemaker decreases the respondent's expected level of education compared to respondents from mothers with the lowest status job. However, it also increases the effects of father's occupational status and of mother's education.

The negative effect of the mother being a homemaker on the offspring's education becomes positive when the mother is highly educated and/or the father has a high status job. The parent's occupational status appears to have a stronger influence than the parent's education. This could be due to how parental education and occupation were standardized. Both were standardized such that their effect represents the effect of moving from a parent with the lowest education/occupational status to a parent with the highest education/occupational status. Because there are only a limited number of educational categories, the distribution of education is more restricted than the distribution of occupational status. As a consequence, the difference between the highest and lowest educational category is likely to be smaller than the difference between the highest and lowest occupational status. The fact that the unit of education implies a smaller step than the unit in occupational status could (in part) explain the difference in effect.

The expected answer to the second question was that over time the resources of the mother could have become more important due to the changing role of women in Dutch society during this period. In addition, the impact of occupational status was expected to decline because occupational status was expected to be more closely related to economic resources, and economic growth and government policy meant that lack of economic resources in a family has become less of a constraint for attaining education. However, no such changes were found in this study. A possible reason for this could be lack of statistical power. The test of this hypothesis was a test that the effects of all the resources on the offspring's education changed over time in such a way that the relative differences in effect remained constant, which is a proportionality constraint. This is a rather subtle constraint, and a test of this constraint is thus a test with a rather low statistical power.

The two main findings of this chapter are that it matters relatively little which parent brings in the resources as long as the mother works, and that no evidence was found that the relative contributions of different family resources have changed over time. The lack of evidence for a change in the relative contributions was not expected, but it has a fortuitous practical consequence for social stratification and mobility research: a significant part of this literature has used only a single indicator of parental resources to estimate the effect of family background on educational attainment of the offspring, most commonly the father's occupational status. A negative trend in the effect of father's occupational status would in that case be open to a number of interpretations: either the educational system has become more open to people from different backgrounds, or father's occupational status has become an increasingly bad proxy for family background as fathers have lost influence relative to mothers, or father's occupational status may have become less important but other family background characteristics, like education, may have remained constant or even increased

in importance. However, the first interpretation seems to be the correct one, as no changes in the relative effects have been found. So, the use of a single indicator for family background is still a reasonable strategy, especially when only one indicator is present in the data.